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Department of Economics

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TABLE OF CONTENTS

PART I

ADAMOVA MARKETA, SOUKUPOVA NIKOLA, DOSTALOVA ELISKA, KRNINSKA RUZENA MODERN TRENDS IN HUMAN RESOURCE MANAGEMENT.....	1
ALPATOV E. GENNADY, NOVIKOV V. ANDREY GLOBALIZATION AND EMIGRATION OF RUSSIAN SCIENTISTS	7
ANTALOVA MARIA THE IMPORTANCE OF GLOBALIZATION AND HUMAN CAPITAL FOR ECONOMIC GROWTH	14
BALCEROWICZ-SZKUTNIK MARIA THE IMPACT OF GLOBALISATION PROCESSES ON CHANGES IN THE CONSUMPTION MODEL - AN ATTEMPT TO EVALUATE.....	22
BENCIKOVA DANA, MALA DENISA, DADO JAROSLAV DEVELOPING INTERCULTURAL COMPETENCE OF GLOBAL MANAGERS AND GLOBAL ENTERPRISES	30
BLAZEKOVA OLGA, VOJTEKOVA MARIA INCREASING OF EMPLOYMENT RATE AS AN IMPORTANT GLOBAL OBJECTIVE.....	38
BLYZNIUK VIKTORIIA, SHUMSKA SVITLANA MACROECONOMIC AND GLOBAL EFFECTS OF EXPANDING THE INFORMAL SEGMENT OF LABOR MARKET: THE CASE OF UKRAINE	46
BODISLAV D. ALEXANDRU, POPESCU LOREDANA, ALPOPI CRISTINA MANAGERIAL INSTRUMENTS FOR SUSTAINABLE BUSINESS ADMINISTRATION	54
BOTIK MILAN GLOBALIZATION OF SOCIETY AND CIRCULAR ECONOMY	62
BOTLIK JOSEF, BOTLIKOVA MILENA GLOBALIZATION AND MIGRATION CENTERS DEVELOPMENT WITH INTENSIVE EFFECT ON STRUCTURE OF THE CZECH REPUBLIC POPULATION - FOREIGNERS STAYING MORE THAN 12 MONTHS.....	70
DENGOV V. VIKTOR, TULYAKOVA R. IRINA, GREGOVA ELENA MILITARY-TECHNICAL COOPERATION OF RUSSIA IN THE CONTEXT OF GLOBALIZATION: EXPERIENCE OF COOPERATION WITH CHINA	78
DURISOVA MARIA, CHODASOVA ZUZANA, TOKARCIKOVA EMESE IMPORTANCE OF VALUE MANAGEMENT TOOLS IN A GLOBALLY OPERATING ENTERPRISE.....	87
FABINYJOVA SVETLANA THE IMPACT OF GLOBALIZATION ON WAGE POLICY	95

GARBAROVA MIRIAM, HOLLA BACHANOVA PETRA SHARING ECONOMY AS A NEW FORM OF BUSINESS IN GLOBAL ENVIRONMENT.....	103
HADAS-DYDUCH MONIKA EMPIRICAL ANALYSIS OF CHINA’S CONNECTIONS WITH SELECTED COUNTRIES IN THE CONTEXT OF GLOBALIZATION AND INTEGRATION	111
HANSUT LUKAS, DAVID ANDREJ PIRACY IN MARITIME TRANSPORT AND ITS IMPACT ON THE GLOBAL WORLD MARKET	119
HEINZ KRZYSTYNA, CHYLKOVA MARTINA SELF-EVALUATION OF STUDENTS’ PROGRESS WITHIN THE ECMT ERASMUS+ IP PROGRAMME DEVELOPING ENTREPRENEURIAL AND COMMUNICATIVE SKILLS	127
HREHOVA DANIELA GLOBAL ENTREPRENEUR - ETHICAL ENTREPRENEUR	136
CHLEBIKOVA DARINA, DURANA PAVOL INFLUENCE OF GLOBALIZATION ON WORK RELATIONSHIPS	144
JANOSOVA DENISA, HULAJOVA LUBICA IMPACT OF GLOBALISATION PROCESS ON CIRCULAR ECONOMY	151
JERMOLAJEVA JELENA, BOGDANOVA TATIANA, SILCHENKOVA SVETLANA HUMAN RESOURCES IN SCHOOL EDUCATION: TEACHER’S PROFESSIONALLY DETERMINED BEHAVIOR IN THE GLOBALIZATION ERA.....	158
JEZOVA DANIELA GDPR – RESULT OF GLOBALIZATION?.....	167
KAMASHEVA ANASTASIA, YAGUDIN RAMIL, GILYAZOV TIMUR THE STATE OF HEALTH AS A BARRIER TO ENTRY AND DEPARTURE OF MIGRANTS: THE IMPACT OF GLOBALIZATION	175
KAMPOVA KATARINA, MAKKA KATARINA, ZVARIKOVA KATARINA CRISIS MANAGEMENT AS A TOOL FOR THE CONCEPT OF SOCIALLY RESPONSIBLE BUSINESS IN GLOBALIZING WORLD.....	182
KEDZIOR-LASKOWSKA MALGORZATA IMPACT OF INTERNATIONALIZATION PROCESS ON SERVICE QUALITY – PERSPECTIVE OF POLISH CARRIERS	190
KOKOVIKHIN ALEXANDR IMPACT OF INTERNATIONAL LABOUR MOBILITY ON HUMAN RESOURCE MANAGEMENT IN REGIONS OF RUSSIAN FEDERATION	198
KOTYNKOVA MAGDALENA SOCIAL PROTECTION EXPENDITURE IN THE LIGHT OF THE GRADUAL CHANGES IN THE EUROPEAN LABOUR MARKET	206
KOVACIKOVA HANA, BLAZO ONDREJ ENTREPRENEURS’ LEGAL RESPONSIBILITY FOR HUMAN RIGHTS OBSERVANCE IN GLOBALIZED BUSINESS WORLD	214

KUCHARCIKOVA ALZBETA COMPARISON OF VIEWS ON THE EVALUATION OF PROGRAMMES OF ACTIVE LABOUR MARKET POLICY	222
KUSA ALENA, PIATROV IGOR GLOBAL TRENDS IN MARKETING COMMUNICATION OF THE BRANDS APPLYING THE PRINCIPLES OF CIRCULAR ECONOMY	230
KUVALDIN B. VICTOR, MOYSA I. NATALIA SOCIO-ECONOMIC INTEGRATION OF IMMIGRANTS INTO EUROPEAN SOCIETY (STUDY OF ETHNIC MINORITIES OF GREAT BRITAIN)	238
LANCARIC DRAHOSLAV, SAVOV RADOVAN, KOZAKOVA JANA WORK FORCE DIVERSITY AND DIVERSITY MANAGEMENT IN THE SLOVAK REPUBLIC IN GLOBALIZATION ERA	243
LAZAROIU GEORGE, IONESCU LUMINITA, MEILA ALEXANDRA DANA, BOGDAN CURTEANU ADRIAN, BOGDAN ALEXANDRU PRECARIOUS WORK OF MIGRANTS IN GLOBAL CITIES. AN EMPIRICAL INVESTIGATION	251
MOHIRTA IONEL, NEGURITA OCTAV, GRECU GHEORGHE, DUMITRESCU OANA CATALINA, DRUGAU-CONSTANTIN ANDREEA AUTOMATION, GLOBAL LABOR MARKET, AND OUTPUT: DO PRODUCTIVITY- IMPROVING TECHNOLOGIES RAISE OVERALL WORK DEMAND?	257
NEGULESCU IULIAN, GRECU IULIA, NEGURITA OCTAV, SPONTE (PISTALU) MARIA, DRUGAU-CONSTANTIN ANDREEA GLOBAL EMPLOYMENT PRECARIOUSNESS: THE PREDOMINANCE OF LOW-PAID JOBS ENTAILING FLEXIBLE WORKING CONTRACTS AND RELATED REGULATORY CHALLENGES.....	263
NEUMANN PAVEL GLOBALIZATION AND ECONOMY PROTECTION IN THE U.S. TRADE POLICY DEVELOPMENT	269
NOVIK ALINA, LUKIANENKO IRYNA DYNAMIC MODELLING OF MIGRATION FLOWS IN UKRAINE IN THE CONTEXT OF GLOBALIZATION	276
OSTOJ IZABELA PAID ANNUAL LEAVE AS A FACTOR OF DIFFERENTIATION OF WORKING CONDITIONS IN THE GLOBAL SCALE.....	282
PALIY G. IRINA, PAVLOVA L. HELEN INTERNATIONAL LAW AND GLOBALIZATION	290
POPESCU H. GHEORGHE, ANDRONICEANU ARMENIA, MITEA DANA RALUCA ELENA, CIURLAU FLORIN CRISTIAN, ANDREI JEAN-VASILE SERVICE-FOCUSED CHARACTER OF THE SHARING ECONOMY: PLATFORM COOPERATIVISM, NON-STANDARD LABOR, AND FLEXIBLE WORKING ARRANGEMENTS	297

PRIHODOVA KATERINA, HUB MILOSLAV IMPACT OF GLOBAL CHANGES ON THE USE OF MODERN TECHNOLOGIES TO ENSURE THE STATE SECURITY.....	303
RADZIK PAULINA, BALCEROWICZ-SZKUTNIK MARIA LABOUR MARKET RESPONSE TO GLOBALIZATION IN SELECTED COUNTRIES OF THE EUROPEAN UNION.....	310
RIEVAJOVA EVA, PRIVARA ANDREJ INTERNATIONAL MIGRATION IN CONTEXT OF ITS INFLUENCE ON DEMOGRAPHIC DEVELOPMENT IN THE SLOVAK REPUBLIC	318
ROLENC JAN MARTIN REFLECTION OF GLOBALIZATION IN THE KEY FOREIGN-POLICY DOCUMENTS OF THE CZECH REPUBLIC.....	326
ROSPUTINSKY PETER MEMBERSHIP IN INTERNATIONAL ORGANIZATIONS WITH RESPECT TO THE CREATION OF THE SOFT POWER OF THE SLOVAK REPUBLIC.....	334
SEDLIACIKOVA MARIANA, SATANOVA ANNA, MORESOVA MARIA HOW EMPLOYEES PERCEIVE CONTROLLING IN THE CONTEXT OF GLOBALIZATION?.....	342
SEEMANN PETER, STOFKOVA ZUZANA, BINASOVA VLADIMIRA FUTURE OF GLOBALIZATION AND ITS IMPLICATIONS FOR WORLD BUSINESS AND MANAGEMENT EDUCATION	350
SEMES MIROSLAV SOCIAL CONSEQUENCES OF GLOBALIZATION	358
SERENCES ROMAN, GALIK JOZEF, HOLUBEK IVAN COMMODITY EFFICIENCY OF FOOD – PROCESSING INDUSTRY	366
SOJKA ELZBIETA FOREIGN WORKERS ON POLISH LABOUR MARKET IN CONDITIONS OF GLOBALISATION OF ECONOMIC RELATIONS	374
STRENTZEROVA MARIANA IMPACT OF GLOBALIZATION ON THE EMPLOYEE MOTIVATION – BENEFITS SATISFYING THE EMPLOYEES’ REQUIREMENTS	382
SVEC ROMAN, SLABA MARIE, MARTSKOVA PETRA DIFFERENCE IN GUESTS’ PREFERENCES OF GLOBALLY OPERATING AND LOCAL ACCOMMODATION FACILITIES	390
SYCHEVA V. EVELINA, BUDAGOV S. ARTUR ANTI-CRISIS MANAGEMENT UNDER CONDITIONS OF GLOBALIZATION	398
TERESHINA NATALIA, BOGDANOVA TATIANA, PODSORIN VICTOR, DANILINA MARIA MODERN PROBLEMS OF LABOUR PRODUCTIVITY INCREASE IN RUSSIAN TRANSPORT COMPANIES DUE TO GLOBALIZATION.....	405

TESAROVA VENDULA CONSEQUENCES OF ECONOMIC GROWTH SUPPORT IN SMALL OPEN ECONOMY IN A GLOBALIZED WORLD	413
TKOCZ-WOLNY KATARZYNA, WSZELAKI ANETA INFLUENCE OF INTERNATIONAL LAW ON THE DISCLOSURE OF SOCIAL AND EMPLOYEES' ISSUES IN NON-FINANCIAL REPORTS OF SELECTED PUBLIC INTEREST ENTITIES IN POLAND	421
TRELOVA SILVIA, KULHANEK RASTISLAV MACROECONOMIC IMPACT OF GLOBALIZATION ON LABOUR MARKET	429
VARVAZOVSKA PAVLA, KUCIRKOVA LENKA REGIONAL SOCIAL BUSINESS IN GLOBALIZATION ERA	437
VRTANA DAVID MULTICULTURAL COMPETENCE AND MOTIVATION OF EMPLOYEES	445
WARZECHA KATARZYNA IMPLEMENTATION LEVEL OF EUROPE 2020 STRATEGY TARGETS AS REGARDS LABOR MARKET IN EUROPEAN UNION COUNTRIES.....	453
ZAGORA-JONSZTA URSZULA STATE IN THE ERA OF GLOBALIZATION	461
ZHULEGA A. IRINA, GAGULINA L. NATALYA, SAMOYLOV V. ALEXANDR SUSTAINABLE DEVELOPMENT UNDER CONDITIONS OF THE SANCTION WORLD ORDER	468
PART II	
BOHINSKA ALEXANDRA ROLE OF A COMPLIANCE PROGRAM IN AN ORGANIZATION	476
DZIAN MICHAL, PALUS HUBERT, SUPIN MIKULAS, PAROBEK JAN THE EU POSITION IN THE GLOBAL TIMBER TRADE ENVIRONMENT.....	484
FALAT LUKAS, HOLUBCIK MARTIN ANALYSIS OF THE STRATEGY OF A SELECTED FIRM FROM THE GAME THEORY POINT OF VIEW.....	492
FURA BARBARA INTERACTIONS BETWEEN ENVIRONMENTAL INITIATIVES OF COMPANIES AND THEIR FACTORS OF COMPETITIVENESS.....	501
GAJANOVA LUBICA, MORAVCIKOVA DOMINIKA, NADANYIOVA MARGARETA ANALYSIS OF SLOVAK AND CZECH CONSUMERS MANNERS FROM ASPECT OF BEHAVIOURAL ECONOMICS ON GLOBAL DIMENSION	509
GALIERIKOVA ANDREA, SOSEDOVA JARMILA INLAND WATERWAY TRANSPORTATION OF DANGEROUS GOODS: RISK ASSESSMENT AND DECISION-MAKING STRATEGIES	517

GRESAKOVA EMILIA, CHLEBIKOVA DARINA THE NEED OF SELF-MANAGEMENT TO QUALIFY MANAGERS IN GLOBAL ENVIRONMENT.....	524
GROFCIKOVA JANKA, IZAKOVA KATARINA CORPORATE GOVERNANCE AND FIRM PERFORMANCE IN SLOVAKIA	532
HES ALES GLOBAL ASPECTS OF INTERCULTURAL COMMUNICATION IN CONTEMPORARY SOCIETY	540
HORAK JAKUB, MACHOVA VERONIKA BUSINESS ENTERPRISES AND GENERATORS OF THEIR VALUE.....	547
CHAROCHKINA EKATERINA, SOGACHEVA OLGA, BELOUSOVA LARISA ROLE OF SMALL INNOVATIVE BUSINESS IN GLOBAL ECONOMY	555
CHRUZIK KATARZYNA, WACHNIK RAFAL PRACTICAL APPLICATION OF THE PROCESS OF EVALUATING THE SIGNIFICANCE OF A CHANGE AND RISK MANAGEMENT	561
JAMBAL TSOLMON, LIZBETINOVA LENKA, STUCHLY JAROSLAV ATTITUDES OF SOUTH BOHEMIAN CUSTOMERS TO FORMS AND SET LOYALTY PROGRAM CONDITIONS.....	570
JANOSKOVA KATARINA, KRAL PAVOL A COMPREHENSIVE LITERATURE REVIEW OF INTERNATIONAL BRAND VALUATION METHODS	577
KARKALIKOVA MARTA, LACKOVA ALICA IDENTIFYING BENEFITS OF A MANAGEMENT SYSTEM IN THE CONTEXT OF GLOBALIZATION	584
KICOVA EVA TRENDS OF FACILITY MANAGEMENT IN GLOBALIZATION PROCESS IN SLOVAKIA	592
KLEMENTOVA JARMILA, STROKOVA ZUZANA SOCIO-ECONOMIC FACTORS OF GLOBALIZATION TRENDS IN THE SERVICE QUALITY MANAGEMENT	600
KLIESTIKOVA JANA, KOVACOVA MARIA, RADISIC MLADEN CSR AS AN INNOVATIVE CONCEPT OF SME'S BRAND MANAGEMENT IN GLOBALISED MARKET CONDITIONS.....	608
KOHLHOFFER-MIZSER CSILLA MAKING OUR OWN DECISIONS–MANAGEMENT IN CONFLICT	616
KOVACOVA MARIA, KLIESTIKOVA JANA, BOROCKI JELENA EMPLOYER BRANDING IN SCOPE OF GLOBAL CHALLENGES	624
KOZENA MARCELA, BRODSKY MARTIN ANALYSIS OF FUNCTIONING OF THE REGIONAL BRAND VYSOČINA REGIONAL PRODUCT IN THE GLOBALIZED ENVIRONMENT.....	632
KRAL PAVOL, JANOSKOVA KATARINA BRAND PORTFOLIO MANAGEMENT AND STRATEGY	640

KRNINSKA RUZENA, ADAMOVA MARKETKA, ZIDOVA NIKOLA, SKOPEC ONDREJ	
CORPORATE CULTURE AS A MOTIVATING FACTOR	648
KRYLOV SERGEY	
STRATEGIC CUSTOMER ANALYSIS BASED ON BALANCED SCORECARD IN PRESENT-DAY GLOBAL ECONOMIC ENVIRONMENT.....	656
LININA IVETA, VEVERE VELGA, ZVIRGZDINA ROSITA	
IMPLEMENTATION OF CUSTOMER RELATIONSHIP MANAGEMENT IN RETAIL TRADE ENTERPRISES OF THE BALTIC COUNTRIES.....	664
LIZBETINOVA LENKA, JAMBAL TSOLMON, STUCHLY JAROSLAV	
LOYALTY PROGRAMS FROM A CUSTOMER'S PERSPECTIVE IN THE REGION OF SOUTH BOHEMIA.....	673
LOUCANOVA ERIKA, OLSIAKOVA MIRIAM, DRLICKOVA EVA	
REGIONAL MARKETING AND BUSSINES IN CONTEXT „ACT LOCALLY, THINK GLOBALLY“	681
MAJERNIK MILAN, DANESHJO NAQIB, SANCIOVA GABRIELA, DUDAS PAJERSKA ERIKA, STOFKOVA ZUZANA	
IMPLEMENTATION OF GLOBALIZED TOOLS OF GREEN ECONOMY IN BUSINESS PRACTICE IN SLOVAKIA	688
MALIKOVA IVETA	
IMPACT OF GLOBALIZATION ON CONSUMER BUYING BEHAVIOR.....	699
MASAR MATEJ, HUDAKOVA MARIA, LUSKOVA MARIA	
PROJECT RISK MANAGEMENT IN GLOBAL ENVIRONMENT	707
MAZANEC JAROSLAV, BARTOSOVA VIERA	
FACILITY MANAGEMENT IN INTERNATIONAL CONTEXT	715
MICUROVA SKOLKOVA SLAVOMIRA, PALIDEROVA MARTINA	
THE IMPACT OF GLOBALIZATION ON THE LEGAL ORDER OF THE SLOVAK REPUBLIC.....	723
MILIC BERAN IVONA, KRZELJ-COLOVIC ZORICA	
GLOBAL TREND IN SUPPLY OF SMALL AND MEDIUM-SIZED HOTEL ENTERPRISES	730
MILICHOVSKY FRANTISEK, MRACEK PAVEL, MUCHA MARTIN	
KNOWLEDGE OF OUTDOOR BRANDS IN MARKETING COMMUNICATION CAMPAIGNS ON THE WAY OF GETTING NEW CUSTOMERS IN CONDITIONS OF GLOBAL MARKET	738
MINAROVA MARTINA, BENCIKOVA DANA	
ETHICAL BEHAVIOR OF MANAGERS AND BUILDING TRUST WITHIN AN ENTERPRISE IN A GLOBAL ENVIRONMENT.....	746
MORAVCIKOVA DOMINIKA, KICOVA EVA	
BRAND AS A STRATEGIC MARKETING TOOL OF A COMPANY IN CONDITIONS OF GLOBALIZATION	755

MUSOVA ZDENKA, MUSA HUSSAM GLOBAL TRENDS INFLUENCING RESPONSIBLE BEHAVIOUR OF CONSUMERS AND BUSINESSES.....	763
NADANYIOVA MARGARETA, GAJANOVA LUBICA, MORAVCIKOV DOMINIKA SPECIFIC ASPECTS OF THE BRAND IN A GLOBAL PERSPECTIVE	771
NICA ELVIRA, SABIE OANA MATILDA, POTCOVARU ANA-MADALINA, DUMITRESCU OANA CATALINA, MITEA DANA ELENA RALUCA BLURRING BOUNDARIES BETWEEN PRODUCTION AND CONSUMPTION IN PLATFORM-BASED LABOR MARKETS. AN EMPIRICAL ANALYSIS	777
PAUROVA VERONIKA, GOGOLOVA MARTINA THE IMPORTANCE OF CORPORATE IDENTITY AND ITS COMPONENTS IN CONDITIONS OF GLOBALIZATION	783
PELLESOVA PAVLINA GLOBALIZATION AND TRENDS IN INTERNATIONAL TRAVEL.....	791
PERACEK TOMAS, MUCHA BORIS, BRESTOVANSKA PATRICIA IMPACT OF GLOBALIZATION ON SELECTED LEGAL INSTITUTIONS TO SECURE COMMITMENTS IN CONDITIONS OF THE SLOVAK REPUBLIC.....	799
PETRUNOV GEORGI TRAFFICKING IN HUMAN BEINGS IN THE ERA OF GLOBALIZATION	807
PIROGOVA OKSANA, PLOTNIKOV VLADIMIR FACTORS OF TRADING ENTERPRISE FUNDAMENTAL VALUE CREATION IN CONDITIONS OF GLOBALIZATION	813
PLOTNIKOV A. VLADIMIR, VOLKOVA A. ALBINA, NIKITIN A. YURY INFLUENCE OF SERVICES ON SOCIAL SPHERE.....	822
POLOZHENTSEVA YULIA, VERTAKOVA YULIA, ANDROSOVA IRINA QUANTITATIVE ASSESSMENT OF THE DEVELOPMENT LEVEL OF INTERREGIONAL RELATIONSHIP OF THE ECONOMIC SPACE	830
PONISCIAKOVA OLGA GLOBALIZATION AND EFFECTS OF DEVELOPMENT TENDENCIES IN CUSTOMER RELATIONSHIP MANAGEMENT	839
POPESCU CATALIN KANTY, PERA AUREL, BOGDAN ALEXANDRU, CURTEANU BOGDAN ADRIAN, CIURLAU FLORIN CRISTIAN FLEXIBILITY IN THE ON-DEMAND SECTOR: THE STRUCTURAL EXPANSION AND SEGMENTATION OF CONTINGENT WORK.....	848
PREDANOCYOVA KRISTINA, KUBICOVA LUBICA, KADEKOVA ZDENKA FACTORS AFFECTING CONSUMER DECISION MAKING IN THE MARKET OF BAKERY PRODUCTS.....	854
RADULESCU CARMEN VALENTINA, BRAN FLORINA, BURLACU SORIN OUTPUT OF DURABLE DEVELOPMENT FOR BUSINESS ADMINISTRATION	863
REBETAK FILIP TRENDS IN SELECTION PROCESSES OF SALES REPRESENTATIVES IN GLOBAL COMPANIES IN SLOVAKIA	871

RYBANSKY RUDOLF, JANOS DOMINIK IMPACT OF GLOBALISATION ON CONSUMER BEHAVIOUR BY UTILISING CIRCULAR ECONOMY	877
SALKOVA DANIELA, REGNEROVA OLGA BEHAVIOR OF CUSTOMERS IN THE PURCHASE OF BAKERY PRODUCTS WITH A FOCUS ON GLUTEN-FREE PRODUCTS IN THE GLOBAL WORLD	885
SAVOV RADOVAN, LANCARIC DRAHOSLAV, KOZAKOVA JANA TALENT MANAGEMENT AND ECONOMIC RESULTS IN GLOBAL ENTERPRISES	892
SUKALOVA VIERA, CENIGA PAVEL CURRENT ISSUES OF THE IMPACT OF GLOBALIZATION ON MANAGERIAL WORK	900
SZEWIECZEK ALEKSANDRA BARRIERS AND INCENTIVES OF BUSINESS MODEL TRANSITION IN A HEALTH CARE ENTITY	908
TIMOKHINA GALINA, KAPUSTINA LARISA, AGABABAEV MUSHFIG MANAGING THE CREATION OF CONSUMER VALUE CHAIN IN A GLOBAL COMPANY	916
TOTH MARIAN, RABEK TOMAS, HOLUBEK IVAN STRUCTURAL CHANGES IN SLOVAK AGRICULTURE AFTER EU ACCESSION... ..	924
VAGNER LADISLAV APPLYING FACILITY MANAGEMENT IN A GLOBAL BUSINESS	932
VACHAL JAN BUSINESS PROCESSES IN MEDIUM-SIZED AND LARGE ENTERPRISES IN CONDITIONS OF A GLOBALIZING ECONOMY	938
YAGUDIN RAMIL, KOLESNIKOVA JULIA, ZAGIDULLINA VENERA, ABDRAKHMANOV AMIRKHAH DETERMINATION OF THE LEVEL OF DEVELOPMENT OF INTANGIBLE PROPERTY IN A GLOBALIZING WORLD	947
ZIDOVA NIKOLA, ADAMOVA MARKETKA, KRNINSKA RUZENA STRESS MANAGEMENT IN THE CONTEXT OF DEVELOPMENT IN THE INTERNATIONAL ENVIRONMENT	956
PART III	
ALEXANDROVA MATILDA PROJECT PORTFOLIO MANAGEMENT IN A GLOBALIZED ENVIRONMENT: A FACTOR ANALYSIS FOR BULGARIAN ORGANIZATIONS	963
ARENDAS PETER EVOLUTION OF RELATIONSHIP BETWEEN V4 AND GERMAN STOCK MARKETS	971

BALCERZAK ADAM P. CLIMATE CHANGE AND ENERGY OBJECTIVES IN EUROPE. CLUSTER ANALYSIS FOR THE EU 15	978
BEDNARIK JAROSLAV CIRCULAR ECONOMY AS A PREREQUISITE OF SUSTAINABLE DEVELOPMENT IN THE GLOBAL ENVIRONMENT	986
BIELIKOVA ALZBETA, BARTKOVA HANA SLOVAKIA AND TAX EVASION OF VALUE ADDED TAX IN THE GLOBAL ECONOMY	994
BIUKSANE INESE WORLD COMPETITIVENESS OPPORTUNITIES IN NOWADAYS: KEY OF LATVIAN FISH PROCESSING SECTOR	1001
BOTLIKOVA MILENA, BOTLIK JOSEF COMPARISON OF OUTBOUND TRAVEL DESTINATIONS OF THE CZECH REPUBLIC IN THE CONTEXT OF GLOBALIZATION TRENDS	1009
BRUKSLE IEVA, DRINKE ZANE PRICING COMPETENCES AS A TOOL FOR COMPETITIVENESS INCREASE OF LATVIAN COMPANIES IN GLOBAL MARKET	1017
CENIGA PAVEL, SUKALOVA VIERA TRANSPORT LOGISTICS AS A SOURCE OF IMPROVEMENT QUALITY OF LIFE IN A REGIONAL CONTEXT IN THE PROCESS OF GLOBALIZATION	1024
CISZEWSKI TOMASZ, NOWAKOWSKI WALDEMAR, CHRZAN MARCIN ACCIDENTS ON EUROPEAN RAILWAYS CAUSES, CONTEXT AND CONSEQUENCE.....	1033
DOLINAYOVA ANNA, KENDRA MARTIN, KVIZDA MARTIN COMPETITION IN THE RAIL TRANSPORT MARKET – THE WAY TO INCREASE THE MODAL SHARE OF RAIL TRANSPORT	1041
DRAPALYUK MICHAEL V., DOROKHIN SERGEI V., NEBESNAYA ANNA Y. DEVELOPMENT OF MULTIMODAL TRANSPORT SERVICES IN THE GLOBAL LOGISTICS CLUSTER.....	1049
DURANA PAVOL GLOBAL QUALITY MANAGEMENT SYSTEMS IN SLOVAK COMPANIES	1057
DVORAKOVA LSKOVA ZUZANA, SKODOVA PARMOVA DAGMAR, DVORAK PETR, KLUFOVA RENATA GLOBALIZATION AND ECONOMIC CONDITIONS OF BROWNFIELDS REGENERATION IN THE VISEGRAD GROUP COUNTRIES	1065
FIRLEJ KRZYSZTOF, FIRLEJ CHRYSYAN SPECIALIZATION IN THE FOOD SECTOR IN POLAND IN AN ASPECT OF IMPLEMENTATION OF A NEW DEVELOPMENT PATHWAY.....	1072
GREGOVA ELENA, DENGOV VICTOR V., TULYAKOVA IRINA R. GLOBAL TRENDS IN RUSSIAN RETAIL: A COMPARISON OF THE MARKET OF ST. PETERSBURG AND MOSCOW	1079

GRZEGA URSZULA

GLOBALIZATION OF CONSUMPTION AND THE STANDARD OF LIVING IN POLAND
– SELECTED ISSUES..... 1087

HAMPLOVA EVA, KOVARNIK JAROSLAV

GLOBALIZATION AND ITS IMPACT ON FOREIGN CONTROLLED CORPORATIONS
IN THE CZECH REPUBLIC 1095

HOLUBEK IVAN, TOTH MARIAN, RABEK TOMAS, PALKOVIC JOZEF

EVALUATION OF GLOBALIZATION IN SLOVAKIA AND V4 COUNTRIES..... 1103

CHLUSKA JOLANTA

EVOLUTION OF COST MANAGEMENT IN POLISH HOSPITALS IN THE CONTEXT OF
GLOBALIZATION OF MEDICAL SERVICES 1112

JEROMANOVA-MAURA SILVA, ZVIRGZDINA ROSITA, LININA IVETA

DEVELOPMENT OF SOCIAL ENTREPRENEURSHIP IN LATVIA..... 1120

**KAPUTA VLADISLAV, MATOVA HANA, SUPIN MIKULAS, TRIZNOVA
MIROSLAVA**

ECONOMIC ENVIRONMENT OF THE SLOVAK REPUBLIC IN THE GLOBAL
CONTEXT 1127

KLEVTSOVA MARIA, POLOZHENTSEVA YULIA, LEONTYEV EVGENIY

RUSSIAN ECONOMY GROWTH MODELING IN THE TRANSFORMATION
CONDITIONS IN THE GLOBALIZATION PERIOD..... 1135

KOLNHOFER DERECSKEI ANITA, PAWLICZEK ADAM

TALENT MANAGEMENT AS AN EFFECT OF GLOBALIZATION IN CASE OF
VISEGRAD 4 COUNTRIES 1143

KONECNY STEPAN, MAZANEK LUKAS, VRANIAK LUKAS

TRANSFORMATIONAL LEADERSHIP IN CZECH COMPANIES: RELATIONS WITH
SUBORDINATES IN THE CONTEXT OF GLOBALIZATION 1153

KORNASZEWSKI MIECZYSLAW, PNIEWSKI ROMAN

GLOBAL APPROACH TO OPERATIONS MANAGEMENT OF RAILWAY TRANSPORT
DEVICES IN POLAND..... 1162

KOSTKOVA MIROSLAVA

GLOBALIZATION TRENDS IN THE TOURIST SUPPLY IN THE SILESIAN MORAVIAN
REGION..... 1171

KRAJNAK MICHAL, MEIER VOJTECH

EVALUATION OF THE DEVELOPMENT OF RUNNING TIME ON SELECTED LONG-
DISTANCE LINES OF RAILWAY IN THE CZECH REPUBLIC 1179

KWASNY JAKUB, MROCZEK ARKADIUSZ, ULBRYCH MARTA

INDUSTRIAL CLUSTERING AS A RESPONSE TO CONTEMPORARY WAVE OF
GLOBALISATION IN SEARCH FOR EVIDENCE FROM POLAND 1187

LEBEDEV PAVEL

MANAGEMENT ACCOUNTING IN RUSSIAN MID-SIZED COMPANIES: RESULTS OF
AN EXTENDED SURVEY-BASED STUDY 1196

MACH JIRI, DVORAK MAREK, HOSKOVA PAVLA EU MILK AND DAIRY MARKET CHANGES AND IMPACT OF GLOBALISATION TRENDS	1204
MARIN-PANTELESCU ANDREEA, RAKOS ILEANA-SORINA, TIRAU ADRIAN ROMANIAN TOUR OPERATORS IN THE GLOBALIZATION AGE	1213
MIRONOVA MARINA, SHOLUDKO ALEXANDER, KUZNETSOVA NATALIYA SOCIO-ECONOMIC DEVELOPMENT OF THE CITIES OF THE TRANS-SIBERIAN RAILWAY OF RUSSIA.....	1220
MITKOVA VERONIKA GLOBALIZATION EFFECTS IN THE MULTIPLIER ANALYSIS – CASE OF SLOVAKIA	1228
MROCZEK ARKADIUSZ CENTRAL AND EASTERN EUROPE METROPOLISES IN THE CONTEXT OF GLOBALIZATION	1236
NOVAK-SEDLACKOVA ALENA, SVECOVA DENISA REGIONAL AIRPORTS UNDER THE LEGAL AND ECONOMIC REGULATORY FRAMEWORK OF THE EU: BENCHMARKING OF PIESTANY, PARDUBICE AND PARMA AIRPORT.....	1244
NOVAKOVA MARIA, BURDA EDUARD, CAPIKOVA SILVIA SOCIAL AND HEALTH REALITY IN SLOVAK REPUBLIC AS A RESULT OF GLOBALISATION.....	1252
NOVIKOV ARTHUR I., NOVIKOVA TATYANA P. NON-DESTRUCTIVE QUALITY CONTROL OF FOREST SEEDS IN GLOBALIZATION: PROBLEMS AND PROSPECTS OF OUTPUT INNOVATIVE PRODUCTS	1260
NOWAKOWSKI WALDEMAR, CISZEWSKI TOMASZ, LUKASIK ZBIGNIEW AN ANALYSIS OF THE SAFETY OF LEVEL CROSSINGS IN POLAND	1268
PARVANOV PETAR, KRASDEV VLADISLAV, ATANASOVA IRINA LEGAL OPPORTUNITIES FOR THE DEVELOPMENT OF SOCIAL ENTERPRISES HUMAN POTENTIAL IN BULGARIA	1275
PAVLU KAROLINA, KOTIKOVA SYLVIE IMPACT OF GLOBALIZATION ON THE STRUCTURE OF ACCOMMODATION CAPACITIES IN THE BORDER AREA OF THE FORMER SUDETENLAND	1283
POKRIVCAK JAN, BIELEKOVA EVA, CUPAK ANDREJ GLOBALIZATION AND FOOD SECURITY IN CENTRAL AND EASTERN EUROPE	1291
REICHER REGINA ZSUZSANNA CORPORATE SOCIAL RESPONSIBILITY AMONG SMALL AND MEDIUM-SIZED ENTERPRISES IN HUNGARY	1300
ROGALSKA ELZBIETA CLUSTER ANALYSIS OF ENTREPRENEURSHIP IN POLAND AT NUTS 3 LEVEL...1308	

SADYRTDINOV RUSLAN, RODNYANSKY DMITRY, MAKAROV OLEG, MILOVANOV YEVGENIY CHRONIC POVERTY ESTIMATION IN RUSSIA IN CONTEXT OF GLOBALISATION.....	1316
SOKOLOV YU I., GALABURDA V.G., LAVROV I.M., ANIKEEVA-NAUMENKO L.O. ENHANCED QUALITY OF RAIL FREIGHT TRAFFIC AS A TOOL TO IMPROVE EFFICIENCY OF GLOBAL ECONOMY	1324
SOKOLOV YURI IGOREVICH, TERESHINA NATALIA PETROVNA, MEZHOKH ZOYA PAVLOVNA, ZHAKOV VLADIMIR VLADIMIROVICH, KORISHEVA OLGA VIKTOROVNA INTERNATIONAL STRATEGIC PRIORITIES OF DEVELOPMENT: COMPETITIVENESS AND ECONOMIC SAFETY IN THE SPHERE OF TRANSPORT.....	1332
SOLOVYEVA ANNA, ANTONYAN OLGA, MAKSIMCHUK OLGA ALIGNING THE RUSSIAN SYSTEM OF CONSTRUCTION PRICING WITH THE CURRENT GLOBAL STANDARDS	1341
SOROKOVA TATIANA, PETRIKOVA DANIELA PARTICIPATION OF SLOVAKIA IN THE GLOBAL VALUE CHAIN IN THE AUTOMOTIVE INDUSTRY	1349
STANKOVA ZLATKOVA MARIYA TOURISM BETWEEN THREATS AND SUSTAINABILITY IN THE CONTEXT OF GLOBALIZATION	1358
STRAKOVA JARMILA STRATEGIC MANAGEMENT OF CZECH ENTERPRISES IN CONDITIONS OF GLOBALIZATION AND HYPER-COMPETITION	1366
SYSOEVA TATIANA, TIMOKHINA GALINA, IZAKOVA NATALYA PERSPECTIVES OF ENTERING THE CHINESE JEWELRY MARKET BY THE RUSSIAN COMPANY	1377
SZYMANSKI ANDRZEJ, KRZYZAK-SZYMANSKA EWA PHYSICAL ACTIVITY OF INHABITANTS OF THE BALTIC COUNTRIES AS A SOCIAL PROBLEM IN GLOBALIZATION ERA	1385
TRETYAK VLADIMIR, MACHERET DMITRY, SOROKINA ANASTACIA CORPORATIZATION OF RUSSIAN RAILWAYS: STATUS AND PROSPECTS OF GLOBAL CORPPORATION DEVELOPMENT	1393
TULYAKOVA IRINA R., DENGOV VICTOR V. MILITARY-TECHNICAL COOPERATION OF RUSSIA IN THE CONTEXT OF GLOBALIZATION: EXPERIENCE OF COOPERATION WITH INDIA.....	1401
URAZGALIEV VLADIMIR S., MENSHIKOVA GALINA A., ALTUNYAN ARMEN G. INTEGRITY ANTI-CORRUPTION STANDARDS: GLOBAL TRENDS IN ESTIMATION AND RUSSIAN REALITIES	1409
VASENSKA IVANKA GLOBAL CREATIVE ECONOMIC INTERPRETATIONS OF THE VALLEY OF THE THRACIAN KINGS ON THE EXAMPLE OF STAROSEL, BULGARIA.....	1417

**VESELA KAMILA, BROZ DAVID, NAVRATILOVA MIROSLAVA, BERANOVA
MARKETA**

INFLUENCE OF THE EU AND COMMON CURRENCY ON THE STRUCTURE OF
FOREIGN COMMERCE..... 1425

VRANIAK LUKAS, MAZANEK LUKAS, KONECNA ZDENKA

MANAGEMENT RESEARCHES OF CEE COUNTRIES: RESEARCHES OF THE CZECH
REPUBLIC IN TERM OF GLOBALIZATION..... 1433

WOJCIECHOWSKI JERZY, OLCZYKOWSKI ZBIGNIEW, LUKASIK ZBIGNIEW
POLISH ELECTRICAL TRACTION POWER ENGINEERING IN THE CONTEXT OF THE
COMMON EUROPEAN RAILWAY SYSTEM 1441

**YAKUNINA REGINA PETROVNA, PSHENICHNYI SERGEY PAVLOVICH,
RYZHOVA ASYA SERGEEVNA, ALEKSEEVA JULIA PETROVNA**
CLUSTER APPROACH TO THE HEALTH SYSTEM IN RUSSIAN FEDERATION
WITHIN THE CONTEXT OF GLOBALIZATION 1450

ZEMANOVA STEPANKA, DRULAKOVA RADKA

GLOBALIZING SUSTAINABILITY AT BUSINESS SCHOOLS? LIMITS TO
IMPLEMENTATION OF THE UN PRINCIPLES FOR RESPONSIBLE MANAGERIAL
EDUCATION IN V4 COUNTRIES 1456

PART IV

BERANOVA MARKETA, SIMA JAN, NAVRATILOVA MIROSLAVA

FINANCIAL LITERACY OF UNIVERSITY STUDENTS IN THE AREA OF OWN
FINANCES 1464

BIKAR MILOS, VAVROVA KATARINA

TECHNICAL ANALYSIS USAGE BY THE PREDICTION OF FINANCIAL ASSETS
PRICES 1472

BOHM PATRIK, BOHMOVA GABRIELA

EFFECT OF FLAT RATE INCOME TAX IN SELECTED EU MEMBER STATES ON
THEIR ECONOMIC GROWTH 1480

BOYKO TATYANA, FROLOVA NATALYA

SMALL INNOVATIVE FIRMS OF GLOBAL IMPORTANCE: APPROACHES TO
PERFORMANCE EVALUATION 1488

BUTKUS MINDAUGAS, MORKIENE AGNE

FINANCIALIZATION IN A GLOBAL PERSPECTIVE OVER LAST HALF OF THE
CENTURY 1494

CUGOVA ANETA, CEPPEL MARTIN

THE USE OF MULTI-CRITERIA BENCHMARK METHOD IN A GLOBALIZED
FINANCIAL ENVIRONMENT 1502

**DANESHJO NAQIB, MAJERNIK MILAN, SANCIOVA GABRIELA, DUDAS
PAJERSKA ERIKA, REPKOVA STOFKOVA KATARINA**

INTERNATIONAL STANDARDIZATION IN THE ECONOMIC-ENVIRONMENTAL
ACCOUNTING OF BUSINESS MATERIAL FLOWS 1510

DITTRICHOVA JAROSLAVA, SVOBODOVA LIBUSE, HEDVICAKOVA MARTINA FINANCING AND LOANS OF THE BUSINESS ENTITIES IN THE GLOBALIZED SOCIETY	1520
DOMONKOS TOMAS, JANOSOVA MIROSLAVA SLOVAK GENERATIONAL ACCOUNTS	1528
DONATH LILIANA EVA, NEAMTU MIHAELA, MIRCEA GABRIELA INTERNATIONAL IMPACT OF FINANCIAL SYSTEMIC RISKS. A DYNAMIC ANALYSIS WITH TIME DELAY	1536
DURICA MAREK FINANCIAL DISTRESS MODELLING IN SLOVAK COMPANIES: DECISION TREES APPROACH.....	1544
DVORAK MAREK, MACH JIRI, HOSKOVA PAVLA EVALUATING THE FINANCIAL PERFORMANCE OF FIRMS IN RELATION TO THE LEGAL FORM OF ENTERPRISE IN THE ASPECT OF THE GLOBAL ECONOMY ..	1552
FERENCZI VANOVA ALEXANDRA, KRAJCIROVA RENATA, MARIS MARTIN, BOJNANSKY JOZEF, DURKACOVA PETRA TAX LICENSE IN THE SLOVAK AGRICULTURAL LEGAL ENTITIES	1560
FRONCZEK MALGORZATA, CZECH KATARZYNA GLOBALIZATION IN FOREIGN TRADE MEASURED BY VALUE ADDED – EXAMPLE OF V4 AND EU-28.....	1568
GAMON WOJCIECH ANALYSIS OF THE COST-EFFECTIVENESS OF IMPLEMENTING A NEW METHOD OF PROTECTING RAILWAY BUFFER HEADS.....	1576
HAJDUCHOVA IVETA, GIERTLIOVA BLANKA, SULEK RASTISLAV FINANCING OF FOREST ECOSYSTEM SERVICES IN CONDITIONS OF GLOBALIZATION	1583
HAKALOVA JANA, PALOCHOVA MARCELA, PSENKOVA YVETTA EFFECTIVENESS OF MODERN TOOLS USED BY FINANCIAL ADMINISTRATION IN TERMS OF GLOBALIZATION TRENDS IN ACCORDANCE WITH THE IMPLEMENTATION OF EU DIRECTIVES AND FORTHCOMING CHANGES IN TAX LEGISLATION IN THE CZECH REPUBLIC	1591
HORNYAK GREGANOVA RADOMIRA, PAPCUNOVA VIERA, ORSZAGHOVA DANA EVALUATION OF FINANCIAL PERFORMANCE OF THE LOCAL SELF - GOVERNMENT IN CONDITIONS OF SLOVAKIA IN CONTEXT OF GLOBAL CHANGES	1599
CHUTKA JAN TRADING OF INTERNATIONAL FINANCIAL MARKETS BASED ON TECHNICAL ANALYSIS IN CONDITION OF GLOBALIZATION	1607
JEDLICKA VIT, KUBENKA MICHAL, NOVOTNY JOSEF, SEJKORA FRANTISEK TAX HAVENS IN THE EUROPEAN UNION, THEIR IDENTIFICATION AND USE BY THE MULTINATIONALS.....	1614

JUHASZOVA ZUZANA, TUMPACH MILOS, KUBASCIKOVA ZUZANA AUDIT OF AUDITING COMPANIES	1622
JURIS ROMAN, GREGOVA ELENA IMPACT OF THE ECONOMIC CRISIS ON THE AVAILABILITY OF FINANCIAL RESOURCES IN SMALL AND MEDIUM-SIZED ENTERPRISES IN THE FACE OF GLOBALIZATION	1630
KAJANOVA JANA TARGET AND PROCESS ORIENTATION OF FINANCIAL MANAGEMENT FROM THE ASPECT OF GLOBALIZATION	1637
KLONOWSKA ALINA GLOBALIZATION AND TAX GAP AS A RESULT OF THE TAXPAYERS NONCOMPLIANCE – EVIDENCE FROM POLAND.....	1645
KLUCKA JOZEF, MASAR MATEJ COMPARISON OF BONITY INDEX WITH SELECTED FINANCIAL INDICATORS IN THE PROJECT	1653
KOSOVSKA IVETA, VARYOVA IVANA IMPACT OF GLOBALIZATION ON STRUCTURE AND CONTENT OF FINANCIAL STATEMENTS IN FINANCIAL ACCOUNTING WITH THE IMPLEMENTATION OF EU DIRECTIVES IN THE SLOVAK REPUBLIC	1661
KOTLEBOVA JANA PROBLEMS OF CAPITAL FLIGHT OF EA19 FROM FLOW OF FUNDS' VIEW OF POINT	1669
KRAJNAKOVA EMILIA WAYS OF FINANCING CLUSTERS IN SLOVAKIA AND IN THE WORLD	1676
KRISKOVA PETRA, UZIK JAN ANALYSIS OF WEAKNESSES IN COMPLIANCE WITH AUDITING STANDARDS IN VIEW OF THE RISK OF EXPRESSING AN INAPPROPRIATE AUDITOR'S OPINION ON FINANCIAL STATEMENTS IN CONDITIONS OF GLOBALIZATION	1684
KUBALA PAVOL COMPARISON OF WACC CALCULATION IN THE INTERNATIONAL BUSINESS ENVIRONMENT.....	1691
KUKALOVA GABRIELA, MORAVEC LUKAS, FILIPOVA DANA BINA, WEBROVA KAMILA EXCISE TAXES RATES CHANGES EFFECTS ON TAX YIELDS IN GLOBAL ECONOMY: CZECH REPUBLIC CASE STUDY.....	1699
MELNIKOV YURY BORISOVICH, ONOKHINA ELENA ALEXANDROVNA, SHITIKOV SERGEY ALEXANDROVICH MODELING THE MECHANISM FOR FORMING REQUESTS IN THE ACTIVITIES OF THE TAX AUTHORITY.....	1707
MICHALKOVA LUCIA, KOVACOVA MARIA ANALYSIS OF THE VALUE OF TAX SHIELD IN THE GLOBAL ENVIRONMENT.	1715

MORAVEC LUKAS, HINKE JANA, KUKALOVA GABRIELA, MYSLIVCOVA JANA VAT CONTROL STATEMENT GLOBAL EFFECTS: CZECH REPUBLIC CASE STUDY IN RELATIVE COMPARISON TO SLOVAKIA	1724
MYSKOVA RENATA, KOPECKA EVA, KUBENKA MICHAL, SEJKORA FRANTISEK ACCOUNTING HARMONIZATION - A CONSEQUENCE OF GLOBALIZATION AND INTERNATIONALIZATION	1732
NOVOTNY JOSEF, KUBENKA MICHAL, JEDLICKA VIT INVESTMENT ACCORDING TO GLOBAL DIVERSIFIED APPROACH	1740
PANUS JAN, HAJNY JAN EXPONENTIAL RANDOM GRAPH MODEL AS A TOOL FOR ANALYZING THE INTERNATIONAL TRADE	1748
PERA JACEK MARKET RISK PREMIUM AND DEFAULT UNDER THE CONDITIONS OF GLOBALIZATION OF MAJOR CAPITAL MARKETS OF THE UE AND GFCI COUNTRIES	1755
PODHORSKA IVANA, SIEKELOVA ANNA OUTLIERS DETECTION TECHNIQUES: IMPACT ON THE PREDICTION ABILITY OF INTERNATIONAL PREDICTION MODELS	1763
POLIAKOVA ADELA THE INTERNATIONAL TAX TREATMENT IS NOT SUFFICIENT – AN EXAMPLE OF ROAD TAX RELIEF IN THE SLOVAK REPUBLIC	1771
PRZYBYLSKA-MAZUR AGNIESZKA IMPORTANCE OF AN EARLY-DETECTION INDEX IN THE ANALYSIS OF PUBLIC DEBT IN THE GLOBAL ECONOMY	1779
RAKOVSKY PETER IMPACT OF GLOBALIZATION ON THE TRANSFER PRICING AFTER BEPS	1787
REZNAKOVA MARIA, PETA JAN MERGER AND ACQUISITION EFFECTIVENESS: GLOBAL TRENDS AND DEVELOPMENT IN THE CZECH REPUBLIC	1794
RYLKOVA ZANETA, SEBESTOVA JARMILA, KREJCI PETRA STRATEGIC COST MANAGEMENT IN BUSINESSES	1802
SEJKORA FRANTISEK, MYSKOVA RENATA, NOVOTNY JOSEF, JEDLICKA VIT USE OF TAX HAVENS BY CZECH COMPANIES IN CONDITIONS OF GLOBALIZATION	1810
SIEKELOVA ANNA, PODHORSKA IVANA FINANCIAL DISTRESS PREDICTION MODELS: INTERNATIONAL REVIEW	1817
SOLOMA ANDRZEJ, SKORWIDER-NAMIOTKO JAROSLAW, WYSZYNSKI ARTUR IMPACT OF THE BANKING GLOBALIZATION ON THE COOPERATIVE BANKS: EVIDENCE FROM POLAND	1824

STANOVSKY MATEJ

GLOBALIZATION OF ACCOUNTING PROFESSION IN SHARED SERVICES CENTERS
..... 1831

STROJEK-FILUS MARZENA

CONSEQUENCES OF APPLYING THE EQUITY METHOD IN FINANCIAL REPORTS IN
THE FACE OF GLOBALIZATION ON THE EXAMPLE OF LISTED COMPANIES IN
POLAND..... 1839

STROKOVA ZUZANA, KLEMENTOVA JARMILA

PSYCHOLOGICAL ASPECTS OF CONTROLLING IN BUSINESS AND GLOBALISING
ENVIRONMENT..... 1847

SULIK-GORECKA ALEKSANDRA

POSSIBILITIES OF HARMONISATION OF INVESTMENT FUNDS FINANCIAL
REPORTING STANDARDS. A VIEW FROM POLAND..... 1855

SVABOVA LUCIA, KRAMAROVA KATARINA, VALASKOVA KATARINA

IMPACT OF FINANCIAL RATIOS ON INTERNATIONAL BANKRUPTCY PREDICTION
MODELS 1863

SZKUTNIK WLODZIMIERZ, SZKUTNIK WERONIKA

GLOBAL FINANCIAL MARKET REGULATIONS AND THEIR IMPACT ON PRICE
COVERGENCE IN EU COUNTRIES 1871

TOTHOVA ALENA, KOZAKOVA MARIA

VARIABILITY OF FINANCIAL RESULTS OF SELECTED INDUSTRIES IN SLOVAKIA
IN AN ENVIRONMENT OF GLOBALIZATION OF ECONOMICS 1879

VALASKOVA KATARINA, BAKES VLADIMIR

INTERNATIONAL PERCEPTION OF THE COSTS OF EQUITY ESTIMATION..... 1887

VALJASKOVA VIERA

KEY ASPECTS OF PRICING AND SELECTION OF PRICING STRATEGY IN GLOBAL
ENVIRONMENT..... 1895

VARYOVA IVANA, KOSOVSKA IVETA

TRANSFER PRICING OF TRANSACTIONS BETWEEN RELATED PARTIES AS A
RESULT OF GLOBALIZATION 1903

VAVROVA KATARINA, BIKAR MILOS

GLOBAL CONDITIONS OF THE BEHAVIORAL ASPECT OF TAX EVASION..... 1911

VIRDZEK TOMAS, KUBASKA PETER, URADNICEK VLADIMIR

IDEAL EQUITY CURVE AS A TOOL OF PORTFOLIO RISK MANAGEMENT IN THE
TIME OF FINANCIAL GLOBALIZATION 1919

VOCHOZKA MAREK, KRULICKY TOMAS

ANALYSIS OF ENTERPRISES IN THE MANUFACTURING INDUSTRY USING
ARTIFICIAL NEURAL STRUCTURES – KOHONEN NETWORKS 1927

VRBKA JAROMIR, VOCHOZKA MAREK

DEVELOPMENT OF THE PRICE OF GOVERNMENT BONDS DEPENDING ON BASIC
MACROECONOMIC INDICATORS..... 1935

**YURKOV DMITIY, KOLESNIKOVA JULIA, FAKHRUTDINOV RUSLAN,
ZAGIDULLIN VENERA**

DETERMINANTS OF M&A PREMIUM IN THE GLOBAL MARKET 1943

**ZINOVYEVA EKATERINA GEORGIEVNA, KOPTYAKOVA SVETLANA
VLADIMIROVNA**

PROSPECTS FOR THE BANKING SECTOR DEVELOPMENT WITHIN THE
CONDITIONS OF INTERNATIONAL FINANCIAL GLOBALIZATION IN THE RUSSIAN
FEDERATION..... 1951

PART V

BAUEROVA RADKA

EVALUATION OF ONLINE GROCERY SHOPPING BASED ON THE HYPE CURVE
CONCEPT..... 1959

**BAULINA OKSANA ALEKSANDROVNA, KLYUSHIN VLADISLAV
VLADIMIROVICH, MAKSYMCHUK OLGA VIKTOROVNA**

"SMART LIVING" AS ONE OF THE ASPECTS OF THE FORMATION OF THE "SMART
CITY..... 1967

BEZAKOVA ZUZANA

GEOLOCATION SERVICES AND THEIR IMPORTANCE IN SOLVING GLOBAL
ENVIRONMENTAL PROBLEMS 1978

**BOLESNIKOV MINJA, RADISIC MLADEN, TAKACI ALEKSANDAR,
BOLESNIKOV DRAGANA, STIJACIC MILICA POPOVIC**

NEED FOR NEW BUSINESS MODELS DEVELOPMENT WITHIN A GLOBAL
CYCLICAL INDUSTRY..... 1984

BOMBINSKA ELZBIETA

GLOBALISATION OF SERVICES – SOME EVIDENCE ON INTERNATIONAL
SERVICIFICATION OF MANUFACTURING 1992

BRACINIKOVA VERONIKA, MATUSINSKA KATERINA

TECHNOLOGICAL SKILLS ACROSS GENERATIONS 2000

BUMBEROVA VERONIKA, MILICHOVSKY FRANTISEK

DEVELOPMENT OF SERVICES UNDER GLOBALIZATION 2007

CEBAKOVA ANDREA, PUTNOVA ANNA, ZAKLASNIK MARTIN

FULFILMENT OF THE INNOVATION POTENTIAL OF LARGE BUSINESSES:
IDENTIFYING THE CRITICAL FACTORS 2015

CWIEK MALGORZATA

DIGITAL DIVIDE IN HOUSEHOLDS OF ELDERLY PEOPLE. EVIDENCE FROM
POLAND..... 2022

DAVYDOV STANISLAV, SPASSKOVA ANNA

RAIL TRANSPORT PROJECT MANAGEMENT IN THE CONTEXT OF
GLOBALIZATION AND DIGITAL TRANSFORMATION OF THE ECONOMY..... 2029

GIRDZIJAUSKAITE EGLE, PECIURE LINA, RADZEVICIENE ASTA MAKERSPACES IN ENTREPRENEURIAL UNIVERSITIES: A SOURCE OF INNOVATION AND CREATIVITY	2037
GREGOR MILAN, HOC MICHAL, MEDVECKA IVETA, BINASOVA VLADIMIRA FACTORY OF THE FUTURE AS THE PRODUCT OF ENGINEERING WORK IN THE GLOBALIZATION PROCESS	2045
GRECHENYUK OLGA, VERTAKOVA YULIA, GRECHENYUK ANTON EFFICIENCY FACTORS OF INNOVATIVE ACTIVITY IN THE CONDITIONS OF GLOBALIZATION	2053
HUB MILOSLAV, PRIHODOVA KATERINA IMPACT OF GLOBAL SOCIAL CHANGES ON THE SECURITY OF PASSWORD AUTHENTICATION.....	2061
CHLEBIKOVA DARINA CHANGE MANAGEMENT IN ENTERPRISES OF THE SLOVAK REPUBLIC IN THE CURRENT GLOBALIZED ENVIRONMENT.....	2067
CHLUSKI ANDRZEJ, KARCEWSKA ANNA THE USE OF BIG DATA RESOURCES IN PATIENT RELATIONS MANAGEMENT IN HEALTHCARE	2075
CHROMCAKOVA ADELA, STARZYCZNA HALINA USING CRM TECHNOLOGY IN CZECH ENTERPRISES	2083
JACIOW MAGDALENA, TWARDZIK MALGORZATA, WARZECHA KATARZYNA SUSTAINABLE DEVELOPMENT OF RETAIL TRADE IN EUROPE - THE REQUIREMENT OF GLOBALIZATION.....	2091
JANIGA-CMIEL ANNA ANALYSIS OF THE LEVEL OF INTERNET-BASED INFORMATION PROCESSING IN THE USA AND SELECTED COUNTRIES OF THE EUROPEAN UNION AGAINST A BACKGROUND OF GLOBALIZATION	2099
JURISOVA VLADIMIRA ZERO WASTE CONCEPT AS A PART OF ECO-INNOVATIONS IN GLOBAL COMPANIES.....	2107
JURKOVIC MARTIN, KALINA TOMAS, ILLES LADISLAV, GAJARSKY MAREK IDENTIFICATION OF USER REQUIREMENTS FOR SHIP SIMULATORS.....	2114
KADLUBEK MARTA, SZYMCZYK KATARZYNA 21-ST CENTURY LOGISTICS – TIME FOR RESPONSIBLE BUSINESS AND SUSTAINABLE DEVELOPMENT IN A GLOBAL CONCEPT	2120
KANOVSKA LUCIE BENEFITS OF SMART SERVICES IN MANUFACTURING COMPANIES IN THE CONTEXT OF THE GLOBAL AREA	2128
KANTOROVA KATERINA, ZAHALKOVA ANNA TOURISM AND SOCIAL NETWORKING IN CUSTOMER COMMUNICATION.....	2136
KAPUSTINA LARISA, KONDRATENKO YULIA, SYSOEVA TATJANA GLOBAL MARKET OF INDUSTRIAL ROBOTS: TRENDS AND PROSPECTS.....	2144

KAZANSKAYA LILIYA, SAKS NADEZHDA, EGOROV YURIY DIGITALIZATION AS A FACTOR OF FORMATION OF NEW ECONOMIC OPPORTUNITIES UNDER GLOBALIZATION CONDITIONS	2152
KICHEVA MARIA, PETKOVA NADEZHDA, BOGDANOVA MARIELA THE IMPACT OF GLOBALIZATION ON THE DEVELOPMENT OF HUMAN POTENTIAL IN AN INNOVATIVE SOCIO-CULTURAL SPHERE AND OPPORTUNITIES FOR SOCIAL ENTREPRENEURSHIP	2159
KOMARKOVA JITKA, KUPKOVA DENISA WEB-BASED GEOGRAPHIC INFORMATION SYSTEMS AS A PART OF SMART CITIES GOVERNANCE IN THE AGE OF GLOBALIZATION – A CASE STUDY	2167
KOROSTYSHEVSKAYA ELENA COMPETENCE CENTERS AS AN INSTRUMENT TO COMMERCIALIZE TECHNOLOGY DEVELOPMENTS IN THE CONTEXT OF GLOBALIZATION.....	2175
KOS-LABEDOWICZ JOANNA THE IMPACT OF ICT USE ON THE COMPETITIVENESS OF THE EU TRANSPORT SECTOR IN GLOBAL MARKETS	2183
KOS BARBARA GLOBAL TRENDS IN INTELLIGENT DEVELOPMENT OF URBANIZED AREAS ..	2191
LIWINSKI JACEK WAGE PREMIUM FROM COMPUTER AND INTERNET SKILLS IN POLAND	2199
LOSONCZI PETER PUBLIC WI-FI NETWORKS IN THE GLOBAL ENVIRONMENT AND THEIR SECURITY	2206
LYAKINA MARIA, VOLKOVA ELENA, TRETYAK VLADIMIR APPLICATION OF DIGITAL ECONOMY GLOBAL TRENDS IN RUSSIAN TRANSPORT SYSTEMS	2214
MAKAROVA S. EKATERINA, NURTDINOV I. ILGIZ EVALUATING THE INNOVATIVE CAPACITY OF THE REGION AS A REGIONAL GROWTH TOOL.....	2220
MARTISKOVA PETRA, SVEC ROMAN, SLABA MARIE PERCEIVED SENSITIVITY OF PERSONAL DATA IN THE GLOBALISED WORLD: COMMON PERSONAL DATA AND HEALTH-RELATED DATA	2229
MIKHAILOV FEDOR BORISOVICH, YURIEVA OKSANA VLADIMIROVNA, MIASNIKOV DMITRII ALEKSEEVICH STRATEGIES OF THE HUMAN CAPITAL DEVELOPMENT IN CONDITIONS OF ACCELERATING DIFFUSION OF TECHNICAL INNOVATION UNDER INFLUENCE PROCESSES OF GLOBALIZATION	2237
MIKLENCICOVA RENATA GLOBAL PERCEPTION OF THE USE OF ECO-PRODUCTS IN THE INTERNET SPACE	2244
MISIK TOMAS, STOFKOVA JANA MOBILE-FIRST AS A GLOBAL TREND OF CITIZEN-ORIENTED GOVERNMENT SERVICES	2251

NOSALOVA MARTINA, LOUCANOVA ERIKA, PAROBEK JAN, PALUS HUBERT GLOBALIZATION AND INTELLIGENT INNOVATION	2259
NOVAK JAROMIR MAIN DISPLAYS OF CHOSEN SYSTEMS BEHAVIOR IN GLOBAL WORLD	2267
NOVIKOVA P. TATYANA, NOVIKOV I. ARTHUR PRODUCTION OF COMPLEX KNOWLEDGE-BASED SYSTEMS: OPTIMAL DISTRIBUTION OF LABOR RESOURCES MANAGEMENT IN THE GLOBALIZATION CONTEXT	2275
PASHKUS A. NATALIYA, PASHKUS YU. VADIM, KOLTSOVA A. ANNA BREAKTHROUGH POSITIONING OF INNOVATIVE PRODUCTS IN THE GLOBAL ECONOMY: APPROACHES AND PROBLEMS	2282
PASIECZNY JACEK CONDITIONS FOR THE DEVELOPMENT OF ORGANISATIONAL GAMES.....	2291
PATAKYOVA MARIA, MAZUR JAN FACEBOOK – GLOBAL ISSUE WITHOUT (EXISTING) SOLUTION?.....	2298
PLAKHOTNIKOVA MARIA, SIMONENKO ELENA, POKRAMOVICH OLGA GLOBAL PROBLEMS OF INCREASING COMPETITIVENESS OF TELECOMMUNICATION ORGANIZATIONS, OPPORTUNITIES PROVIDED BY THE DIGITALIZATION OF THE ECONOMY	2307
POMFFYOVA MARIA, ROSTASOVA MARIA POSSIBILITIES OF SPIN-OFF COMPANIES AS A DRIVER OF INNOVATION IN REGIONS.....	2315
POPOV YURI LEONIDOVICH, GUSHINA YULIA VALERYEVNA, KARPUSHOVA SVETLANA EVGENIEVNA IMPACT OF GLOBALIZATION ON COMPETITION AND DIVERSITY OF BUSINESS AND TECHNOLOGY DEVELOPMENT	2321
RYBICKA KAROLINA, RYBICKI PIOTR IMPLEMENTATION OF INFORMATION SYSTEMS IN MANAGEMENT UNDER CONDITIONS OF GLOBALIZATION	2328
SETEK JAROSLAV ECONOMIC ASPECTS OF CYBERCRIME IN THE GLOBAL DIMENSION.....	2336
SIUDA DAGNA ACTIVITY OF THE VIRTUAL BRAND COMMUNITIES MEMBERS ON FANPAGES	2344
SOLOSICHENKO ZH. TATYANA , NESTEROVA V. ZINAIDA, GONCHAROVA A. NADEZHDA MODERN ASPECTS OF INTERNET MARKETING DEVELOPMENT IN EDUCATIONAL INSTITUTIONS IN THE CONTEXT OF GLOBALIZATION	2352
SROKA ALICJA, BALCEROWICZ-SZKUTNIK MARIA TELECOMMUTING AS AN ECHO OF GLOBALISATION.....	2361
TRAVNICKOVA ZUZANA GEOCACHING: GLOBAL GAME IN THE LIGHT OF FREEDOM INDICES	2369

VIDROVA ZDENKA, CENIGA PAVEL LOGISTICS SYSTEMS IN CONDITIONS OF GLOBALIZATION	2377
VOKOUN MAREK GLOBALIZATION AND INNOVATION: INNOVATION ACTIVITIES OF MULTINATIONALS IN THE CZECH REPUBLIC 2008-2014.....	2385
VOLKOVA A. ALBINA, PLOTNIKOV A. VLADIMIR, NIKITIN A. YURY DIGITAL TECHNOLOGIES OF MANAGEMENT IN A GLOBALIZED ECONOMY..	2392
YORDANOVA NIKOLAEVA DANIELA, HRISTOV TSVETAN, KIROVA PENEVA MILENA, PENCHEVA TSANEVA MIGLENA, EVSTATIEV BORISOV IVAN OPPORTUNITIES FOR STUDY OF UNIVERSITY GRADUATES PROFESSIONAL REALISATION USING WEB BASED TOOLS	2399
ZADNANOVA SILVIA, HRASKOVA DAGMAR SIMULATION AS A MODERN AND EFFECTIVE METHOD FOR MEASURING HEALTH QUALITY THROUGH THE ASSUMPTIONS OF BENEFITS AND INVESTMENTS WITHIN THE GLOBAL ENVIRONMENT	2407
ZAK STEFAN, HASPROVA MARIA GLOBAL VIEW OF THE CONSUMER DECISION JOURNEY ON THE MOBILE HEALTH MARKET	2414
ZAUSKOVA ANNA, REZNICKOVA MONIKA IMPACT OF SOCIAL MEDIA ON RAISING AWARENESS OF ECO-INNOVATIONS IN A GLOBAL ENVIRONMENT	2421
ZHURAVLEVA NATIALIA, SHAVSHUKOV VIACHESLAV GLOBAL TRENDS IN THE CYBERSECURITY OF TRANSPORT COMPANIES AND METHODS OF BUSINESS PROTECTION.....	2429
ZIEMKIEWICZ BARTOSZ, PIETRZAK BERNARD MICHAL CLUSTER ANALYSIS OF DIGITAL ECONOMY IN THE EUROPEAN UNION.....	2437
PART VI	
ABAKUMOVA JULIET, PRIMIEROVA OLENA ECONOMIC GROWTH, GLOBALIZATION AND INCOME INEQUALITY: THE CASE OF UKRAINE.....	2445
ALSHATTI SCHMIDT DUSANA WORK-LIFE BALANCE AS A KEY FACTOR IN ACQUIRING AND RETAINING GLOBAL TALENT	2453
ALTUNYAN ARMEN G., URAZGALIEV VLADIMIR S., MENSHIKOVA GALINA A. GLOBALIZATION AND INEQUALITY IN SOCIETY	2462
COREJOVA TATIANA, AL KASSIRI MARIO, MADUDOVA EMILIA GLOBALIZATION AND BETTER LIVE INDEX LEVEL IN V4 COUNTRIES	2469
DIMA CRISTINA ASSESSING THE SOCIAL IMPACT OF PUBLIC INVESTMENT	2476
DOBREA RAZVAN CATALIN ASSESSING THE ECONOMIC IMPACT OF PUBLIC INVESTMENT	2484

DYSHAEVA LYUDMILA THEORETICAL FOUNDATIONS OF ECONOMIC EDUCATION AS AN INTERNATIONAL PROBLEM.....	2492
FIRLEJ CHRYSYTIAN, MIERZEJEWSKI MATEUSZ PROFITABILITY CONDITIONS OF SELECTED COMPANIES FROM THE WIG FOOD INDUSTRY INDEX IN 2011-2017	2500
GAZDIKOVA JANA, BOHM PATRIK EFFECTS OF THE EURO CHANGEOVER ON THE INFLATION IN BALTIC STATES	2508
GOGOLOVA MARTINA, HAMPL MAREK GLOBAL APPROACH TO THE PROPOSAL OF METHODOLOGY FOR MOTIVATING AND ACTIVATING STUDENTS TOWARDS LEARNING	2516
GUCIK MARIAN, MARCIS MATUS SUSTAINABLE DEVELOPMENT OF TOURISM: TRANSITION FROM GLOBAL TO LOCAL DIMENSION	2524
HASKOVA SIMONA A NEW GLOBAL TREND IN PROGNOSIS OF ECONOMIC DEVELOPMENT: FUZZY APPROACH TO THE ESTIMATION OF GDP GROWTH RATE	2532
HEDVICAKOVA MARTINA, SVOBODOVA LIBUSE GLOBALIZATION AND IMPACT OF INDUSTRY 4.0 AND SOCIETY 4.0 ON THE LABOUR MARKET	2540
HEJDUKOVA PAVLINA, KUREKOVA LUCIE GLOBALIZATION AND HEALTH: PRIORITIES FOR RESEARCH ACTIVITIES AND NATIONAL POLICIES WITH EMPHASIS ON STATISTICAL ANALYSIS.....	2548
CHOVANCOVA BOZENA, SLOBODNIK PATRIK ANALYSIS OF METHODS MEASURING COUNTRY RISK ON GLOBAL BOND AND STOCK MARKETS.....	2554
IMPPOLA JORMA JAAKKO SUSTAINABILITY CHALLENGES IN GLOBALIZED WORLD.....	2562
KARCZEWSKA ANNA, CHLUSKI ANDRZEJ NEW GLOBAL PHENOMENA IN THE SPHERE OF WORK AND CONSUMPTION AND THE QUALITY OF LIFE	2570
KIROVA MILENA PENEVA, NEDYALKOV NEDYALKOV ANTON, PENCHEVA MIGLENA TSANEVA, YORDANOVA DANIELA NIKOLAEVA UNIVERSITY AS PREREQUISITE FOR SUSTAINABLE REGIONAL DEVELOPMENT IN INTERNATIONAL CONTEXT.....	2578
KOPACKOVA HANA, LIBALOVA PETRA CITIZEN REPORTING SYSTEMS IN THE GLOBAL AND CZECH SPECIFIC VIEW.. ..	2586
KOVARNIK JAROSLAV, HAMPLOVA EVA FOREIGN TRADE IN GLOBALIZED WORLD: COMPARATIVE ANALYSIS IN SELECTED COUNTRIES FROM CENTRAL EUROPE	2594

LENARTOVA GIZELA ROLE OF INTERNATIONAL EXCHANGE OF INFORMATION IN THE FIGHT AGAINST TAX EVASION AND FRAUD IN GLOBALIZED ECONOMY	2602
LYAKIN ALEXANDER, DAROVSKI IVAN IMPACT OF RECESSION ON THE ECONOMIC GROWTH	2612
MACKOVA MARIE, DVORAKOVA LILIA PROPOSAL OF ECONOMIC MANAGEMENT METHODOLOGY IN SELECTED SEGMENT OF NON-GOVERNMENTAL NON-PROFIT ORGANIZATIONS IN CONDITIONS OF GLOBALIZED ECONOMY	2620
MARECEK JAN, MACHOVA VERONIKA IMPORTANCE OF ANALYZING THE DEVELOPMENT OF THE NATIONAL ECONOMY IN THE CONTEXT OF A GLOBAL WORLD	2629
MASTALERZ-KODZIS ADRIANNA METHODOLOGY OF MEASUREMENT OF SOCIO-ECONOMIC DEVELOPMENT IN GLOBALIZATION CONDITIONS - SPATIAL ANALYSIS OF SELECTED CHARACTERISTICS	2637
MISKIEWICZ-NAWROCKA MONIKA THE POPULATION LIVING STANDARD IN AGING EUROPE.....	2644
MLYNAROVA DENISA, SCERBA KAMIL, ORVISKA MARTA ENVIRONMENTAL PUBLIC EXPENDITURES ON DIFFERENT GOVERNMENTAL LEVELS	2652
MORESOVA MARIA, SEDLIACIKOVA MARIANA GLOBALIZATION TRENDS AND THEIR IMPACT ON ECONOMIC AND SOCIAL ASPECTS OF HOUSING.....	2660
MUCHA BORIS, BRESTOVANSKA PATRICIA, PERACEK TOMAS, STRAZOVSKA LUBOMIRA SPECIAL FEATURES OF FAMILY BUSINESS IN THE CONTEXT OF GLOBALIZATION	2668
MYSLYAKOVA YULIYA, ZAKHAROVA VICTORIA EVALUATION OF INNOVATIVE INDEX OF INDUSTRIAL DEVELOPMENT FOR BRICS MEMBER COUNTRIES IN GLOBALIZATION CONDITIONS	2676
NAGRANOVA MARIA SOCIO-ECONOMIC IMPLICATIONS OF GLOBALIZATION – THE BENEFIT OR THE THREAT?	2683
NEMTSEV VIKTOR N., VASILYEVA ANASTASIA G. CYCLICAL AND INNOVATIVE DEVELOPMENT OF THE INSURANCE MARKET IN CONTEXT OF GLOBALIZATION.....	2688
NOVAK DAVID IMPACT OF CLIMATE CHANGE ON INSURANCES AND INSURED	2696
NOVIKOV ANDREY V., ALPATOV GENNADIY E. ECONOMIC DEVELOPMENT OF SOCIETY: INSTITUTIONAL FEATURES AND GLOBALIZATION PREREQUISITES	2704

NOVY MILOS

GLOBALIZATION AND DUAL QUALITY OF FOOD AND DRUG PRODUCTS 2711

PALIDEROVA MARTINA, MICUROVA SKOLKOVA SLAVOMIRA

COMPARISON OF THE TAX BURDEN ON NATURAL AND LEGAL PERSONS IN THE SLOVAK REPUBLIC AND IN THE CZECH REPUBLIC IN GLOBAL ECONOMY CONTEXT 2719

PASHKUS VADIM Y., PASHKUS NATALIYA A., PASHKUS MARGARITA V.

STRATEGIC POSITIONING OF TERRITORIES IN THE GLOBAL ECONOMY: BRAND DEVELOPMENT IN ACCORDANCE WITH THE MATRIX OF COMPETITIVENESS OF TERRITORIES 2727

PAWLAS IWONA

DISPARITIES IN DEVELOPMENT IN THE LIGHT OF TAXONOMIC RESEARCH – EVIDENCE FROM SELECTED WESTERN HEMISPHERE COUNTRIES 2735

PELECKIS KESTUTIS, PELECKIENE VALENTINA, PELECKIS KESTUTIS K., LAPINSKIENE GIEDRE, POLAJEVA TATJANA, NEDELKO ZLATKO, POTOCAN VOJKO

SEARCH FOR EQUILIBRIUM OF NEGOTIATING POWERS IN BUSINESS NEGOTIATIONS UNDER CONDITIONS OF GLOBALIZATION (CASE OF MONOPSONY) 2743

REGNEROVA OLGA, REGNEROVA MARTA, STURCOVA JANA

WATER AS A PHENOMENON OF LIFE IN GLOBALIZED WORLD 2751

ROWLAND ZUZANA, VOCHOZKA MAREK

ANALYSIS OF THE DEVELOPMENT OF THE EU ECONOMY 2758

RUIZ CHICO JOSE, PENA SANCHEZ ANTONIO RAFAEL, JIMENEZ GARCIA MERCEDES

ANALYSIS OF THE AGRICULTURAL PRICE DIFFERENTIAL BY COUNTRIES WORLDWIDE, UNDER CRITERIA OF FOOD SECURITY OF SUPPLY 2766

SACZEWSKA-PIOTROWSKA ANNA

HIGHER EDUCATION AS A DETERMINANT OF POVERTY EXIT IN THE ERA OF GLOBALIZATION: A META-ANALYSIS 2773

SALGOVICOVA JARMILA

RELATIONSHIP BETWEEN THE CIRCULAR ECONOMY AND THE QUALITY OF LIFE IN A GLOBALIZED SOCIETY 2781

SHELUDKO IGOR, KIROVA MILENA

MODIFICATION OF DATA ENVELOPMENT ANALYSIS FOR RISK RANKING IN INTERNATIONAL BUSINESS 2789

SIMONOVA STANISLAVA, FOLTANOVA NIKOLA

APPLYING THE GLOBAL PRINCIPLES OF THE SUSTAINABLE DEVELOPMENT FOR BETTER QUALITY OF LIFE 2797

SOLTES VIKTOR, REPKOVA STOFKOVA KATARINA

IMPACT OF GLOBALIZATION ON SELECTED QUALITY OF LIFE INDICATORS 2805

SREDL KAREL, SOUKUP ALEXANDR, RODONAIA ELIZBAR

GLOBAL BUSINESS IN CANNED FOOD MARKET 2813

STANEK DUSAN, POLAKOVA ZDENKA GLOBALIZATION AND ITS IMPACT ON DIVERGENCE IN THE EU WITH REGARD TO THE DIRECTION TOWARDS TRADE WARS.....	2821
STOFKOVA ZUZANA, GOGOLOVA MARTINA, HRASKOVA DAGMAR, STALMASEKOVA NATALIA E-HEALTH AS A SUPPORTIVE FACTOR OF IMPROVING QUALITY OF LIFE	2830
STRAPUC CONSTANTIN SUBTERRANEAN ECONOMY IN GLOBALIZATION ERA	2838
STRAZOVSKA LUBOMIRA, SULIKOVA ROZALIA, RAFAJ PETER BENCHMARKING AS A TOOL FOR EFFECTIVE ENHANCEMENT OF SLOVAK CITIES AND REGIONS IN THE GLOBAL ENVIRONMENT	2846
SULDINA GALINA, SADYRTDINOV RUSLAN, VLADIMIROVA SVETLANA QUALITY OF LIFE EVALUATION FOR LARGE CITIES IN GLOBALIZED WORLD..	2854
SWADZBA SLANISLAW GLOBALIZATION IN THE NEW COUNTRIES OF THE EUROPEAN UNION.....	2862
SWADZBA URSZULA THE ECONOMIC KNOWLEDGE OF THE YOUNG GENERATION OF VISEGRAD GROUP COUNTRIES - A SOCIOLOGICAL ANALYSIS	2870
SWIETLIK BEATA SHELTERED WORKSHOPS AS ONE OF THE METHODS OF PREVENTING GLOBAL SOCIAL EXCLUSION OF THE DISABLED	2878
VESELKOVA ALEXANDRA QUALITY OF THE EDUCATION SYSTEM VERSUS COMPETITIVENESS	2886
VOJTKOVA MARIA GLOBAL PROBLEM OF POVERTY WITH A FOCUS ON INCOME AND MATERIAL DEPRIVATION IN SLOVAKIA	2894
VOLEJNIKOVA JOLANA, KUNHARTOVA LENKA GLOBALISATION AND ECONOMIC POSITION OF SENIORS IN THE CZECH REPUBLIC.....	2902
ZEUG-ZEBRO KATARZYNA SPATIAL ANALYSIS OF THE STANDARD OF LIVING OF THE POPULATION IN THE EUROPEAN UNION.....	2910
ZIEMELIS MARIS, RADIN MICHAEL A., IEVINS JANIS WORK SAFETY SYSTEM IMPROVEMENT AND DECREASING WORK ENVIRONMENT RISKS IN CONSTRUCTION INDUSTRY	2918

EVALUATION OF ONLINE GROCERY SHOPPING BASED ON THE HYPE CURVE CONCEPT

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Abstract. Globalization has an impact on changes in consumer habits and the purchasing behaviour of customers. In this context customer demand better and more innovative products and services. That has also been reflected in grocery sales where a major innovation of today is online grocery shopping through various platforms and technologies. Each innovation is accepted by its users in a different time horizon, but the path from the introduction to the plateau of productivity on the market is the same. The path of innovation is called the Hype Curve. By this curve it is possible to gauge at what stage of innovation the innovation is. The Hype Curve can be an important guideline for companies that recognize the importance of innovation as a factor of competitiveness. The aim of this paper is to evaluate into which phase in the concept of Hype Curve is online grocery shopping on the Czech market. Secondary data on the penetration of online grocery shopping and the publicity of this innovation on the Czech market will be used to identify this phase. Research outcomes are useful for strategic managers of traditional retail organizations that decide to switch to the e-tail or hybrid form. The results of this paper can also help retail organizations that are already trading in this market in deciding on the adoption of further innovations linked to OGS. Voice Purchases, Augmented and Virtual Reality, Chatbots, Smart Refrigerators, Echo Amazon and Amazon Dash, Delivery Droids and 3D technology are the other innovations that this paper also deals with.

Keywords: globalization impact, innovations, Hype Curve, Online Grocery Shopping, changes in customer behaviour

JEL Classification: L81, M21, M31, F19, F60

1. Introduction

Globalization is currently a widely discussed concept. Globalization causes certain phenomena that open up huge opportunities on the one hand (border disappears, mobility is increasing, which for some people presents freedom and enormous opportunities for learning), but also bring problems (it can be a source of anxiety for part of the population) (Vysekalova, 2011). Globalization also caused structural problems in the welfare states such as unemployment increased and social problems which arose from labour market rigidity and public financing deepened (Yay & Aksoy, 2018). Despite that, economic globalization is an important determinant that has and continues to alter the lifestyle and consumer preferences of economic agents as well as their political, social and even environmental realities (Coulibly et al., 2018; Pan et al., 2017).

Now we are in the so-called third phase of globalization. This phase is characterized by the fact that attention is drawn to the needs of buyers with the growing influence of individuals on the whole market. There is an increasing need to tailor products to local markets and

underestimate the power of consumers. Customization and personalization are the hallmarks of the third era of globalization. Due to globalization processes, there are changes in consumer habits and behaviour. (Vysekalova, 2011)

New technologies are key to the third stage of globalization, making it easier for people to find products, services and communities that are close to them (Vysekalova, 2011). Technological uncertainty in the firm's environment affects its risk preferences differently depending on its technological capabilities (Schubert et al., 2018; Hashai, 2018), strategic flexibility (Dai et al., 2018) innovation processes (Kriz & Welch, 2018; Kumaraswamy et al., 2018) and business models (Cozzolino et al., 2018). New technologies also intervene in the workplace and support work from home (Daniel et al., 2018) or multicultural social networks promote idea flow and creativity (Chua, 2018). Globalization has also been reflected in online grocery sales. Internet and new technologies are massively expanding and have changed consumers in their everyday lives so much that online shopping has become a phenomenon (Bauerova & Klepek, 2018). This paper deals with online grocery shopping as a consequence of changes in consumer behaviour due to globalization in the Czech Republic. The most commonly reported benefit of online grocery shopping is convenience (Haridasan & Fernando, 2018; Pan et al., 2017; Kang et al., 2016; Chintagunta et al., 2012), but also time savings, home delivery, access to multiple retailers (Kang et al., 2016), economic value and wide assortments of products (Huebner et al., 2016) are the benefits of this type of shopping. Therefore online grocery shopping through various platforms and technologies can be perceived as a major innovation of today's world with a huge potential. Each innovation is accepted by its users in a different time horizon, but the path from the introduction to the plateau of productivity on the market is the same in most cases. Hype Curve is known as this path of innovation.

Hype Curve specification

The Hype Curve, known as Gartner's Hype Cycle, offers an overview of the relative maturity of technologies in a certain domain (Linden & Fenn, 2003). This curve is not a new phenomenon, but one that repeats itself with each innovation that somehow captures people's imagination (Fenn & Raskino, 2008). The fact that the Hype Curve is still being used is evidenced by studies based on this curve such as energy storage technology (Khodayari & Aslani, 2018), or proton pump inhibitor (Heading, 2017). The Hype Curve provides not only a scorecard to separate hype from reality, but also models that help enterprises decide when they should adopt a new technology. (Linden & Fenn, 2003). The Hype Cycle adds another dimension to technology life cycle models, which makes this model different from S-Curve or Adoption Curve. The added dimension characterizes the typical progression of an emerging technology from user and media overenthusiasm through a period of disillusionment to an eventual understanding of the technology's relevance and role in a market or domain (Linden & Fenn, 2003). Each Hype Cycle drills down into the five key phases of technology's life cycle, which are innovation trigger, the peak of inflated expectations, a trough of disillusionment, the slope of enlightenment and plateau of productivity (Gartner, 2018). The Hype Cycle phases can be specified as follows:

The **Innovation Trigger** is characterized by two subphases, which are technology trigger and on the rise. The technology trigger is a technological breakthrough, public demonstration, press release or another event that generates significant publicity and industry interest in an emerging technology. Typically no usable products exist, only research and laboratory prototypes. On the rise, subphase is characterized by the situation that media articles explain the technology and discuss its potential impact on business and society. Products with high

margin are specified for this subphase because vendors are still trying to recover R&D costs, and the technology is expensive compared to its cost of production. (Linden & Fenn, 2003)

The **Peak of Inflated Expectations** is characterized by the increasing the number of vendors offering the technology. These vendors are primarily startup companies and small vendors. These companies try to use the increasing amount of hype for their marketing benefit. A growing number of enterprises start to examine how the technology may fit within their business strategies, although most of them do not take action. (Linden & Fenn, 2003)

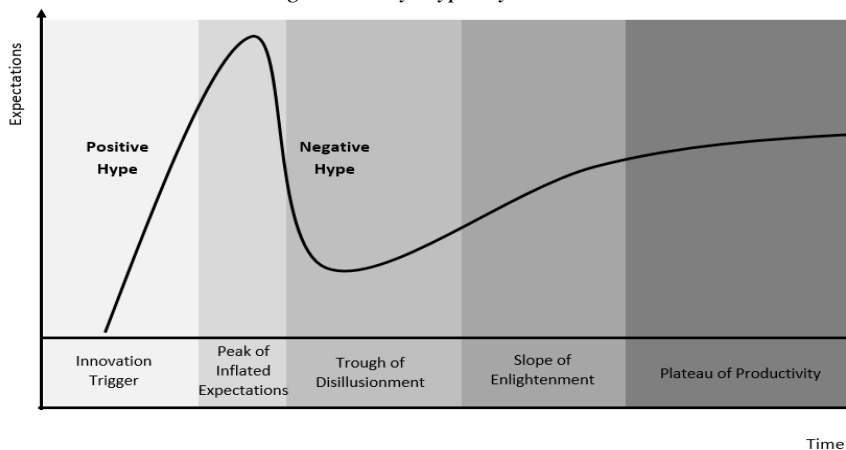
A **Trough of Disillusionment** is caused by that technology does not live up to enterprises' and the media's over-inflated expectations, it is rapidly discredited. Media interest wanes, except for a few cautionary tales and highly publicized failures. (Linden & Fenn, 2003)

The next phase is the **Slope of Enlightenment**. Climbing the slope of enlightenment is specify as focused experimentation and real-world experience by an increasingly diverse range of enterprises lead to a better understanding of the technology's applicability, risks and benefits. Companies seek mezzanine or later-round funding for marketing and sales support to pull themselves up the slope. (Linden & Fenn, 2003)

The **Plateau of Productivity** represents the beginning of mainstream adoption when the real-world benefits of the technology are demonstrated and accepted. Technologies in this stage become increasingly embedded into solutions that increasingly are "out of the box," with decreasing service elements as the technology matures. Technology in this stage often evolves the ecosystem around it, which supports multiple providers of products and services, and also a market for related products and services that extend or are based on the technology. (Linden & Fenn, 2003)

The mentioned phases are visible on the visualization of the Hype Cycle in figure 1.

Figure 1: Thy Hype Cycle elements



Source: (Gartner, 2018); own visualization based on Gartner' Hype Cycle

2. Methods

Given that the aim of this paper is to evaluate into which phase in the concept of Hype Curve is online grocery shopping on the Czech market, so the secondary data on the penetration of online grocery shopping and the publicity of this innovation on the Czech market was used to identify this phase. Since the Hype Curve is characterized by an added dimension that characterizes the typical development of emerging technology from user and media

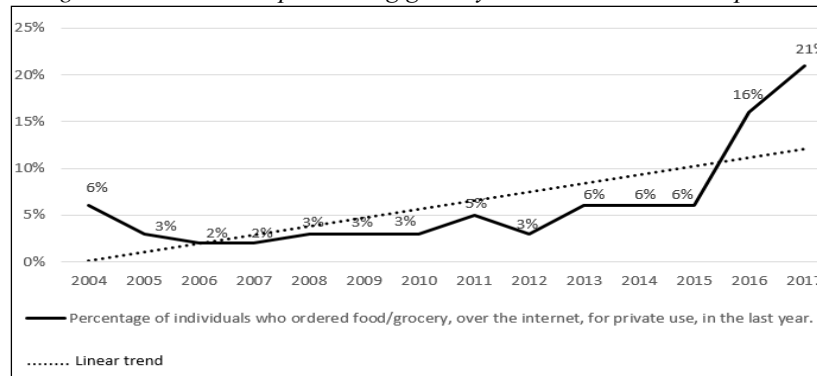
overenthusiasm, the online grocery shopping evaluation from the point of view of the hype curve was done through the following steps.

The first step was to analyse the time series of Czech individuals shopping grocery online to define customers' interest in this technology. The second step was to analyse the articles in Czech online media through time to find how much is online grocery shopping popularized. The Google search engine with editing in search of only Czech pages in news category was used for searching the articles. Both the title of the article and its content were analysed to obtain relevant data on the publicity of the technologies in question. At this step, other technologies that are related to online grocery shopping have also been analysed. Data were analysed at an annual frequency. Given that the paper is written in July 2018, data for 2018 were analysed only by the end of June this year. In the last step, a Hype Curve for online grocery shopping in the Czech market was created. Subsequently, the individual technologies were plotted in the corresponding phases of the Hype Curve, based on the analyses performed.

3. Results

The first step was to analyse the individuals' popularity of online grocery shopping in the Czech Republic. The growing popularity of online grocery shopping in the last two years in time series is evident from figure 2. By analysing this time series it can be said that online grocery category can have a high growth potential due to change in customers' purchasing behaviour appearing in 2016 when purchasing grew rapidly over the previous years. From 2015, this category has grown to 21% of individuals purchasing grocery online in 2017. Two people out of 10 purchasing grocery online in the Czech Republic in 2017. A continuous growth linear trend along with the timeline length suggests online grocery shopping could be put into the Peak of Inflated Expectations phase on the Hype Curve.

Figure 2: Individuals' purchasing grocery online in the Czech Republic



Source: own visualization based on Eurostat database (2018)

The second step was to evaluate online grocery shopping and other technologies that are or can be used for online grocery shopping from a publicity point of view. The analysed technologies are listed along with the number of articles in the reports in table 1.

As in the study of individuals purchasing grocery online was found the growing popularity, so in the investigation of publicity, it was found that in 2016 and 2017 publicity increased significantly. Articles in magazines are positively oriented on the subject, but there are references to logistics and distribution issues in 2017 and 2018, which are very important for the online sale of grocery to ensure freshness. Based on this finding, online grocery shopping can be included in the Peak of Inflated Expectations Phase.

Voice purchases have been appearing slightly in articles just recently. The same applies to Smart Refrigerators, Amazon Dash and Delivery Droids. These technologies can be integrated into the Innovation Trigger phase for the Czech market. Other technologies are reported very often in news. So-called virtual reality is often associated with a wider reality that is perceived more positively. These technologies are already at the very top for a long time, and we can see that negative hype might occur.

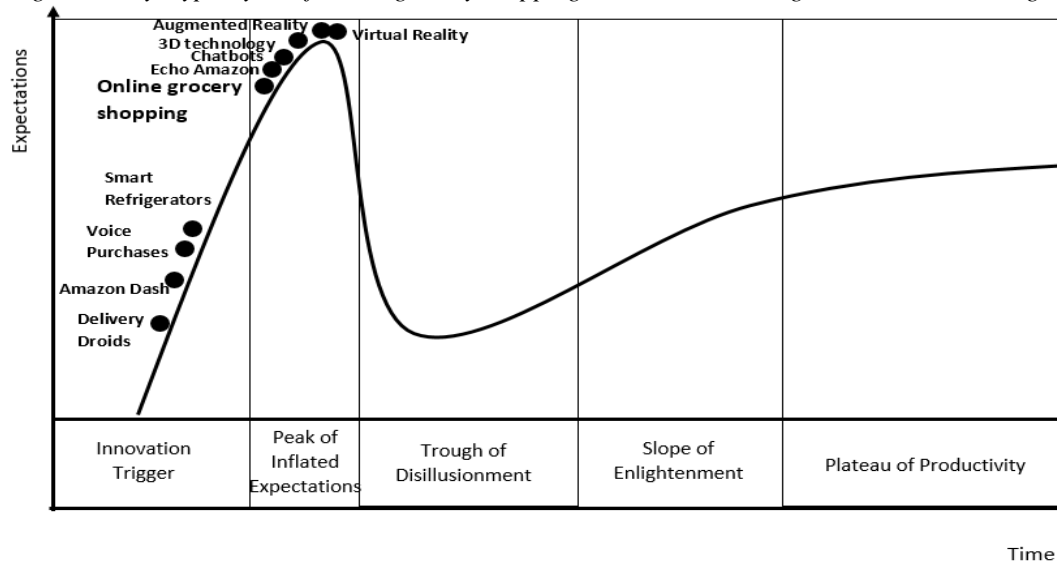
Table 1: The findings of articles analysis

Type of technology	A number of articles written about each technology										
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	01.-06. 2018
Online grocery shopping	1	0	3	2	10	7	18	35	54	53	28
Voice Purchases	0	0	0	1	0	0	1	3	1	3	5
Augmented Reality	0	3	4	2	13	11	16	17	71	161	151
Virtual Reality	10	15	19	8	22	30	64	140	170	173	168
Chatbots	0	1	9	2	9	8	7	4	38	135	132
Smart Refrigerators	0	0	0	1	0	6	4	4	6	9	7
Echo Amazon	0	0	0	0	0	1	2	2	41	121	99
Amazon Dash	0	0	0	0	0	0	0	1	3	3	0
Delivery Droids	0	0	0	0	0	0	0	0	0	0	1
3D technology	28	37	47	49	67	66	167	168	180	182	172

Source: Own Calculation

Based on the analyses, a Hype Curve has been created to capture online grocery shopping together with other technology related to this topic. In total, four technologies (Voice purchases, Smart Refrigerators, Amazon Dash and Delivery Droids) were included in the innovation trigger phase due to their publicity. Other technologies (online grocery shopping, Augmented Reality, Virtual Reality, Chatbots, Echo Amazon, 3D technology) were included in the Peak of Inflated Expectations phase. The generated Hype curve is shown in Figure 3.

Figure 3: Thy Hype Cycle of online grocery shopping and other technologies related to e-tailing



Source: own visualization based on analyses

4. Discussion

The major findings of this study are, that online grocery shopping is in the Peak of Inflated Expectations stage in the Czech market. Together with increasing customer popularity and newspaper publicity, this category has the potential for growth in the future. However, due to insufficient logistics and distribution facilities, the negative hype may occur. It can be said that it is only a matter of time before online grocery shopping gets into the Trough of Disillusionment phase of Hype Curve. Online grocery shopping on the Czech market exactly matches the Peak of Inflated Expectations specified by as the number of vendors offering this service is increasing (Linden & Fenn, 2003). These vendors are mainly small companies, such as košík.cz, rohlík.cz or sklizeno.cz. Also, the growing number of businesses are beginning to see how service can fit into their business strategies, though most of them do not take action (for example these merchants: Globus, Kaufland)

Whereas when online grocery shopping gets to the Plateau of Productivity stage of Hype Curve, it will need to be supported by other technologies and services, so other technologies have been explored in this paper. Four of these technologies were included in the innovation trigger phase, as media articles explain the technology and its potential impact on business and society, but products have a high margin and technology that is costly compared to its cost of production. These technologies are Voice purchases, Smart Refrigerators, Amazon Dash, Delivery Droids. The rest of the investigated technologies (Virtual and Augmented Reality, 3D technology, Chatbots, Echo Amazon) were then included in the Peak of Inflated Expectations phase due to their publicity lengths in the market.

5. Conclusion

Globalisation caused the changes in consumers' behaviour preferences. Consumers are more interested in new technologies and searching products and services online. Due to globalization processes, there are also changes in consumer habits and behaviour in grocery shopping. While until recently most of the customers preferred the traditional retail stores, in 2017, already 21% of them shops grocery online in the Czech Republic. In connection with high publicity, we can

speak of a large potential market that is currently in the Peak of Inflated Expectation in Hype Curve. Other technologies are also associated with the sale of grocery online. Some of them are still at the stage of the innovation trigger on the Hype Curve (Voice purchases, Smart Refrigerators, Amazon Dash, Delivery Droids), while others can be expected to have a negative hype (Virtual and Augmented reality). Choosing technology to promote online grocery shopping is an important aspect of the long-term functioning of this service on the market. However, each of these technologies is demanding high investment at this stage, which will probably return to a business organization after a long time in the Plateau of Productivity phase.

Acknowledgment

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"SMART LIVING" AS ONE OF THE ASPECTS OF THE FORMATION OF THE "SMART CITY"

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Abstract. Today, cities are the main forces of economic development, and have occupied a central place in production, consumption, defining social and economic relations and, currently provide a significant share of gross domestic product at the regional level. Cities play a critical role in national, regional and global development. Of course, the quality of living of people in the region depends on them. So today, cities must meet special requirements, such as the availability of urban infrastructure, mobility, security, urban areas, environmental friendliness, development of city self-management, quality and comfortable accommodation. Implementation in totality of the above factors, allows us to classify this type of city to a new kind called a "smart city", one of the basic philosophy principles of which is safe and comfortable accommodation. The purpose of the paper is theoretical and methodological substantiations of the concept of "smart living" as the most important aspects of the formation of "smart cities" from the standpoint of population provision with affordable and comfortable housing. Subject of paper – factors, that determine the comfort and affordability of residential real estate smart cities, and the object of research – the sphere of housing construction of the city, providing safe and comfortable accommodation. The results of testing the author's approach proves the possibility of the implementation of measures to achieve the General goal of providing the population with quality and affordable housing to meet the quality standards of granting housing and communal services as one of the basic principles of the smart city philosophy.

Keywords: smart city, housing construction, comfortable accommodation, regional construction cluster public-private partnership

JEL Classification: R11, R15, P41

1. Introduction

Today, cities play a critical role in national, regional and global development. From them, of course, depends on the quality of living of people in the region (Dameri, 2013). So today, more than ever, cities must meet special requirements, such as the availability of urban infrastructure, mobility, security, urban areas, environmental friendliness, development of city self-management, quality and comfortable accommodation (Komninos, 2006). Implementation in totality of the above factors allow us to classify this type of city to a new kind called a "Smart City", one of the basic principles of the philosophy which is safe and comfortable

accommodation (Hollands, 2008). The topicality of the formation of the concept of development of Volgograd as a "Smart City" and the Volgograd region as a "Smart Region" is not in doubt as the population of the region, and outside researchers. The results of the various rankings confirm the fact that the potential of the city and region not being used. Thus, in modern dynamically changing conditions of the external environment to which we include the economy, demographic situation, scientific and technological progress, and policy of particular relevance is the concept of "smart cities", "smart region" (Anthopoulos & Fitsilis, 2010). The above explains the relevance of the paper in which the authors relied on foreign scientists: Dameri 2013; Su, 2011; Hollands, 2008; Schuler, D., Komninos, 2006; Couclelis, 2004; Anthopoulos & Fitsilis, 2010; Ergazakis et al., 2004; Batagan, 2011.

2. The definition of the terminology

One of the basic principles of the philosophy of "Smart City" is safe and comfortable living. Therefore, the primary task and at the same time the current urgent problem of cities is the lack of comfortable housing. Ensuring the creation of convenient and comfortable housing, as well as reducing the cost of its subsequent operation is possible only with a view to reducing the cost and unification of building structures, the use of information and communication technologies and new materials (Couclelis, 2004). It is also obvious that with the development of construction technologies and standards, previously built housing should be suitable for redevelopment and implementation of innovative engineering management systems according to the standard of smart homes (Su, et al., 2011).

Having studied various theories and concepts to the genesis of the term "Smart City", presented in the works of foreign scientists, the authors formulated from the standpoint of a systematic approach to their understanding of this socio-economic and technological phenomenon (Ergazakis et al., 2004). Thus, according to the author's terminology, *"Smart City" is a holistic system, which implements an integrated approach to the management and development of the territory, taking into account environmental factors.* The authors identify the following subject aspects of the formation of "Smart City": 1. «Smart urban planning», from the position of territorial zoning and development of suburban areas; 2. «Smart living», in terms of provision of affordable and comfortable housing; 3. «Smart complex of housing and communal services»; 4. «Smart economy», from the standpoint of industrial development; 5. «Smart mobility (transport)»; 6. «Smart energy» from the perspective of smart energy saving; 7. «Smart entrepreneurship» (Batagan, 2011).

3. Questions, hypotheses, and methods

To achieve the goals of present paper, we solved the followed problem and questions: 1) selected key indicators, on the basis of which it is possible to evaluate the level of comfort and availability of residential real estate smart cities; 2) were set targets for selected indicators to monitor the achievement of objectives – the provision of a smart city quality and affordable housing; 3) developed measures, activating the processes of development of the construction industry smart city on the basis of the starting mechanism of the formation of the construction cluster, as well as justifies the basic conditions for their implementation to achieve targets.

Methodologically, paper is based on comprehensive and systematic approaches with the use of a comparative, retrospective, statistical, mathematical, logical, cluster analysis, modeling and forecasting. The development of residential areas and new housing construction with provision of comfortable living conditions and quality housing and communal services is one of the

priority tasks affecting the quality of life of the population. Thus, for the transformation of Volgograd into a "Smart City", and the Volgograd region into a "Smart Region" it is necessary, among other things, to provide the population with quality and affordable housing, taking into account the quality standard of housing and communal services.

This paper is devoted to the issues of smart living, from the standpoint of the provision of affordable and comfortable housing. Its logical sequence is represented by the need to implement the following structure of tasks: 1. The selection of key indicators; 2. Setting targets for selected indicators; 3. Development of activities to achieve targets.

As key indicators on the basis of which it is possible to assess the level of comfort and availability of residential real estate, the authors identified the following: 1. The total area of residential premises, falling on average per inhabitant (sq. m.); 2. The ratio of the average cost per square meter of residential real estate and the average monthly nominal wage (%); 3. Share of household expenditure on housing and communal services (%); 4. Housing improvement (%).

4. Results

The analysis of the current situation in the field of provision of the population of the Volgograd region with comfortable and affordable housing is presented below. Classic social norms provide residential real estate (formerly assigned by the housing legislation) is 18 sq. m. per one citizen, 42 sq. m. for a family of two people, 33 sq. m. for living alone. In the housing legislation of the Russian Federation provides that the provision of the area of premises is established by local government depending on the level of security achieved in the relevant municipality with the premises provided under contracts of social hiring, and other factors. According to the decisions of the Volgograd city Council, the norm of providing the area of premises under the contract of social hiring in Volgograd is reduced to 14 sq. m. of the total area per person. The minimum sanitary norm of living space has an index equal to 6 sq. m. per person.

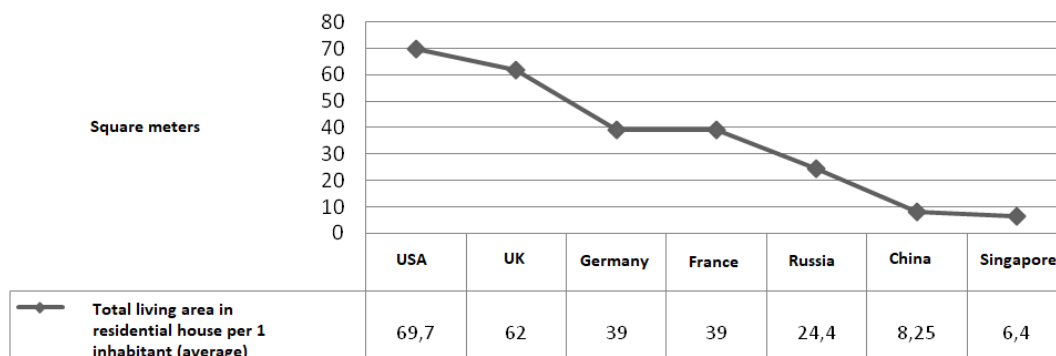
Table 1: The total area of residential premises, which accounts for an average of one resident (sq. m.)

Russian regions / Years	2012	2013	2014	2015	2016	2017
Russian Federation (as a whole)	22,6	23	23,4	23,4	23,7	24,4
Volgograd Region	21,3	21,6	22	22,3	22,8	23,3

Source: Data of Federal state statistics service (<http://www.gks.ru/>)

The data of tab. 1 allow us to state that despite the fact that the social norm of provision of the population with housing both in the Russian Federation as a whole and for the Volgograd region is being fulfilled, it is necessary to increase both the social norm and the actual provision of the population with living space.

Figure 1: Comparison of the total area of residential premises per inhabitant (on average) in different countries



Source: compiled by paper authors

For comparison, the average security of an inhabitant with the residential real estate in developed countries is: USA – 69.7 sq. m., UK – 62 sq. m., Germany – 39 sq. m., France – 39 sq. m. (Martin et al., 2016). Thus, based on the data of statistics and common sense, the authors determine the target for the key indicator – the increase in the provision of the population of the region with residential real estate to the European level of 39 sq. m. per inhabitant (the level of Germany, France).

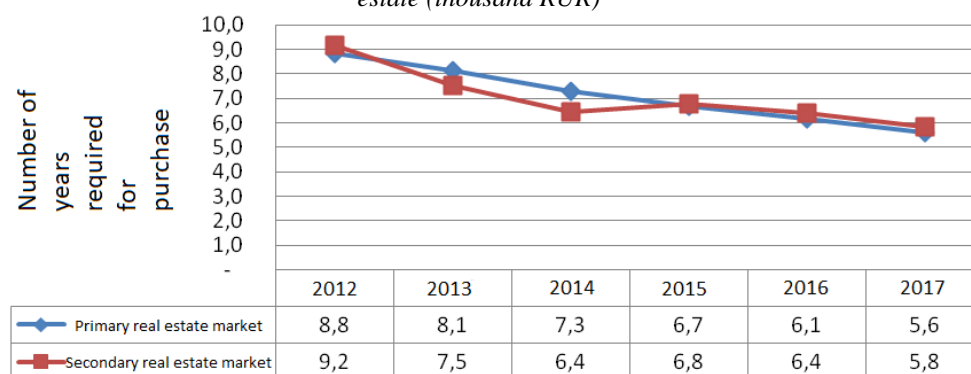
Table 2: The ratio of the average cost per square meter of residential real estate and the average monthly nominal wage (%) in the Volgograd region and in the whole of the Russian Federation

Years	Average nominal wage, thousand RUR		Average price per 1 sq. m. in the primary housing market, thousand RUR		Average price per 1 sq. m. in the secondary housing market, thousand RUR		The ratio of average income and average cost of housing in the primary market		The ratio of average income and average cost of housing in the secondary market	
	Volgograd region	Russian Federation	Volgograd region	Russian Federation	Volgograd region	Russian Federation	Volgograd region	Russian Federation	Volgograd region	Russian Federation
2012	14,86	21	37,40	48,1	38,90	60	0,40	0,44	0,38	0,35
2013	16,19	23	37,60	43,7	34,80	48,2	0,43	0,53	0,47	0,48
2014	18,58	27	38,70	48,2	34,20	56,4	0,48	0,55	0,54	0,47
2015	21,05	30	40,00	50,2	40,60	56,5	0,53	0,59	0,52	0,53
2016	22,83	32	40,10	51,7	41,60	58,1	0,57	0,63	0,55	0,56
2017	24,36	34	38,90	51,5	40,60	56,3	0,63	0,66	0,60	0,60

Source: Data of Federal state statistics service (<http://www.gks.ru/>)

As the data of tab. 2 show, during the analyzed period from 2012 to 2017 there is an increase in the average nominal wage, the growth rate is significantly ahead of the growth rate of the average price per 1 sq. m. both in the primary and secondary real estate markets. At the same time, the average nominal wage does not allow the average family of two to meet one of the basic needs of a comfortable stay, namely the acquisition of a comfortable home. Thus, the authors calculated the required number of years for the acquisition of social norms of housing for a family of two people (i.e. 42 sq. m. of residential real estate) on the basis of the average nominal wage.

Figure 2: Dynamics of the number of years required for the acquisition of real estate in the Volgograd region, taking into account the average wage (thousand RUR) and the average cost per square meter of real estate (thousand RUR)



Source: compiled by paper authors

The data of fig. 2 clearly demonstrate that at the end of 2017 it is necessary to postpone the monthly salary of one of the residents for almost 6 years in order to obtain the necessary value. The calculations used the following assumption: family of two people fully meets their living needs at the expense of one of the residents, the salary of the second family member is completely postponed for accumulation. As we can see, the required number of years for the acquisition of social norms of residential real estate has decreased from 9.2 in 2012 to 5.8 in 2017, but continues to be significantly high. In order to reduce the number of years required for the acquisition of the social norm of housing for a family of two to 2, it is necessary that the ratio of the amount of accrued wages and the average value of the square meter of residential real estate is not less than 0.88. Therefore, the authors set a target for the key indicator – to increase the indicator to at least 0.88 units.

Table 3: The share of household expenditures for housing and communal services (%)

The Region Of Russia / Years	As a percentage of total consumer spending					
	2012	2013	2014	2015	2016	2017
The Russian Federation As A Whole	9,2	9,5	8,8	8,8	8,9	9,5
Central Federal District	8,7	9,7	8,6	8,6	9,2	10,3
City Of Moscow	5,7	8,3	6,7	6,6	6,7	8,3
North-West Federal District	9,9	10	9,6	10	9	9,2
Saint-Petersburg	8,7	9,4	9,1	9,4	7,6	7,5
Southern Federal District	9,5	9,7	9,6	9,7	9,3	9,1
Adygeya Republic	8,4	7,1	7,6	8,7	8,7	9,3
Republic Of Kalmykia	6,9	8,1	7,2	9,2	10,6	9,8
Krasnodar Region	8,6	9,6	10	9,4	8,8	8,2
Astrakhan Region	6,7	6,3	6,7	6,6	7	6,9
Volgograd Region	10,8	10,7	8,9	9,5	9,6	9,6
Rostov Region	11	10,6	10,9	11	10,5	10,6

Source: Data of Federal state statistics service (<http://www.gks.ru/>)

As shown in tab. 3, in the structure of the actual final consumption of households, the cost of housing and communal services of the Volgograd region at the end of 2017 amounted to

9.6%, which is higher than the all-Russian indicator and the average for the southern Federal district. At the same time, the share of housing and communal expenses in such cities as Moscow and St. Petersburg, Krasnodar region is significantly lower: 8.3%, 7.5%, 8.2%, respectively. Based on the fact that the standard of living of the population of the Volgograd region is lower than in the capital (the city of Moscow and Moscow region) authors as the target for key indicator asked a reduction of expenses on payment of utility expenses to the level of the city of St. Petersburg, in the amount of 7.5% of the total amount of consumer spending.

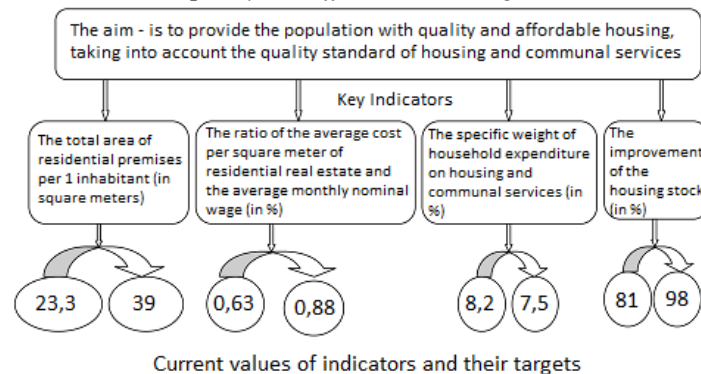
Table 4: Improvement of housing stock in 2017 (%)

Region of Russia Federation / Indicator	The average % of improvement of the housing stock (excluding hot water and gas)	Specific weight of the total area, equipped with:				
		Cold Water Supply	Water Disposal (Sewerage)	Heating	Gas (Network, Liquefied)	Hot Water Supply
The Russian Federation As A Whole	81,2	81,4	76,8	85,4	66,7	68,1
Central Federal District	84,80	84,2	81,3	88,9	69,7	74,3
City Of Moscow	98,90	98,8	98,6	99,3	42,9	94,3
North-West Federal District	81,67	82,4	80,2	82,4	62,2	73,2
Saint-Petersburg	98,53	98,8	98,2	98,6	62,2	95
Southern Federal District	79,17	79,8	75	82,7	83,6	65,6
Adygeya Republic	85,13	81,4	77,7	96,3	73,9	74,4
Republic Of Kalmykia	67,47	54,9	49,4	98,1	98,4	44
Krasnodar Region	78,20	80,8	76,6	77,2	79	65
Astrakhan Region	82,33	83,6	73,1	90,3	85,9	65,5
Volgograd Region	81,67	79	75,3	90,7	90,3	69,5
Rostov Region	78,20	79,3	74,4	80,9	85,6	64,7

Source: Data of Federal state statistics service (<http://www.gks.ru/>)

As the data of tab. 4 show, the improvement of the housing stock of the Volgograd region leaves much to be desired: water supply is 79%, which is lower than the all-Russian indicator, water disposal (sewerage) – 75.3%, heating – 90.7%, gas – 90.3%, hot water – 69.5%. The average value of housing improvement for the Volgograd region is 80.96%. The leaders in the improvement of the housing stock are the cities of Moscow, St. Petersburg with an average share of water supply, Sewerage, heating – 98%. Thus, the set target for the key indicator is the achievement of housing development in the region of the value equal to 98%, which corresponds to the level of the capital region.

Figure 3: Key indicators and targets to monitor the achievement of the goal-to provide the population with quality and affordable housing



Source: compiled by paper authors

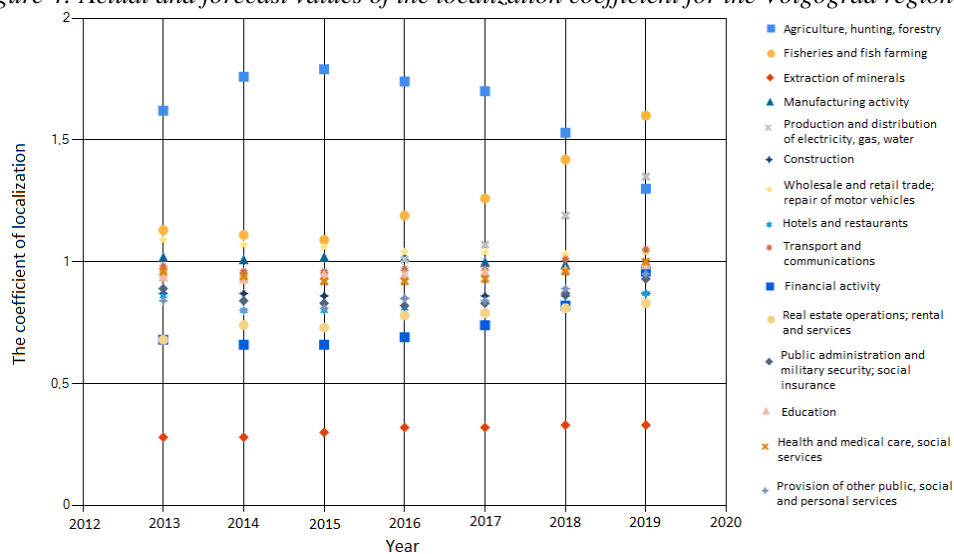
To achieve the goal – to provide the population with quality and affordable housing, taking into account the quality standard of housing and communal services (fig. 3), it is necessary to intensify the development of the construction industry of the city and the region as a whole. To activate the process of development of the construction industry in the city and the region, we consider it appropriate to launch a mechanism for the formation of a construction cluster by creating a cluster development center in the region. Thus, the development and promotion of the cluster initiative will follow the scheme of significant participation of the authorities at the initial stage, followed by a weakening of attention to the development of the cluster at the final stage (Herrmann et al., 2012). The results of sectoral employment forecasting are shown in fig. 4.

To assess the possibility and feasibility of creating a construction cluster in the region, the authors conducted a retrospective analysis of the industry employment of the Volgograd region with the employment forecast for 2018-2019. Calculations were carried out using the author's software "Oracle-1" (Certificate Of State Registration №2015612210 from 13.02.2015).

The calculation for the Volgograd region revealed the following: the value of the localization coefficient is greater than 1 (the industry dominates the region's economy) for: agriculture (1.7 for 2017; the forecast values of the coefficient are 1.53 and 1.3, respectively). For fishing, the localization coefficient was 1.25 in 2017; the calculated forecast values were 1.42 and 1.6, respectively. The next leader is wholesale and retail of 1.04 for 2017, the forecasted values for 2018 – 2019 is 1.03 and 1.04. The calculations of the index of industrial localization objectively reflect the picture of socio-economic development of the region, which characterized by a bias towards the service sector to the detriment of production, as well as the preservation of the traditional agricultural orientation of the region.

For the construction industry at the end of 2017, the localization coefficient is 0.86; the forecast values were 0.86 and 0.87 for 2018 and 2019, respectively, which according to the methodology developed by M. Porter, indicates the possibility of clustering the industry under study (Porter, 1986).

Figure 4: Actual and forecast values of the localization coefficient for the Volgograd region



Source: compiled according to the calculation of programs "Oracle-1"

In the author's model, which is proposed in this paper, the cluster is divided into two areas: *the area of private business and the area of state regulation*. The main directions of functioning of the field of state regulation are: consulting in the field of industrial training, the formation of a protective mechanism to ensure property rights, the procedure for subsidizing the share of the interest rate on loans and credits, surety, the implementation of regional projects on a target basis, the provision of land plots for the preparation of investment sites with developed infrastructure (Dominicis et al., 2013).

The area of private business in the author's model is differentiated into the following economic entities: financial institutions, construction complex and infrastructure institutions (Feldman et al., 2005).

To infrastructure institutions the authors include higher and secondary educational institutions that provide training and retraining of specialists of wide and narrow profile for enterprises forming a cluster, consulting firms working in the field of solving legal, marketing problems, as well as firms that, among other things, carry out outsourcing procedures and provide other services necessary for enterprises forming a cluster.

Financial institutions include banking structures, insurance companies, funds specializing in investment activities and companies engaged in leasing operations. Depending on the direction of its activities, financial institutions carry out the functions of investors; banking structures – lending functions; insurance companies hedge possible risks; leasing companies provide equipment rental services; funds specializing in investment activities – carry out the selection and financing of projects (Järvinen et al., 2012).

In the sphere of the construction complex within the framework of our study included firms directly involved in the design and construction, as well as organizations and enterprises of related industries with construction (Shibeika & Harty, 2015).

In the developed model of the territorial cluster (for the Volgograd region), the main position will be held by JSC "Center For Cluster Development". This center will interact with all members of the cluster, it is also expected that it will organize the activities and ensure the functioning of the entire cluster Association. Its sphere of influence will also include coordination of interactions, implementation of procedures for monitoring agglomerations

formed in industries. The center will also monitor the implementation of project decisions, will carry out procedures for finding and attracting financial sources for investment, as well as moderation of the dialogue with public authorities.

The most dense relationship will have to be formed between *JSC "Center For Cluster Development"* and the regional investment and construction complex. It will combine the following functions in the future: 1) *from the position of JSC "Center For Cluster Development"* – identification of economic entities that are potentially able to form a cluster, as well as the implementation of various types of support for small and medium-sized enterprises on the issue of feasibility in practice of cluster initiatives; 2) *from the position of business structures* – financial reporting and reporting on the development of selected sources of financing of investment projects, procedures for the project preparation of residential and industrial buildings; development of other projects – future facilities for investment and government support, including by representatives of private business interested in addressing these issues (Brentani & Kleinschmidt, 2015).

The pooling of financial resources of private enterprises and public funds will be carried out on the basis of Public-Private Partnership (PPP). Among the most actively used instruments for PPP today are: *investment agreements, lease and management agreements, special economic zones, concessions, joint ventures*.

Thus, in order to achieve the stated goal-to provide the population of the region with quality and affordable housing, taking into account compliance with the quality standards of housing and communal services, it is necessary to carry out the following activities:

1. The launch of the mechanism of formation of the construction cluster in the region, by creating in the region of the center for cluster development (for example, like in the neighboring regions: Astrakhan oblast (<http://www.astrackr.ru>), Tatarstan republic (<http://cluster-rt.ru>), Lipetsk oblast (<http://ckr48.ru>), and others).

2. Launch of projects for the reconstruction of housing and communal infrastructure on the basis of PPP projects (example of neighboring regions: 2.1. Construction and reconstruction of water supply and sanitation facilities of the city of Rostov-on-Don for a total amount of 37125.45 million RUR; 2.2. Reconstruction of water supply and Sewerage facilities of the Krasnodar region for a total of 10925 million RUR; 2.3. Reconstruction of water supply and sanitation systems in Krasnodar for a total amount of 3156.97 million RUR).

3. Formation of land plots for the construction of 7-10 million sq. m. of housing, including for low-rise construction (in the free territories of Volgograd).

4. Equipment land plots in the free territories by objects of municipal infrastructure (financing by raising loans under the guarantee (including municipal guarantee)).

5. Development of mortgage lending, including by subsidizing part of the interest rate.

6. Providing municipal support to residents of Volgograd for the purchase (construction) of their own (private) housing.

7. The formation of the effective mechanism of management of the housing stock in the city of Volgograd, which will be implemented by enhancing the role of owners of housing and the growth of the level of responsibility of the enterprises of housing and communal services, increase of efficiency of state and municipal control (supervision), licensing control.

8. Revitalization of unused (inefficiently used) territories: stimulation of transfer of industrial enterprises from the center of Volgograd to the outskirts for the use of these territories for residential or business development. Targeted urban development, which will change the structure of the economy of Volgograd, namely it will increase share of services, information, transport and logistics and other services.

5. Discussion

Thus, the study conducted by the authors confirms the need and the possibility of implementing the developed organizational and economic procedures to achieve the main goal-to provide the population with quality and affordable housing, taking into account compliance with the quality standards of housing and communal services, as one of the basic principles of the philosophy of "smart city". We believe that it is possible to achieve targets for key indicators in the long term, not earlier than 2030.

6. Conclusion

The proposed theoretical and methodological approach is an original, characterized by a high degree of certainty, universality and comparability, the possibility of verification of the forecast of the key indicators of comfort and availability of residential real estate smart city from a position of justification of the concept of "smart living" in it. The results of testing the author's approach proves the necessity and possibility of the implementation of measures to achieve the General goal of providing the population with quality and affordable housing to meet the quality standards of granting housing and communal services as one of the basic principles of the philosophy "Smart City".

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GEOLOCATION SERVICES AND THEIR IMPORTANCE IN SOLVING GLOBAL ENVIRONMENTAL PROBLEMS

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Abstract. One of the most important elements that can be used in marketing today is the location. Geotargeting provides extensive opportunities, but it can also be used to monitor the value added of marketing activities, which can be one of the pillars of social responsibility. In our case, it is the environmental aspect. The advantage of geotargeting lies in measurability and personalization that is incomparable with traditional media. The use of geotargeting is irreplaceable and its potential is constantly developing and growing in online environment. The main advantage lies in precise targeting, with the greatest possible intervention of the target group at the lowest cost. Geotargeting is mainly used by organizations or companies operating locally and which products are available on the regional or domestic markets. It is very important to be able to orientate correctly the use of location-based marketing to its benefit and to achieve the set goals of the company. However, this basic aspect of geotargeting has much wider potential and can be used in a wider context in favour of nature conservation or eco-innovation management. The contribution deals with the basic theoretical basics of location-based marketing and the use of geotargeting as well as other options related to the introduction of these services into practice and its interaction with globalization.

Keywords: Local-based marketing, Geotargeting, Eco-innovation, Location, Geomarketing.

JEL Classification: M31, L86

1. Introduction

Geomarketing is now more important than ever before. Nowadays, in global markets, it is important to make quick use of any available information and to be ahead of the competition. The globalization has important effect to changing market conditions. We can say that „the current society is characterized by the development of global processes and the interconnection of national economies” (Hes & Hesova). International competition affects the price of products and services. (Kicova & Nadanyiova) Companies can benefit from a geomarketing approach to sales, marketing and marketing planning. Geomarketing allows for better processing of information, enabling the combination of insular information on regional markets. Geomarketing includes geographic and visual analyzes of company data to identify trends and relationships, optimal scheduling of placement and sales territory. Using digital maps to display the market, customer and social groups allow effective decision making.

1.1 Use of geolocation in enterprises

Geolocation can be used in businesses in multiple areas. No matter what kind of industry is going on, businesses gather huge amounts of customer data. Most likely, much of this data has a geolocation component. The traditional example is Google Maps, which gives businesses the ability to see their data on a digital map. By displaying data in the Google Map Interactive app,

we can thoroughly analyze statistics, which allows us to identify information that we can use. Companies can customize their mapping solutions to fit their needs with customized filters (www.mavenwave.com/a). In the field of logistics, many companies use large data and geospatial analyzes to optimize route planning and time reduction provision of services. Another option is the implementation of interior navigation solutions to increase employee productivity, such as navigation on business premises. The main goal is more efficient management of the use of office premises and corporate assets. In the field of finance, investors focus on satellites or drones as a data source to make more informed commodity decisions and possibly predict consumer demand. In the field of advertising, the use of geolocation services is the most accurate. It allows for better ad targeting, the use of consumer geospatial data, as well as tracking the history of purchases and placements. In the amusement industry, Pokémon GO is the biggest mobile game that is a good example of a combination of cyberspace and the real world, while also experiencing expanded reality (AR). According to Shel Davis (www.mavenwave.com/b), each company should analyze the localization data they are already collecting. Furthermore, it is necessary to determine how they can use other data to achieve better business results. (Bai & Zhu, 2018; Fuller, 2018).

1.2 Geotargeting in marketing

Geotargeting is the process of locating a person by location through the user's IP address, but usually the router, which provides an Internet connection to other devices that are preferred to the GPS location (www.leanplum.com). In online environments, ad servers record and identify large databases in which IP addresses are recorded, sorted by other parameters (state, postcode). The minor disadvantages lie in the partial inaccuracy of the technology in open spaces, as well as the human instore targeting. Location is one of the most important elements that can be used in marketing. Marketing activities (advertising, campaigns) planned in a certain geographic area are often based on geolocation services that provide information about the physical surroundings of customers. Context aware applications provide information about the current location through mobile device location systems, including GPS, GSM, or Wi-Fi (Syagnik Banerjee et al., 2013). Global positioning systems or GPS units have become a common part of a modern company (Larry E. Daniel & Lars E. Daniel, 2012).

One of the benefits that have emerged from the use of mobile devices is just geotargeting. Applications installed on mobile phones load users' GPS signals directly from or share with, advertisers, resellers who can send back information to users, or potential customers (Chen et al., 2017). Geographic targeting has enabled personalization for customers based on their physical location acquired from smartphones. (Kliestik et al., 2018) However, for better targeting, marketers need additional data, not just the location of the consumer. We have in mind the data on age, income or health, and so on. These data would greatly facilitate targeting of communications (Baye et al., 2018) as well as overall marketing management. (Manderson & Considine, 2018)

2. Geomarketing vs. Proximity marketing

Since geomarketing can be perceived as a “specific application of the spatial economy” (Latour & Le Floch, 2001), its use nowadays in the face of emerging information technologies and market globalization allows a creative use of personalization and geolocation in marketing. the importance of building a marketing strategy is the integration of geographic intelligence into various marketing aspects (Ramadani et al., 2018), the use of geographic parameters in marketing research or in practice in companies these tools can be more customer-focused,

which makes it easier for business to use in its processes, In terms of geomarketing, we would like to mention proximity marketing, a relatively new form of marketing that takes into account (remove the) mobility and real-time consumer geolocation through wireless and interactive technologies. It is an interactive form of media that is inconsistent with traditional forms of media such as television, radio and media printing in the sense that consumers are being called upon to actively communicate. Such new technologies may, however, be perceived as disturbing. (Acheampong, A. O., 2018)

Geomarketing uses the geographic length and width of mobile devices by using GPS or cell tower triangulation. This is the use of mobile marketing so that the company can target consumers within a certain geographic area. Here an important role is played by geofence, a virtual barrier that determines geographical boundaries. GPS-based services are not accurate enough to be used indoors. Therefore, this type of placement-based marketing is ideal for those who want to promote their product or service in a larger area. If communication is really personalized, the proximity factor must be used. This is a place for using proximity marketing (Levesque et al. 2015; Curtin et al., 2007; Schmidt et al., 2018)

Proximity means proximity in space, time or relationship. Proximity marketing, therefore, uses a form of location-based communication, but this communication with the consumer is timely, relevant and personal, and uses the exact location of the customer. Finding mobile devices with "near" technology can be achieved with an accuracy of several meters. Proximity marketing allows marketers and brands to communicate better through more targeted and personal information to the consumer. The most used is Bluetooth Low Energy (BLE), Near Field Communication (NFC) and Wi-Fi technologies. (Schwab & Werker, 2018)

The basis of marketing management based on the use of geomarketing and proximity marketing elements is the use of geographic data analysis, the subsequent creation of a database that will assist in the creation of a localized database. This is a move from a global to a local one, focusing on the use of GIS software, the decision quality and results depend on different geographic data. Implementation in practice is often called geo-merchandising, i.e. everything that's going on at the point of sale to improve business performance, or all the ways to help move products in the store. In the case of GIS, it is about modern computer information systems for processing, cartography and analysis of geospatial information. Geographic information is information based on geographic location (country, regions, municipalities, cities, etc.). GIS is natural and convenient business software for every business with spatial element data, using real-life object analysis that combines common data processing with visualization and geospatial analysis (Ilieva & Angelov, 2014). This makes GIS different from other information systems. They also serve to predict events and events, to clarify important factors and their possible consequences, strategic planning and use in current marketing trends. An interesting link is the use of geolocation services in applications that are related to improving the quality of life or the creation of games with connections to real measuring devices (air cleanliness, carbon footprint, food quality, etc.), resulting in various applications or games meaning, respectively added value in terms of improving the quality of life or the environment (ec.europa.eu).

3. Research (geolocation services)

The implementation of our survey focused on the analysis of innovative activities by business entities in the Slovak Republic using various types of computer software, and was also focused on the use of geolocation services in companies' activities. The survey is preceded by

research that we will subsequently implement. Companies can use geolocation services in connection with the basic security of some processes in the enterprise as well as in relation to marketing activities. Based on the survey we have data on the use of geolocation services of companies in Slovakia. The question of how to use different forms of geolocation services (to identify the exact location of the material needed for production, goods ready for sale, job positions at work, or better targeting of the public message delivered (personalized content of the report) woodworking, energy, textile, apparel and food industry).

Table 1: Geolocation services in different types of industry

		Geolocation services				Total	
		no		yes			
		Count	% of Total	Count	% of Total	Count	% of Total
Industry	woodprocessing industry	26	25,0%	2	1,9%	28	26,9%
	energetic industry	4	3,8%	2	1,9%	6	5,8%
	textiles and clothing industry	8	7,7%	2	1,9%	10	9,6%
	food industry	56	53,8%	4	3,8%	60	57,7%
Total		94	90,4%	10	9,6%	104	100,0%

Source: Own processing

From the survey results shown in Table 1 90.4% of respondents do not use geolocation services. They are used by 9.6% of companies, with the largest use in the food industry. If we should speak in numbers, there are only 10 companies out of a total of 104.

Data collection for its customers is of great importance to businesses. It allows them to track their movement or behaviour, which they can then use to manage marketing activities. That is why, in the framework of the questionnaire survey, we were focusing on determining the rate of data collection and customer information, as well as analyzing the relevant computer software. Survey results show that 57.7% of the companies surveyed do not collect and analyze data about their customers. 42.3% answered the question positively, the question is whether the companies manage to work properly with the data and use them to their advantage. Given the answers to the previous question, where only 9.6% of companies use geolocation services, we can assume that data collection is in progress, but not all originate or are also related to location detection.

Table 1: Geolocation services in different types of industry

Do you collect data and information about your customers, do you analyze them?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	60	57,7	57,7	57,7
	Yes	44	42,3	42,3	100,0
	Total	104	100,0	100,0	

Source: Own processing

4. Conclusion

This survey serves to create a basic image for the SOLOMO marketing area. For the purposes of this post, we focused on LO - location, which is one of the areas of this type of marketing. The survey showed that the demanded companies use geolocation services to a very limited extent. On the one hand, this may be due to the area of industry as well as insufficient knowledge of the possibilities of using geolocation tools or geographic information systems. The question of customer data collection could be more refined in the main research in order to more accurately analyze the collection of data given by individual companies. Consequently, it should be obvious whether the use of geolocation information is important for companies.

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NEED FOR NEW BUSINESS MODELS DEVELOPMENT WITHIN A GLOBAL CYCLICAL INDUSTRY

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Abstract. The subject of this work is a future development of a post-revenue model that will be based on innovative sales strategies. The industry in focus is global automotive industry. This paper gives an overview of why it is necessary to adopt a new business model and how much it is actually a requirement of the global automotive market itself. The automotive industry is a highly cyclical industry because it depends heavily on the availability of investments at some point, and for this reason, the corporate well-designed sales strategy is the primary tool for maintaining the level of revenues and their growth in the industry, such as automotive. The industry is highly turbulent and has faced severe changes in the recent decade where clients expect more service-oriented approach by major manufacturer as well as by other stakeholders involved in the automotive value chain. Thus, stakeholders have to innovate constantly to keep clients satisfied. In this respect, in our paper we highlight the most important aspects to be considered by business counterparts relevant to the automotive industry companies in order to build future sustainable business operations. We present the factors that need to be examined, especially in the context of emerging markets in Europe and provide directions for future research.

Keywords: automotive industry, business models, vehicle sharing, digitalization.

JEL Classification: M31, L86

1. Introduction

The structure of global car sales will drastically change. By 2035, the main carriers of revenue and profits are shifting from traditional sales, after-sales and financial services to holistic intermodal mobile solutions. The dynamics of these changes will become visible in the next few years, even if this fundamental change in the sales structure will not be fully utilized before 2025.

Strong cyclical industries must be constantly monitored, as negative changes in these sectors will automatically aggravate the recession of the economic cycle. (Behun et al., 2018) Therefore, car manufacturers have to set a course for future sales by focusing on strategic investments. The most important efficiency indicator in automotive industry is the fleet consumption of their product portfolio. (Held et al, 2018) Progress in digitalization in the automotive industry, as well as the establishment of an autonomous drive, have initiated a phase of fundamental change. By 2035, mobility services as new sources of revenue could account for as much as 50% of the car industry's revenue. (McKinsey, 2016) More and more start-ups and established companies from other industries will penetrate the automotive market and use their forces to launch attacks on industry's sources of income. It is very likely that the sale of vehicles will suffer in particular. After-sales and financial services, today's profitters, will also be under pressure. This change will reorganize the entire automotive industry.

Today, companies operate in an uncertain and dynamic environment that is characterized by a change in customers' desire and rapid change of technology. One of the strategies that companies have adopted to better adapt to changing environments is to move from closed to more open innovation (OI), with external collaboration becoming more and more important (Lazzaretti et. al, 2013). Chesbrough (2003) underlined the term OI, which, after a decade of research, redefined as "a distributed innovation process based on the purposeful management of knowledge flows across the borders of the organization, using monetary and non-monetary mechanisms, in line with the business model of the organization". The percentage of firms implementing the OI model has increased over the last decade (Cricelli et al., 2015). The literature on open innovation often directly links business models and open innovation. In fact, open business models facilitate the integration and commercialization of external resources. (Foss and Saebi, 2017; Clauss, 2017) The literature also provided evidence of the important role of business models in enterprise performance, competitiveness and innovation at the enterprise and industry level. (Cozzolino et.al, 2018) Business models define how a company creates, delivers and captures value for its stakeholders. (Reymen et.al, 2017)

2. Major trends in automotive industry

2.1 What are numbers saying

The traditional way of selling cars in showrooms slowly loses primacy with digital technologies, as customers use the Internet, social networks and mobile channels to gather the information they need to make smarter purchases. In the meantime, digital technologies in the car quickly redefine the after-sales market. Today, two-thirds of customers are starting a search for a new or a used car online. More and more of them decide what to buy before they go into the sales shop, which often reduces the role of dealers in the sale. Selling without a clear strategy is a waste of time. Such a strategy is based on thinking about what is best at a given moment, and not on a clear vision of what sales actually want to achieve. Most companies account for 80% of the income coming from 20% of customers, which indicates that a group of 20% of clients generates 80% of a company's business. These 20% of clients bring 4 times more traffic than the other 80%. (Hardy, 2010; Krasteva et. al, 2015; Daly, 2016) This principle is known as the Pareto principle. In order to lead the business with success and bring profit, the sellers must have all the tools and skills that will help them. It is necessary to implement a system that works well and generates revenue.

Digitalization and new business models have revolutionized many industries, and the automotive industry will not be an exception. According to the McKinsey study (2016), some

authors report that the car industry is shrinking; however, it is claimed that growth is accelerated and comes out from new revenues, which are driven by business models based on new mobile technologies, data linking and enhanced functions. The qualitative change of the production chain is too big and difficult change for a number of companies. For other companies, this is a necessary challenge and for the environment and society of people it is the future and the life-long need (Regnerova & Regnerova, 2017). The automotive revenue balance will significantly increase and diversify towards intelligent mobility services. This could lead to an additional \$ 1.5 trillion (or 30% more) in additional potential revenue in 2030, compared to \$ 5.2 trillion from traditional car sales and additional products / services (versus 3,5 trillion dollars in 2015). Together, these revenues could accelerate the growth of the annual growth of the automotive industry to 4.4% (compared to around 3.6% from 2010 to 2015). (McKinsey, 2016). According to the KPMG (2017) survey, more than 75% of car industry executives believe that an online car will generate more revenue over the entire lifetime than 10 offline cars, making the traditional way to measure market share based on the number of cars sent in history. The question is, who in this era of digitalization will earn revenue, and whether information companies such as Apple or Google will contact the customers of automotive manufacturers, as these companies still do not have a clearly defined and completed business concept in the car industry due to where traditional carmakers continue to dominate the market. (KPMG, 2017)

2.2 Future for automotive players

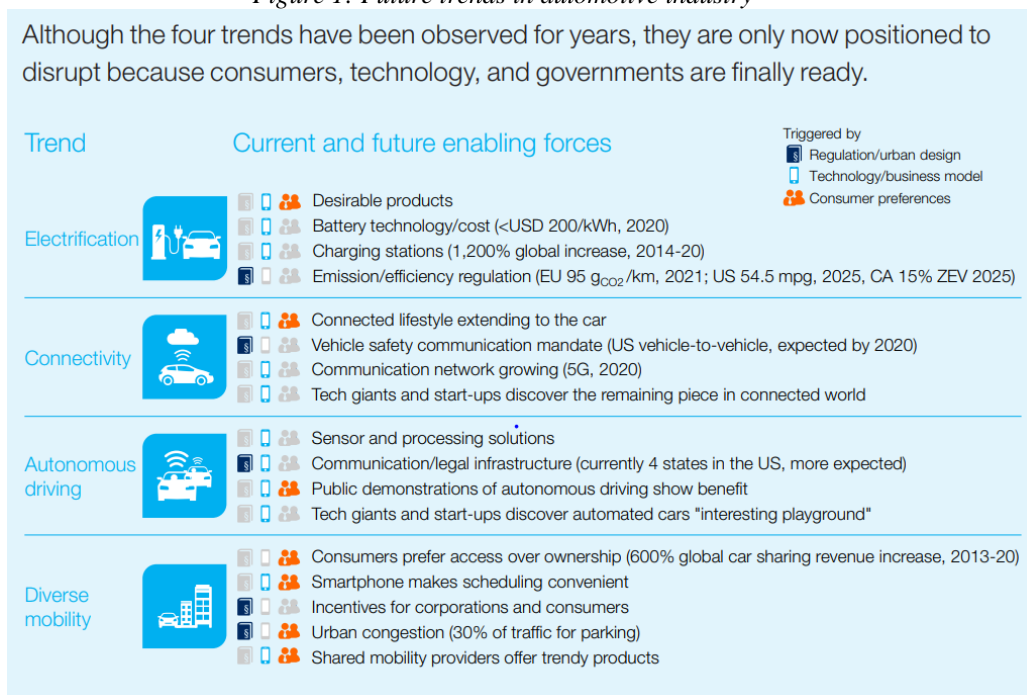
A more recent approach to reduce automobile ownership is through the use of vehicle sharing programs (VSPs). A VSP involves a fleet of vehicles located strategically at stations across the transportation network. In its most flexible form, users are free to check out vehicles at any station and return them to stations close to their destinations. Vehicle fleets can be comprised of bicycles, low emission cars, or electric vehicles. Such systems offer innovative, low-cost, and flexible solutions to the larger mobility problem and can have positive impacts on the transportation system as a whole by reducing urban congestion (Nair & Miller-Hooks, 2011). The emerging "sharing economy" is particularly interesting in the context of cities that struggle with population growth and increasing density. (Cohen & Kietzmann, 2014) Car manufacturers are directly involved in car sharing operations, searching for new channels to sale their cars. (Perboli et. al, 2018) The sharing economy is a phenomenon that shapes the cultural, economic and social landscape of our modern world. (Novikova, 2017)

With the constant pressure on all players in automotive to cut down on emissions and pollution, while having new generation of millennials running businesses, companies who adopt principles of green marketing, as a holistic approach will gain competitive edge. Accepting the principles of green marketing increases the value of the company's products, the company gains a competitive edge, improves its image, gets to new markets and is prepared to cope with the environmental pressures of stakeholders (Moravickova et al., 2017). There are two kinds of trends of the eco-innovation policy involved, one to do with environmental pollution and the other with the innovation and diffusion of new technologies (Rennings, 2000; Jaffe et al., 2005). Autonomous technology will increasingly enable cars to become a platform for drivers and travellers to use their time while traveling for personal activities, which could include the use of new forms of media and services. The increased speed of innovation, especially in software-based systems, will require a car upgrade. Consumers will be constantly aware of technological advances, which will further increase the demand for additional functions in private cars. Total global car sales will continue to grow, but annual growth rates

are expected to decline from 3.6% in the last five years to 2% per year by 2030 (McKinsey, 2016).

This decline will largely be conditioned by macroeconomic factors and the increase in new mobility of services. Consumer preferences, tightening regulations and technological breakthroughs contribute to a fundamental shift in the behaviour of individual mobility. Individuals increasingly use more ways of transport during their travels, and goods and services are increasingly delivered to consumers. As a result, the traditional business model of car sales will be complemented by a host of diverse intelligent mobility solutions. Consumers today use their cars as "prudent" vehicles, regardless of whether they travel to work or travel with their families to the beach. In the future, they may want the flexibility to choose the best solution for a specific purpose of traveling, on request through their smartphones. Success in 2030 will require automobile companies to anticipate market trends in advance and explore new business models of mobility as well as economic and consumer sustainability. In order to do so, they must proactively analyse consumer preferences. It is necessary to pay great attention to changing demographics in key markets, in particular the increase in urbanization and the instability of emerging economies. Every car company must be very clear on how it plans to create added value for its customers. In other words, it has to determine its rules of the game. Unique processes, tools, knowledge, skills and organization must be established - which will enable them to deliver this value better than the competition, which will bring them ultimate success (Krings et al, 2017). Not only that the automotive market we know will change for good due to changes in habits of consumers and automotive business paradigm will change as well whereas main profit wells will shift.

Figure 1: Future trends in automotive industry



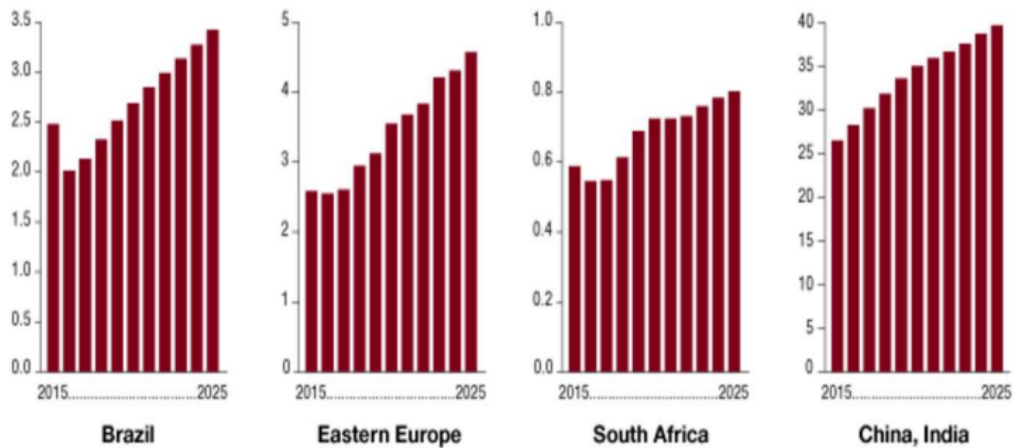
Source: Automotive revolution – perspectives towards 2030 (McKinsey & Company, Advanced Industries 2016)

SMEs can also become a source of innovation and increased productivity (Heer & Nettekoven, 2017) whereas those who recognize the chance to change the model of behavior and offer given to the market will be the ones to succeed. Anyhow, the focus of the activity of car manufacturers in Europe over next 5 years will be on developing new markets and that is

why South East Europe, area to be researched, plays such an important part together with former Soviet and Stan countries. This focus will not be seen only through improvement of their dealer network but also through improvement in the offer given towards end user – SME in this case (Johnson, 2012).

It is expected that emerging markets continue with steady performance (continued growth) over next 10 years, shown on the graph below:

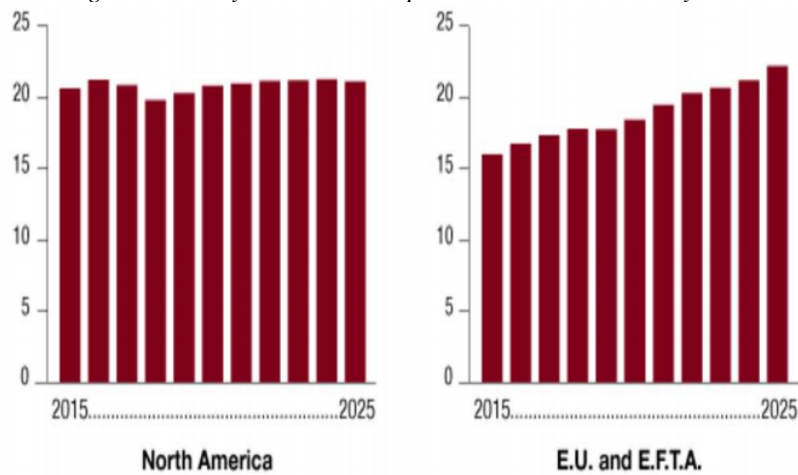
Figure 2: Continued growth in emerging markets

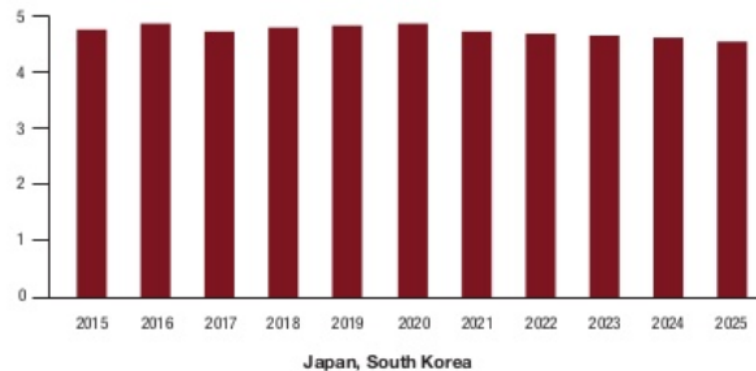


Source: PwC Autofacts, 2016 Q1 Forecast Release

While North America, Japan and EU are expected to have steady sales with no incremental increase:

Figure 3: Steady sales in developed economies in next 10 years





Source: PwC Autofacts, 2016 Q1 Forecast Release

With volumes growing, it is needed to investigate willingness of South East European businesses to change and adopt new models of car sharing, smart mobility and products subscription where entire market will become super EASCY – electrified, autonomous, shared, connected and yearly updated.

3. Parameters to be found

The aim of this paper is to determine the importance of new business models in sales and how they contribute to easier adaptation to new market conditions, especially since sales in the automotive industry are in transition from traditional to digital, with the constant development of intelligent mobility. It also needs to illustrate the extent to which innovative sales strategies combined with new technologies can help car industry companies make a shift in their business and achieve competitive advantage. The results are expected to provide professionals with relevant data on business revenue and modelling models based on innovative sales strategies. All mentioned above will be considered in future research, and this paper emphasizes why it is necessary to be done. (Lazzarotti et al., 2013; Moravcikova et al., 2017)

Interesting area where such a research should be conducted is SEE, because companies in Southeast Europe covers both ends – automotive companies who are offering vehicles through new services and interfaces and clients / users who are car users. It covers their behavioural thinking on new data, new ways of utilizing their car parks but also new technological solutions in terms of measuring their performance in terms of car usage and new platforms to communicate with their car service providers. Finally, research that will be conducted should prove how transparency in communication among stakeholders can influence their business performance seen through cost cutting on one hand and profit increase on the other, how usage of new technologies can help in articulating client needs in a better way and preparation of what is to come in Industry 4.0 for automotive companies.

4. Conclusion

In order to survive, organizations have to change constantly. Today, in the era of digitalization and a high pace of change in the environment, organizations have to change faster, and therefore the current way of sales must follow the trends that exist on the market. The ability of companies to quickly adapt to new sales trends will be their basic ability and capacity. The purpose of introducing new business models in sales is with the goal of easier adaptation to new market conditions, especially since sales in the automotive industry is in transition from

traditional to digital, with the constant development of intelligent mobility. The new way of selling and renting vehicles, with a subscription, comes at a time when the car industry faces a number of problems, long loan periods, a drop in sales. Companies are looking for new revenue streams and new ways to get customers back.

For any type of business, whether small or large, well-organized companies, long-term car rental can be a cost-effective way to improve efficiency, which would reduce vehicle maintenance costs.

There are many advantages in renting a car, as opposed to owning it and more and more people and companies seem to move towards solutions proposed by the sharing economy. Car renting and sharing can help solve some of the problems that all major cities encounters, such as congested streets and air pollution. Global giants in the automotive industry, re-branding themselves as "mobility" companies, see rent as a way to turn customers from one-time customers to sources for long-term revenue generation.

Acknowledgment

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GLOBALISATION OF SERVICES – SOME EVIDENCE ON INTERNATIONAL SERVICIFICATION OF MANUFACTURING

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Abstract. Services have occupied a dominant place in most economies for a long time and they are indisputably perceived as an important feature of the global economic landscape. The recent research on measuring trade in terms of the value added to products has highlighted an even more significance of services in home economies as well as in international trade. It has also thrown a light on the growing interrelationship between services and manufacturing activities described in the term of ‘servicification of manufacturing’. Essentially, the servicification of manufacturing can be defined as the fact that manufacturing companies increasingly buy, produce and sell services. All these activities could either be run at home or internationally. The main objective of the papers is the discussion of analytical frameworks for the international dimension of servicification as well as an overview of the previous research relating to this phenomenon. The analysis shows that measuring all constituents of international servicification encounters numerous limitations resulting from statistical data shortcomings. Nevertheless, the existing research clearly evidence the increasing level of international dimension of servicification. It points out that international trade in services goes beyond the scope of GATS modes of supplying services and in addition to cross-border transactions and rendering services through the movement of labor and capital, it encompasses services embodied in exported or imported goods which are traded indirectly across borders.

Keywords: servicification, global supply chains, trade in services

JEL Classification: F23, F60, L80

1. Introduction

Services have occupied a dominant place in most economies for a long time and they are indisputably perceived as an important feature of the global economic landscape (Francois et al., 2015). The recent research on measuring trade in terms of the value added to products has highlighted an even more significance of services in home economies as well as in international trade. It has also thrown a light on the growing interrelationship between services and manufacturing activities described in the term of ‘servicification of manufacturing’. Essentially, the servicification of manufacturing can be defined as the fact that manufacturing companies increasingly buy, produce and sell services. All these activities could either be run at home or internationally.

The main objective of the papers is discussion of analytical frameworks for the international dimension of servicification as well as an overview of selected research relating to this phenomenon. Because the article is mainly of a theoretical and conceptual nature, the basic research method is a comprehensive literature review. The paper consists of two main parts

devoted successively to: analytical frameworks of international servicification of manufacturing (i.e. its concept, constituents and measuring methods) and main findings of selected empirical research on this phenomenon carried out by WTO, National Board of Trade and OECD. The paper concludes in the recapitulation of the main findings resulted from the conducted study.

2. Analytical frameworks of international servicification of manufacturing

2.1 Servivification of manufacturing – the concept and constituents

The term of ‘servicification of manufacturing’ has been introduced by National Board of Trade (2010) and it has been developed in a number of studies in recent years (such as Baldwin et al., 2015; Lodefalk, 2015, 2016; National Board of Trade, 2016). In general, the servicification means the growing importance of services in manufacturing activities resulting in the fact that the manufacturing companies became ever more dependent on services and many manufacturing products, especially high value ones, can now be perceived ‘*as complex bundles or hybrids of goods and services interactions*’ (Cernat & Kutlina-Dimitrova, 2014, p.7). Servicification is defined briefly and simply by National Board of Trade (2016) as the fact that manufacturing increasingly buys, produces and sells services. Hence the phenomenon of servicification covers three constituents displayed in table 1.

Table 1: Components of servicification of manufacturing

Buying services	<ul style="list-style-type: none"> - the growth in the use of services inputs by manufacturing firms - services as external inputs - services embodied in products
Producing services	<ul style="list-style-type: none"> - the increase in provision of support services (such as R&D, design, distribution, logistics, marketing, sales, after-sale services, IT, back-office and management) within manufacturing firms - services as in-house inputs - services embodied in products
Selling services	<ul style="list-style-type: none"> - the growth of services sold bundled with goods - services as outputs - services embedded in products

Source: Own elaboration

The first component of the servicification – buying services - is more intensive use of services inputs by manufacturing firms. Services are (and always have been) a central part of manufacturing operations in every stage of production. Case studies show that even relatively small manufacturing companies use about 40 types of external services to carry out their activities (National Board of Trade, 2010). The observed increase in the use of services inputs by manufacturing firms has its two primary causes. First, it is closely connected to the continuing trend of outsourcing that aims at the separation of services functions in manufacturing from core production functions. As a result services previously produced in-house by manufacturing companies are now purchased externally as inputs. For Baldwin (Baldwin et al., 2015) observation of this trend became the basis for the statement that that servicification may partly be a ‘statistical phenomenon’. Secondly, more intensive use of services inputs by manufacturing enterprises is associated with the development of global value chains (Baldwin & Lopez-Gonzalez, 2015). Services are perceived as the ‘glue’ in global value chains as geographically split companies need services such as transport, communication, logistics, finance, etc. which could link their manufacturing operations across countries.

The second component of servicification is in-house provision of services within manufacturing firms. It can generally be seen as an alternative to buying services as the same

service can either be outsourced or performed in-house. The way the firm servicifies - makes or buys - depends on its decisions on whether to internalise a particular activity or keep it external. Among the main factors influencing this decision can be mentioned i.a.: costs factors, the will to have core strategic functions in the firm (e.g. R&D, sales and operations planning, strategic procurement), the need of having service on a continuous basis and with a certain degree of control over it supply, access to qualified employees.

The last component of servicification in manufacturing is the growth of the sales of services which are bundled with goods. Manufacturing companies use services as outputs for many reasons (e.g. to increase the value of products to consumers; to differentiate products from competitors; to customize, upgrade and prolong offers), at different stages of sales and after-sales relations with the customer (e.g. installation services, repair services, maintenance services), usually as a complement but also as a substitute for a manufacturing product (e.g. firms lease products rather than sell them).

Servicification of manufacturing causes that manufacturing merchandise can no longer be seen as only tangible product, but rather as a mix of goods and services. For analytical and measurement purposes the key is the ability to extract the value of services from this ‘manuservice box’. Research on these issues led to development of the concept of ‘embodied’ and ‘embedded’ services. Embodied services are those that constitute an input into the manufacture of a good meanwhile the embedded services pose an input into the sale of a good. The key difference between these two groups of services is the possibility to separate them from the product: it only occurs in a case of embedded services.

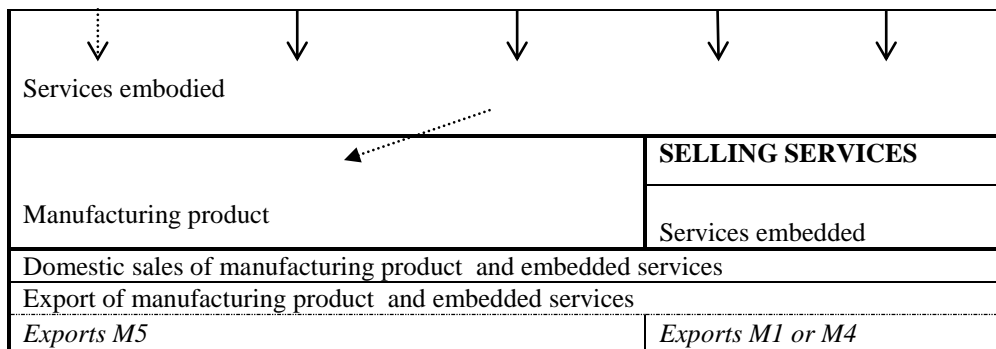
2.2 International servicification

The servicification of manufacturing is not a purely domestic phenomenon but it also has international dimensions that occur in all of its three components (Figure 1). International servicification in terms of ‘buying’ takes place if services inputs are purchased abroad (offshore sourcing) or they are derived from a locally established affiliate of a foreign company. In a case of ‘producing’ component international attribution of servicification occurs in two cases, too. First, when a domestic manufacturing company processes goods inputs sent by a foreign company. Secondly, if in-house provision of services takes place within manufacturing affiliate of a foreign company. Finally international servicification occurs in its ‘selling’ component, when manufacturing products together with embedded services are exported.

International servicification strongly affects trade in services – all of the four modes of service supply set down by GATS (Figure 1). But, additionally, it results in a new mode of international trade in services, indirect trade, named ‘Mode 5’ (Antimiani & Cernat, 2018). In this mode services are provided through the cross-border movement of manufacturing goods and it encompasses services which are inseparable part of manufacturing good i.e. services embodied (both external and in-house inputs) as well as part of embedded services which are not charged for directly but sold in a package with a product.

Figure 1: Trade in services effects of international servicification

BUYING SERVICES			PRODUCING SERVICES	
Domestic sourcing		Offshore sourcing	Domestic company	Local affiliate of foreign company
Domestic company	Local affiliate of foreign company			
	Imports M3	Imports M1 or M4	Exports M2	Imports M3



Notes: Grey shaded cells - international servicification components. In italics – trade direction (exports/imports) and modes of service supply (M1- cross border supply; M2- consumption abroad; M3 – commercial presence; M4- presence of natural persons; M5- indirect trade in services).

Source: Own elaboration

2.3 Methods of measuring international servicification

The international servicification of manufacturing measurement methods are based on the assessing the value of services both embodied and embedded in manufacturing products. For ‘buying’ and ‘selling’ components of servicification – which encompass services supplied on contractual basis – this value is evaluated with the use of inter country input-output tables (ICIO) by looking at the share of value-added originating in services industries. In recent years this method has been widely applied and developed to a high degree due to numerous research on trade in value-added terms and studies on global value chains (such as Bohn et al., 2018; Johnson & Noguera, 2012; Koopman et al., 2014; Los et al., 2016; Miroudot & Ye, 2018).

Notwithstanding this method has some limitations resulting primarily from the lack of current data (the most recent statistics available are those for 2011) and the table’s sectoral classification which is based on industrial and not product classification – it could lead to inaccuracy of servicification measurement. Another limitation, especially important for international servicification, arises from the fact that transactions recorded in ICIO tables are on domestic basis which means that domestic value added comprises the value originating from companies of both domestic and foreign ownership. One of the proposed way of solving this problem – newly displayed by Miroudot and Ye (2018) - is the accounting framework for the decomposition of value-added into domestic, foreign and double counting terms in domestic sales.

Though, the biggest challenge in measuring international servicification remains its ‘producing’ component because of the statistical shortcomings relating to the value of in-house provision of services within manufacturing firms (Lodefalk, 2014). To assess this value the share of service employees in manufacturing is often employed (Miroudot & Cadestin, 2017; National Board, 2016).

3. International servicification – some empirical research results

Numerous empirical studies on servicification on manufacturing have been carried out in recent years and most of them have taken into account the international dimension of this process, i.e. international servicification. Below are presented the results of three studies conducted by WTO, OECD and Swedish National Board of Trade. The studies have covered differentiated: components of servicification, research groups and researched periods (but not longer than to 2011); also the employed measuring methods and databases have been different however service value-added analysis has posed the common essential research method.

Although the previously mentioned limitations of the existing measuring methods and above all – despite huge data scarcity all the research lead to the conclusion that international servicification increases and, consequently, services embodied or embedded in manufacturing products play a systematically growing role in international trade in services.

3.1 WTO

The research of Lanz and Maurer (2015), conducted for the years 1995-2008, cover only one element of international servicification of manufacturing, namely foreign services value added content of gross domestic merchandise exports. The research results prove that servicification of manufacturing is substantial both in developed and developing countries: in 2008 services value added content in manufacturing exports of these groups of countries amounted to 33% and 26% respectively. Although in both groups domestic sourcing of services made up the majority of the total services value added content, international servicifiacion component share was meaningful, adding up to, on average, about 33% in developed countries and about 46% in a case of developing countries. From 1995 to 2008 international servicification of manufacturing exports had increased by more than 4 pp. and 2 pp. in developed and developing countries respectively. This growth was accompanied by a smaller increase in domestic sourcing of services in developed countries (1 pp.) and the decline of this component in developing countries' group

3.1.1 National Board of Trade

Compared to Lanz and Maurer, National Board of Trade (National Board, 2016) studies have covered more components of international servicification, longer research period (1995-2011) and the studied group of countries has been limited to EU countries. The main research findings are as follows:

1/ Service inputs on average constitute 27% of the cost share in EU manufacturing of which almost half (13%) is imported. Thus the EU average import share is low, however there are relatively large differences between individual countries: ranging from 75% in Ireland and 37% in Lithuania to 5% and 8% in Latvia and UK respectively. Between 1995 and 2000 the share of imported service inputs increased by 5 percentage points, from 8 to 13%.

2/ About 42% of employees in EU manufacturing work in service occupations. Most of them (more than 70%) are high-skilled service suppliers (managers, professionals and technicians) which means that manufacturing, to a great extent, consist of skill-intensive service production. These research results concern the whole group of manufacturing enterprises, without separating the foreign affiliates from it. Therefore they can not be considered a precise description of 'producing' component of international servicification.

3/ Manufacturing companies are important service exporters: country evidence (there is no EU-level data available) show that service exports coming from manufacturers represents in Germany and Sweden 25%, in Italy 35% and in Austria and Czech Republic 16% of total service exports.

4/ In 2011 the EU average share of service value added in manufacturing exports amounted to 39% and it was higher by 3 pp. comparing to 1995. Cross-country differences in this share were significant, reaching values from 46% (France) and 44% (Ireland) to 29% (Romania) and 33% (Grece).

3.2 OECD

OECD studies (Miroudot & Cadestin, 2017) are probably the most comprehensive research so far, complementing the value-added trade analysis with the less investigated components of servicification such as in-house services and bundles of goods and services. They have covered 1995-2011 as research period, mainly OECD countries as studied group and have used three major data sources i.e.: TIVA database, labour force surveys and ORBIS dataset. The main research findings are as follows:

1/ In 2011 services amounted to 35% of the value added in the world gross manufacturing exports. In all manufacturing industries except from coke and petroleum this share was above 30% and the highest level (38.4%) was achieved by chemicals and motor vehicles.

2/ All manufacturing industries relied on the same mix of services inputs: distribution and business services represented about one third each share meanwhile the last third was split between transport, finance and other services.

3/ Between 1995 and 2011 the services value added in the world gross manufacturing exports had only grown by less than 1 pp. More significant increases had such industries as utilities (8pp.), wood products, paper, print and publishing (5pp.). The aggregate results were determined by China and the US, where the services value added had not relevantly changed (a minor decrease for China and slight increase for the US). Nevertheless, there were many countries in which an increase in the share of service value added had been recorded; it was especially impressive in Turkey, Latvia, Iceland (above 10 pp.), Luxembourg, Finland, Russia, New Zealand (above 8pp.).

4/ Manufacturing exports tend to rely to a larger degree on services sourcing from abroad. In 2011 all manufacturing industries had higher shares of foreign services value added with meaningful (above 4 pp.) increases in industries such as chemicals, rubber and plastics, ICT and electronics. At the same time domestic services value added in most of the industries was decreasing. With the exception of China and Philippines, all other countries shifted towards foreign services inputs. Particularly high growth (above 8 pp.) of foreign services value added in gross manufacturing export was recorded in Ireland, Luxembourg, Poland and Turkey.

5/ In 2015 across countries, between 25% and 60% of employees in manufacturing firms carried out service support functions and not core manufacturing activities. What's important, since 1995 the share of services employment within manufacturing companies in the researched countries has tended to increase. Core manufacturing activities had a larger share in employment in traditional low-tech manufacturing sectors such as textiles and apparel, wood or non-metallic minerals. Estimates show that - expressed in value added – in-house services account on average for about 15 % of gross exports of manufacturing products.

6/ Firms involved in the sales both goods and services account for share of total sales and exports up to 69 per cent

4. Conclusion

The analysis shows that services as inputs, outputs as well as in-house activities within manufacturing firms constitute a key component of manufacturing process and manufacturing products. As the globalization progresses, the international dimension of the servicification of manufacturing, i.e. international servicification, increases. This trend is evidenced by a numerous empirical research although international servicification measuring encounters large

limitations resulting from statistical data shortcomings and research methods that are still being developed and improved.

International servicification means that manufacturing sector strongly affects trade in services, which goes far beyond the scope of GATS' modes of supplying services. In particular, in addition to cross-border transactions and rendering services through the movement of labour and capital this trade encompasses services embodied in exported or imported goods which are traded indirectly across borders. On the other hand, an adequate supply of services affects the functioning of the manufacturing sector and its export competitiveness.

These interdependencies are important for economic policy, especially industrial as well as trade policies. They can not consider neither manufacturing nor service activities in isolation but as strongly connected and mutually interacting elements. As the empirical studies show that there are large cross-country differences in international servicification and one common pattern of this phenomenon can not be found, there is a huge field for further research. They could explore the reasons of the cross-country and industry differences as well as the impact of trade in services liberalisation on competitiveness of manufacturing industries and manufacturing exports.

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TECHNOLOGICAL SKILLS ACROSS GENERATIONS

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Abstract. In the present world for the purpose of better meeting the needs of the customers, the companies should collect data about their customers and transform them to statements, knowledge, information. Thanks to the information about the customers, the companies can react to customers' needs in the adequate way all over the world. It means that more than ever before the companies have to know their customers. That is why it is necessary to research the consumers located on the market. The customers are part of the generations. Many generations can be seen in the current society. The customers have some general characteristics resulting from being a part of the concrete cohort. Technology development at international level changes the behaviour of the consumers, which can be perceived as one of the impacts of globalization. Some consumers are more skilled in technology than the others. It is important to determine these differences in order to use the right content and channel for communication with customers. That is why the aim of the paper is to investigate how the consumers from different generations are skilled in technology in the Czech Republic. The questionnaire as the primary research method was used to achieve the aim of the paper. 840 respondents were included to this survey. The survey was distributed in September 2017 by the research agency IPSOS.

Keywords: Millennials, Generation X, Baby boomers, Technology

JEL Classification: M39

1. Introduction

Times have changed, in large part due to new technologies which have appeared, changing how we relate to each other and communicate. The invention, discovery, and widespread adoption of the Internet brought about profound change in society (Martins et al., 2016). People in different continents became, practically overnight, just a click away from continuous and economical communication, what can be considered as one of the reason of globalization. (Oliveira, 2018)

So, in the new mobile and connected world technology has dictated how we communicate, socialize, and in many cases how we learn and evolve as human beings, in particular the younger generation, or the so-called millennials or also called generation Y. This younger adult generation is of interest, for example, to marketing professionals who want to know what the future holds for us, and how consumption will possibly change, over the next ten years or so, as this group gains in purchasing power. (Lantos, 2014; Oliveira, 2018)

It is important to explore the consumption of technologies and also the skills of consumers from different generations in this fields for helping the marketing professionals to understand the consumers and set up for them the right offers, in right way, though right channels.

That's why aim of the paper is to investigate how are the consumers from different generations skilled in technology. The research is focused on Czech population.

2. Literature Review

Although some research has minimized the importance and potential existence of clear generational differences (Costanza & Finkelstein, 2015), evidence from decades of studies has shown that generational differences do exist, particularly in work values, attitudes, personalities, and career experiences (Lyons & Kuron, 2014; Sungdo, 2018)

Every generation has its own characteristics. Each generation is said to have social, economic, political, and other contextual factors that shaped their values and beliefs about work. Baby Boomers (1946-1964), for example, were raised in an era of economic growth that included the unwritten social contract that workers would be rewarded by their employer in terms of job stability, pay, opportunity, and retirement if they worked hard (Smola & Sutton, 2002). Generation X (1965–1979), on the other hand, encountered economic instability in their formative years due to downsizing and shifting economic tides, thus providing them with a different view of the social order of things than did the previous generation (Kupperschmidt, 2000; Smola & Sutton, 2002). Millennials (1980–2000) have only recently entered the full-time workforce and many unanswered questions remain about this group in terms of values and beliefs about work. (Real et al., 2010)

Media proliferation, market globalization and the emergence of a new generation of information and communication technologies – the Internet being the most prominent of them – are changing the marketing rules and market dynamics by weakening the corporate competitive position while presenting individuals with many new opportunities and empowerment. (Wind & Mahajan, 1997; Rha et al., 2002; Constantinides, 2014)

The increasingly globalized and competitive market has forced the companies to implement innovative ways to attract consumers. In this regard, the use of modern technologies is crucial for companies. The developments in information and communication technologies in the last two decades have significantly affected the marketing done by companies, providing them with unprecedented opportunities and tools to attract and retain consumers. (Marasco et al., 2018) Consumers are increasingly using the Internet and social media tools such as Facebook, Twitter, Blog, Flickr, and so on. (Balakrishnan et al., 2014)

The success of 21st century retailers depends increasingly on their online presence and the development of interesting and attractive communication and presentation of offers to internauts who spend a lot of time on social media interacting with people, catching up on the latest news, commenting on various events and situations and sharing other people's posts. (Dabija et al., 2018)

Recent technological advances in the service industry have led to the transformation of service delivery from face-to-face to self-service technologies (Lu et al., 2009). It has brought new ways of doing business and changed the interaction between customers and organizations. Generation Y is familiar with technology and the Internet at a very early age and they grew up with new technologies (Djamasbi et al., 2010; Glass, 2007; Kumar & Lim, 2008). They use modern technologies on a daily basis. So, technology is inevitable for their life (Krbova, 2016). They are not afraid of new technologies and they are often the first adapters of new technologies (Glass, 2007; Guresa et al., 2018).

Social networks and the online environment are essential elements in the lives of Millennials (Eastman & Liu, 2012). Millennials are “objectively motivated shoppers” (Martin & Turley, 2004) who pay attention to store environmental variables and retailers’ technological incentives in their decision making and purchasing process. The Internet represents their main source of information, its usage being reflected in the large number of social networking websites on which they have accounts and frequently interact with other people. (Dabija et al., 2018)

Social networks have brought about a shift in individuals’ behaviour, preferences, values, identity, expectations about product performance and satisfaction with a product or service, which often evolves from an intangible and abstract process to a unique, dynamic and fun experience. Therefore, their commitment to companies can be influenced much more easily through social media. (Bolton et al., 2013; Dabija et al., 2018)

Millennials have become the largest generation in the world, with a population of more than 75 million in the U.S., it is quite different cohort from the others and it is an important group to study. (Taylor, 2018)

Literature review is mostly based on foreign resources. Many scholars in abroad try to understand the different cohorts of consumers to make better offerings for them in the market. Thus, it is necessary to explore the generations in Czech Republic for needs of the Czech market. Because the people grow in different conditions, it is obvious that their reactions to the offerings, trends are also different. It means that the consumers from different parts of world also behave differently. However, is it also like that in the case of technologies as the global phenomenon? From that point there is a question:

RQ: What are the differences in technological skills among generations in Czech Republic?

3. Methods

Part of the survey was focused on exploring technological prowess across different cohorts of consumers.

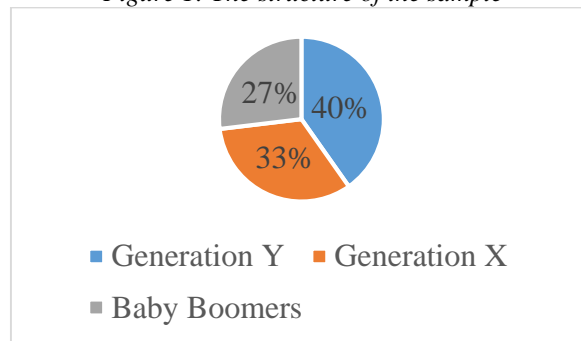
For researching the questionnaire was chosen. Globally 840 respondents were engaged in. The age of the respondents was in the scale from 18 to 65 years. The respondents were selected just according to their age, they weren’t selected according to marital status, gender, the level of income and education, place of living or other demographic characteristics. The respondents were heavy social network users. The primary data were achieved via research agency IPSOS. That is the survey lasts just few days and it was realized in 2017. The agency warrants a few of mechanisms for controlling the quality of data. Also the panel is certified by SIMAR authority.

For answering the RQ of the study CHI-SQUARE TEST of the statistical methods in MS EXCEL was used.

According to the gender the structure of the sample was evenly unfolded – 48 % of male and 52 % of female were involved.

The structure of the sample, which is seen on Figure 1, was as follows: 40 % members of generation Y (in 2017 in the age of 18-37), 33 % members of generation X (in 2017 in the age of 38-52) and 27 % respondents belonging to the generation Baby Boomers (in 2017 in the age of 53-65).

Figure 1: The structure of the sample



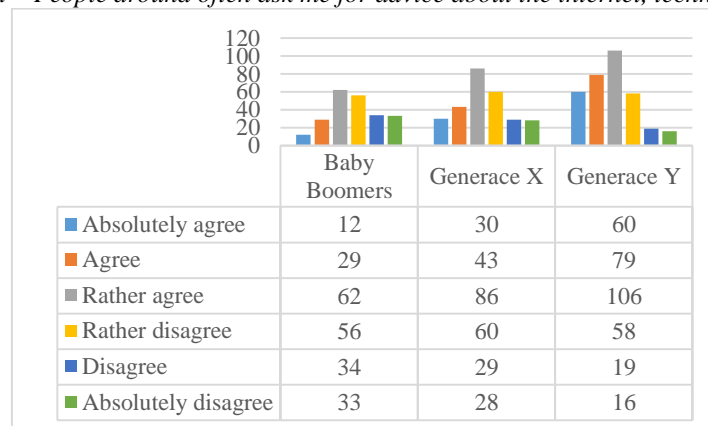
Source: Authors

4. Results and Discussion

For the purpose to answer to the RQ the four statements about the using technologies were tested at the survey. The respondents had the options in six level scale to choose the degree of their agreement with the statements.

At first we wanted to find out, how the environment perceives the respondents. So, the respondents had to choose the degree of agreement according to their meaning to the statement: *People around often ask me for advice about the internet, technology and electronics*. Based on answers the relation between age (being a part of some generation) and degree of agreement with the statement was found (see Figure 2). The number of significance was 1,11609E-14. According to this finding we reject the null hypothesis and accept the alternative one: Being the member of concrete generation has a significant influence on the skill of controlling the internet, technology and electronics.

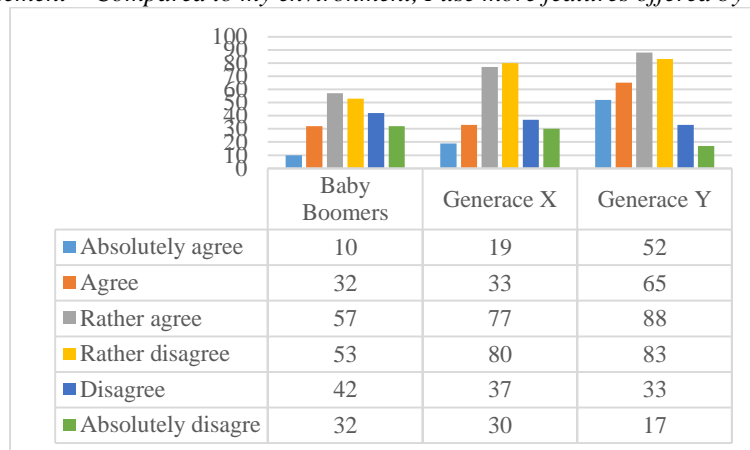
Figure 2: Statement – *People around often ask me for advice about the internet, technology and electronics*



Source: Authors

After that the respondents were questioned about their skills in the field of social networks. The given statement was: *Compared to my environment, I use more features offered by social networks*. Also in this case the relation was found according the answers, which are seen on Figure 3. Because of the number of significance, which was 3,06191E-12, we can reject the null hypothesis and accept again the alternative one: Being the member of concrete generation has significant influence on the degree of using features offered by social networks.

Figure 3: Statement – Compared to my environment, I use more features offered by social networks

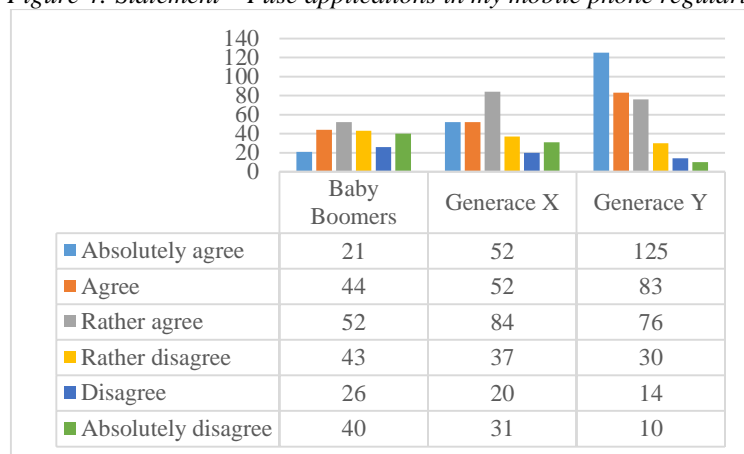


Source: Authors

Afterwards the statement: *Compared to my environment I can use the Google search engine much better* was tested. Also in this case the significance was found. The number of significance was 5,59155E-09. Thus, we can declare that there is relation between age (being the member of concrete generation) and the degree of the Google search engine. (Real et al., 2010)

In the end the statement: *I use applications on my mobile phone regularly* was tested. According to the answers of the respondents (Figure 4) we can reject the null hypothesis, because the number of significance was 3,0331E-25. So, based on this finding we can accept the alternative hypothesis: Being the member of concrete generation has significant influence on intensity of using the applications in the mobile phone.

Figure 4: Statement – I use applications in my mobile phone regularly



Source: Authors

5. Conclusion

There are many generations in the market. In this study the three generations were tested – Baby boomers, generation X and generation Y. There is also generation Z, which is growing. The results of the study are clear. Different generations use and consume the technology in different intensity. Generation Y, also called Millennials, Net generation is quite different from the other two generations. From the survey we can see that generation Y in all of statements answered “absolutely agree” the most. It means that members of this generation are using many applications of their mobile phones in a high intensity every day against the members of other

tested generations. It follows that the skills in the field of technology are higher than are the skills in generation X or Baby Boomers. The consumers from different parts of world also act differently. Historical background, possibilities in the field of business, the conditions in which they raised up and many others influenced also the perceptions, opinions, behaviour of the consumers. But as we can see from the results of survey there is not the differences in using the technologies. If the consumer is from U.S. or from Czech Republic (speaking about developed countries) the consumption of the technologies is almost same. The younger generations used to have their mobile phones always near them and surf on the social networks every day in the high intensity. Of course, the younger generations are after more skilled in using technologies. It is very important to study the perceptions, opinions, behaviour of the consumers, because marketing professionals can use these outputs for communication with them. Also it helps to understand the differences and react to them in an appropriate way. There is still space for another researches about the consumers and now is the right time for the exploring these three generations, because as we know every generation has an expiration date.

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DEVELOPMENT OF SERVICES UNDER GLOBALIZATION

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Abstract. In recent days, dynamic business environment has required an ability to adapt and change the most important challenge for each company according to conditions of globalization, technology development, and managerial innovations. To be competitive, small businesses must grow up throughout the development of internal sources, skills, and abilities, which reflect continuous improvement and innovative corporate potential. By growing significance of the service sector in the knowledge economy, it is one of the important fields, because of the contribution to economic value added, increasing employment and work productivity. Service sector provides knowledge of external information and has become a facilitator of innovations for other companies within global potential. Purpose of the paper is to find out dependencies between received service-market strategies of last five years and small knowledge-intensive services in the Czech Republic, operating on different markets and global orientation. Data from 128 companies were from Amadeus database and processed by the statistical program IBM SPSS Statistics 24. For the purpose of the paper, the factor analysis and the test of independence were used. The application of factor analysis reduced the basic set, originally formed by twelve key variables into three indices. All observed factors were put into independence test to indicate the dependency between indices and individual markets, where analyzed companies operated.

Keywords: global orientation, services, business development, strategic management

JEL Classification: L26, M16, O14

1. Introduction

The globalization of services (especially knowledge-intensive) not only involves the geographical extension of services economic activity across borders, but also is an intrinsic part of wider processes of change in the international organization of production and division of labor (Miozzo & Miles, 2002). Liberalization and the application of new information and communication technologies (ICT) have transformed services, not simply improving their growth processes or increasing their trade, but altering how industrial activities are conducted, integrating services and goods, and contributing to the unbundling of service activities (ibid).

It is well known, that the knowledge intensive business services (KIBS) as a small proportion of all services, is significant in terms of economic benefits and as the key part of the growth in value added, employment and labor productivity (Freel, 2006). In the Czech Republic the importance of the manufacturing industry still prevails, which is reflected in the relatively lower share of market services and thus the KIBS in the structure of the Czech economy (Pazour, 2008). However, this segment represents a facilitator of knowledge, external information, and an innovation facilitator for other client businesses including the manufacturing sector

(Shearmur & Doloreux, 2012). On other side, KIBS must to be internally innovative organizations and introduce business strategies in strengthening their competitiveness. They are very heterogeneous and there is great need to deepen our understanding about the types of business development they undertake (Miles et al., 2017; Rodriguez et al., 2015). A detailed analysis of their business development strategies could be useful for government efforts to support to promoting the internationalization of companies.

The structure of this paper is as follows. The following section introduces the theoretical framework consisting of business development strategies with the focus on KIBS sector. The subsequent methodology section provides the details of data collection and analytical methods. The fourth section presents the findings of the analyses. The results are discussed with the aim of answering the proposed research questions. The final section summarizes the conclusions of the study and provides the implications for future research.

1.1 Globalization and business development strategies of KIBS

Globalization pressure rise the firms to innovate to keep up with the competition. Growing competition is thus liable to be confronted by many service firms, as well as new international opportunities. Technological innovation has helped create this situation, and will be part of the response to it (Miles, 2005). The globalization helps in the consequent developments of the service sector, especially knowledge intensive business services (KIBS). KIBS themselves need to global in working and should exist at the international level. Their networks and operations can no longer be confined to domestic or regional levels. The localization effects and globalization effects are also manifested in a number of forms which relate to the growth of KIBS. This group of services may be pulled into international markets as a result of the location decisions of their existing clients, and the requirement to follow them as they move to new locations, or they may form part of a push by KIBS firms themselves to enter and exploit opportunities in overseas markets (Miozzo & Miles, 2002).

As Wood (2006) argues, the market reach of KIBS often extends well beyond their regional bases to national and international nexuses of “corporate exchange”, which is particularly the case for very well-established KIBS such as legal services and accountancy. Globalization and localization effects are generally interconnected, rather than diametric forces (Huggins, 2011). For instance, successful connectivity in global spaces is often the outcome of an initial system of localized interaction, whereby it is the knowledge crossing hallways and streets that initially catalysis intellectual exchange and knowledge transfer across oceans and continents.

Similarly, international market-based interactions are leading to more localized network-based exchanges, such as those occurring when KIBS firms establish operations in locations to deepen relationships with key customers (Miles, 2005). KIBS will now have to function with international networking with the advent of globalization, many of the transactions which were performed with the physical presence of personnel will now have to be done with the use of ICT. This increases the need for more reliable and sophisticated communication systems. Global networking will also ensure that KIBS perform and innovate in ways which are different from those already existing. With all this and more, KIBS no doubt will develop and rise to the challenges of the international stage. The development of KIBS internationally will result in the central growth of the sector and will thus, lead to the development of the economy as a whole.

Ansoff's product-market expansion matrix was modified by Scheuing et al. (1989) who identified four different business development strategies for services that can be pursued using

four different types ranging from new service/markets, through new service lines and service line extensions, to service improvements. Researchers have proposed several typologies that address service-market issues. Service development strategies offer a typology which classifies service innovation into different types and capture the intensity of firms' innovation efforts within a technological domain (Branzei & Vertinsky, 2006). The one of the key criteria which have been used as the basis for establishing the typologies is the degree of "newness". Gadrey et al. (1995) have observed four types of service innovations, namely (1) innovations in service products, (2) architectural innovations which bundle or un-bundle existing service products, (3) innovations which result from the modification of an existing service product, and (4) innovations in processes and organization for an existing service product. Avlonitis et al. (2001) divided service innovation into six different types: new to-the-market services, new-to-the-company services, new delivery processes, service modifications, service line extensions, and service repositioning. Market development strategies reflect the breadth of the geographic markets served and firm's pursuit of new distribution channels. Firms engage marketing actions such as changes in sales or distribution methods, advertising or permanent exhibitions following objective to increase appeal for the firms' products and/or to enter new markets. Also, the development of ICT has implications, which concerns with the modes and timing of production and delivery of some types of services much more possible and easier. This can increase geographical reach of KIBS and, accordingly, the perception of an increasing international pressure on local firms (Corrocher et al., 2009).

1.1.1 Defining of knowledge intensive business services (kibs)

There are different approaches of defining KIBS (Miozzo & Soete, 2001; Shearmur & Doloreux, 2012). This sector is characterized by private sector of small enterprises with high level of knowledge and orientation of its services to other companies and organizations that are predominantly non-routine (Muller & Doloreux, 2007). The industrial classification method is widely used for the different definitions of KIBS. Some ambiguity remains regarding the sector's scope, in large part because KIBS do not coincide neatly with the sectoral classifications of established statistical systems (Miles et al., 2017; Schnabl & Zenker, 2013).

Table 1: Classification of KIBS activities according to NACE 2

	Description of section	Description of division
J, 62	Information and Communication activities	Computer programming, consultancy and related activities
J, 63		Information service activities
M, 69	Professional, scientific and technical activities	Legal, law and accounting, consulting activities
M, 70		Activities of head offices; management consultancy activities
M, 71		Architectural and engineering activities; technical testing and analysis
M, 72		Scientific research and development
M, 73		Advertising and market research
M, 74		Other business activities

Source: Modified by authors according to Schnabl and Zenker (2013)

2. Sample and Methods

The research question for the purpose of this research is "Are there dependencies between perceived service-market strategies according geographical markets they served and global orientation of KIBS?" From this question there was defined hypothesis "there is correlation between business development strategies with served target markets and the global orientation of KIBS enterprises".

Primary research was conducted on a sample of small enterprises in the Czech Republic already operated in the market. Based on retrospective data over the 5-year period, it has been identified innovation development strategies and related changes within the business. The source of contacts to respondents was the university database Amadeus for which selection criteria were selected:

- i. Headquarters in the Czech Republic, only private profit sector of market services (limited liability companies, joint stock companies and self-employed);
- ii. The enterprises had to be in operation for more than 5 years and there should not be a presumption of bankruptcy or insolvency;
- iii. The size determined by total number of employees is between 9 and 50;
- iv. Owner should be a senior executive (CEO) and must be in the top management or in the board of directors, and has majority share (50.1%);
- v. Classification of economic activity according to NACE 2 (see Table 1).

The Amadeus database outputs found a total 1124 of companies that could be contacted. The questionnaire survey was distributed electronically by sending a link to the e-mail questionnaire to owners actively involved in the company's operations in the last five years. Research was conducted in the form of a questionnaire survey from July to September 2017. The resulting sample of respondents copies the theoretical database file structure. As table 2 displays, the total return rate from the survey was 128 valid answers in correctly and completely filled form. In terms of the overall return rate to the original sample of respondents was 10.5%. The data have been processed by the statistical program IBM SPSS Statistics 24.

Table 2: Structure of respondents according to KIBS classification by NACE Rev.2

KIBS by NACE Rev. 2	Theoretical		Empirical	
	Absolute	Relative	Absolute	Relative
Section J, 62	300	24,71 %	37	28,91 %
Section J, 63	21	1,73 %	3	2,34 %
Section M, 69	214	17,63 %	19	14,84 %
Section M, 70	64	5,27 %	7	5,47 %
Section M, 71	407	33,53 %	40	31,25 %
Section M, 72	17	1,40%	4	3,13 %
Section M, 73	123	10,13 %	11	8,59 %
Section M, 74	68	5,60 %	7	5,47 %
KIBS total	1 214	100 %	128	100 %

Source: Own work

3. Results and Discussion

We used exploratory factor analysis (principle components analysis technique with a Varimax rotation) to reduce the number of variables for explanation of service-market strategies adopted by KIBS. The examination of out-put variables in terms of business development strategies is based on Sum Factors as the average score of multi-item scales. The applicability of the sets of the items to measure new latent factors was examined by using Correlations. In evaluating the exploratory factor analysis, several criteria are used: the total variance explained (≥ 0.50), the factor loading (≥ 0.50) and the internal consistency was measured with Cronbach's alpha giving results above the critical limit of 0.60 (Cronbach, 1951). The items of business development strategies measured via five Likert-scale measures (1: strongly agree, 5: strongly disagree) and the values of Cronbach's alpha. We've also incorporated the organizational

changes in technology (software, hardware and other ICT technology) and marketing invention (customer segments, service or company advertising / promotion, distribution channels and customer communication). This items was constructed as the mean of questions on Likert-scale measure (1: significant change, 5: remain the same).

As can be seen from table 3, the pattern of loadings suggests that the three factor resolution of business development strategies represented by (F1) **a new service development strategy** (a newness of services to the firm or market based on changes in technology), (F2) **penetration strategy through modification** (modification/revision existing services by expansion of contemporary markets or searching for niche markets) and finally (F3) **strategy of market extension** (repositioning of existing services to the new markets through marketing actions) which together explained 59,11 % of the variance with KMO 0,734. The basic statistics of observed factors is displayed in Table 4 show, that small KIBS enterprises implemented incremental innovations in the last five years.

Table 3: PCA with Varimax rotation: Business development strategies

	Name of the factor and items/statements included	Loadings	Cronbach's alpha
Factor 1 (31,19% of variation)	The service was totally new to the company	,796	0,826
	The service created a new product line for the company	,757	
	The service supplemented and existing company line	,711	
	The service was response to changing customer needs or behavior	,699	
	SUM Technology changes	,671	
	The service was totally new to the market	,691	
Factor 2 (18,37% of variation)	The service was a revision of an existing services	,774	0,766
	The service was a modification of an existing services	,731	
	The searching for niche at the current markets	,714	
	The company expands current market	,656	
	The service offered new features towards competition	,583	
Factor 3 (9,55% of variation)	The company entered a new market	,748	0,608
	SUM Marketing changes	,657	
	Existing service targeted into new markets	,608	

Source: own work

Table 4: Descriptive statistics of observed factors

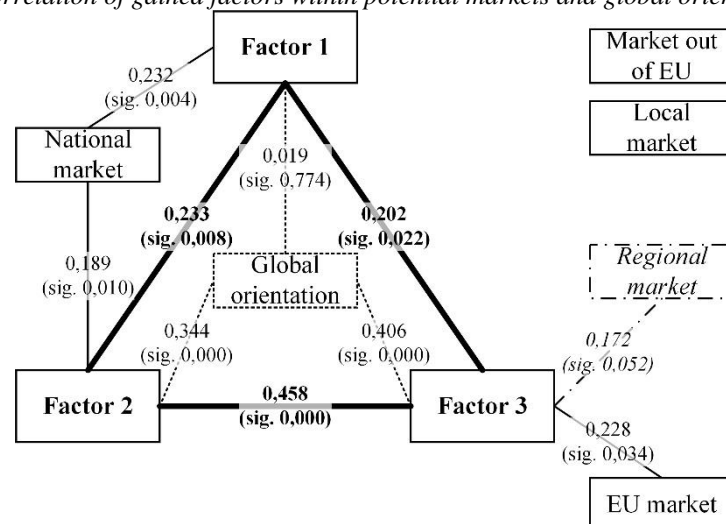
	Median	Mean	Variance	Std. deviation
Factor 1	3,467	3,130	,880	,938
Factor 2	2,200	2,336	,705	,840
Factor 3	3,833	3,467	,879	,938

Source: own work

It is entirely reasonable that some firms will be pursuing two or more modes of business development strategies simultaneously because the research asked the KIBS enterprises to focus on all their innovation and organizational change efforts. Thus gained factors are close to each other (bivariate correlation elaborated at 95 % level of significance): F1 correlates with F2 ($r=0,233$, $Sig.=0,008$) and with F3 ($r=0,202$, $Sig.=0,022$) and F2 correlates with F3 ($r=0,458$,

Sig.=0,000). As can be seen, service innovations often form the basis for process innovations in services based on changes in technology (Miles, 2005). Penetration strategy through modification are related with acquiring more (new) customers and expanding current markets or searching for market niches and finding shortcomings in competition. In repositioning strategy, the KIBS enterprises are engage in marketing actions such as changes in distribution methods, advertising or permanent exhibitions with the objective to increase appeal for the firms' products and/or to enter new markets with existing services and increase sales and range of offered services. Further, we divided a potential geographical markets into five broader dimensions: local, regional, national, EU member states, outside of EU according their percentage of total sales. There were identified some significant correlations. The new service development strategy (F1) and penetration strategy through modification correlate with national market (F2) ($d=0,232$, Sig.=0,004 and $d=0,189$, Sig.=0,010). In other words, the more KIBS enterprises have national scope of operation (well established on domestic market), the more will be engaged in diversification strategy through innovation of services. The penetration strategy through modification in addition (F3) correlate with outside of EU markets ($d=0,228$, Sig.=0,034) and the strategy of repositioning existing services correlates with EU market ($d=0,360$, Sig.=0,000) and some extent with regional markets ($d=0,172$, Sig.=0,052). Extant studies show that younger firms are likely to expand geographically, using their existing product lines to serve new regional and international markets, while older firms are more likely to grow locally, developing specialized products for small, established demographic niches (Branzei & Vertinsky, 2006). Further, the innovations of services (especially more radical in terms of newness to the market) which are untested and bringing into the new markets are a very risky strategy. Finally, as a result of the interaction between service providers and their customers, some innovation activities are aimed at adapting the services to the users' needs, which might in itself be considered a form of innovation (Rodriguez & Nieto, 2010) which is often under the protection of the contract between the service provider and the customer. This may be a barrier to distributing and delivering service innovation to foreign markets as well.

Figure 1: Correlation of gained factors within potential markets and global orientation of KIBS



Source: own work

In addition, we wanted to corroborate premise that KIBS focus on global market environment with existing services rather than newly or modified services or products targeted mainly on national market. This premise were confirmed by correlations between global orientation and the penetration strategy through revision/modification of existing services (F2)

($d=0,344$, $Sig.=0,000$) and strategy of repositioning existing services (F3) ($d =0,406$, $Sig.=0,000$).

4. Conclusion

The globalization, along with other factors such as market liberalization, development of ICT, have provided service firms with the opportunity to carve out a larger international presence. The service firms are currently internationalizing more and more quickly than ever before. The results clearly show that small KIBS enterprises in Czech Republic prefer, in particular, incremental innovations. The results of this paper point the opposite result of research studies suggested that service and process innovation increasing the internationalization of KIBS firms (Rodríguez, Nieto, 2010). However, research is concerned with small businesses that may play a supporting roles, the more advanced innovation are almost entirely pursued within large organizations, with little outreach (Miles, 2005). Furthermore, the consequence of the internationalization of small businesses may not only be the direct result of innovation, but may also be related to other changes such as ownership structure, collaborations, customization of products. This study is based on a cross-sectional sample and additional research is needed in order to investigate the dependences revealed in this study in samples of specific KIBS service categories (e.g. IT, R&D, architectural, design).

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FULFILMENT OF THE INNOVATION POTENTIAL OF LARGE BUSINESSES: IDENTIFYING THE CRITICAL FACTORS

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Abstract. Innovation is positively recognized as a source of wellbeing, economic growth and long-term success of a firm. It is not question, whether, but how to innovate especially in the terms of globalization, Industry 4.0 and new trends in the environment. Different factors have impact on the corporate innovation activities. Innovation capacities are driven within the company by various aspects, such as management approach, knowledge, creativity or leadership. External factors, different innovation policies of countries, market forces, environmental changes or technological capability, play also an indisputable role. The source of innovation usually lies on the interface between the firm and its environment. Large firms are the main leaders in the innovation process based on the latest data. Specialised departments, which focus mainly on innovation, can be found in majority of them. Large firms have the advantage of various skills and specialised knowledge obtained due to their wide range of activities and human capital. The possibility of progress in employee career when their proposal is accepted or diversity of impulses to innovate gained by operation in globalized environment can have positive impact. On the other hand, large firms are not very flexible compared to small and medium- sized firms, but they have superior financial resources to invest as a result of their size. Based on the research, factors, which lead to the fulfilment of innovation potential in the large firms are discussed and evaluated in a case study.

Keywords: innovation, organization, management, large businesses, innovation factors

JEL Classification: M10, O31, O32, O39

1. Introduction

Innovation in current environment became necessity for survival and continuous development. Connected globalized world puts constant pressure to create and implement something new for companies. It is necessary to understand not to only formal parts of innovation process but also to the informal parts, to internal and external forces driving innovation and how the strategy is connected to innovation is necessary. Existence of different innovation models for national or regional culture, for different industries or different types of companies raises question of common factors for successful innovation in general.

2. Defining innovation

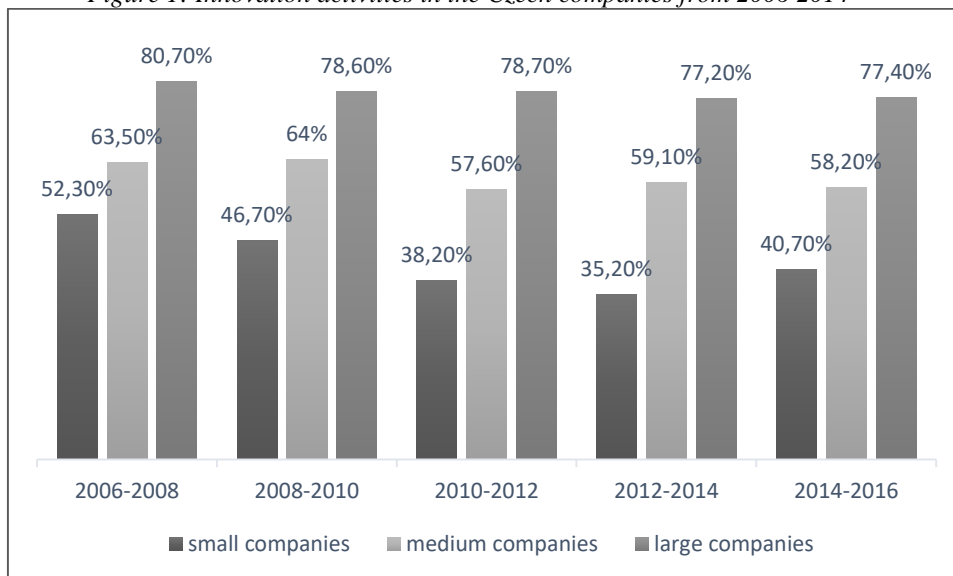
Nowadays there is not one unambiguous definition and even the definitions evolve through time. Essentially innovation is linked to new, dramatically improved product, process or service. First and basic definition was given by Schumpeter (1934) as “a historic and irreversible change in the method of production of thing” and “creative destruction” (Schumpeter, 1934). He distinguished innovation from invention. Dunphy et al. (1996) characterized invention as “the first working model of the technology” and innovation as “the first commercially feasible version of the invention”.

As basis for recognition of innovation the OECD Oslo Manual (OECD, 2005) is used commonly: “An innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations” (OECD, 2005). Basically, every activity of firm which leads to something new what improves some aspect of firm.

3. Innovation in the large companies

Reasons for innovation can be found in positive correlation between performance and innovation. Yamin et al. (1999) published research which states that suggests that innovative companies are more profitable than noninnovative companies. The complexity of structure and multilevel management are challenging for innovation activities and based on that small companies should have had advantage in the field of introduction of innovation. Latest researchers prove otherwise.

Figure 1: Innovation activities in the Czech companies from 2006 2014



Source: Adapted from CSU, 2018

Based on the latest data from the Czech Republic the innovation activities trend has changed, after continuous decline from 2006 to 2014 there is growth in the period of 2014-2016. Compared to small businesses it is cleared that large businesses are still leaders in the innovation, which is in the contradiction to the general belief of small businesses as main force of innovation. From the international point of view, enterprises in the Czech Republic innovate less than the EU27 average (share of 49% in the period 2010-2012) and gradually the Czech Republic approaches countries with lower innovation rates. (CSU, 2018)

4. Critical factors of innovation

As internal organizational aspects which are influencing innovation can be named: type of innovation; management (leadership, creativity); formalized structure (departments, divisions – responsibility, informality); ad hoc structures (project groups) or the processual aspect of the organization (including the role of the employees in the process) (Edquist, 1997). Common critical success factors of innovation based on research in high technology companies are: participative leadership, management, support and good information flow (Balbontin et al, 1999).

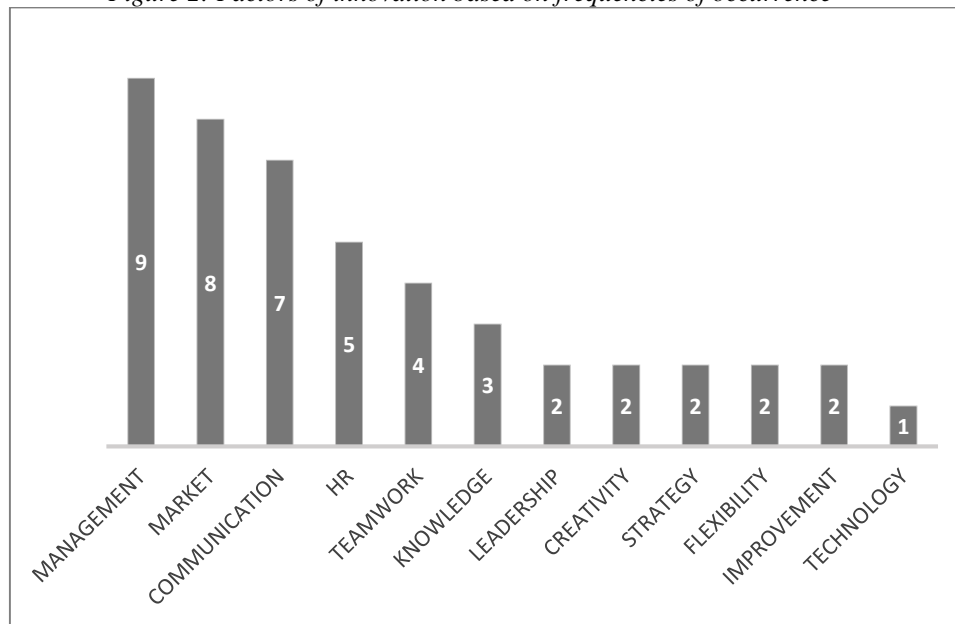
Keizer et al. (2002) analysed enhancing factors of in collaboration with other firms, linkages with knowledge centres, utilising financial resources or support regulations, strategy, structure, technology policy, level of education investment in R&D, geographical location, stating the using innovation subsidies, having links with knowledge centres and the percentage of turnover invested in R&D as most influential for companies. Radas & Bozic (2009) added market scope, presence of organizational and strategic changes in the firm and market of the firm to the mix. Adoption of project management framework has positive effect on innovation (vanderMeer et al., 1996), strategy support proactive approach to innovation (Birchall et al, 1996), leadership style influence creativity, culture and climate (Somech, 2006; Mathisen et al., 2012), importance of knowledge management for innovation was recognized by Hall & Adriani (2003) and manager's prior experience, conducting training sessions to the employee at firm level have positive affect for innovation activities (Seenaiah & Rath, 2018).

Critical factors have diverse effects on large and small companies (Acs & Audretsch, 1988); customer requirements and societal requirements on corporate social responsibility opens new possibilities for innovation activities for companies (Kesidou & Demirel, 2012); importance of close cooperation with customers was recognized as incremental for innovation (Bos-Brouwers, 2010); product, firm, market and innovation process are recognized as key factors of success (De Jong & Vermeulen, 2006); suppliers, clients, market orientation, turnover growth and size contribute positively to innovation (Barata & Fontainha, 2017) and decisive correlation between innovation and decentralized structure, presence of organizational resources, belief that innovation is important, willingness to take risks and willingness to exchange ideas was proven (Wan et al., 2005).

One of the general overviews of factors of successful organizational innovation based on literature research is done by Read (2000). He established eleven factors as key elements of innovation: management support for an innovative culture, customer/market focus, communication/networking – internal and external, HR strategies that emphasise innovation, teams and teamwork, knowledge management, development and out-sourcing, leadership, creative development, strategic posture, flexible structure, continuous improvement, technology adoption (Read, 2000).

Negative factors which suppress innovation potential were studied by Kanter et al. (1997): restriction of creativity by environment, dominant vertical relations, poor lateral communication, limited tools and resources, reluctance to change, overlooking internal innovation, indefinite innovative activities, unsupportive climate in company.

Figure 2: Factors of innovation based on frequencies of occurrence



Source: Adapted from Read, 2000

5. Methodology

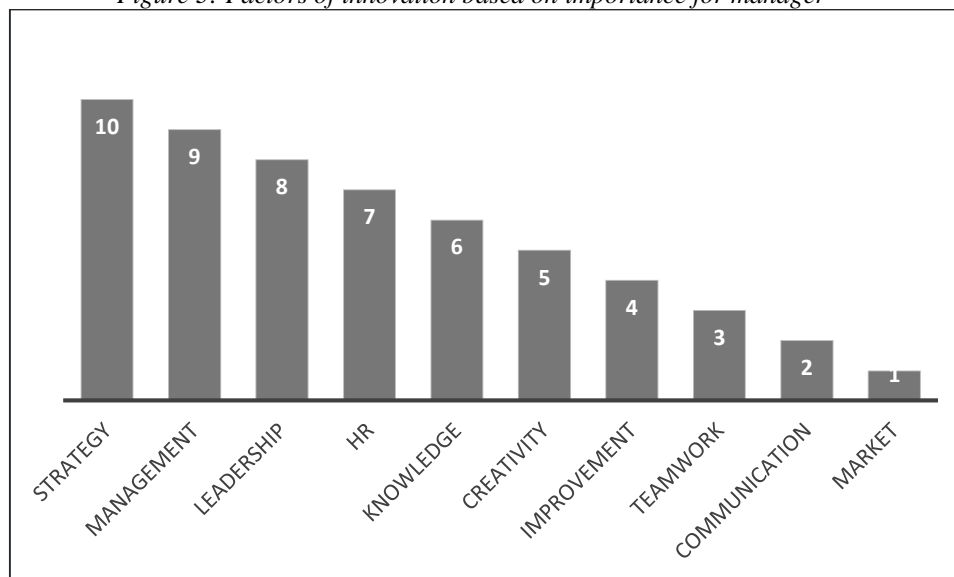
This study is done by case study research. The main source of data is structured questionnaire with semi-opened questions. The questionnaire was designed by good practises of successful innovation management based on previous secondary research. No objective measurements were used.

The key person of this research was lean manager of one production chain who is with the company for 3 years. Innovation of processes is fundamental part of the manager`s job and gives a unique opportunity to examine managers` approach to daily innovation. The main question of this research was to determine which factors are considered as the most important for the fulfilment of the innovation potential.

6. Result

It can be said that good innovation culture is a mix of many factors. It is clear, that the examined company have the knowledge of innovation management and understanding of the importance of continuous improvement on daily basis. Based on research, various factors were discussed in order to get insight to innovation process in the company and the manager was asked to grade factors in the order of their importance for the company.

Figure 3: Factors of innovation based on importance for manager



Source: Own processing

Strategy plays the central role of innovation management for the company even though secondary research showed semi-importance of this factor. That can be accounted to the German leadership which gives clear vision of future progress for whole venture group where the company must follow the vision. Contrary to the general belief the market demands were not considered as important. It can be explained by strategy of the company which is based on the close cooperation with customers. Other factors are in general consistent with secondary research proving that management and leadership outline fundamental part of innovation management. It must be said that clear distinction between factors proved to be difficult for the manager and it is possible that replicated research in the same company with another manager could show different results.

7. Conclusion

The aim of this paper was not to capture all the factors which have an impact on the innovation process or moreover to give any precise recipe for successful innovation. Separation of one factor from each other is not possible mainly because the innovation is driven by synergetic effect of all factors working together. It also must be point out that every innovation is under the influence of other factors outside of the company like political situation, environment, legal requirements or culture of the state. (Seeniah & Rath, 2018)

Nowadays companies cannot simply wait for the new trends to emerge on the markets but must actively search for novelty and diversity. It is necessary to undertake the crossdiscipline approach to innovation with consideration of differences of each company. Companies behaviour shape the environment around which puts a pressure to sustainable and responsible development.

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DIGITAL DIVIDE IN HOUSEHOLDS OF ELDERLY PEOPLE. EVIDENCE FROM POLAND

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Abstract. The development of the Internet and communication technologies has become one of the keystones of globalization and modern society. The Internet has changed every aspect of how people live their lives. It is possible to communicate and work internationally, do shopping abroad and many other things without leaving one's home, On the other hand, no access to information and communication technologies and no ability to use them are seen as potential barriers for individuals to participate in the information society, which can lead to a digital divide. It seems that the most vulnerable social group in terms of digital exclusion are the seniors. This study shows selected aspects of the problem of digital inequality in Poland. The purpose of this paper is to estimate the scale of the digital divide of households of elderly people in recent years and to identify the socioeconomic factors that are conducive of digital exclusion. In order to extract the qualitative factors conducive to digital divide, logistic regression was carried out. The scale of digital exclusion of older people in Poland was compared with other European Union countries. Individual, non-identifiable data from a household budget survey conducted by the Central Statistics Office in Poland in the years 2012-2016 were used in the analysis.

Keywords: digital divide, digital development, households of elderly people, information society

JEL Classification: D31, D19, I31

1. Introduction

In Poland, just like in other countries of the European Union, the percentage of people over 65 years of age is on the increase. According to the demographic forecast for Poland for the years 2008-2035 (*Prognoza...*, 2009), the number of Poles will decrease by about 5.5% during this period. At the same time, the percentage of persons over 65 years of age in the population will increase from 13.5% to 23.2%. Aging of the Polish population will result in changes not only in the functioning of individuals and households, but also of the state as a whole. In case of some senior citizens and their households, old age may mean worsening of their financial situation or social exclusion (Cwiek & Wałęga, 2014; Torraco, 2018).

In the information society, the digital divide resulting from the lack of access to information and communication technologies (ICT) or the inability to use them can become the reason for social exclusion (Deursen & Mossberger, 2018; Zhao et al., 2014). It is believed that age is one of the main determinants of the digital divide (Deursen et al., 2011; Niehaves & Plattfaut, 2014; Varallyai et al., 2015). Seniors often enjoy long-standing technologies and are not aware of the existence of various types of newer information and communication technologies (Wu et al., 2015). Acquiring of new skills, including learning how to use the latest technology at an older

age becomes difficult due to the deteriorating perception, attention, memory and learning. In addition, small letters, colors which are difficult to distinguish and the plethora of stimuli characteristic for many applications can discourage them from using the Internet (Szmigielska et al., 2012). Seniors are also worried about security issues and loss of personal contacts with others (Loh et al., 2009).

Despite the difficulties mentioned, older people can achieve a number of benefits from the use of the latest technology, such as time and money saving, access to medical services or establishing and supporting social contacts (Quan-Haase et al., 2017). The purpose of this paper is to estimate the scale of the digital divide of households of elderly people in recent years and to identify the socioeconomic factors that are conducive of digital exclusion.

2. Data and research method

For the purposes of this study, individual non-identifiable data from the household budget survey carried in 2016 by the Central Statistical Office were used. The subject of research were the households, in which the person who is the primary provider was aged 65-74, and the object of the study included whether the household had a computer with an Internet access (5,930 observations).

Identification of the factors that affect the use of the Internet in the households of seniors in Poland was conducted using econometric modeling. In view of the fact that the explained variable—having access to a computer with an Internet access (Y)—is dichotomic, a logit model was used. In the case of this model, depending on certain factor (x_j), probability can be interpreted as the value of the distribution function expressed by the formula (Maddala, 2006):

$$P(Y_i = 1) = \frac{\exp(\alpha_0 + \alpha_1 x_{i1} + \alpha_2 x_{i2} + \dots + \alpha_k x_{ik})}{1 + \exp(\alpha_0 + \alpha_1 x_{i1} + \alpha_2 x_{i2} + \dots + \alpha_k x_{ik})} \quad (1)$$

The parameters of the above model are usually estimated using the maximum likelihood estimation, maximizing the logarithm function reliability relative to the parameters of the model using the iterative numerical procedures.

As the explanatory variables, characteristics of the household and the head of the household were considered:

- biological type of the household (two zero-one variables; the reference group were households without children),
- socio-economic group of the households (four zero-one variables; the reference was the group of households of retired people),
- subjective assessment of the financial situation (five zero-one variables; the reference group were households whose members believed their financial situation was bad or very bad),
- degree of urbanization (three zero-one variables; the reference group were households located in areas with low population density),
- class of place of residence (three zero-one variables; the reference group were households located in the countryside).

In order that match the model of the McFadden R^2 formula was applied (Gruszczyński, 2012):

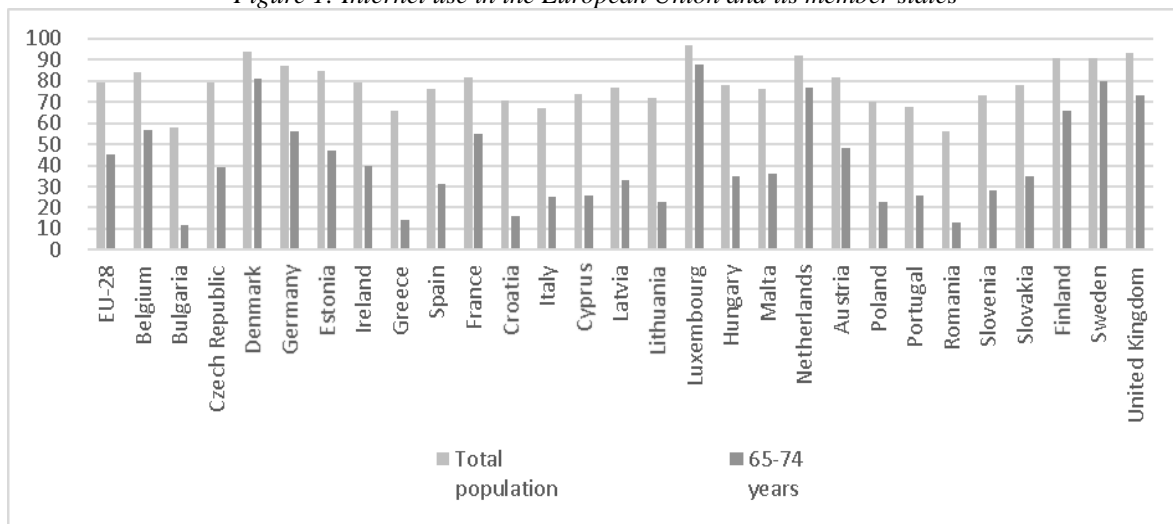
$$\text{McFadden}R^2 = 1 - \frac{\ln L_{fit}}{\ln L_0} \quad (2)$$

where: lnL_{fit} is a reliability function of the full model, and lnL_0 is the logarithm of the model reliability function where only a constant term occurs. If the model perfectly forecasts the variable, then $lnL_0 = 0$, therefore $McFaddenR^2 = 1$. In practice, however, R^2 McFadden values are small, closer to 0 rather than 1 (Gruszczyński, 2012).

3. Elderly people using the Internet in Poland and in the European Union

Four out of five residents of the European Union between 15 and 74 years old use the Internet regularly, i.e., at least once a week (cf. figure 1). This proportion had increased from 2006 by 76%. The distribution of Internet users in the society is geographically diverse—in countries such as Luxembourg, Denmark United Kingdom, Netherlands, Sweden and Finland Internet users account for more than 90% of the population, while in Romania and Bulgaria this percentage is lower than 60% (up 56% and 58%). Even greater variability emerges in the distribution of the population aged 65-74 regularly using the Internet. It ranges from 88% in Luxembourg to 12% in Bulgaria. The proportion of Internet users among seniors has increased over the past 10 years by 3.5 times. In Poland, the percentage of older people who use the Internet on a regular basis is 23% and is about 47 percentage points lower than in the whole society.

Figure 1: Internet use in the European Union and its member states



Source: Eurostat.

The mere fact of using the Internet is not sufficient to describe the degree of the digital inequality of older people. Despite having suitable equipment allowing them to use the new technologies, the scope of their activity on the Internet is very limited (cf. Table 1).

Table 1: Population using the internet in 2016, by age and by type of use

Specification	Internet banking		Made an online purchase		Read online news sites/newspapers/news magazines		Participated in social networks	
	Total	65-74 years	Total	65-74 years	Total	65-74 years	Total	65-74 years
EU-28	49	26	55	27	58	31	52	16
Poland	39	10	42	8	58	20	44	6

*During the previous 12 months

Source: Eurostat.

Most seniors in Poland use the Internet to look up information—they read online newspapers or other online news (cf. Table. 1). In contrast, only one in ten people aged 65-74 (i.e., 43% of Internet users) bank online. 35% of senior Internet users shop online and only one in four has a social networking site profile. It follows from this that the Polish seniors are not only less likely to use the Internet, but also have lower skills that do not allow them the full potential of the network.

4. Determinants of Internet access in Polish seniors' households

In order to extract the socioeconomic qualitative factors, logistic regression was carried out. The information contained in Table 2 shows that most of the proposed variables significantly affect the likelihood of having a computer with an Internet access at home. The likelihood of Internet access at home is much greater in households in which there are children. A significant impact on the probability of having a computer with an Internet access also has the socio-economic category of the household—if the main provider is professionally active (i.e. employed or entrepreneurial) there is a higher probability of having a computer in comparison to the households of retirees.

With the improving of the subjective assessment of the financial situation of the household, the likelihood of having a computer with Internet access increases as well. The variable is also affected by the location of the household and the population density of the area. Households located in large cities and in areas with a high population density were the least affected by the digital divide.

Table 2: Evaluation of the parameters of the logistic model of equipment of Polish seniors' households with computers and Internet access

Specification	Parameter	Standard error	Wald-statistics	p-value
Constant	-1.8576	0.19	91.86	0.000
Households with children	2.8415	0.23	153.72	0.000
Households of employed people and entrepreneurs	1.5695	0.18	79.46	0.000
Households of farmers	-0.0426	0.39	0.005	0.946
Households maintained from non-earned sources	-0.0644	0.34	0.004	0.848
Subjective assessment of own material situation: poor	0.3981	0.20	4.013	0.045
Subjective assessment of own material situation: average	1.2626	0.18	48.74	0.000
Subjective assessment of own material situation: good	1.8675	0.19	96.49	0.000
Subjective assessment of own material situation: very good	2.4211	0.20	144.83	0.000
Density of population: average	0.1737	0.04	15.92	0.00
Density of population: high	0.5996	0.09	42.54.66	0.00
Cities with population between 100,000 and 499,000	-0.0664	0.01	21.84	0.00
Cities with population over 500,000	0.1982	0.10	4.12	0.04
McFaddenR ² =0.136846, Chi ² =1118.729,df=12, p=0,00				

Source: own studies

Similar results regarding the effect of the presence of children in the household, and the socio-economic characteristics of the household on the probability of having a computer with an Internet access were obtained in Britain (Eynon & Helsper, 2015). Friemel stresses the influence of education, income, interest in technology and computers prior to retirement as factors affecting the level of Internet use among seniors (Friemel, 2014). Other studies of the determinants of social exclusion point to the role of GDP per capita, telecommunications

infrastructure and the quality of regulations (Chinn & Fairlie, 2010), gender (Dixon et al., 2014), place of residence (Ricardo-Barreto et al., 2018; Schleife, 2010; Silva et al., 2018), health (Levy et al., 2014; Yu et al., 2016) and socio-economic background (Kania-Lundholm & Torres, 2018; Lissitsa & Chachashvili-Bolotin, 2015).

5. Conclusion

Access to the Internet in the age of globalization seems to be a prerequisite for full professional and cultural participation in modern society. Seniors are a group which seems to be particularly affected by inequalities. The problem is not only a small proportion of older people who use the Internet regularly, but also the limited scope of the activities that they perform online, which makes them unable to take full advantage of the opportunities offered by the Internet.

The study has shown that the factor the limiting digital divide affecting households of elderly people in Poland is the professional activity of the main provider of the household. It seems that the professional activity of older people is conducive to the acquisition and preservation of digital skills, resulting in use of the Internet outside of their working time. Also the fact that households of self-employed people and entrepreneurs are in better financial health than households of old age pensioners is not without significance and also promotes these households' equipment with computers with Internet access. The positive impact of the presence of children on the probability of having a computer with an Internet access in households of older people seems very optimistic. As it is to be hoped that in such households seniors have the opportunity to acquire digital skills from their children or grandchildren in a spontaneous and unaffected way.

In Poland, a difference in the access to the Internet is still observed depending on the localization of the household. Households located in areas with low population density are particularly vulnerable to digital divide, which can be explained by a smaller choice of Internet service providers, higher prices and poorer quality of connection.

Due to the increasing proportion of older people in most European societies and the validity of the problem of the digital divide, the analysis of the issue of access to the Internet and the level of digital literacy in senior citizens should be continued in the coming years.

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RAIL TRANSPORT PROJECT MANAGEMENT IN THE CONTEXT OF GLOBALIZATION AND DIGITAL TRANSFORMATION OF THE ECONOMY

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Abstract. The paper discusses the issues of rail transport project management in the framework of globalization and digital transformation of the economy. The author notes that infrastructure projects on railway transport have high capital intensity, complex engineering, technical, organizational and legal structures. The implementation of such projects requires the use of professional experience and knowledge in the field of attracting investments, application of public-private partnership mechanisms, taking into account industry features of infrastructure facilities and project management, and digital orientation of the modern economy. Deep transformations caused by the processes of digitalization of the world economy require a new vision of problems, innovative forms and methods of economic activity to improve the efficiency of the implementation of transport infrastructure projects. The globalization of the economy is an objective process that encompasses all aspects of society, opening up new opportunities for individual and group interaction. Globalization requires new "rules of the game" and values influencing the activity of transport organizations, creating new mechanisms of interaction between economic and social development. All of these requires from transport organizations innovation, flexibility and the ability to adapt to the new economic environment of the world economy. The purpose of this paper is to analyze the aspects of project management in the railway transport related to the development of the information society and the widespread use of information and communication technologies in the context of globalization and the digital transformation of the economy.

Keywords: rail transport, project management, digital transformation

JEL Classification: R40, O18, O22

1. Introduction

The importance of using rapidly developing information and communication technologies (ICT) in highly competitive commercial environments is well known (Dadderio, 2003), especially to ensure sustainable business growth, and in some cases even for its survival in the market. Many business concepts would not have been realized so successfully without the help of ICT, for example, JIT (Just-in-time), Collaborative Planning, Forecasting and Replenishment, indicative budgeting systems. Modern global production chains are no longer conceivable without the use of digital technologies in the sphere of planning, marketing, supply, delivery of finished products and, ultimately, sales and after-sales service (Raymond & Bergeron, 2014). The new principles of functioning of a business ecosystem set before the management of transport companies a number of little-researched tasks to ensure the stable development under the conditions of globalization and the digital economy. Globalization

requires new "rules of the game" and values influencing the activity of transport organizations, creating new mechanisms of interaction between economic and social development. All of these requires from transport organizations innovation, flexibility and the ability to adapt to the new economic environment of the world economy.

Transport and logistics should be one of the leaders of the economy under the conditions of its digitalization, i.e. combination of technologies and developments into a global multi-element and multi-level system capable of changing completely the existing technological paradigm. Railway companies are obliged to introduce product and process innovations to build a unified intelligent transport system (UITS), and to build their activities in accordance with the following principles: full coordination of action of business units, free information exchange, service management, open services, online business. Within the implementation of the above principles, the strategy of innovative development of railway administrations and the practice of project management should be designed.

The purpose of this paper is to analyze the aspects of project management in the railway transport related to the development of the information society and the widespread use of information and communication technologies in the context of globalization and the digital transformation of the economy.

2. Methods

Initially, project management arose as a subsection within the studies of work structuring and network planning designed in the late 50s of the 20th century in the United States, and then was enriched by the theoretical principles and systematic approach tools and began to claim to be an independent academic discipline. In the wide domain of scientific knowledge in project management, certain areas can be highlighted, but at the same time we understand and underline all convention and "softness" of the boundaries and differences between them.

Anbari identified the five main lines of thought in the practical application of the systems approach to solving managerial objectives, i.e. in fact, in project management (Anbari, 1985). In a series of articles Bredillet suggests the possibility of singling out (Tab.1) nine project management schools (Bredillet, 2008).

Table 1: The nine schools of project management thought.

School	Metaphor	Key Idea	Came to Prominence	Influence
Optimization	The project as a machine	Optimize the outcome of the project using mathematical processes	Late 1940s	Operations research
Modeling	The project as a mirror	Use of hard and soft systems theory to model the project	Hard systems: mid-1950s Soft systems: mid-1990s	Systems theory, Soft systems methodology
Governance	The project as a legal entity	Govern the project and the relationship between project participants	Contracts: early 1970s Temporary organization: mid-1990s Governance: late 1990s	Contracts and law, Governance, Transaction costs, Agency theory
Behavior	The project as a social system	Manage the relationships between people on the project	Organizational Behavior (OB): mid-1970s Human resource management (HRM): early 2000s	OB HRM

Success	The project as a business objective	Define success and failure identify causes	Mid-1980s	Internal to project management
Decision	The project as a computer	Information processing through the project life cycle	Late 1980s	Decision sciences, Transaction costs
Process	The project as an algorithm	Find an appropriate path to the desired outcome	Late 1980s	Information systems, Strategy
Contingency	The project as a chameleon	Categorize the project type to select appropriate systems	Early 1990s	Contingency theory, Leadership theory
Marketing	The project as a billboard	Communicate with all stakeholders to obtain their support	Stakeholders: mid-1990s Board: early 2000s	Stakeholder management, Governance, Strategy

Source: Bredillet, 2008

System analysis of the project management schools and the actual problems of the digital economy in transport, the study of investment appeal of the railway industry are represented in the works of many scholars (Palkina, 2017; Toque et al., 2017; Sivertceva, 2017). Apart from individual scientific schools, today there are many international organizations that work on developing the project management standards (Project Management Institute (PMI), Software Engineering Institute, Australian Institute of Project Management et al.). However, there are no universal project management standards yet, but the most frequently used ones are: ISO 21500:2012 – Guidance on project management, ISO 31000:2009 – Risk management, ISO/IEC/IEEE 16326:2009 – Systems and Software Engineering-Life Cycle Processes-Project Management, A Guide to the Project Management Body of Knowledge, PRINCE2 - Projects in Controlled Environments et al.. The main idea underpinning these standards is to ensure project sustainability throughout all stages of its life cycle (Carvalho & Rabechini, 2017; Aarseth et al., 2017).

3. A study of project management methodologies when setting up "smart" control systems in railway transport

Today, a large number of "digital economy" definitions as applied to various aspects of public and economic life are already used. Retail and wholesale, tourism, insurance, banking, communications companies were the first to change to the new principles of management. The "quantum leap" in the population's mobility has led to the evolution in the sphere of passenger transportation; the spread of sharing economy model and the mobile Internet has led to the creation of new markets for transportation services. This area involves large trading platforms (eBay and Craigslist) and less common ones such as travel exchange systems (Airbnb), car sharing networks (RelayRides and Zipcar). The sharing economy model leads to the re-understanding of not only what people acquire, but how they physically receive a service or product. Already today, the active use of digital platforms has enabled motor transport to take some passengers off railways (Lyons, 2014). They find for themselves other options for movement, more attractive ones. Therefore, railway companies also need to offer digital services to their customers.

Digitalization of dynamically interacting processes of production, distribution, exchange and consumption is the basis of a new industrial revolution in transport (Industry 4.0). Its distinctive feature is the unification of previously disparate technologies into a single smart production

system using: Building Information Modeling; Product Lifecycle Management; Computer-Aided Design; Internet of Things; Blockchain; BIG DATA - a set of approaches, tools and methods for processing huge volumes of data and other technologies.

The implementation of innovative projects in the process of building a single intelligent transport system is closely linked to the concept of uncertainty and fuzziness, which makes managing these projects quite a challenge. There is a direct relationship between the degree of novelty and the complexity of an innovative project, which in its turn requires the use of non-traditional approaches to the management of such enterprises (Silvius et al., 2017). We will note that the degree of novelty is one of the key differences between an innovative project and a traditional one. Moreover, due to the high degree of uncertainty inherent in innovative projects, several functional areas can be singled out that are the most critical ones in terms of management: stakeholder management, human resource management, risk management. The management of these areas of knowledge in the sphere of development of information technologies differs significantly from the traditional approach in project management.

Project activities aimed at changing an object or process is characterized by the existing fixed goal, constraints of time and resources, novelty and complexity. Under the conditions of globalization, it is large infrastructure projects that become a means to achieve the goals and objectives of the railway entity in the context of a strategic plan. At the same time, large and mega projects of transport infrastructure construction are in terms of management some of the most difficult ones (Locatelli et al., 2017, A). They often go beyond the limits of the allocated budgets and periods. Similar projects are as a rule initiated by one or more of the following strategic directions: market requirements; strategic opportunities; customer requirements; the need for sustainable development (Martens & Carvalho, 2017); technological progress; legislative requirements.

In its turn, the strategic plan of an organization becomes the primary factor managing investments in projects. Accordingly, for the implementation of project activities in railway companies the following specifics and risks are characteristic: significant restrictions on the availability of public and private resources; risk of corruption and misuse of a project budget (Locatelli et al., 2017, B); for the successful implementation of projects, high levels of commitment, cooperation and adaptation of the project stakeholders are required (Ika & Donnelly, 2017); the project budget and personnel are appointed and controlled by railway administration jointly with main stakeholders.

Projects in rail transport are frequently enough built on the principles of outsourcing. Using quantitative data collected from 234 outsourcing projects, Liu Shan empirically determined that control of project results is more efficient than control of the process, though it has a positive effect on the efficiency of projects financed from outside (Liu et al., 2017). The situation is exacerbated in the case of mixed-use projects, for interaction difficulties or even conflict of interest arise, related to the fact that a project efficient for one business unit of a holding could have the opposite effect for the adjacent business units. To date, the only way on the basis of which this contradiction can be resolved is “digitalization” of business processes of project activities.

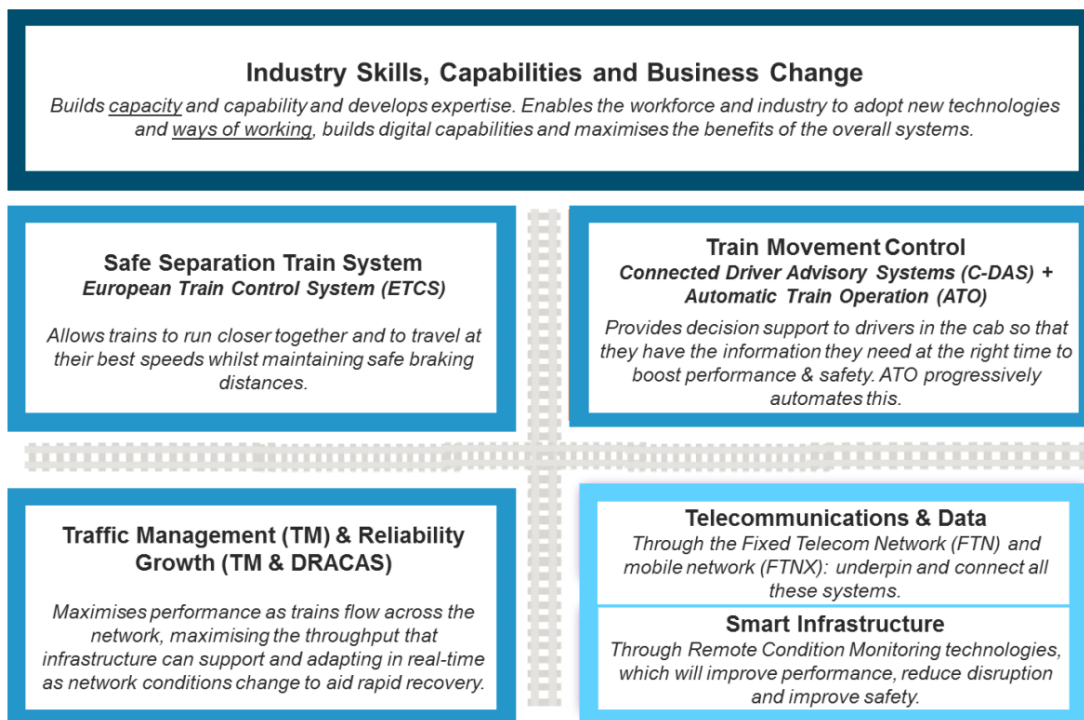
4. The scientific and technical project "Digital Railway"

The implementation of the project of creating a "smart" railway is the strategic goal of the development of rail transport in the world, as reflected in the reports "A Global Vision for Railway development. International Union of Railways" (2015), "Rail Technical Strategy

Europe” (2014), as well as local strategies of railway companies (holdings, operators, rolling stock manufacturers, etc.) such as "Shift2Rail" in the European Economic Community, "The Silk Road Economic Belt" in China, "Digital Railways" in UK and Russia. Scientific and technical projects under the common heading "Digital Railway" (DRW) is among the most priority ones on the list of innovative programs of railway holdings the world over.

The goal of the DRW project is usually to increase the competitiveness of the national railway companies in the local and global markets for logistics and transport services on account of the efficient use of modern digital technologies aimed at fulfilling the objectives of the rail carrier of freight and passengers and the owner of a public railway infrastructure (Fig. 1). The DRW concept is not limited to information technologies or operation, but has effects on the entire ecosystem of railways (Fig. 2). Thus, the methodology of the DRW project has to be developed by the railway community of scholars and practitioners taking account of the best practices achieved in other sectors, aviation and automobiles, with the analysis of not only the customer’s current needs, but also of the promising expectations of the railway system. (Cichocki & Unbehaven, 1993)

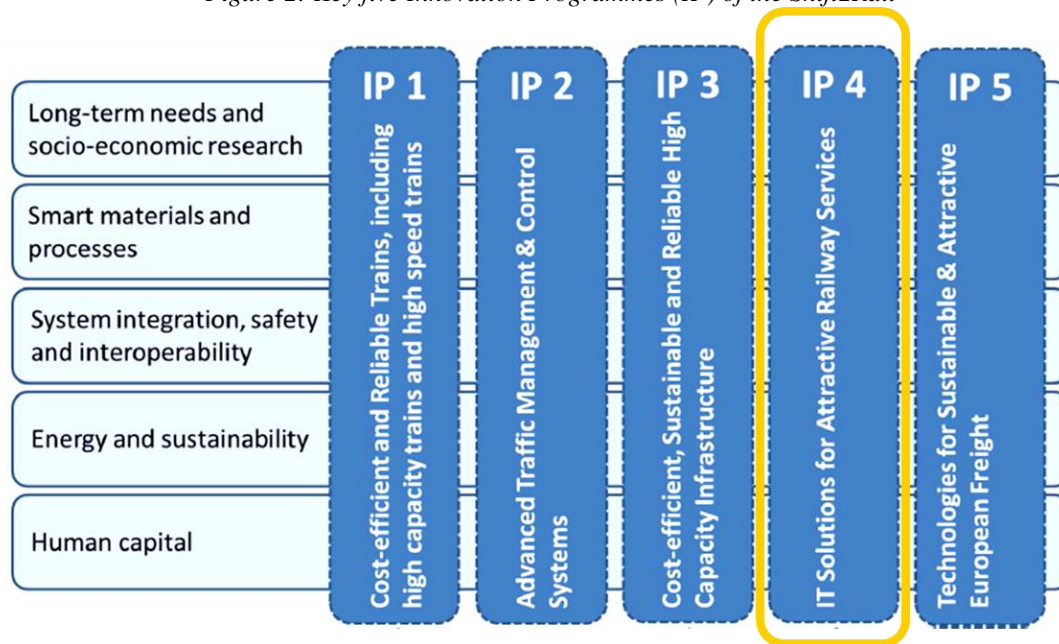
Figure 1: Key components of the Digital Railway Programme in the European Economic Community



Source: <https://www.networkrail.co.uk/>

Additional benefits will appear for every link in the value chain, allowing at the same time the expected negative risks to be reduced. Under the conditions of the global digital development the rail transport must prove that it is able to fulfil the objectives of the carrier of goods and passengers, not only now, but also in the future, through promoting advanced research in the sphere of digital technologies.

Figure 2: Key five Innovation Programmes (IP) of the Shift2Rail



Source: <http://www.gof4r.eu>

The promising direction of the "Digital Railway" mega project is surely the way to completely autonomous trains. To achieve this goal, a huge amount of work is to be done in many areas. First of all, it is necessary to create and prove that an automatic control system provides for the required rail traffic safety. Secondly, it is necessary to change the regulatory framework governing the operation of trains for the implementation of these technologies not only in a single country but also on a global scale. Thirdly, it is important to transform the consciousness of people by showing that the new technologies imply the elimination of monotonous hard work and the emergence of new occupations requiring creative labour and high skills.

5. Conclusion

Having reviewed the achievements in the sphere of project management, it is necessary to recognize that the further development of integrated project activities in railway companies under the conditions of globalization and the digital transformation of the economy is associated with the solution of a number of problems, namely: improvement of the methods of calculating planned indicators for the project activities; the basis for planning in the short-term may be the data on revealed problems obtained in the process of "digitization" of business processes at the level of railway holding units; development of a flexible methodology for calculating the economic efficiency of projects taking into account risk factors and uncertainties; toughening of the examinations at the project initiation stage; development of information systems of project activities evaluation; improvement of the system of employee motivation for project activities; focus on the project implementation stage in project management training programs; development of an information system for analysing the results of project activities, including for the purposes of efficient replication of projects and knowledge accumulation.

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MAKERSPACES IN ENTREPRENEURIAL UNIVERSITIES: A SOURCE OF INNOVATION AND CREATIVITY

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Abstract. Makerspaces are becoming increasingly common on university campuses, but there is great variation in what constitutes a makerspace in today's globalized world. On some university campuses, departmental classroom laboratories are being renamed or repurposed as makerspaces. In some cases, though, universities are creating makerspaces for the entire campus or even entire university community. Makerspaces vary not only in size, but also in funding structure, accessibility to public, etc. This paper presents the idea that university makerspaces can be a source of innovation and creativity. The hypothesis is analysed, that makerspaces can provide new forms of higher education institutions & business collaboration, new forms of learning for students and staff if the certain characteristics are met, when designing or operating a makerspace. A list of makerspaces in European HEIs is drafted. Finally, suggestions are drafted for the management of higher education institutions on how to improve the management of makerspaces in order to boost innovation culture.

Keywords: makerspaces, innovation, creativity, entrepreneurial universities, HEI & business collaboration

JEL Classification: I23

1. Introduction

The Maker Movement, or the shared economy, lies in the fact that individuals become a significant influencing force on their own production and consumption of physical goods. In the universities traditional test-based assessment doesn't reflect neither the making practices nor the expected competences (Giannakos et al., 2017). It is widely acknowledged that the Maker Movement is having far reaching effects on business, economy, even our everyday way of life (Make, 2013). The global distribution and accessibility of the Web, and desktop manufacturing technologies available openly nowadays, allow practically anyone to not only produce and customize their own goods, but also to engage in entrepreneurial manufacturing activity with minimum investments and efforts required. This empowers individuals to innovate and compete in production even with the global manufacturing giants in various fields of economic activity. As Anderson (2012) states, the Maker Movement gives hardware entrepreneurs the ability to be both, small and global. Makerspaces may be seen as spaces where people can engage in technology development for a more democratic and sustainable urban life (Niaros et al., 2017).

One of the most evident manifestations of the Maker Movement is the collaborative innovation, prototyping, and manufacturing of hardware in community-oriented cocreation

spaces often referred to as open workshops (Verbund Offener Werkstätten, 2014). These include co-working spaces, hackerspaces, makerspaces, fab labs, and other workshops. They offer an individual the possibility to openly access production tools and machines, specifically 3D printers, Computerized Numerical Control (CNC) mills, and laser cutters, and use them for prototyping and manufacturing of hardware goods in a space shared with other like-minded software and hardware enthusiasts and entrepreneurs, who call themselves hackers and makers. The creations coming from open workshops can range from simple 3D printed pendants and other accessories to complex Arduino-based robots, drones, and even whole 3D printed and assembled cars (Business Insider 2014).

Over the past decade, the number of makerspaces have grown enormously around the world user-reported numbers show nearly 1,400 active spaces in 2016, and it's 14 times more than there were in 2006. These spaces are also called hackerspaces, FabLabs or innovation labs, acting as communal workshops where so called makers are sharing the ideas and resources. Thus, these hands-on hubs for problem solving have grown in popularity in school libraries in recent years, but were not formally recognized in the former standards (Gerrity, 2018). Different types of makerspaces are usually installed in university libraries. Noh (2015) says that Library 4.0 must include not only software-based approaches but also technological environment development, which means that libraries have to be intelligent, include context-aware technologies, open source, big data, cloud service, augmented reality and state-of-the-art display (Noh, 2015).

Makerspaces are wide spread globally in different forms, usually that being: private for profit makerspaces, community centers, makerspaces owned by schools, universities or city libraries. In this paper we analyse the university owned makerspaces and how they could be exploited in order to boost the innovation development, business collaboration and competitive advantage of a university.

2. Makerspaces and their types

The idea of a university innovation space is quite recent, with the first one dating back to MIT's makerspace around 2001 (Barrett et al., 2015). While makerspaces are appearing in many universities and engineering schools across the country, there is still very little empirical assessment of these spaces.

There are a number of definitions of open or collaborative workshops. For example, Verbund Offener Werkstätten (2014) describes them as open collaborative spaces with equipment and tools available to all technically and artistically active individuals (hackers, makers, crafters, tinkerers, and artists) and their groups allowing them to work on their software, hardware, or art projects.

According to Craig Forest et al. (2016), makerspaces are places where “users work side by side on different projects within an open culture of collaboration. Makerspaces are generally equipped with traditional manufacturing equipment [...] and emerging rapid prototyping tools. [...] They empower their users to develop, build and test physical prototypes”.

The definition of open workshops given by Kostakis et al. (2014) describes them as physical places working on the basis of the community created around them, where individuals are immersed in the culture and ethics of each place and are able to engage with meaningful and creative projects. Thus, the authors stress the community basis of every workshop and the specific environment and ethics present in it (Iscenco, 2015).

These places empower the users to innovate without constraining their imagination or creativity (Barrett 2015). There is also the need of developing professional figures like consultants, may be operating in fab labs, co-working spaces or makerspaces that can mentor and advise makers (Giusti et al., 2017).

There can be many types of university makerspaces according to management type, budget structure, theme.

Table 1: Makerspace types

Management	Access	Budget structure	Location	Membership
Student run	Daytime hours	Funded by university	On / Off campus	Open to university community
Faculty run	Prolonged hours	Funded by university and business		Open to university community & public
Administrative staff run	24/7 access	Funded by community		Free for university community & fees for public audiences
		Fee based memberships		

Source: Authors

The main aim of the universities creating makerspaces is to develop a culture of learning by doing, giving students, teachers, independent inventors and entrepreneurs the opportunity to learn by doing, creating a multidisciplinary space open to the outside to receive different insights and inputs (Maravilhas & Martins, 2018).

All maker educators not depending on the type of their organization aim to help youth deal with failures in a productive way that would help advance their projects, their learning and their persistence in the face of obstacles (Maltese et al., 2018). Scholars should devote future debate to new possibilities for universities to perform entrepreneurial activities taking advantage of digital technologies (Rippa & Secundo, 2018).

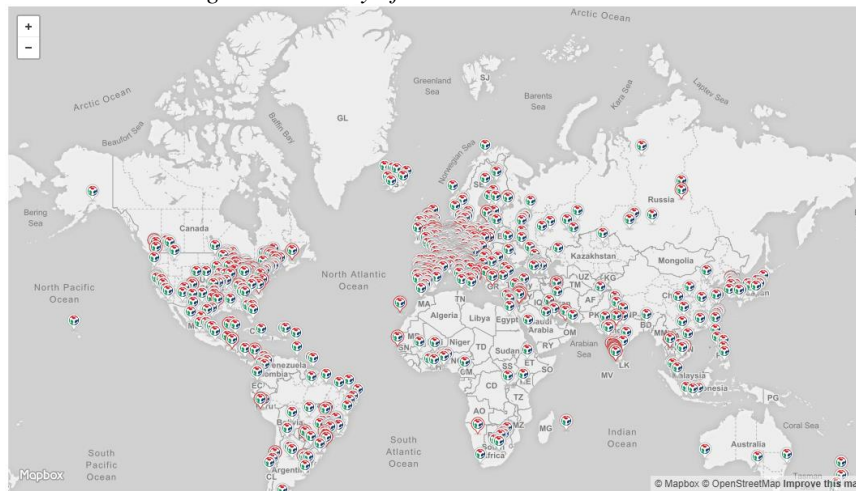
a. Makerspaces in Europe

Due to the vast number of types of the makerspaces and lack of it's promotion and online presence, especially of the smallest private or community workshops, it is challenging to collect all the cases in one comprehensive list. Some spaces are licenced as FabLabs or at least informally categorize itself that way – we referenced the user generated list having 1260 FabLabs around the world (see Fig. 1) and picked out all the European ones. According to Rosa et al. (2017), FabLabs account nearly for half of the makerspaces in the EU28 (48%; 397 makerspaces), whereas Hackerspaces account for 40% (327 makerspaces) and other type of makerspaces for 12% (102 makerspaces) (see Fig. 2). This left us with 397 Fab Labs in hand. And finally, since this research is focused on university makerspaces, after filtering out all the private ones, as well as the ones that are least promoted or online present (only 55 out of 80 makerspaces had social media presence), we had 80 university makerspaces on the list.

Out of 80 university makerspaces: 7 were a result of university consortia, 4 as a joint venture by a university and private business, and the rest of it – a fully university owned makerspace.

The size varied from 100 to 2600 sq. m. The biggest being Drahi X-Novation Center (XF4B) at Ecole Polytechnique (2600 sq. m.) and DTU Skylab at Technical University of Denmark (1550 sq. m.).

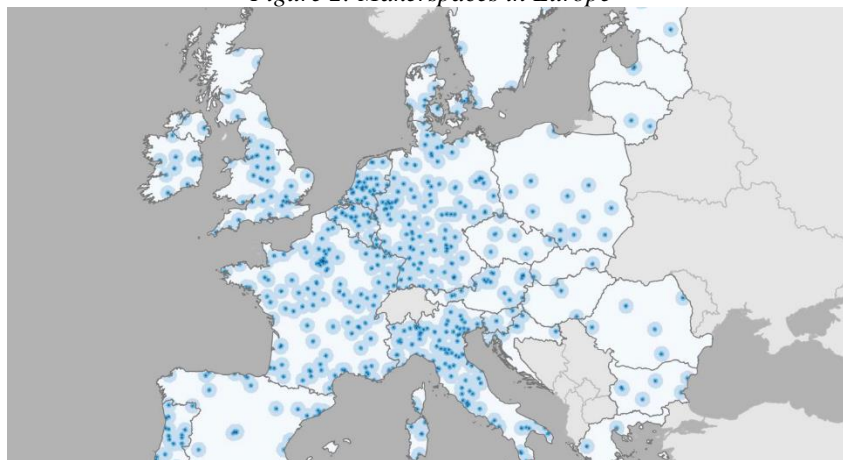
Figure 1: Density of FabLabs around the world



Source: <https://www.fablabs.io/labs/map>

Majority of university makerspaces are clearly engineering oriented (mostly rapid prototyping). All 80 units had 3D printers, which appears to be absolute mandatory to have in order to call yourself a makerspace. As Bisballe Jensen et al. (2016), most dominant tools in Norwegian makerspaces are 3D printer, laser cutter, mechatronics, CNC mill, vinyl cutter, sewing machine, lathe, welding, foundry, wood-working, 3D scanner and printing. For some places that call themselves a makerspace, it's all they have – a 20 sq. m. room with a few 3D printers available.

Figure 2: Makerspaces in Europe



Source: (Rosa et al., 2017)

The analysis of equipment description done in the research executed by authors of this paper in 2017 shows the following proportions: metal – 71, wood – 53, electronics – 56, computing – 55, painting/dying – 7, audio – 8, textile – 18, photo/video – 16, 3D modelling and graphic design – 42, startup incubator – 18.

Table 2: Makerspace tools & technologies

Permanently seen	Often encountered	Complementary	Original, rare
3D printers	Electronics	Audio	Robotics workshops
CNC mills	Graphics / Design	Video	Virtual reality gear
Laser cutters	Metal processing	Photo	Augmented reality gear
	Wood processing	Painting	
		Arduino	
		Textile	

Source: Authors

As seen from the research, rapid prototyping is an integral part in makerspaces regardless of their type or country of origin. What is interesting, the upcoming trend of media workshops in makerspaces and interdisciplinary projects: photo & video studios, graphic design, virtual reality labs are integrated in some makerspaces.

b. Innovation and creativity boost in makerspaces

Chris Anderson, CEO of 3D Robotics, and former Editor-in-Chief at Wired once said about a private makerspace TechShop: “It’s the same revolutionary innovation model, but now applied to one of the biggest industries in the world - manufacturing.” Robert Scoble, Startup Liaison Officer at Rackspace said “TechShop is the garage that Thomas Edison wished he had”. These are all praise for the once successful network of private makerspaces. Once successful, because TechShop filed bankruptcy in 2017.

This is not the first time we see a private makerspace business collapse. But that only implies that this sort of business is risky for private bodies. Perhaps this model fits better in a safer environment where it generates other “profits” such as innovation and creativity rather than money. After all, the first makerspace was opened in a university by a group of students of MIT in 2001 (Barrett et al. 2015).

This paper presents the idea that certain characteristics of a makerspace can promote innovation and creativity in universities. The presumption is twofold: makerspaces can be strong sources of innovation, and makerspaces that have more of the characteristics outlined below will generate more innovative ideas and products.

According to Iscenco, two important basic elements that lead to more innovation in a makerspace are intrinsic motivation and unstructured activity, and these elements are distinct from much of the university experience (Iscenco, 2015).

Intrinsic motivation, contrary to extrinsic motivation, refers to behavior that is driven by internal rewards rather than rewards coming from another source, in other words: performing an activity because it’s personally satisfying rather than seeking for external rewards. Intrinsic motivation is important for increased innovative thinking and creativity (Pink, 2011, Sawyer, 2008).

A second intangible element of university makerspaces that are trying to produce innovation is unstructured activity (Sawyer, 2008). While innovation, by definition, is not structured, most university activities are highly structured: students are given very specific structured assignments. Unstructured learning and experimenting in makerspaces is often referred to as productive failure which leads to greater learning outcomes. In other words, through experimentation and errors participants in a maker activity will theoretically reach greater

comprehension than through a more structured approach. Therefore, makerspace managers should strive for atmosphere and infrastructure with considerable freedom of action.

Other authors also suggest, that the culture of an environment has a significant impact on the amount of innovation that is produced (Johnson, 2011, Weiner, 2016). The role of culture is also highlighted in research on makerspaces, especially through the sense of community makerspaces: “Participants often refer to the space as feeling like a family or group of friends” (Sheridan et al., 2014, p. 528). Makerspaces support or generate a community of practice where members share knowledge, experiment, and work together on innovative projects.

The situated learning perspective proposed by Lave and Wenger (Lave, 1991; Lave & Wenger, 1991) also emphasizes the social component of learning, described as “an integral, inseparable aspect of social practice” (Lave & Wenger, 1991, p. 31). It reconceives learning as a sociocultural practice where students learn through experimenting and practice interacting with other students, professors, or experienced business professionals. Situated learning leads to a cohesive community of practice (Lave & Wenger, 1991).

According to Van Holm (2015), success in entrepreneurship of makerspaces is threefold. Firstly, maker movement attracts more people into product design and thus leads to more “accidental entrepreneurs”. Secondly, makerspaces help create networks and encourage the development of new ideas and innovative thinking. Thirdly, prototyping helps to reduce production costs which allows to start early sales and to attract outside funding.

As Giusti et al. (2017), managers may design open innovation strategies balancing their portfolio of collaborations to maximize the absorption of relevant knowledge and makers may consider engaging in open innovation practices to accelerate knowledge absorption and eventually launch a start-up. By shifting the focus of learning from the individual cognitive development, to learning as a sociocultural practice, the situated learning perspective leads us to understanding how maker spaces might support the development of entrepreneurial students. Moreover, it also provides a relevant model to design a community of practice that allow newcomers to engage in peripheral participation and gradually become core members of the community. According to Han et al. (2017), economic support must be a priority for makerspaces to make users feel greater autonomy and competence in their projects. (Saorin et al., 2017)

The premise of this paper is that these innovation-promoting characteristics can be identified and managed in order to increase the output of innovation in the university.

3. Conclusion

It’s challenging to find the best practices of makerspaces, since each and every makerspace is unique. They differ vastly in size, management, funding structure, theme.

As seen from the research, rapid prototyping is an integral part in most makerspaces, although the upcoming trend of media workshops in makerspaces and interdisciplinary projects with strong digital core has been discovered: photo & video studios, graphic design, virtual reality labs are increasingly integrated in makerspaces.

The elements that lead to innovation and creativity boost in a makerspace are intrinsic motivation, unstructured activity and community culture, which are distinct from the usual university experience.

The following suggestions were made for the improvement of innovation and creativity in university makerspaces. Firstly, promoting intrinsic motivation by encouraging students to take ownership of their learning is important. Secondly, it is recommended that makerspace managers strive for unstructured activities through atmosphere and infrastructure with considerable freedom of action. Lastly, community development is key. Networking and knowledge sharing through hackathons, weekly gatherings, joint projects might seem as a waste of resources under already tight budget of a makerspace, but they certainly bring long term benefits and help building that incubator environment for the next innovation.

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FACTORY OF THE FUTURE AS THE PRODUCT OF ENGINEERING WORK IN THE GLOBALIZATION PROCESS

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Abstract. This paper deals with the advantages and opportunities of the Factory of the Future and roles of the existing professionals in creation of the Industry 4.0 standard. The further removal of the human factor from the industry and supplementing the manual labour by automation resolves in new opportunities for engineers. The production of the Industry 4.0 is becoming the product of human intellect. The design of such factory and its effective implementation will require skilled Innovators, Mathematicians, Electrical Engineers, Constructors (Machine Engineers), Technologists, Industrial Engineers, Programmers as well as Designers. Therefore, the role of human labour will change from the routine work to more creative and flexible work. The creation of artificial intelligence and introducing of robotic and automated elements into the production cycle will supplement entire physical labour. There are also three stages of exclusion process of a human factor from a technical system described. Forecasting based on the Theory of Inventive Problem Solving (TRIZ) of the development of logistic systems in a nowadays conditions determines the Factory of the Future. The further dynamization of production lines makes it possible to reconfigure the factory according to arising needs. This opens a new perspective for application of artificial intelligence into control of the industrial system.

Keywords: production, operations management, globalization, factory of the future, industrial engineering

JEL Classification: L0, L600, I200, F61

1. Introduction

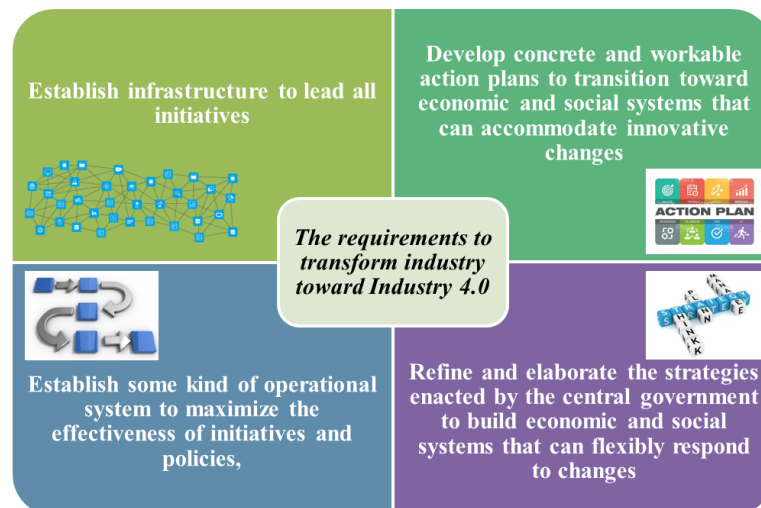
The new global economy of the twenty-first century has transformed the economic, social, educational and political landscape in a profound and indelible manner. It is composed of a trilogy of interactive forces that include globalization, trade liberalization and the information technology and communications revolution. Globalization has melted national borders, free trade has enhanced economic integration and the information and communications revolution has made geography and time irrelevant. The role and functions of entrepreneurship in the new

global economy has taken on added significance and face compounded challenges. (Passaris, 2006) The Factory of the Future has an evolving definition, even different names. Smart Manufacturing, Industry 4.0 or the Digital - Huffington Post reports that early adopters who have at least partially implemented smart manufacturing initiatives have documented measurable results:

- 82% reported increased efficiency,
- 49% reported fewer product defects,
- 45% reported customer satisfaction gains.

The impact promises to grow and be even more substantial as manufacturers and their suppliers deploy and integrate more technologies across the entire manufacturing landscape. Greater speed, value, innovation, and closer alignment with demanding customers will be the new normal. (Keaney, 2015), (Fernandes et al., 2018). The requirements for successful transformation of industry towards Industry 4.0 are shown in the Figure 1.

Figure 1: The requirements to transform industry towards Industry 4.0



Source: own collaboration by (Sung, 2018)

Genrikh Saulovich Altshuller, the author of TRIZ, after thorough analysis of patent fund defined laws of the development of the technical systems. According to one of the laws; the law of gradual removal of human presence from the technical system by increasing of completeness of its parts, the technical system is considered being a complete system as soon as it is composed from all the necessary parts that are required for its operation omitting the human factor.

Many studies have been devoted to better understanding the effects and significance of globalisation (Berdiev & Saunoris, 2018), According to this law, the standard Industry 4.0 is improving the current industrial standard in the direction of the increasing level of ideality.

The Factory of the Future becomes the product of the human intellect (Micieta & Turekova, 2010). Therefore, the role of human labour will change from the routine work to more creative and flexible work. The creation of Artificial intelligence and introducing of robotic and automated elements into the production cycle will supplement entire physical labour. Instead

of manual work there will become enough space for occupations of intellectual workers (Doms et al., 1997).

Another decisive factor for further development and prosperity of any country is quality of its engineers, who are responsible for innovations. Investment into engineers' education brings higher increase of productivity than investment in capital assets. Industry 4.0 branded the fourth industrial revolution, is in fact more of a political vision than a new technical paradigm (Arieli & Mueller-Frankz, 2014), (Schleicher et al., 2018). It is simply the continuing progression of achieving better knowledge and control over the entire production process that has been ongoing since industrialization made efficient mass production possible (Snihur et al., 2018). The main benefit of this new way of looking at things is the chance to establish new business models (Schütze et al., 2018). In the scope of Industry 4.0, Internet-of-Things (IoT) is the vision of interconnection of all the entities in the physical world, so that they will always get in touch within the digital world (Hahn et al., 2017), (Kumaraswamy et al., 2018).

2. Methodology - advantages of Industry 4.0

(Since) production system is multifactor system and its model is dynamic, not static one, we cannot say that the effectivity of the production system is a function of low storage spaces or short transfer times. The production effectivity depends on the collection of large amount of factors, that are dynamically changing and that are individual (unique) for every production system (Gregor & Gregor, 2016). As it is described in Table 1, there are three main parts of a technical system: executive body, energy converters and energy sources.

There are also three stages of exclusion process of a human factor from a technical system:

1. The maintenance of the main function

- a. using Tools (club, stone knife, ax),
- b. the use of the energy conversion mechanisms (lever, the wedge, pulley),
- c. use of different sources of energy (natural energy - wind, water, sun, animals, thermal energy - steam engines, steam turbines, internal combustion engines).

2. The process management

- a. equipment for control and manipulation with mechanisms (steering wheel on the boat)
- b. mechanisms, converters in the system of machine control (rudder machines in the Navy)
- c. the device producing pulse commands to control the process - working without feedback (various copiers)

3. Information and decision-making

- a. sensors used as a complementary sense for human,
- b. machine data analysis, aggregation and transformation of obtained information into a form suitable for the human perception,
- c. Automated Control Systems.

Table 1: Main parts of technical system

	Main parts of the technical system		
Functional level	Executive body	Converter	Source
1. Functional maintenance	Tool	Force and energy	Energy
2. Process control	Controlling device	Orders	Orders
3. Information and decision making	Sensors	Information	Decisions

Source: Tanguera, 2018

Forecasting based on the Theory of Inventive Problem Solving (TRIZ) of the development of logistic systems in a nowadays conditions determines the factory of the future. The ultimate goal of betterment is gradual removal of a human factor from the production process making it fully automated and reconfigurable.

Industry 4.0 refers to the application of these digital industrial technologies (Figure 2):

- advanced robotics (autonomous, cooperating industrial robots, numerous integrated sensors and standardized interfaces),
- **additive manufacturing** (3D printing, particularly for spare parts and prototypes, decentralized 3D facilities to reduce transport distances and inventory),
- **augmented reality (AR)** - (augmented reality for maintenance, logistics etc.; display of supporting information).

Augmented reality is a 3D technology which merges the physical and digital worlds in real time. Applications based on this technology rest on three pillars: tools to track information about real-world objects of interest; hardware and software to process information; and devices to show the user the digital information integrated into the real environment (Azuma et al., 2001),

- **simulation** (simulation of value networks, optimization based on real-time data from intelligent systems),
- **emulation** (real-time monitoring of production systems (Krajcovic, 2011), (Krajcovic, 2013), processing of real-system data to refine the simulation model, operational and rapid verification of control principles based on current data).

From the simulation point of view, it's a new concept for describing a new wave in modelling and simulation. While the use of simulation tools was previously restricted to design stages, today different type of simulation tools are used in testing, validation or optimization. In the automated industry, we could define a DT as a multiphysic and multiscale simulation model that mirrors the corresponding physical twin, allowing the extension of the simulation to all life cycle phases of the system. (Ayani et al., 2018), (Rosen et al., 2015)

- **horizontal and vertical integration** (cross-company data integration based on data transfer standards, precondition for a fully automated value chain (from supplier to customer, from management to shop floor),
- **Industrial Internet** (Networks of machines and products, multidirectional communication between networked objects), (Li & Bathelt, 2018),
- **Cloud** (management of huge data volumes in open systems, real-time communication for production systems),
- **Cybersecurity** (operation in networks and open systems, high level of networking between intelligent machines, products, and systems),
- **Big Data and analytics** (full evaluation of available data from ERP, SCM, MES, CRM, and machine data; real time decision-making support and optimization).

Big Data has been classified according to five fundamental elements, which are volume (size of data), variety (different types of data from several sources), velocity (data collected in real time), veracity (uncertainty of data) and value (benefits to various industrial and academic fields).

Moreover, other research work like (Manogaran, et al., 2017) introduces additional characteristics beyond the 5V's model such as: validity (correct processing of the data), variability (context of data), viscosity (latency data transmission between the source and destination), virality (speed of the data sent and received from various sources) and

visualization (interpretation of data and identification of the most relevant information for the users).

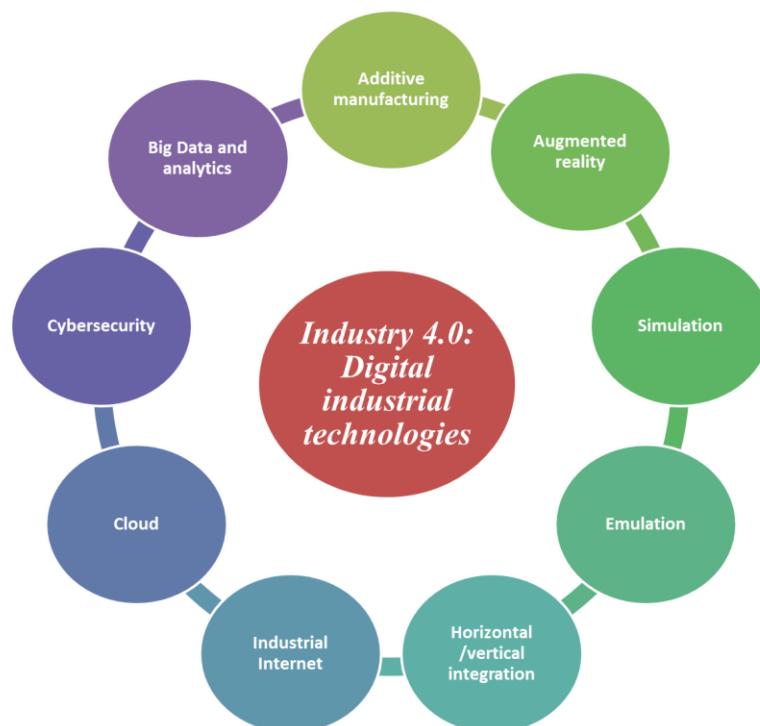
Technological advances have driven dramatic increases in industrial productivity since the dawn of the Industrial revolution. Currently, the rise of new digital industrial technology known as Industry 4.0, a transformation that is powered by foundational technology advances.

In fact, Industry 4.0 offers multiple benefits – enhanced productivity is just the beginning. Defining the strategy is the biggest challenge in getting started with Industry 4.0, while changing company culture is the biggest challenge in implementing it.

Best-in-class enterprises are using bold experiments, iterating quickly, and rapidly scaling successful across the organization. Simple and affordable design, technical specifications and the launch of new production facilities will be essential if businesses want to stand up to global competition.

Increasing complexity, strong market competition, and higher investment in greenfield businesses force existing businesses to perceive themselves as complex, long-lived products that will need to steadily and accurately manage the various stages of the life cycle, designing the plant, engineering, operation and shutdown. Such holistic life cycle phases of a manufacturing enterprise will need to be addressed through appropriate distributed, interoperable and high-performance ICT tools using parallel and distributed computing.

Figure 2: The Digital industrial technologies - Industry 4.0



Source: own collaboration by (BCG, 2016)

3. Conclusion

The core of Industry 4.0 is essentially the implementation of industrial innovations that are based on digitalization and digital technologies as such. These innovations are primarily

concentrated in the research area of decentralized, autonomous, intelligent structures, that should bring synergetic effects to the industry and that are nowadays known as Cyber-Physical-Systems (CPS). CPS represents a system of all the objects present in the production environment, from the material, through the machines, equipment, robots, sensors, buildings, logistic elements, devices and systems, up to finished products. All the objects within CPS are connected by communication network that, via internet, enables mutual communication while providing required communication services. CPS can thus not only “sense” information about the whole environment (both internal and external) via sensors, but it can also share the information through the given network. People can only communicate with such complex and sophisticated systems through appropriate interfaces, that are allowing control through speech recognition, touch, or directly by thoughts, which are commonly known as HMI (Human Machine Interface). The changes that evoke the transformation of the factories constitute an unequivocal stage of the development. The new stage of development, as well as the previous stages, brings immensely positive prospects along with great risks.

In this work, we presented vision for future industry 4.0 digital factory and our approach to enhance competence of employees.

In practice industry 4.0 means that all the various manufacturing operations (inputs, control, measurement, results, material flow etc.) - are linked by computer network.

Each activity performed in workplaces is being managed and controlled by computers. Work operations begin by scanning the bar code that is printed on each significant sub-assembly and on the product. The unique information stored in the database contains of accurate description of what has to be performed with the product. The computer evaluates, what other operations will be performed, what parts are to be used, verifies the completeness of the operation being performed, checks their successful completion and records new useful data in the central database. The complete history of the product cycle saved in the central database. This data is then key source information, not only for resolving complaints, but especially for statistical analysis of production process and its effectiveness. The results are then being analyzed and used for further improvement of the production process.

Acknowledgment

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EFFICIENCY FACTORS OF INNOVATIVE ACTIVITY IN THE CONDITIONS OF GLOBALIZATION

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Abstract. In the conditions of globalization, the growth of innovative activity is a key task for the economic development of any state. It is the basis of growth of competitiveness and economic development of any state. Therefore, it is very important to determine the factors of innovation effectiveness, taking into account the growing tendencies of globalization in the world. The aim of this research is to identify and study the factors of the effectiveness of innovative activities of the state in the context of globalization. In this paper, we used a variety of theoretical and empirical research methods, including a literature review, economic and mathematical, economic-mathematical and economic-statistical analysis methods. As a result of research, we identified factors that have the greatest impact on the resulting innovation indicators in the state. Stimulation of these factors will enhance greatly the efficiency of innovative activity in the country. Results of the study have a high practical value, since they will help determining the future directions and priorities of the strategic innovative development of the state. In this study, we used a significant amount of statistical data, which allowed achieving the main purpose of the study and drawing conclusions about the most effective factors of innovative activity in the conditions of globalization, the stimulation of which will increase the level of the country economic development and its competitiveness.

Keywords: globalization, innovative activity, innovative activity factors, efficiency factors

JEL Classification: O11, O31, O43

1. Introduction

The relevance of the work is due to the need to achieve high level innovative development of the state, as the basis of competitiveness and economic development. In the paper the authors investigated the main factors of innovative development of the Russian economy.

The success of innovation depends on the coordination of actions of its various participants, including authorities of different levels (Plotnikov & Vertakova, 2015). A breakthrough in the innovation sphere should be provided not so much by a large-scale investment of funds in the innovation sector (Babkin et al., 2015), but rather by the ability of state authorities to play an active role in the innovation process (Grechenyuk & Grechenyuk, 2016).

At the same time, it should be noted that in terms of science intensity (Grechenyuk et al. 2015), Russia is relatively comparable with innovative and most dynamically developing economies (Grechenyuk et al., 2016), however, in terms of science output (efficiency and effectiveness) (Kazanskaya & Palkina, 2016)., Russia lags far behind these countries (Grudina

et al., 2016), (Huang & Naubahar, 2015). In this regard, there is an urgent need to identify the main factors of innovative activity, the stimulation of which will allow achieving the required level of innovative development of the state (Vertakova et al., 2015).

2. Body of paper

Innovative activity of organizations of economic systems at global and national levels is defined as the ratio of the number of organizations that carried out technological, organizational or marketing innovations to the total number of organizations surveyed in a certain period of time (Kulikova et al., 2016). Such a classic indicator is "The share of organizations that implemented technological innovation in the total number of organizations" (Vertakova & Plotnikov, 2016).

Assessment of the effectiveness of innovation should, first of all, take into account the results of innovative processes, that is, created and used advanced production technologies (Plotnikov & Volkova, 2015). The number of organizations performing research and development, the number of personnel of these organizations, as well as internal costs, contribute to the creation of new technologies (Quinney, 2015), but the effectiveness of innovation does not characterize (Vertakova et al., 2016 A). The number of factors and the degree of their influence on the number of established and used advanced production technologies are not the same (Vertakova et al., 2016 B). Therefore, first consider the influence of factors on the number of advanced manufacturing technologies created, and then on the number of advanced manufacturing technologies used.

As a result of the analysis of the influence of factors on the number of advanced production technologies, 23 indicators were identified. For our study, we distinguish five groups of factors: innovative factors, demographic factors, entrepreneurial factors, educational factors, factors of potential. In Table 1, we will reflect the degree of influence of factors on the number of advanced production technologies (APT) created by the correlation coefficients. The study period is five years - from 2013 to 2017.

Table 1 shows that all selected factors have a significant impact on the number of created APT. The correlation coefficients are greater than 0.7.

Table 1: Assessment of the impact of factors on the number of created APT

Number of created APT	2013	2014	2015	2016	2017
INNOVATION FACTORS					
Number of R&D organizations	0,890	0,885	0,877	0,930	0,932
Number of employees engaged in R&D	0,889	0,874	0,858	0,921	0,916
Internal R&D costs	0,880	0,884	0,850	0,914	0,912
Number of used APT	0,692	0,760	0,801	0,712	0,688
Number of organizations implementing technological innovation	0,752	0,799	0,762	0,730	0,788
Costs of technological innovation	0,652	0,665	0,590	0,495	0,427
DEMOGRAPHIC FACTORS					
Number of population	0,777	0,790	0,782	0,804	0,768
Number of economically active population	0,809	0,821	0,813	0,832	0,801
Average annual number of employed in the economy	0,838	0,843	0,824	0,855	0,827
ENTREPRENEURIAL FACTORS					
Number of enterprises and organizations	0,846	0,863	0,841	0,899	0,918
Value of fixed assets	0,725	0,725	0,684	0,737	0,710
Investments in fixed assets	0,746	0,737	0,689	0,679	0,605
Foreign investment in the Russian economy	0,719	0,793	0,698	0,811	0,789

Direct foreign investments	0,301	0,591	0,662	0,783	0,805
Number of credit institutions	0,730	0,751	0,690	0,769	0,760
Number of branches of commercial banks	0,701	0,687	0,735	0,712	0,731
Balanced financial result of organizations	0,739	0,769	0,715	0,729	0,762
Amount of profit organizations	0,735	0,772	0,718	0,783	0,762
CAPACITY FACTORS					
GDP	0,793	0,809	0,749	0,812	0,804
Consolidated budget revenues	0,723	0,760	0,690	0,765	0,704
Consolidated budget expenditures	0,716	0,765	0,697	0,766	0,868
EDUCATIONAL FACTORS					
Number of higher educational institutions	0,847	0,839	0,805	0,862	0,880
Number of students of higher educational institutions	0,833	0,830	0,798	0,855	0,824

Source: Authors' calculations using Rosstat Data ([https:// www.gks.ru/](https://www.gks.ru/))

We will carry out a pair correlation comparison and identify the factors that have the same impact. We will leave those indicators that have the greatest impact on the result (the highest value of the correlation coefficient).

Table 2: Matrix of pairwise correlation comparison of innovation factors

Innovation factors	Number of R&D organizations	Number of employees engaged in R&D	Internal R&D costs	Number of used APT	Number of organizations implementing technological innovation	Costs of technological innovation
Number of R&D organizations	1	0,986	0,976	0,649	0,665	0,349
Number of employees engaged in R&D	0,986	1	0,994	0,688	0,636	0,357
Internal R&D costs	0,976	0,994	1	0,658	0,590	0,339
Number of used APT	0,649	0,688	0,658	1	0,737	0,454
Number of organizations implementing technological innovation	0,665	0,636	0,590	0,737	1	0,791
Costs of technological innovation	0,349	0,357	0,339	0,454	0,791	1

Source: Authors' calculations using Rosstat Data ([https:// www.gks.ru/](https://www.gks.ru/))

As a result, we leave only two of the six indicators of the group of innovative factors for further consideration – the number of R&D organizations and the number of organizations implementing technological innovation. Table 3 presents a pairwise correlation comparison matrix for demographic factors.

Table 3: Matrix of pairwise correlation comparison of demographic factors

Demographic factors	Number of population	Number of economically active population	Average annual number of employed in the economy
Number of population	1	0,997	0,983
Number of economically active population	0,997	1	0,991
Average annual number of employed in the economy	0,983	0,991	1

Source: Authors' calculations using Rosstat Data ([https:// www.gks.ru/](https://www.gks.ru/))

For further study, we take the average annual number of employees in the economy, as this indicator has a greater impact on the number of advanced production technologies. Table 4 presents a pairwise correlation comparison matrix for entrepreneurial factors.

Table 4: Matrix of pairwise correlation comparison of entrepreneurial factors

Entrepreneurial factors	Number of enterprises and organizations	Value of fixed assets	Investments in fixed assets	Foreign investment in the Russian economy PФ	Direct foreign investments	Number of credit institutions	Number of branches of commercial banks	Balanced financial result of organizations	Amount of profit organizations
Number of enterprises and organizations	1	0,842	0,666	0,934	0,915	0,923	0,683	0,888	0,911
Value of fixed assets	0,842	1	0,888	0,836	0,801	0,826	0,704	0,952	0,947
Investments in fixed assets	0,666	0,888	1	0,592	0,583	0,564	0,791	0,768	0,748
Foreign investment in the Russian economy	0,934	0,836	0,592	1	0,957	0,980	0,481	0,926	0,947
Direct foreign investments	0,915	0,801	0,583	0,957	1	0,908	0,490	0,859	0,884
Number of credit institutions	0,923	0,826	0,564	0,980	0,908	1	0,474	0,930	0,951
Number of branches of commercial banks	0,683	0,704	0,791	0,481	0,490	0,474	1	0,567	0,571
Balanced financial result of organizations	0,888	0,952	0,768	0,926	0,859	0,930	0,567	1	0,997
Amount of profit organizations	0,911	0,947	0,748	0,947	0,884	0,951	0,571	0,997	1

Source: Authors' calculations using Rosstat Data ([https:// www.gks.ru/](https://www.gks.ru/))

Thus, we leave only two of the nine indicators of business factors - the number of enterprises and organizations and the number of branches of commercial banks. Table 5 shows the pairwise correlation comparison matrix for the potential factors.

Table 5: Matrix of pairwise correlation comparison of capacity factors

Capacity factors	GDP	Consolidated budget revenues	Consolidated budget expenditures
GDP	1	0,895	0,942
Consolidated budget revenues	0,895	1	0,990
Consolidated budget expenditures	0,942	0,990	1

Source: Authors' calculations using Rosstat Data ([https:// www.gks.ru/](https://www.gks.ru/))

Using the same method, we exclude revenues and expenditures of consolidated budgets and leave only one factor - GDP. Table 6 shows the matrix of pairwise correlation comparison for the last group of factors - educational factors. For further study we take the number of higher education institutions that have the greatest impact on the number of advanced production technology.

Table 6: Matrix of pairwise correlation comparison of educational factors

Educational factors	Number of higher educational institutions	Number of students of higher educational institutions
Number of higher educational institutions	1	0,987
Number of students of higher educational institutions	0,987	1

Source: Authors' calculations using Rosstat Data ([https:// www.gks.ru/](https://www.gks.ru/))

As a result, out of 23 factors influencing the resulting indicator, only 7 indicators remained. Now we will do the same analysis for them (Table 7).

Table 7: Matrix of pairwise correlation comparison of selected factors

Factors	Number of R&D organizations	Number of enterprises and organizations	Number of organizations implementing technological innovation	Average annual number of employed in the economy	GDP	Number of branches of commercial banks	Number of higher educational institutions
Number of R&D organizations	1	0,980	0,665	0,892	0,887	0,682	0,967
Number of enterprises and organizations	0,980	1	0,644	0,900	0,933	0,683	0,986
Number of organizations implementing technological innovation	0,665	0,644	1	0,832	0,612	0,871	0,580
Average annual number of employed in the economy	0,892	0,900	0,832	1	0,877	0,875	0,885
GDP	0,887	0,933	0,612	0,877	1	0,680	0,914
Number of branches of commercial banks	0,682	0,683	0,871	0,875	0,680	1	0,656
Number of higher educational institutions	0,967	0,986	0,580	0,885	0,914	0,656	1

Source: Authors' calculations using Rosstat Data ([https:// www.gks.ru/](https://www.gks.ru/))

Thus, according to the results of the study, we have proved that of the many various factors of socio-economic development, only two factors are enough to build a model of influence on the number of created advanced production technologies.

Now we turn to the second result indicator – the number of advanced production technologies used.

As a result of the analysis of the impact of factors on the number of used advanced production technologies, 16 indicators were identified (Table 8).

Table 8: Assessment of the impact of factors on the number of used APT

Number of used APT	2013	2014	2015	2016	2017
INNOVATION FACTORS					
Number of R&D organizations	0,530	0,560	0,584	0,539	0,649
Number of employees engaged in R&D	0,619	0,629	0,650	0,679	0,688
Internal R&D costs	0,578	0,599	0,622	0,555	0,658
Number of used APT	0,692	0,760	0,801	0,712	0,688
Number of organizations implementing technological innovation	0,755	0,733	0,721	0,737	0,737
Costs of technological innovation	0,530	0,560	0,584	0,539	0,649
DEMOGRAPHIC FACTORS					
Number of population	0,609	0,605	0,617	0,627	0,625
Number of economically active population	0,611	0,610	0,621	0,622	0,617
Average annual number of employed in the economy	0,605	0,612	0,631	0,641	0,639
ENTREPRENEURIAL FACTORS					
Number of enterprises and organizations	0,487	0,506	0,559	0,517	0,640
Value of fixed assets	0,493	0,467	0,533	0,489	0,613
Number of branches of commercial banks	0,600	0,580	0,600	0,628	0,669
CAPACITY FACTORS					
GDP	0,484	0,485	0,550	0,508	0,627
Consolidated budget revenues	0,512	0,494	0,552	0,497	0,625
Consolidated budget expenditures	0,515	0,504	0,563	0,499	0,646
EDUCATIONAL FACTORS					
Number of higher educational institutions	0,461	0,474	0,526	0,479	0,609
Number of students of higher educational institutions	0,519	0,521	0,576	0,544	0,664

Source: Authors' calculations using Rosstat Data ([https:// www.gks.ru/](https://www.gks.ru/))

Using the method of pair wise correlation comparison of factors on the resulting indicator, we left only 7 indicators. In table 9, we will perform the same analysis for them.

Table 9: The matrix of pairwise correlation comparison of the remaining factors

Factors	Number of employees engaged in R&D	Number of enterprises and organizations	Number of organizations implementing technological innovation	Average annual number of employed in the economy	Consolidated budget expenditures	Number of branches of commercial banks	Number of students of higher educational institutions
Number of employees engaged in R&D		0,973	0,636	0,867	0,969	0,632	0,941
Number of enterprises and organizations	0,973	1	0,644	0,900	0,979	0,683	0,978
Organizations implementing technological innovation	0,636	0,644	1	0,832	0,527	0,871	0,664
Average annual number of employed in the economy	0,867	0,900	0,832	1	0,914	0,875	0,930
Consolidated budget expenditures	0,969	0,979	0,527	0,914	1	0,668	0,969
Number of branches of commercial banks	0,632	0,683	0,871	0,875	0,668	1	0,735
Students of higher educational institutions	0,941	0,978	0,664	0,930	0,969	0,735	1

Source: Authors' calculations using Rosstat Data ([https:// www.gks.ru/](https://www.gks.ru/))

According to the results of the study, we have proved that from a variety of factors of socio-economic development of the countries, only two factors are enough to build a model of influence on the number of used advanced production technologies.

3. Conclusion

As a result of the study, we can conclude that the main factors influencing the effectiveness of innovation activity of economic systems were identified. Then, in the process of reduction, that is, the simplification of the constructed factor models, we came to the conclusion that only the number of R&D organizations, number of employees engaged in R&D and the number of enterprises that implemented technological innovations influenced the processes of creating and using advanced production technologies (APT).

These indicators undoubtedly create the conditions for the creation and use of innovations, as organizations that perform research and development are the place where advanced production technologies are created, and organizations that implement technological innovations are where they are used.

However, the dependence revealed by us is observed as a whole in the Russian Federation. At the same time, Russian regions differ significantly in terms of innovation and socio-economic development.

Therefore, in some regions, indeed, it is sufficient to influence precisely these factors in the processes of creating and using technologies. In other regions, and their majority, this dependence weakens or does not work at all. In such regions, to stimulate the functioning of individual blocks of the innovation process, it is also necessary to take into account the effect of other factors.

And first of all, it is necessary to take into account the specifics of development, both the entire innovation process and its individual blocks. And an important aspect is not the innovative activity, but the efficiency of the processes of creating and using advanced production technologies and their transformation into the resulting indicators of socio-economic development.

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IMPACT OF GLOBAL SOCIAL CHANGES ON THE SECURITY OF PASSWORD AUTHENTICATION

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Abstract. An authentication is the process of verifying the identity with the required degree of assurance. An example might be logging into e-mail inbox when a user firstly enters his username (identification) and his password (authentication). Although, different ways of authentication (biometrics, smart cards...) exist currently, an authentication through passwords is often used because of easy implementation and low financial requirements. But this way of authentication is not generally considered to be too secure because users often choose easy to guess short passwords, divulge their passwords to others, remark their passwords, and often use the same password for different services. Many existing passwords are not resilient to various forms of attack, such as a dictionary attack or brute force attack that also has relatively high economic impacts. However, due to globalization, there are significant social changes that affect the passwords that end users choose and therefore their security. At this time, users are choosing other passwords than they used to, such as choosing English terms for their passwords, using other mnemonic tools, and so on. The goal of this paper is to evaluate the password authentication security from the globalization point of view with respect to the ability of end users. Through the proposed dictionary attack and brute force simulation model, the attacks on the passwords that were acquired over the last fifteen years will be carried out and the impact of globalization on their security will be analysed.

Keywords: global social changes; security; authentication; passwords; dictionary attack; brute force attack

JEL Classification: L86

1. Introduction

At times when the Internet was a purely academic network, it was unthinkable that anyone would try to gain access to data that was not intended for him or to fraudulently impersonating anyone else. At that time, users knew each other and therefore trusted each other. The turning point came when the commercial sphere was gaining access to the Internet. The number of users increased sharply, including those who did not have the purest intentions. The Internet has become anonymous and is currently accessible to almost anyone. Nowadays, internet is used by both commercial sphere and non-commercial sphere, an example is municipal institutions, that also which also emphasize security (Fuka et al., 2016). With the increase of the number of users, the number of data and thus their aggregate value also increases. Anonymity allows users to perform actions that are contrary to "morality" without the possibility of finding the originator. The problem of anonymity is therefore addressed

through identification and authentication. While identification is the assertion of an entity (user, process, etc.) about its identity, authentication is the process by which it can be validated or disproved by appropriate means of identity.

Although there exists a different types of authentication (Barkadehi et al., 2018), there exist three basic authentication methods that are distinguished:

- knowledge authentication (passwords, PINs,...);
- authentication through an authentication thing (smart cards, tokens,...);
- biometric authentication (iris scanning, finger print,...).

Although many mature authentication mechanisms exist (for example smart cards, biometrics), currently passwords are still used for these purposes (AlAzzazi & Sheikh, 2007), (Shieh et al., 2007), (Lee et al., 2008), (Juang & Greenstein, 2018), (Luo et al., 2019). The reasons of passwords using are low expenses and easiness of implementation.

Due to the fact that impostors are always looking for new ways on how to get access to protected accounts, many factors that influence password authentication security exist. A lot of authors frequently discuss about the factors that influence password security, for example: length, randomness, and the period the password is used. However, it is certain that the password security has a strong influence on the user's behavior, both when choosing a password and managing it (Hub, 2015), (Kusyanti & Sari, 2017). Conversely, overly secure passwords can put excessive demands on users (Hub et al., 2010), (Woods & Siponen, 2018). That's why you have great new authentication as intuitive graphical passwords (Mahey et al., 2018).

Some authors are trying to make a distinction between a “weak” and a “strong” password, commonly by using an expert’s opinion (Burnett & Kleiman, 2006), (Furnell, 2007), (Farrell, 2008), (Erguler, 2016), (Li et al., 2017), (AlSabah et al., 2018). Other authors are trying to break passwords, and the results of their experiments are present as a proof of the passwords weakness (Klein, 1990), (Garrison, 2008), (Tatli, 2008). The alternative way is to create a mathematical model of a password attack that results in value of a password security (Tukey, 1962), (Shay & Bertino, 2009), (Rass & König, 2018).

2. Research question

Globalization affects many things (Mudambi, 1998). Already in 2003 a hypothesis about the impact of globalisation to passwords selection was formulated (Hub, 2003, A). This hypothesis was then discussed somewhat fuzzily and not very concretely. The aim of the paper is to analyse the long-term trend of choice of passwords by end users and to discuss the effects of global social trends on this trend. At the same time, further development of changes in the behaviour of end users in the choice of password and impact on the security of information systems will be predicted.

3. Methodology

The following steps were set to achieve the goal of this paper:

1. To conduct exploration data analysis on passwords gathered in the past
2. To conduct rigorous quantitative evaluation of security of passwords gathered in the past.

3. To gather appropriate amount of passwords in 2018.
4. To conduct exploration data analysis on passwords gathered in 2018.
5. To conduct rigorous quantitative evaluation of security of passwords gathered in 2018.
6. To compare security of passwords gathered in 2018 and in the past.
7. To discuss results and to formulate conclusions.

As the past data the dataset collected in 2005 (Hub, 2005) respectively dataset collected in 2008 (Hub & Čapek, 2011) will be used. The new dataset will be collected from the beginning in 2018 by the same manner as past datasets that will making it possible to compare each other.

Exploration data analysis (EDA) represents procedures for analysing data, techniques for interpreting the results of such procedures, ways of planning the gathering of data to make its analysis easier, more precise or more accurate, and all the machinery and results of (mathematical) statistics which apply to analysing data (Tukey, 1962). During exploration data analysis especially length of passwords, type of passwords and correlation between characters in passwords and general Czech texts will be analysed. This gives us an idea of the long-term trends of password choice.

As a measure of security of a given password the expected value of the number of attempts an attacker has to carry out to break the password $S(p_i)$ will be used (Hub & Čapek, 2009) (see Eq. 1).

$$S(p_i) = \frac{N_i + 1}{2} + \sum_{j=1}^{i-1} N_j \quad (1)$$

where:

$S(p_i)$... Security of a password p that is a word from i -th reduced dictionary.

i The order of the reduced dictionary that contains a password p .

N_i The size of the i -th reduced dictionary.

It must to be noted, that the creation of reduced dictionary is created on the base of its success rate $SDA(d)$ (see Eq 2) and is detailed described in (Hub & Čapek, 2009).

$$SDA(d) = \frac{NBP_d}{N_d \cdot NP} \quad (2)$$

where:

$SDA(d)$ Success rate of the dictionary attack on dictionary d .

NBP_d .. The number of passwords that would be broken by dictionary d .

N_d The size of dictionary d .

NP Total number of tested passwords used in the attack simulation.

4. Results

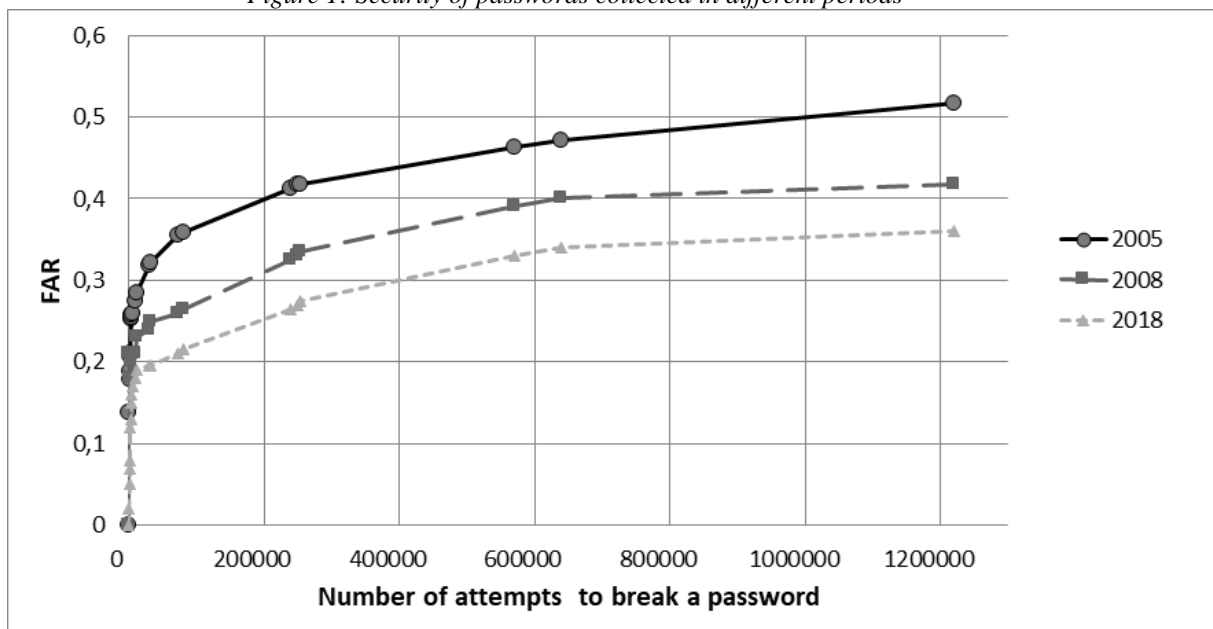
In the past, the first set of 2,958 passwords was collected during 2005 (Hub, 2005) (in fact, the first collection was conducted in 2003 (Hub, 2003, B), but because of small amount of data, this study can not be used for a comparison). All users who choose passwords were native Czech speakers. The requirements for password choosing was:

- the password had to contain one character at minimum;
- maximum length of the password was not restricted;
- users had no time limit when choosing a password;
- a password could contain arbitrary characters typed using a Czech keyboard.

The second set of 1,895 really used passwords was collected in 2008 (Hub & Čapek, 2011). For a better, more convenient comparison of both studies, the requirements were exactly the same.

Because of the aim of this paper is to study long-time trends in a password choosing, new data were collected between January – May 2018. The requirements to a password choosing were exactly same. During this period totally 1,048 passwords were chosen.

Figure 1: Security of passwords collected in different periods



Source: own processing

The passwords collected in different periods were inserted to dictionary attack and brute-force attack model and given values were compared (see figure 1). This result for example says that any password in 2018 were possible to break with probability approximately 0.3 after 400,000 attempts.

5. Conclusion

The passwords used in 2018 are more secure against dictionary and brute-force attack than passwords used in 2005 and 2008 respectively. When looking at the passwords in more detail, there is a trend in the use of foreign words such as passwords or parts of them. Users increasingly choose foreign terms, foreign-language names for their passwords, increasing the set of candidate passwords a potential attacker has to test. In this respect, global social change has a positive impact on password authentication in this case. Of course, it is important to keep in mind that these global social changes will also be adapted by attackers who are likely to adjust the list of dictionaries used during dictionary attacks.

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CHANGE MANAGEMENT IN ENTERPRISES OF THE SLOVAK REPUBLIC IN THE CURRENT GLOBALIZED ENVIRONMENT

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Abstract. The model of change management in an organization is based on the fact, that the forces leading to change act on the organization continuously and are the result of the dynamic nature of a modern, globalized world. These forces need to be thoroughly re-evaluated and recognized when there is a need for change. Equally important is the timing of the change, the determination of the alternation of the change process, the selection of the change process (methods) in relation to the constraints, the monitoring of the change process and its evaluation in terms of the achieved results. The process is dynamic, and each implementation of the sequence of steps can cause further changes. That is why this process is demanding and still open. The success of implementing change depends on the style of managers' thinking, on the ability of the manager to choose the right people for the whole change process. Very important for managing change is the ability of the manager to inspire and motivate members of the change team. The aim of the paper is to compare the change management approach in small and large enterprises under the conditions of the market economy, the globalization process and the dynamically developing environment of the SR in which businesses operate. At the same time, it is about defining changes affecting the management; the methods they use, and how to push changes in the organization.

Keywords: change management, enterprises, managerial functions, globalized world, ability of the managers

JEL Classification: M5, M11, M54

1. Introduction

Riadenie zmien je považované za jednu z disciplín manažmentu, pričom čím komplexejšia a väčšia zmena, tým aj úroveň manažmentu je vyššia. Zmenu ľudia vnímajú ako proces transformácie jedného stavu na druhý, iný, nový. Zmena však nemusí mať len charakter fyzickej zmeny, ale v jej vyšších formách môže ísť o zmenu stavu informovanosti, zmenu štruktúry organizácie, zmenu úrovne vzdelania apod. Dôležitá je i hĺbka zmeny. Obsah a proces realizácie zmien sa stali predmetom prístupu a reakcie na zmeny tak, aby prinášali najlepší možný požadovaný výsledok.

2. Theoretical background

Prax a skúsenosti s prístupom k realizácii zmien viedli k rôznym defináciám zmien, niektoré na úvod prezentujeme. Prezident spoločnosti General Electric, Welsh povedal: „*ak je tempo zmien vo vnútri podniku pomalšie ako tempo zmien mimo podnik – blíži sa koniec existencie*

podniku“ (Borovsky, 2005) Podstatu zmeny možno charakterizovať podľa Mikuša ako život samotný. „Život je zmena. Život existuje iba v zmenách. Buď sa všetko živé vyvíja, alebo pre neschopnosť realizovať zmeny postupne zaniká.“ (Mikus, 2008) Podobný názor má Machan, ktorý hovorí, že: „všeobecná zmena je prechod akéhokoľvek objektu z jednej podoby do podoby inej.“ (Machan, 2012). „Zmena je nepretržitý a čiastočne nepredvídateľný a nejednoznačný proces, ktorého prostredníctvom sa firma vyrovnáva nie len so zmenami prostredia, ale aj so zmenami vo vnútornom prostredí firmy,“ (Kubickova & Rais, 2012). „Všetko čo je prispôsobivé a schopné zmeny má schopnosť vyvíjať sa a rásť. Všetko čo je rigidné a nereaguje zákonite speje k svojmu zániku.“ (Papula & Papulova, 2014). Covey sa ku zmenám vyjadril: „zmena – skutočná zmena – vychádza zvnútra von. Zmeny nedosiahneme drobnými úpravami našich postojov a nášho správania za pomoci technik rýchlych riešení, ktoré ponúka etika osobnosti. Skutočnú zmenu dosiahneme, keď sa sústredíme na korene – na štruktúru nášho myslenia, na základné, podstatné paradigmy, ktoré určujú náš charakter a tvarujú okuliare, cez ktoré hľadáme na svet.“ (Covey, 2010) Johnson popisuje jednoduchý spôsob, ako sa vyrovať so zmenami vo svojej práci a osobnom živote vo svojom diele Kam sa podel môj Syr? Autor vyjadril prístup k neočakávanej zmene spôsobom: „zmeny sa dejú, predvídajme zmeny, vnímajme zmeny, zmene sa rýchlo prispôsobme, zmeňme sa, radujme sa zo zmeny a buďme pripravení rýchlo sa znova zmeniť a opäť sa radovať zo zmeny. (Johnson, 2012) Lesáková podčiarkuje dôležitosť globalizácie vytvárajúcej nové príležitosti a hrozby. Uvádza súčasné obdobie rozvoja manažmentu ako „...riadenie v podmienkach nepretržitých a kritických zmien.“ (Lesakova, 2017).

Príspevok Gurbu et al. berie do úvahy moderné podniky v procese neustálej transformácie súvisiacej s reštrukturalizáciou a adaptáciou na konkurenčnú výhodu. Autori venujú osobitnú pozornosť charakteru a determinantom riadenia zmien a úlohe manažéra konkrétnej úrovne riadenia pri implementácii organizačných zmien. (Gubra, 2016) Zmena zahŕňa kvalitatívny a kvantitatívny rozmer Hoci je možné odlíšiť kvantitatívne a kvalitatívne aspekty zmeny analyticky, pri úplnom vysvetľovaní zmien musia byť obe dimenzie (Davidsson et al., 2010). V štúdií Riadenie zmien prostredníctvom vedenia Al-Ali et al., preskúmali vplyv vedenia zmeny na organizačnú kultúru a postupy riadenia zmien v podnikoch verejného sektoru v SAE. (Ahmed, 2006) Popescu et al. Hovorí o ...“ odolnosti voči zmenám a jej vplyvu na úspešnosť implementácie zmeny.“ (Popescu, 2012) Ďalšie spracovanie aspektov úspešného riadenia zmien vidíme v publikácií autori Barker et al., ktoré závisí na efektívnom a dynamickom vedení, súdržných tímoch, účinnej sociálnej podpore, jasných komunikačných cestách (vrátane riadenia stresu a odolnosti) a schopnosti podávať trvalý výkon pri extrémnom tlaku. (Barker, 2016) Mikh, OM vo svojom príspevku o pripravenosti spoločnosti na zmenu a o oprozese modelovania zmeny v podnikoch. (Mikh, 2015). O hlavných prístupoch k riadeniu v moderných podmienkach a typoch odporu voči zmenám na rôznych stupňoch vývoja podniku hovorí príspevok autora Khmurova. (Khmurova, 2015) Nad interakciou zmeny a stability a ich podpory kritického vývoja v podnikoch ako sú inovácie internacionalizácia a strategická obnova sa zamýšľa autor Moshe vo svojom príspevku. (Moshe, 2010) Rozsah stability a zmeny v každom vývojovom procese je podmienený obsahom zmeny, organizačným nastavením a vonkajšími rámcovými podmienkami (Mejia-Morelos et al., 2013).

Zmeny sa dejú, či už náhodne alebo sú niekým vyvolané. Musíme ich brať ako reálny stav, ktorý sa vyvíja v čase. Dôvody prečo zmeny nastanú sú rôzne. Dôležitý je však fakt, akým spôsobom sa k zmene postavíme, či už pozitívne alebo s odporom. Postupná adaptácia na zmeny, pozitívny prístup a najmä iniciácia zmeny zaručuje jednotlivcovi alebo tímu, vyťažiť optimálny výsledok z východiskovej situácie. Ak ľudia volia negatívny prístup k riadeniu

zmien vždy budú stáť na mieste, pretože ich odpor k zmenám ich nikam neposunie. Maximálny efekt je však dosiahnutý pod vedením schopného manažéra a za účasti ďalších ľudí. Zmena je jednoducho všetko to, čo sme sa rozhodli vykonať iným spôsobom ako tomu bolo doteraz.

3. Management of changes

Základom manažmentu zmien je uvedenie si potreby zmeny, jej istej existencie a predpokladu úspešného napredovania vďaka nej. S manažmentom zmien sa spája starostlivé naplánovanie, organizovanie, vedenie ľudí a kontrola konečného výsledku implementovanej zmeny. Manažment zmien je v rukách vrcholového manažmentu a zvyčajne sa skladá z nasledujúcich krokov:

- **určenie potreby** zmeny, je to náročná úloha, ktorá súvisí s rozhodovaním o: uskutočnení zmeny, dopade zmeny na ľudí, ekonomických dôsledkoch zmeny, presvedčení a správnosti realizácie zmeny.
- **príprava a realizácia** zmeny, je krok, ktorým sa majú zabezpečiť všetky zdroje ako aj proces realizácie zmeny riadením procesu zmeny,
- **prijatie a stabilizácia** zmeny, úlohou tohto kroku je presvedčenie prostredníctvom komunikácie o prijatí zmeny o jej výhodách a prospechu, ktorý prinesie zamestnancom.

Vplyv času na zmeny

Minulosť už bola a nie je možné ju vrátiť späť. Je možné ju analyzovať a na základe toho určovať trendy možného vývoja do budúcnosti samozrejme za určitých podmienok. Tie sa však často menia, ale nie všetky, niektoré nekončia v prítomnosti, ale môžu pokračovať i v budúcnosti.

Všetky podniky žijú a fungujú v prítomnosti a v budúcnosti. Manažéri preto musia riadiť tak súčasnosť, ako aj zajtrajšok, ktorý je síce neistý, ale smeruje k zmene, ktorá môže byť príležitosťou, ale i hrozbou. Pretože istotou pre nás je, že budúcnosť bude iná ako minulosť a prítomnosť a teda zmena nastane.

Druhy a formy zmien

Zmeny môžu byť **plánované**, ale aj vznikajúce **náhodne**. Z hľadiska rozsahu môžeme deliť zmeny na malé a veľké. Malé majú charakter operatívnych zmien, ktoré sa uskutočňujú v každodennom procese a veľké sú väčšinou plánované a týkajú sa veľkého rozsahu zmien.

Veľké množstvo prvkov a faktorov, ktoré sú iniciátormi zmien, možno rozdeliť na **vnútorné** a prevažujúce **vonkajšie vplyvy**. V súčasnosti labilné a búrlivé externé prostredie je pre značnú časť podnikov relevantným zdrojom impulzov pre realizovanie zmien.

Table 1: Externé a interné príčiny vzniku zmien

Externé príčiny vzniku zmien:	Interné príčiny vzniku zmien:
Politicko – hospodárske	Personálne
Sociálne	Organizačné
Technické	Technické
Podnikateľské	Finančné
	Marketingové

Source: spracované podľa: Droppa, 2010

Formy zmien môžu byť rôzne a závisia od toho kde sa realizujú a čoho sa týkajú. Uvádzame niektoré základné formy zmien:

- zmeny v technológii ovplyvňujú spôsoby práce, hodnoty, menia požiadavky na pracovný výkon jako aj počty zamestnancov,
- zmeny v organizačnej štruktúre súvisia s optimalizáciou počtu zamestnancov a mnohokrát vyžadujú novú orientáciu zamestnancov, súvisia aj so zmenami v riadení vzhľadom na zmeny v hierarchických stupňoch,
- zmeny v spotrebiteľských preferenciách a trhoch tie súvisia so zmenami hodnôt a náročnosťou spotrebiteľov, čo sa prejavuje prispôsobovaním sa trhov ich požiadavkám.

Zmeny, ku ktorým dochádza v reálnych štruktúrach a ktoré spĺňajú podmienku novosti sú považované za **inovácie**.

Rozhodovanie o realizácii zmeny

Pri rozhodovaní o realizácii zmeny je dôležité je si uvedomiť, či je zmena vôbec potrebná, uskutočniteľná a ako je naliehavá. Tiež sa treba zamerať na úspešný priebeh zmeny, ktorého predpokladom sú ľudia, dostatok zdrojov a podmienky za ktorých bude zmena prebiehať.

Rozhodovanie o zmene definuje Lojda ako formy stratégie:

- **mocenská stratégia**, využíva formálnu autoritu a zmenu prikazuje. Splnenie či nesplnenie pokynov je premetom odmienu či trestov. V krátkom časovom horizonte je úspešná a hodí sa pre krízové riešenia,
- **racionálna stratégia** pracuje so všetkými faktami a hodnotami, presvedča pomocou racionálnych argumentov. Svoje opodstatnenie hľadá u odborníkov a ich expertných posudkoch,
- **normatívna stratégia**, snaží sa o zmenu hodnotového systému, Vede zamestnancov k novej hodnotovej orientácii na nové ciele, vzory správania, pracovné postupy atď. (Lojda, 2011)

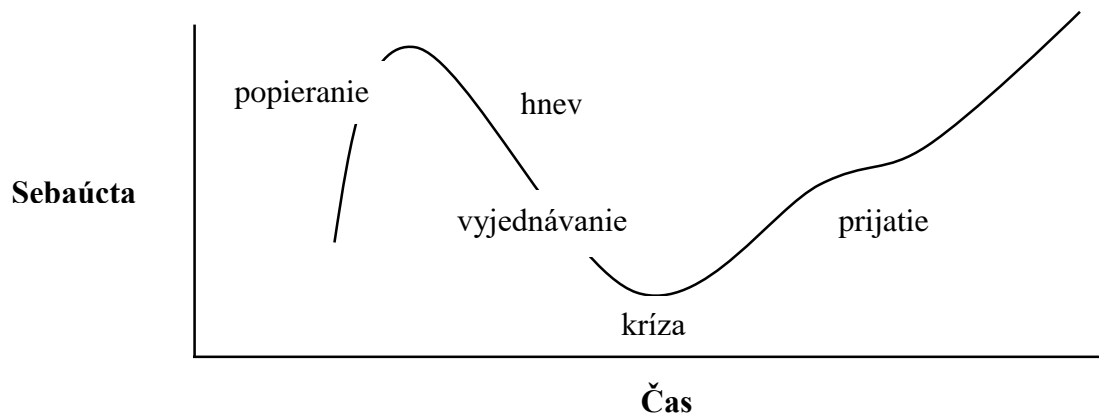
Odpor k zmenám

Zmenu realizujú ľudia a s ľuďmi. Teda človek je realizátorom zmeny na jednej strane a objektom zmeny na strane druhej. Odpor k zmene vzniká práve v tom druhom prípade keď sa človek stáva objektom zmeny, preto je dôležité, aby manažéri nezabúdali na tieto skutočnosti a v celom procese riadenia zmien pristupovali k minimalizácii neganitivity u ľudí zamestnancov, ktorých sa zmeny týkajú.

Ďalším dôvodom odmietania zmeny môže byť, že ľudia nie vždy vidia **potrebu** zmeny, alebo si myslia, že príčina zmeny je **neistá**. Čím je zmena radikálnejšia, tým k nej cítíme väčší odpor. „*Postupné zmeny sú prirodzené, či ich očakávame, alebo nie. Zmena nás môže prekvapiť iba vtedy, ak ju neočakávame a nehľadáme.* (Johnson, 2012).

Myšlienku psychodynamických zmien založených na koncepte vnútorných psychologických stavov, uverejnila Kübler-Rossová. Autorka si uvedomila, že ľudia sa postupne priebehom štádií so zmenou vyrovnávajú. (Cameron & Green, 2015; Englund & Gerdin, 2018)

Figure 1: Proces zmeny a prispôsobenia, podľa Kübler-Rossovej



Source: Cameron & Geen, 2015

Niekedy sú samotní manažéri zdrojom odporu k zmenám z nejakých dôvodov. Dôležité je identifikovať kto zmenu popiera a aké má na to dôvody. Akým spôsobom sa vysporiadame s jednotlivými spôsobmi negatívneho prístupu k zmene je podmienené významom zmeny a dôvodmi odporu. Medzi takéto môžu patriť strach zo straty zamestnania, strach zo straty pracovnej pozície v podniku, strach z nových povinností, vyplývajúcich zo zmeny, prípadne zo zvládnutia rekvalifikácie apod. (Thistlethwaite & Wood, 2018)

Podpora zmeny

Skúseností manažérov dokazujú, že pre podporu zmeny je dôležité motivovať zamestnancov, komunikovať a informovať ich ako aj ponúknuť im možnosť angažovať sa v procese zmeny. Najvhodnejším spôsobom angažovania je otvorenosť a česťnosť k angažovaným.

Pre jednoduchú orientáciu v pravidlách vedúcich k úspechu riadenia zmeny môžeme použiť pravidlo SUCCESS, čo je skratka anglických slov, my uvádzame preklad významov: podpora vízie, pochopenie organizácie, súlad s organizačnou kultúrou, komunikácia, pomoc skúsenejších, silné vedenie. (Martinsuo & Hoverfalt, 2018; Weissova, 2017)

Z hľadiska podpory či zamietania zmeny autor Lojda uvádza nasledujúci štruktúru podporovateľov a odporcov zmien (Lojda, 2011):

- aktívni odporcovia zmeny 10%,
- pasívni odporcovia zmeny 40%,
- pasívni podporovatelia zmeny 40%,
- aktívni podporovatelia zmeny 10%.

4. Changes and their application in Slovak companies

Po roku 1990 prešla Slovenská republika obrovskými zmenami, od politických, ekonomických, sociálnych, technických aj podnikateľských. Proces zmien, ktorými prešla nebol ľahký, bol postupný a podniky v SR za posledné roky, tie ktoré prijali zmeny sa

stabilizovali sa, prežili a žijú stále. Tie ktoré sa nevedeli prispôbiť zmenám zanikli alebo sa stali súčasťou zahraničných firiem, ktoré prišli na Slovensko. Ak hovoríme o zmenám v tomto kontexte išlo o veľké zmeny, ktorých súčasťou bol aj vstup SR do EÚ ako aj silne rastúci proces globalizácie. (Bredillet et al., 2018; Anand & Barsoux, 2017)

Zmeny, ktoré vznikali boli nielen veľké svojim významom, ale aj rozsiahle, pretože sa týkali celej ekonomiky SR, ako aj všetkých oblastí činnosti podnikov od plánovania, riadenia, organizovania, vo vnútri podnikov až po prechod na trhové hospodárstvo, čo prinieslo zmeny v dodávateľsko–odberateľských vzťahoch, adaptovaní sa na trhové ekonomiku, na zmeny požiadaviek zákazníkov, prenikanie na zahraničné trhy ap.

Najväčšími zmenami prešli asi tie najefektívnejšie podniky, čo len potvrdzuje, že zmena je predpokladom úspechu. Každá zmena však prináša problémy, ktoré treba riešiť. Niektorí manažéri sa im jednoducho vyhýbajú a na Slovensku najmä v štátnom sektore.

V štátnych podnikoch chýbajú manažéri (osobnosti), ktorí by vyvíjali tlak na riadenie zmien s cieľom zvýšiť efektívnosť. Súkromné podniky sú viac-menej donútené k zmenám, no ešte stále ich riadia chaoticky a nekoncepčne. Nestačí realizovať iba zmeny v organizačnej štruktúre, zmenami musia prejsť celé procesy. Príkladom sú zahraničné podniky, ktoré majú svoje dcérske spoločnosti na Slovensku a realizujú zmeny s cieľom byť efektívnejšie, úspešnejšie. (Schmidt et al., 2017)

5. Conclusion

Úspešná zmena si vyžaduje aby metódy, techniky, stratégie a implementačné taktiky boli prispôbené konkrétnej histórii, kultúre a ľuďom. Proces zmeny v podniku je často príliš komplexný avšak existuje celý rad modelov ako zmeny uskutočniť. Každá zmena, ak je to možné, by mala byť zmenou plánovanou. Táto plánovaná zmena môže byť úspešná len vtedy, ak zobudí v členoch podniku dovtedy latentnú víziu a dá formu a podstatu seba záujmu týmto členom. Nanútená zmena vždy vedie k odporu. Platí, že tých, ktorí nanucujú zmeny je relatívne menej ako tých, ktorí sú nútení zmenu prijať. Nanútená zmena bude mať väčšinou neočakávané dôsledky – aj také, že sa v konečnom dôsledku zmena neuskutoční.

Pre riadenie zmien je dôležité vytváranie tímov, ktoré zmenu riadia, sú za jej realizáciu zodpovedné. Podnikom, ktoré majú dobre vyvinutý formálny organizačný systém sa ľahšie vytvára systém riadenia zmien. Profesionálne riadené zmeny majú väčšiu šancu na úspech.

Kým v minulosti boli zmeny udalosťou, dnes sú zmeny spôsobom života. Zmena je cestou k úspechu, respektíve udržaniu konkurencieschopnosti. Manažment zmien a inovácií je integrálnou súčasťou každého úspešného podniku čo platí nielen pre veľké podniky, ale aj malé si musia uvedomiť, že bez riadenia zmien nebudú schopné v budúcnosti čeliť konkurencii, ktorá dnes prichádza z celého sveta.

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THE USE OF BIG DATA RESOURCES IN PATIENT RELATIONS MANAGEMENT IN HEALTHCARE

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Abstract. In the contemporary world, management of quality of health services is very important due to globalization and the increasing competition in healthcare. Establishing good relations with patients is critical to management of quality of medical services. Due to the asymmetry of knowledge, the patient's trust and positive experiences related to the healthcare providers are of great importance. A new approach is needed to manage the relationships between providers and patients, caused by the opportunities and challenges offered by modern technologies and the development of global information society. Among other things, this concerns also the analysis of a specific type of Big Data resources. The data collected by health care entities often meet the definition of Big Data. Global Big Data resources, with substantial variability and varied structure, contain much useful information. The aim of this paper is to present opportunities for using Big Data resources generated by health care stakeholders in management of patient relations. The use of Big Data analytics in patient experience management should have a positive impact on quality and efficiency of services provided by the health care entities. The paper presents selected examples of using Big Data in managing patient relations.

Keywords: healthcare management, patient relations management, Big Data

JEL Classification: I10, I12

1. Introduction

Economic growth, followed by the development of consumer society, leads to changes in habits and expectations of patients concerning contemporary culture of providing services. Healthcare entities have to more and more often be aware of this reality and manage patients relations adequately. Facing the constantly increasing competition, orientation of the organization towards customer becomes not only a choice but the prerequisite of the achievement of the competitive advantage and success. In this context, it is important to build strong relations between patients and service-providers. Building good relations with patients requires access to a broad range of various data concerning patients and, on the other hand, access to the data useful for patient concerning specific services and healthcare entities that can provide these services. This results from the specific character of health services. Apart from classic characteristics of services, a substantial effect on services by the following factors:

- complex patient emotional processes, stress, uncertainty, awareness of knowledge asymmetry, personnel attitudes to patients
- professional performance of healthcare services that requires high qualifications, knowledge and experience,

- final effects depend on many factors, no guarantee of cure,
- freedom of choosing the methods and treatment technology by the doctor,
- limitation of patient sovereignty, especially in urgent cases.

Resources of data collected and processed by contemporary organizations are increasing rapidly. These data often adopt various formats, with low level of structuring and various sources. The examples include sound data, graphics, videos, comments from social media, various texts (i.e. little structured by nature and very difficult to be effectively processed and analysed in terms of the contents) (Lau et al., 2016)

The term Big Data (BD) has been also used with respect to the data sets which, due to certain features, are very difficult to be processed, analysed, acquired and stored by means of traditional methods offered by conventional ICT. In the literature, Big Data are presented as data resources which, if properly managed, processed and analysed, can contribute to creation of a new knowledge with innovative and practical character for business organizations. BD offers specific opportunities and challenges for managers of business organizations.

The progressing globalization of the economy is conducive to globalization of healthcare services. A substantial part of healthcare services are of local character in a sense that it concerns a specific patient in a specific place. Part of processes of medical services can be, however, performed in a remote manner. Examples include on-line consultation with experts from the best centres, cheap and fast access to global resources of the most recent scientific knowledge, improved qualifications, and searching for the best methods and medical supplies.

2. Big Data information resources in health care

Pawełszek and Wierzchowski argue that Big Data can be considered from three major standpoints (Pawełszek & Wierzchowski, 2015). The technological standpoint concerns the methods to perform analysis of Big Data by means of modern information technology, statistical methods, methods of artificial intelligence and data exploration. The business standpoint concerns practical and economic applications of Big Data. The social standpoint of Big Data is connected with social consequences of the results of processing of Big Data resources. In addition to obvious benefits, there are also certain threats connected with mass processing and utilization of personal data.

The current increase in the amount of generated data results from three basic causes (Jelonek, 2017, p.1993). The first cause is rising number of applications that acquire (partially automatically), huge amounts of data (such as measurement sensors and other mobile devices, services of social media etc.). The second cause is the decreasing cost of memory and development of cloud computing technologies. The third cause is that a substantial increase in computing power of cloud technologies helps use advanced methods of artificial intelligence for the purposes of searching for information in increasingly Big Data sets.

There is no universal and generally accepted definition of Big Data. Big Data are mostly characterized as resources of data that meet the 3V criterion:

- Volume - very big bases of the data generated by organizations and private persons. This concerns all the healthcare entities, especially because over 80% (Priyanka & Kulennavar, 2014) of these data are poorly structured.

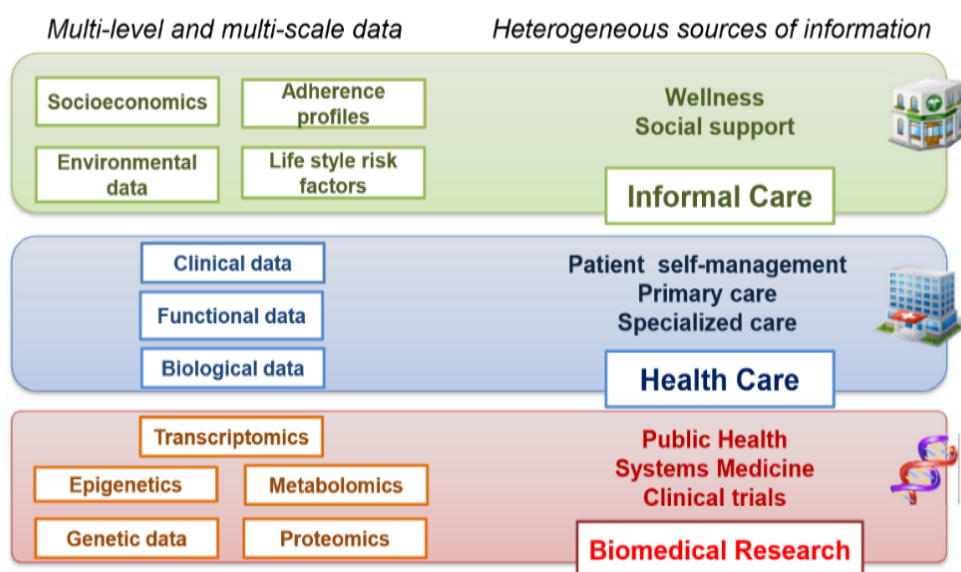
- Variety - substantial diversity of data, especially the structure, formats of notations and methods of presentation and visualization. Examples include data from medical social media (search and sentiment data), streaming transmission of diagnostic data (audio and video), or various text files.
- Velocity - substantial speed of changes. Velocity means frequency and speed at which the data are generated, captured, processed and made available. Healthcare entities and patients generate more and more data in substantially shorter periods of time (Gandomi & Haider, 2015).

Other authors enumerate other Vs, such as Veracity, Value, Visualisation (Uthayasankar et al., 2017). Big Data are complex and very big resources of data of various types, with different level of data structuring and various formats (Chluski & Ziora, 2015).

Fig. 1 presents potential areas of collecting and processing of Big Data concerning health care. Typology of these data is presented in the left part of the figure. On the right are sources of data located in organizations engaged in health care. The extended health care is performed in three major areas: informal care, health care and biomedical research (Cano et al., 2014, Cano et al., 2017).

Informal care includes activities concerning prevention and promotion of healthy lifestyles using social media.

Figure 1: Potential areas of collecting and acquisition of Big Data. Source: (Cano et al., 2014, Cano et al., 2017).



Source: own processing

Health care concerns patients who are provided professional medical services. Potential sources of Big Data mean electronic medical documentation, including computer imaging data and other diagnostic data, data collected from various sensors of physiological parameters, and economic data.

The area of *biomedical research* includes individual fields of medical sciences and the related sources of data concerning scientific research and access to the results of epidemiological, clinical and statistical examinations of Big Data.

Several selected possibilities of using Big Data Analytics (BDA) by healthcare stakeholders are presented in Table 1.

Table 1: Big Data Analytical capabilities from the point of view of healthcare stakeholders

Stakeholders	Sources Big Data	Nature of analytics
patients	Social and information platform of entities, e-health platform, clinical forums.	classification and ranking of social networking sites, analysis of medical texts, construction of health ontologies, patient network analysis
medical service providers	genomic data sets, Personal and Electronic Health Record, sensors and device captured data.	genomic sequence analysis, categorization of patients, identification of high-risk patient, specific treatment plans, creating evidence based guidelines, real-time health analysis of patients
managers of medical entities	medical documentation records, labor force report, current and future treatment plans, patients feedback, accounting records, medical devices logs	creating strategies for resource planning, predicting the duration of hospital stay, estimation of patient satisfaction scores based on demographical data, failure prediction and detection of medical equipment
payers and insurers	data from the census, societal data, history of claims	demographic analysis of claims, trustworthy analysis of claims, reduction of claim frequency
clinical and pharmaceutical scientists	clinical reports, current sales drug reports, Patients Health Records	identification of usage and purchase patterns of drugs, prediction of structure of proteins for effective drug design

Source: (Palanisamy & Thirunavukarasu, 2017)

The appropriate use of opportunities of Big Data Analytics can be useful for all the stakeholders of healthcare. Along with the development of infrastructure and information technologies, the number of BDA beneficiaries should increase (Belle et al., 2015).

3. Specific nature of patient relations management

Due to the specific nature of medical services and expectations of patients resulting from the development of consumer society, managers and employees of medical entities should devote more and more attention to building a positive company image and positive experience and trust of patient.

The conventional customer relationship management (CRM) can be and is actually used in management of healthcare entities. CRM is a concept of enterprise management based on striving for the best possible knowledge of customers and adjustment of the organization to their needs (Stein & Smith, 2009). Contemporary organizations collect substantial amounts of data, with many sources, varied structure and degree of formalization. Much of them are of Big Data character. Effective use of these data in order to implement the CRM concept is virtually impossible without the support of information technologies.

CRM systems used in healthcare entities should take into account the specific nature of their activities that consist in providing health services. The analytical part of the CRM system maintains its classical structure and functionality due to its 'technological' character. Technologies of collecting, processing and analysis of data, including Big Data analytics, depend on the character and type of the data. The operational part is largely integrated with transactional hospital systems (of ERP type) and, consequently, the most specific to health care. Contact CRM is deprived of certain classical marketing components due to limitations present in many countries concerning advertising medical services.

More or less consciously, patients also build their experience and start relations with employees of healthcare entities. Patient-doctor relations are examined and analysed by

psychologists, sociologists, managers, marketing experts etc. The models they develop are based on a more or less active participation of patients in creation of these relations. This concerns especially the dialogue, i.e. mutual exchange of information (but also emotions, e.g. through body language), transparency of actions, reduced asymmetry of knowledge and increase in responsibility, including accepting the part of risk by a patient (Sofaer & Firminger, 2005). Active participation of patients requires access to reliable sources of information and knowledge, which are specifically adjusted to patients, who in most cases do not have medical background.

The use of correct Big Data analytic methods should improve the efficiency of management of healthcare entities, also in the area of patient relations management. This concerns in particular:

- better utilization of all possible methods of contact with patients, including social media, e-mail, call centres, instant messengers etc.
- additional opportunities for patient segmentation with consideration for social functions of health care, health promotion, prevention, identification of high-risk groups of patients etc.
- facilitation of the evaluation of quality and effectiveness of activities of various entities of health care from the standpoint of patients and other social and political organizations.
- access to a new type of information that improves decision processes both in clinical area and management of healthcare entities.
- comparative analyses and predictive modelling based on the demographic data and history of behaviours, experiences and opinions of patients.

Management of relations with patients can be analysed in two areas. The first concerns technical and specific quality and effectiveness of functioning. With the longer perspective, this is the precondition for the quality of providing services appreciated by patients. For the purposes of this paper, this can be termed *the area of institutional relations management*. The other area concerns patient experience and building proper relations from his or her standpoint (Sarasohn-Kahn, 2013). For the purposes of the paper, this will be termed *the area of self-management of patient experience*. As results from the definition of the term 'relation', these areas should be largely interrelated.

4. Selected examples of the use of Big Data analytics in health care

Amazon, Berkshire Hathaway and JPMorgan Chase & Co. announced in January 2018 that they work together to help to improve employees' healthcare. The aim of this project is to reduce costs and increase employee satisfaction. Initially, the activities will focus on technological solutions to provide employees in the United States and their families with high quality and transparent healthcare at a relatively low cost (BusinessWire.com, 2018).

Amazon's corporate vision is "*to be Earth's most customer-centric company, where customers can find and discover anything they might want to buy online.*" Financial support of JPMorgan with assets of over 2.5 billion \$ can suggest that technological innovativeness of this initiative is adequately mature in terms of business. Cooperation with a big company which, among other things, offers insurance services (Berkshire Hathaway managed by Warren Buffet, with market capitalization of over 0.5 billion \$) will improve competitiveness with respect to

medical insurers. Amazon ensures technological and information advantage (access to Big Data resources) concerning expectations, habits and needs concerning individual patients. It is very likely that centralized on-line platforms such as MarketPlace will be developed for connecting patients, doctors, various healthcare entities, suppliers of medical equipment and medical supplies, and pharmaceutical companies.

PatientsLikeMe (patientslikeme.com, 2018) and 23andMe (23andMe.com, 2018) are very popular social platforms for patients in the USA. The basic objective of their activities is to exchange information between patients who suffer from the same diseases (Yan et al., 2016). The portals have global character (there are no geographical limitations for users). The collected data correspond to the definition of Big Data. Crowdsourced health research studies have been conducted within these platforms based on data provided by users (Frost et al., 2011). Some examinations were published in reviewed scientific journals (Swan, 2012). Most studies have been of self-experimentation character. They concerned optimization of physical and mental fitness, effective reduction of body weight, effects of different rehabilitation methods etc. Such examinations are also termed self-quantification. This method consists in using various data sources, including monitoring equipment (measurement sensors) for collecting, management and analysis of the data concerning personal health in order for the patient to better understand his or her body, behaviours and interactions with the environment (Swan, 2009).

The example of the Polish company that monitors and analyses opinions about healthcare entities is WizerunekLekarza.pl. The portal allows for examination of patient's opinions about healthcare entities and doctors which are presented in social media using e.g. sentiment analysis (WizerunekLekarza.pl, 2018). The type and scope of services proposed by this portal can provide feedback for evaluation of doctor's image and healthcare entity's image and, indirectly, evaluate the quality of patient relations management.

5. Conclusion

Information Big Data resources and analytical capabilities of modern information technologies can be useful sources of information and knowledge used in decision-making processes concerning patient relations management.

Big Data Analytics can offer benefits in decision-making processes of *institutional patient relations management*. This mostly concerns the question of current status and objectives that should be analysed for further activities connected with patient relations management. Various predictive analytical techniques can be used, for example machine learning and artificial intelligence, which can be especially helpful in providing solutions for personalized medical care. The technological potential of Amazon and access to global Big Data resources, innovative character of previous activities and strategic orientation towards meeting customer needs can be considered as very good foundation for competitive building of correct relations between patients and suppliers of services within the above discussed initiatives of the company.

The classical methods of patient relations management used in relationship marketing (based on CRM philosophy) can be supplemented with knowledge extracted from Big Data resources. Identification of certain determinants of positive patient relations can be difficult or uneconomic due to complexity of phenomena, and type and structure of available Big Data. The frequent problem is the lack of theoretical basis concerning new phenomena discovered with the development of BDA. The use of analytical tools for data mining, machine learning, capabilities of artificial intelligence and Big Data potential allows for extracting and use of additional

knowledge impossible or very difficult to be acquired using conventional methods. BDA used by large financial, insurance and pharmaceutical companies for acquisition of knowledge about patients is often useful for both parties and entire societies (by reduction of costs and prices of services, better allocation of resources, prevention, increase in efficiency of health protection).

Broad access and the use of online communication platforms and development of virtual communities allows patient to build correct relations with suppliers of medical services within *self-management of relations and experience*. Patients can have global access to reliable information from global resources of medical Big Data. This information should be presented according to the principles of evidence medicine with consideration for legal and ethical limitations in a manner that is clear for patients without medical background. Active participation of patients in global virtual health communities generates huge amounts of Big Data, which are useful also for other stakeholders of health care and can be used in patient relations management.

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USING CRM TECHNOLOGY IN CZECH ENTERPRISES

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Abstract. The customer relationship management can create an advantage and it can improve company performance on the business market. It is still developing area in scientific publication and in companies. CRM components, the CRM implementation barriers are frequently discussed and also the use of customer relationship management in companies according to their size. Another CRM component is very important, and it is the globalization in technology (software). Companies that implement and work with the CRM will gain the long-term relationship with customers and the loyal customers. This article aims to present the level of using CRM technology in Czech enterprises according to their size and the field of business within 2014 – 2017. The starting point is a theoretical review about the importance of CRM, the CRM components, and the CRM specifics in small and medium-sized enterprises. Data was obtained from the Czech Statistical Office in 2014 – 2017 and is divided according to the years, the company size, and the field of business. In this article, two statistical hypotheses were formulated. These hypotheses were verified by using the Pearson correlation coefficient. The results show the significant differences of using the CRM technology between the company size and the field of business.

Key words: CRM, Czech enterprises, Pearson correlation coefficient

JEL classification: M32

1. Introduction

The customer relationship management (CRM) is a strategic approach that integrates people, business, and technology to understand the customer needs (Mohammadhossein & Zakaria, 2012; Pozza et al., 2018). Companies realized that customer care is important for building customer loyalty and also important for company competitiveness. Companies can be in close relationships with customers personally or through technology. For successful customer relationship management can be used the CRM technology (software). This article aims to present the level of using CRM technology in Czech enterprises according to their size and the field of business within 2014 – 2017. First part of article is about the CRM importance, the technology globalization in CRM application and specifics of CRM in SMEs. The second part is the research part based on data from Czech Statistical Office. Data obtains information about using CRM in small, medium and large companies. There has been also formulated two statistical hypotheses about the dependences between the size of enterprises and the business field and using CRM application.

2. Importance of CRM

The rapid growth of technology provides the opportunities to better understand customers and to manage customer interactions (Hennig-Thurau et al., 2010). An important company objective is to serve its customers to their satisfaction. When a customer gets a personalized attention in company and is served with a sense of human touch, the customer would be very much satisfied. However, customer dissatisfaction with company is a potential threat to its market share and would damage the company reputation (Rai, 2013).

Customer relationship management has been developing through different definitions. According to Greenberg (2010) it is a combination of philosophy, strategy, system, and technology that would effectively manage the customer transactions and the customer relationship in company. Shafia et al. (2011) say that CRM is an effective tool to achieve the objectives such as satisfied and loyal customers and increased market share. It is a mechanism to keep the loyal customers satisfied and if it is possible to generate positive references for the company's services and products. Some companies consider that CRM is only a technological solution or some of them consider that it as a strategy where the customer relationships are at center (Chen & Popovich, 2003). Buttle (2009) argues that CRM is the business strategy core that integrates processes and external networks to create and provide value to customers. It is based on quality customer data and this data is conditioned by the information technologies. Information technology can be an effective tool to develop customer relationship that integrates database with marketing strategy that may focus on the existing customer base (Rai, 2013; Liagkouras et al., 2015; Brockman et al., 2017).

Most SMEs do not implement this system due to several reasons. The reason is a lack of CRM knowledge, expertise to implement it and lack of resources (Levy 2001; Powell and Yetton 2001; Boon et al., 2011). Alshawi et al., (2011) say that there are different results of success of SMEs introducing CRM solutions. The main problem are the organizational and technical factors and data quality. This study confirmed some similarity in problems faced by SMEs. With the gradual development of trade, the development of relationships with existing and potential customers became more important. This development of customer relationships needs to be managed in order to get progressively relevant information about consumers, and that information also needs to be continuously recorded.

2.1 CRM components

The growth of information technology has provided more capabilities to manage customer relationships and to manage changing demands. The CRM is combination of people, business processes and technology that provide understanding of customers and to support a strategy for building long-term customer relationships. Scholars usually say that are three major CRM components such as technology, people, and business process (Dohnal, 2002; Verhoef, 2003; Chen et al, 2003; Payne, 2007; Buttle, 2009; Coltman et al., 2011; Valmohammadi, 2017). These components have a significant influence on successful CRM implementation. The technology component is tool that support the connection among all CRM components and company departments. In some companies is CRM perceived such a technology or database and business automation tool. Other companies this system perceived as a tool specially created for individual communication with customer (Chen et al., 2003). Technology has an important role to support other components – people and business process (Coltman et al., 2011). Customer oriented companies integrate marketing and other processes to fulfill customer needs without any problems. Technology and business process are a critical part for successful CRM

implementation. However, just third CRM component – people (employees) create barriers to customer relationships. Human capital enables company to manage the technological and business risks that are associated with CRM investments (Coltman et al., 2011).

2.2 CRM application

The CRM system is often implemented as web-based tool. It could be seen as the strategical connection among marketing strategy and information technology in company (Glazer, 1997). The CRM contains a core company asset – the customer relationships. Thus, it requires special customer care. Technology, one of the major CRM components has been defined as the information technology that is determined for specific purpose of customer relationship management (Chen & Popovich, 2003). Companies should to utilize the CRM technology to analyze enormous customer information due to the interaction (Shaqrah, 2016, Vasista et al., 2017). Companies have a possibility to choose the technology for managing customer relationships. They can create own the CRM application, to buy an external CRM or to pay for the CRM in the cloud. Cloud CRM means technology where customer data are in the cloud and it is accessible to company via the Internet (cloud computing). It offers access to this application via web-based tool or web browser. Employees can log in to this cloud CRM from any computer or device with Internet connection. It is designed with aim to be more flexible and it is often a good option for small enterprises and start-ups who lack an IT expertise and to have a functional CRM software without large costs (Alam et al., 2015).

3. Methods

The research part of this article is focused on secondary research. Data is based on the official statistical results of the Czech Statistical Office. The research was about the using information and communication technologies in business sector, for example the using ERP and CRM software and automated data sharing. Secondary research is focused on the Czech enterprises (small, medium, and large) using CRM application in last four years (2014–2017). It has been chosen specific area about using CRM. These questions were included in cloud computing and internal software parts.

The Czech Statistical Office monitors SMEs according to the small, medium and large enterprises. The structure of the business field is comparable in all mentioned years. However, the business field Finance and Insurance is mentioned only in years 2014 and 2015. It is interesting that the business field Finance and Insurance was not include. Although this business field used the IT software the most.

It has been formulated statistical hypotheses and dependencies among them. The hypotheses have been formulated about the size of companies, the field of business and about the using of CRM application.

Statistical hypotheses:

H₀₁: There is no dependency between the size of enterprises and using CRM application.

H₀₂: There is no dependency between the business field and using CRM application.

Alternative hypotheses:

H₁₁: There is dependency between the size of enterprises and using CRM application.

H₁₂: There is dependency between the business field and using CRM application.

Verification of hypotheses

To evaluate hypotheses and to assess dependency of one of the characteristics on the second one, the Pearson correlation coefficient was applied. This coefficient measures the linear relationship among two sets of data.

$$r_{Prs} = \frac{\sum (Y_{m-i} - \bar{Y}_m)(Y_{est-i} - \bar{Y}_{est})}{\sqrt{(\sum (Y_{m-i} - \bar{Y}_m)^2)(\sum (Y_{est-i} - \bar{Y}_{est})^2)}} \quad (1)$$

The Pearson correlation coefficient can take values from -1 to +1. A value -1 shows that the variables are linearly related by a decreasing relationship and a value +1 shows the perfectly linear relationship by an increasing relationship. A value 0 shows no linear relationship among variables. If the correlation coefficient is greater than 0,8, it means that there is a strong correlation. If the coefficient is less than 0,5, the correlation is weak (Bolboaca et al., 2006).

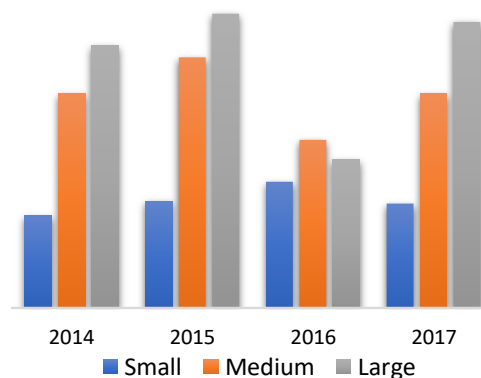
4. Research, result and discussion

How it was already mentioned for secondary research was used the data from Czech Statistical Office. The number of reporting units in the sample is 7 977 and the number of questionnaires used for the calculation is 6 500. A lot of scholar's research are about the using CRM according to the company size (in SMEs and large companies), the CRM implementations and the barriers of using CRM (King, 2008; Buttle, 2009; Alshawi et al., 2011; Boon et al., 2011). However, it is a lack of studies which are focused on the dependence among the field of business and the using of CRM.

4.1 Using CRM in Czech companies according to the size

The results of using CRM in Czech companies according to the size in 2014 – 2017 are shown in following chart (figure 1). There is a significant difference of using CRM between small, medium and large companies. The higher share of using CRM technology is in case of large and medium sized Czech companies against small companies in mentioned years. An interesting result is in 2016, where shares are lower for all company size.

Figure 2: Using CRM according to the company size



Source: Author's work

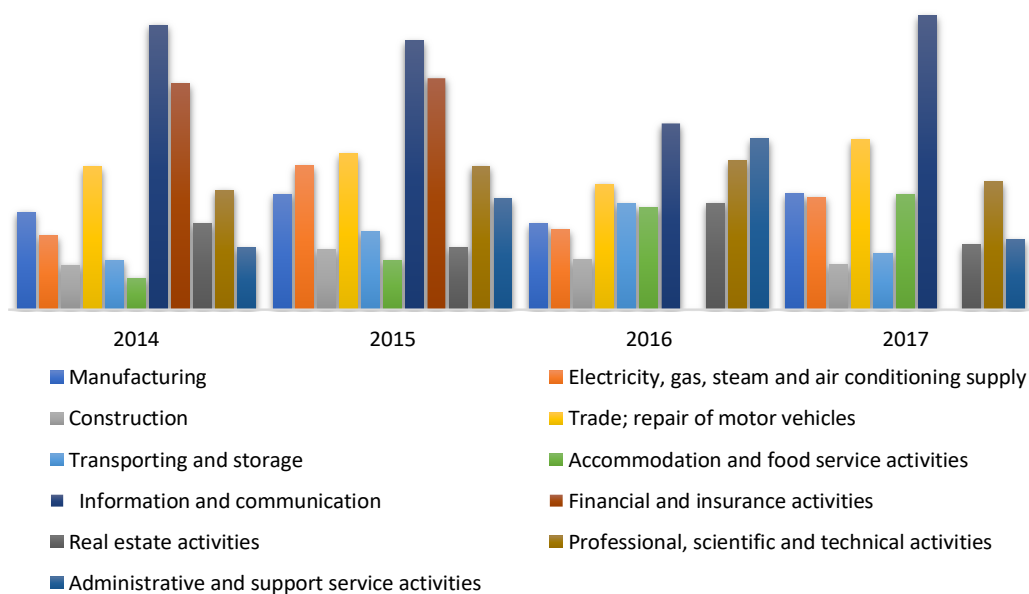
This difference can have several reasons. The reasons are mentioned in CRM components, people, technology and finance. A lot of small sized companies have a lack of finance and they

have not possibilities to invest to employees and to the technology that help to customer relationship management (Boon et al., 2011, Alshawi et al., 2011). However, Kubikova and Lukoszova (2013) argue that the global trend is the increased interest of companies in technological applications. These trends have also been confirmed in the European market in 2007-2010. The greatest increase was in Slovakia and Turkey. Only a few countries have a lower interest in CRM. In this period it was Germany, Slovenia and Czech Republic. The situation was slightly different in 2014-2017. A significant growing in using CRM technology are in Spain, Belgium and Germany in 2014 – 2017. The Czech Republic, Slovakia, Bulgaria, Croatia and Hungary do not show a significant interest in this kind of technology and communication support. The Czech companies prefer other technological support, for example ERP systems.

4.2 Using CRM according to the field of business

What is the result of using CRM according to the field of business? The field of business is divided according to the classification of economic activities NACE (figure 2).

Figure 3: Using CRM according to the field of business



Source: Author's work

In the first place of using CRM is the Information and communication category that is still increasing. This business field has a close relationship with technology, because of the specialization. In the second place is the Financial and insurance activities. What can be the cause of it? This may be due to the fact that banks were the first users in commercial computer technology to improve customer care and they also used electronic customer contact. As was already mentioned, it is interesting that in 2016 – 2017 the financial and insurance activities are not included. Although, this field of business had a high share of using CRM in previous years. It was found that it is not required to include all field of businesses and it helps to reduce the administrative load of respondents. This is the reason why the Czech Statistical Office decided not to include the financial and insurance activities. The category Trade, repair of motor vehicles is in the third place. Other field of businesses are almost in the same place.

In general, we can say that the situation in the field of business where are the lowest shares in technology using it can be influenced by purchase costs. According to the CZSO results, the category Accommodation and food service activities is in the lowest level of using CRM. Although, the cloud CRM is one of the less expensive and less demanding technology (Petkovic, 2010). Lukosova and Kubikova (2013) evaluate the Czech market as specific. The using CRM was mainly aim to the industry, banking and IT companies. How was it already mentioned according to CZSO the Czech enterprises mainly use other communication and technological support then CRM.

4.3 Verification of hypotheses

For tested hypotheses was used the Pearson correlation coefficient. The results are shown in Table 1. that is divided into years and using CRM according to the company size and the field of business.

Table 1: The result of Pearson correlation coefficient

	2017	2016	2015	2014
The company size/using CRM	1	0,998105318	0,965762697	0,970148827
The field of business/using CRM	0,906914516	0,916136089	0,939043400	0,9055764196

SOURCE: AUTHOR'S WORK

The hypotheses evaluate the relationship of using CRM between the company size and the field of business. We reject the statistical hypotheses and accept the alternative hypotheses H_{11} and H_{12} . The significant dependence is in case of hypothesis H_{01} in 2017.

5. Conclusion

The globalization is still growing in using information technology. The CRM processes are focused on improving customer care. Alshawi et al. (2011) and Boon et al. (2011) argue that the usual barriers of using CRM are a lack of financial resources or limited technological knowledge and employees' skills. The cloud CRM supports the improvement of collaborative CRM part. Anytime the company employees can connect to this CRM application by web browser or tool from computer or mobile. Alam et al. (2015) says that using of this application could help to small and medium sized companies which they have a lack of IT experiences and they use the CRM software, but with lower costs. However, the latest secondary research in 2014 – 2016 confirm the lowest shares of using cloud CRM in small and medium sized companies and it is an opportunity for future research. Alam et al. (2015) says that it is the right way for SMEs. Nevertheless, the shares are still low. The first hypothesis also confirmed the relationship between company size and the using cloud CRM. Why? The future research can answer on this question. (Henning-Thurau et al., 2010, King, 2008)

It is interesting, that Czech enterprises mainly use ERP system. For example, ERP system use 77 % large companies, 53 % medium sized and 20 % small enterprises in 2017. The highest share of using CRM is in companies which are focused on information and communication technology. However, the category financial and insurance activities also have a high share of using cloud CRM in 2014 and 2015. Further research could focus on high and low shares of using cloud CRM in companies and to identify the causes of difference.

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SUSTAINABLE DEVELOPMENT OF RETAIL TRADE IN EUROPE - THE REQUIREMENT OF GLOBALIZATION

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Abstract. The article presents the synthetic results of the research, whose objective was to identify the key success factors of sustainable retail development. It was assumed that the application of the principles of sustainable development by commercial enterprises contribute to enhance their market competitiveness and it is the requirement of globalization. The essential elements of sustainable operation of commercial enterprises include: the quality of offered products and their selection, customer service quality and purchasing conditions, including the format of the retail outlet. The article identified the level of retail development in eight European countries using the method of multidimensional comparative analysis. Significant differences in the assessments of commercial network in terms of retail outlets type were identified using Kruskal-Wallis test. Key success factors for sustainable development of trade in Europe are diverse and have different importance for customers.

Keywords: sustainable development, retail trade in Europe, globalization

JEL Classification: F01, F14, F18

1. Introduction

Dynamic processes occurring in the contemporary economy bring significant changes in terms of the functioning of the majority of production and service-providing enterprises operating in various sectors including retail. Another key issue raised in this article is the fact that in conditions of growing competition, retail chains search for new strategies of functioning on the market (Bilińska-Reformat et al., 2018). Especially in times of economic downturn, implementation of sustainable development (SD) concept is a very important source of retailers' competitive advantage. The actions connected with SD used by global retail chains fulfil the expectations of contemporary, aware and demanding customers. Sustainable socio-economic development has become one of the most important challenges of the modern world. Its main aim is to develop mechanisms and modes of action to enable the further development of civilization while maintaining and respecting the laws of nature and socio-economic aspirations of humanity (Lee & Seo, 2018). This concept represents a new form of conscious, responsible life of an individual and the whole community on the basis of interaction with the social and natural environment, taking into account environmental constraints and social expectations (Aldieri & Vinci, 2018; Bonilla et al, 2018; Warzecha, 2017).

Sustainable development is an increasingly important part of the business strategy of trading companies in the United States and Europe. More often it stems from the needs and expectations

of customers and the conditions for seeking a competitive advantage in today's market conditions and globalization. Modern communication channels, especially social media, allow consumers to quickly and effectively express their expectations and dissatisfaction. Increased awareness of international and national public opinion concerning decent wage of employees, respecting the principles of fair trade or the impact of businesses on environment, social and economic environment cause that trading companies are increasingly choosing to pursue an active dialogue with their customers and consequently implement the principles of sustainable development in their business operations (Twardzik & Heffner, 2015). This applies above all to three of the following areas. Firstly, transparent relationship with the client, or reliable information about products, their composition and origin and their impact on the environment. Secondly, companies increasingly responsibly manage the supply chain. This means both social responsibilities, understood in this case as the provision of decent working conditions for employees and associates throughout the supply chain, as well as crucial for the industry environmental responsibility, which is not only monitoring, but also managing the effects on the environment throughout its life cycle. A special form of support for the idea of sustainable development is to change the concept of products packaging. Companies tend to optimizing the economic, social and environmental aspects of their activities. For this purpose, they often take into account the entire life cycle of packaging from raw material sourcing through manufacturing and distribution, to the re-use and waste disposal. Empty containers are received from stores within the network of waste collection to be processed into paper, and then into new packaging, which ensures full transparency of the process.

More and more frequently used strategy is the use of packaging from 100% renewable or recycled materials. However, for most companies to achieve full control over the entire supply chain is a major challenge.

2. Methodological assumptions of retail trade research in Europe

The aim of the retail trade research in Europe was to identify opinions and assessments of the functioning of retail outlets in selected countries. It was assumed that the application of the principles of sustainable development by commercial enterprises contributes to enhancing their competitiveness, and such elements of their functioning as location, price levels, the quality of offered products and their choice, customer service quality, hours of operation and possible forms of payment are key factors of market success.

The characteristics of retail trade in Europe was based on the following indicators: turnover in retail trade, number of commercial establishments, number of employees in retail outlets and volume of purchases of goods and services in such outlets. In direct research were gathered the opinions of these countries' inhabitants on the functioning of the various types of trade outlets (discount stores, convenient stores, specialist shops, hypermarkets, supermarkets, markets).

The study used secondary and primary sources of information. There was used literature on the subject matter, specialized journals and publications available in the Internet. Secondary data were obtained from Eurostat database. Residents of Belgium, Finland, France, Germany, Poland, Romania, Slovakia and Hungary were the source of information in the direct research. The direct research was conducted in the Department of Market and Consumption of the University of Economics in Katowice (Jaciow et al., 2015; Kucharska, 2015). Assumptions for direct research are presented in Table. 1.

Table 1: Assumptions for direct research

Research subject	Individual consumers
Research type	Quantitative
Research method	Survey
Research tool	Questionnaire translated into national languages
Selection of individuals of the sample	Not random, purposeful
Criteria for the selection of the sample	Activity in the market of consumer goods and services
Spatial extent of research	Belgium, Finland, France, Germany, Poland, Romania, Slovakia, Hungary
Time range of reserach	2016

Source: own processing

To examine the functioning of certain types of trade outlets there was carried out direct testing in selected countries using a questionnaire consisting of 9 questions. The aim of this research was to answer the question of how the people of the countries surveyed evaluate the various types of retail outlets in terms of location, price levels, quality and choice of products, customer service, opening hours of the outlet and forms of payment. Respondents indicated the answer on the seven ordinal scale assessing the functioning of the type of store in terms of seven features (where 1 means very bad, 7 means very good). The reliability of the test measured by Cronbach's alpha coefficient was 0.923.

The study involved 2052 respondents, including 15.3% residents of Belgium; 7.9% - Finland, 9.9% - France, 14.5% - Germany, 13.6% - Romania, 15.6% - Slovakia, 14.6% - Poland, 8.5% - Hungary.

3. Trade in selected European countries - characteristics

Germany has the biggest turnover in retail trade from 8 European countries. In Germany there is also the biggest number of large commercial enterprises, more than double that of France and twenty times more than in Slovakia. The trade employs more than 3 million people, on average twice more than in Romania, Poland, France and Belgium, and almost five times more than in Hungary. In Hungary, Finland and Slovakia are the most shops per 1000 inhabitants (Table 2).

Table 2: Basic characteristics of retail trade in selected European countries in 2016

Specification	Belgium	Finland	France	Germany	Poland	Romania	Slovakia	Hungary
Turnover in retail trade (in million €)	89 404	38 896	210 487	498 000	100 682	31 985	18 094	25 077
Number of people employed in commercial enterprises	324 537	164 424	1915 985	3454 251	1232 214	478 652	174 165	317 382
Number of stores	88 302	28 860	617 867	426 349	353 562	111 348	58 195	144 190
Number of inhabitants per 1 shop	125.2	87	203.2	188	127	180	93	64.5
Number of stores per 1000 inhabitants	7.9	11.5	4.9	5.3	9.2	5.58	10.7	15.5

Source: Eurostat. Retail trade statistics - NACE Rev. 2 G (sbs_na_dt_r2)

The structure of turnover in the different sectors of retail trade in selected European countries varies greatly. Retail sale in non-specialized stores dominates in the countries of Central and Eastern Europe (Romania, Slovakia, Poland). On the other hand, retail sale in specialized stores has a larger share in Western Europe. Retail sale of cultural and recreation goods in specialized stores achieve the largest share in Belgium and France, and negligible in Slovakia, Romania

and Poland. Retail sale via stalls and markets reaches a very high share in France and very small in Finland, Germany and Belgium.

Out of many methods of multidimensional comparative analysis, were used taxonomic methods (Kuc, 2012, A; Mościbrodzka, 2014): linear ordering - classic method of Z. Hellwig development pattern in order to create a ranking of the best developed countries in terms of retail trade and the methods of Ward and k-means to separate groups of similar countries in terms of the studied phenomenon (Kuc, 2012,B).

The study used the Z. Hellwig taxonomic measure of development in order to organize the tested objects (countries) in terms of the state of retail trade. Higher value of the development meter indicates that the tested object is closer to the pattern. Abstract point of standardized coordinates is the development pattern. The best values of diagnostic variables are the coordinates of that point.

Synthetic indicators replace the description of objects using a set of diagnostic features described by one aggregate size. They therefore allow the numerical description of the complex phenomena which cannot be directly measured.

Taxonomic synthetic measure of development is based on Euclidean distance and is normalized, i.e. it has a value in the range [0,1]. If the measurement values vary less than 1, the object is more developed because of the level of multivariate phenomenon, which is closer to the reference object. On the basis of the calculated synthetic measurement was made the linear arrangement of objects and tested European countries were divided into four typological groups: of high, moderate, low and very low level of retail development according to the three-means method.

According to this method a set of objects is divided into two subsets: in the former there are objects which correspond to the value of the Z. Hellwig meter greater than the overall average, in the latter there are all the others. Then they defined average indirect in each group. They set typological groupings:

- Class I - high retail level where: $z_i > \bar{z}_{1i}$;
- Class II - moderate retail level where: $\bar{z}_i < z_i \leq \bar{z}_{1i}$;
- Class III - Low retail level where: $\bar{z}_{2i} < z_i \leq \bar{z}_i$;
- Class IV - a very low level of retail trade where: $z_i \leq \bar{z}_{2i}$;

where: \bar{z}_i - average measure of growth and $\bar{z}_{1i}, \bar{z}_{2i}$ - average indirect measure of growth.

In order to isolate groups of countries similar in terms of variables describing the retail trade in the countries surveyed there were used clustering methods based on the similarity of multivariate taxonomic objects (here: the countries): the method of hierarchical clustering (Ward), and iterative-indexing method (k-means) (Rand, 1971; Chernoff, 1973; Rencher, 2002). The result of the application of the method of agglomeration is dendrogram whose nodes correspond to objects clusters.

For each of the isolated objects clusters there was also used the method of arithmetic mean which answers the question “Which of the selected features decided for the division of the different classes and what features are dominant in particular classes?” (Ward, 1963).

The starting point in the method of Ward and k-means method is to normalize variables (as tested characteristics are given in different units) and then determine matrix elements of taxonomic distance between the countries surveyed (Murtagh & Legendre, 2014; Kuc, 2012,

A). Variables have undergone the standardization procedures and taxonomic distance has been determined by using Euclidean metrics:

$$d_{ik} = \sqrt{\frac{\sum_{j=1}^m (z_{ij} - z_{kj})^2}{m}} \quad (i, k = 1, \dots, n) \quad (1)$$

where: z_{ij}, z_{kj} – normalized values of the j -th variable for the i -th and k -th country.

Ward's method was then used following the scheme (Everitt et al., 2011):

1. it was assumed when beginning the process of grouping that each object (country) creates on its own a class; single-element n classes (clusters);
2. at each level of grouping there was found that pair of p and q ($p < q$) clusters (based on a minimum distance matrix element) between which the distance is the smallest
3. $d_{pq} = \min \{ d_{ij} \}$ ($i, j = 1, \dots, n$)
4. they combined p and q clusters into one new cluster, giving it number p by removing the focus q ; this allows the number of clusters is reduced by one;
5. there was calculated distance of newly created group from all other clusters according to the formula below:

$$d_{pr} = \frac{n_p + n_r}{n_p + n_q + n_r} d_{pr} + \frac{n_q + n_r}{n_p + n_q + n_r} d_{qr} - \frac{n_r}{n_p + n_q + n_r} d_{pq} \quad (2)$$

where:

d_{pr}, d_{qr}, d_{pq} – the appropriate elements of the distance matrix reduced on the basis of the procedure (r takes values different than p, q);

n_p, n_q, n_r – respectively the number of clusters of p, q and r wherein $r \neq p, r \neq q$);

6. the calculations were continued until one group containing all objects (countries) surveyed has been created.

The objective of the Ward method is to link objects in order to make the variance of intragroup variables in the clusters describing the objects as low as possible.

The results of grouping are shown in a dendrogram (on the charts there is also a scale that allows reading of the minimum distance underlying connecting clusters), where the vertical line indicates the dendrogram intersection defining the division of a classified set of objects into homogeneous groups.

The state of retail development is characterized by indicators denoting the various aspects (Table 3). All variables taken for testing are characterized by sufficiently high volatility ($V_S > 10\%$). To evaluate the interrelated nature of selected features there was employed a reverse correlation coefficient matrix. From the set of potential variables were removed variables: $X_7 - X_{10}$, as part of a diagonal matrix R^{-1} for these variables significantly exceeded the value of 10. $X_1 - X_6$ variables are stimulants. All variables were normalized using the method of standardization according to the formula:

$$z_{ij} = \frac{x_{ij} - \bar{x}}{S} \quad (3)$$

where: \bar{x} - the arithmetic mean of the variable x_i ; S - standard deviation of the variable x_i .

Table 3: Potential diagnostic indicators describing retail trade in selected European countries* in 2016 and the selected characteristics

The variable name	symbol	\bar{x}	S	Vs [%]
The number of inhabitants per 1 shop	X ₁	149.50	46.90	31.37
Apparent labour productivity in k. euro/person	X ₂	23.70	15.22	64.24
Gross operating surplus/turnover in %	X ₃	5.29	3.12	58.98
Investment rate in %	X ₄	18.04	10.99	60.99
The number of employees in the retail per 1000 inhabitants	X ₅	31.50	5.39	17.10
The production value of retail trade in million euro per 1000 inhabitants	X ₆	1.31	0.90	68.65
Average personnel costs w in k. euro/person	X ₇	18.46	12.57	68.12
Wage adjusted labour productivity in %	X ₈	134.03	27.06	20.19
The number of retail businesses per 1000 inhabitants	X ₉	6.83	2.18	31.96
Value added at factor cost in mln euro per 1000 inhabitants	X ₁₀	0.75	0.44	58.00

* for the purpose of the analysis were taken only the following countries (Belgium, Finland, France, Germany, Hungary, Poland, Slovakia, Romania), for which there was also conducted primary research using a questionnaire, in which the inhabitants of the country evaluated the functioning of selected retail outlets

Taking into account standardized values of the variables there was calculated the Hellwig taxonomic measure of development and on its basis there was made the linear arrangement of objects and division of the countries into the previously described four typological groups (Table 4).

Table 4: Taxonomic measure of retail development in European countries in 2016

Country	Z. Hellwig measure	Typological group	Figure 1: Distance of the countries surveyed from the pattern according to the Z. Hellwig method
Belgium	0.352	High level of development	
Germany	0.306		
Finland	0.272	Moderate level of development	
Slovakia	0.254		
Poland	0.236	Low level of development	
France	0.151		
Romania	0.093	Very low level of development	
Hungary	0.021		

Source: Own calculations within EXCE.

To examine the similarities of the countries surveyed in terms of the state of retail and dividing countries into disjoint and non-empty subsets called classes due to the phenomenon studied there was used the Ward's method and the method of k-means.

4. Conclusion

Finland and Germany are the countries which achieved the highest rates of implementation of the Europe 2020 Strategy (sustainable development) among the countries surveyed whereas Poland, Slovakia, Hungary, Romania achieved the lowest rates (Eurostat, 2015). Belgium and Germany obtained the highest level of development of the retail trade whereas Hungary obtained the lowest level of development. The inhabitants of Romania gave the highest rating

to the trade network operating in their country whereas the inhabitants of Slovakia gave the lowest rating to the trade network operating in their country. The key success factors of trade outlets in terms of their type is the quality of the products, choice of the product, price and also location, level of customer service, opening hours and forms of payment. Taking those factors into consideration will contribute to sustainable growth in terms of ecological, economic and social development of the European countries surveyed on the globalizing market. The analysis conducted opens field for in-depth analysis of the strategies of sustainable business development of trade businesses in Europe with the emphasis of the acceptance of actions taken by retailers in the socio-economic environment.

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ANALYSIS OF THE LEVEL OF INTERNET-BASED INFORMATION PROCESSING IN THE USA AND SELECTED COUNTRIES OF THE EUROPEAN UNION AGAINST A BACKGROUND OF GLOBALIZATION

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Abstract. Globalisation is a process of worldwide internationalisation. Globalization affects a great number of economic, scientific and social spheres of human activity, gradually leading to the disappearance of both geographic and social borders. The emergence of the Internet and the ongoing development of technologies exert a powerful impact on the world, national economies, society, culture, as well as human relations and everyday life. The article aims to analyze the level of Internet-based information processing in the US states and selected EU countries within the context of globalisation. The analysis spans the years 2001, 2009, 2010, 2011, 2016 and is based on data for selected countries published by the Central Statistical Office as well as national and OECD statistical yearbooks. The variables, whose relevance and statistical accuracy were first verified, formed a basis for the classification of the countries according to the Internet usage by physical persons aged 16-74. A linear ordering method - the construction of a synthetic variable based on the measurement of distance to the reference standard by means of the general distance measure developed by M. Walesiak, and an object grouping method were adopted in order to identify homogeneous groups comprising objects that represent the same level of development of the phenomenon under study.

Keywords: Econometric Methods, Globalisation, Information Society, Taxonomic Analysis.

JEL Classification: C01, C02, C51

1. Introduction

Globalization is shaped by various economic, social and scientific processes. One of its sources is the continual scientific and technological progress, which leads to the development of the information society - another factor contributing to globalization. Globalization and scientific and technological advancement are interconnected, they mutually influence each other (Michie, 2018). Modern technologies enable us to communicate, with the result that information is becoming omnipresent in our lives. The extent to which we can access information is a measure of our development. As an information society we gather, process and transfer information and we increasingly apply the information that we possess to all areas of our lives (Gordon, 2018). The level of development and its pace depend mainly on the possibility to access new technologies and the ability to process and use the collected information (Bliźniuk&Nowak, 2005), (Piketty et al., 2018). One of the major problems we are facing nowadays is a widening gap between rich and poor countries in terms of the access to information, the speed of this access, the ability to find and apply information, as well

as the ability to discriminate between useful and harmful information (Globan-Klas & Sienkiewicz, 1999). New technologies support social development through e-working, e-education, e-administration, e-commerce, etc. (Hoffman et al, 2018), (Olkhovaya et al., 2018). Moreover, they remove geographical barriers, allowing online commercial transactions, simultaneous cooperation with institutions and companies based in various countries (which, i.a. reduces transportation costs), faster and easier access to public administration services, undertaking studies at foreign higher education institutions due to international exchange programs of students and faculty members (Janiga-Cmiel, 2017B), (Saloma, 2017), (Cerrito et al., 1918). The development of the information society in the USA is largely based on the knowledge gained through scientific research. One of the examples is a report entitled “The Structure of the World Electronic Economy”, published in 1997 and supported by Bill Clinton. To sum up, it is common knowledge today that countries committed to the promotion of social development can spare no effort to encourage the development of the information society as it constitutes a core element of such development.

2. Ordering a set of objects

Both linear and non-linear ordering methods can provide a basis for grouping objects (Panek, 2009). The linear methods allow establishing a hierarchy of objects according to a specific criterion. In the study, the synthetic variable was constructed based on the measurement of distance from the reference standard which deploys general distance measure (GDM) proposed by Walesiak. Objects can be ordered when their characteristics are measured on an ordinal scale at least; if they are on an interval or ratio scale, they have to be normalized. The synthetic variable is determined according to formula:

$$s_i = \frac{1}{2} - \frac{\sum_{j=1}^k w_j c_{i0j} d_{0ij} + \sum_{j=1}^k \sum_{i^*=1}^{l_{i^*}} w_j c_{ii^*j} d_{0i^*j}}{2 \sqrt{\sum_{j=1}^k \sum_{i^*=1}^{l_{i^*}} w_j c_{ii^*j}^2 + \sum_{j=1}^k \sum_{i^*=1}^{l_{i^*}} w_j d_{0i^*j}^2}}, \quad (1)$$

Where: $w_j \in [0; k]$ and $\sum_{j=1}^k w_j = k$. Moreover, if objects are measured on the interval or ratio scale, we have to substitute them with $c_{jj^*j} = z_{ij} - z_{i^*j}$, $i^* = 0, i^*$ and $d_{0i^*j} = z_{0j} - z_{i^*j}$, $i^* = i, i^*$ (2), z_{0j} -standardized value for a reference object, respectively. For variables measured on the ordinal scale we use a modified formula

$$c_{ii^*j} = \begin{cases} 1, & z_{ij} > z_{i^*j} \\ 0, & z_{ij} = z_{i^*j} \\ -1, & z_{ij} < z_{i^*j} \end{cases}, i^* = 0, i^*, \quad d_{0i^*j} = \begin{cases} 1, & z_{0j} > z_{i^*j} \\ 0, & z_{0j} = z_{i^*j} \\ -1, & z_{0j} < z_{i^*j} \end{cases}, i^* = i, i^*, \quad (2)$$

substituting respectively. The calculated synthetic variable takes values from the [0,1] interval, and the lower the value, the closer the object is to the reference standard.

2.1 Synthetic variable

The first information about a synthetic variable can be found in the works of Z. Hellwig, who developed a method for presenting a complex phenomenon by means of one synthetic variable. Variables which describe a particular phenomenon are usually diverse in character, as there are both stimulants and destimulants among them. The aim of the synthetic variable is to aggregate all the structure features of the variables that are used for its construction (Panek, 2009), (Janiga-Cmiel, 2017A), (Hadas-Dyduch, 2016A), (Hadas-Dyduch, 2016B).

2.2 Ordering the US states and the EU countries according to the level of computer and Internet usage

The first stage of the study focused on the United States in the years 2001, 2009, 2010, 2011, 2012. The ordering a set of objects was adopted to analyze the following variables: X₁-Internet use by individuals, X₂-Households with broadband access, X₃-Individuals using the internet by place of use, X₄-Reasons for not having internet access at home, X₅-Individuals using mobile devices to access the internet on the move, X₆-Households without access to a computer (For the other examples, this set of variables is also included). The values of the diagnostic variables were stimulated and standardized (Panek, 2009). Next, the coordinates of the reference standard were established by means of the following formula:

$$W_0=[z_{0j}], j=1,\dots,k, \text{ where } z_{0j}=\begin{cases} \max_i\{z_{ij}\}, & \text{variable type of stimulant} \\ \min_i\{z_{ij}\}, & \text{variable type of destimulant} \end{cases} \quad (3)$$

where $j=1,\dots,k$ and $i=1,\dots,l$. The values of the synthetic variable were calculated according to formula (1), taking into account substitution (2). The list of the US states arranged according to the level of computer and Internet use in the year 2001 is shown in table (1), (Janiga-Cmiel, 2017B), (Janiga-Cmiel, 2016). (The values of the synthetic variable are arranged from the largest to smallest in the rows of the table).

Table 1: Ordering the US states- 2001

2001	Maryland	Utah	Massachusetts	Alaska	Washington	Hawaii	Florida	Minnesota	New York	Connecticut
	0.082	0.076	0.054	0.041	0.040	0.040	0.039	0.038	0.035	0.031
	Vermont	Mississippi	Maine	New Jersey	Louisiana	Pennsylvania	Illinois	New Hampshire	Kentucky	North Carolina
	0.029	0.028	0.028	0.027	0.027	0.026	0.026	0.025	0.024	0.023
	Idaho	Georgia	Missouri	Indiana	Rhode Island	Nebraska	Oregon	Texas	Iowa	Tennessee
	0.023	0.020	0.020	0.017	0.017	0.017	0.017	0.016	0.014	0.014
	Nevada	West Virginia	Alabama	Oklahoma	Wisconsin	Delaware	North Dakota	Kansas	South Carolina	New Mexico
	0.014	0.013	0.012	0.012	0.012	0.012	0.010	0.008	0.007	0.007
District of Columbia	Ohio	Montana	Arkansas	Virginia	California	Arizona	Wyoming	Michigan	South Dakota	Colorado
0.007	0.007	0.006	0.005	0.004	0.004	0.003	0.002	0.001	0.001	0.000

Source: Based on own research

The same procedure was used to examine the other years; 2009, 2010, 2011, 2016, the results of the analyses are presented in the tables below.

Table 2: Ordering the US states- 2009, 2010, 2011, 2016.

2009	Maryland	Connecticut	Alaska	New Jersey	New Hampshire	Hawaii	New York	Massachusetts	Virginia	Colorado
	0.670	0.345	0.198	0.090	0.068	0.063	0.055	0.047	0.046	0.046
	Washington	Nevada	California	Utah	Rhode Island	Delaware	Oregon	Alabama	Wyoming	Maine
	0.045	0.040	0.039	0.036	0.032	0.032	0.030	0.029	0.024	0.024
	Wisconsin	Pennsylvania	Texas	Arizona	Florida	West Virginia	New Mexico	Vermont	Georgia	Tennessee
	0.024	0.022	0.021	0.020	0.020	0.019	0.017	0.015	0.014	0.013

	Oklahoma	Louisiana	District of Columbia	Ohio	Nebraska	Mississippi	Idaho	North Carolina	Missouri	Indiana
	0.013	0.012	0.012	0.011	0.011	0.010	0.010	0.009	0.008	0.008
South Carolina	South Dakota	Montana	Kentucky	Arkansas	North Dakota	Kansas	Minnesota	Illinois	Iowa	Michigan
0.008	0.006	0.006	0.006	0.004	0.004	0.002	0.002	0.001	0.001	0.001

2010	Maryland	Alaska	Massachusetts	Mississippi	New Jersey	Washington	California	New Hampshire	New York	Arizona
	0.093	0.088	0.076	0.068	0.060	0.059	0.045	0.045	0.042	0.039
	Rhode Island	District of Columbia	Missouri	Colorado	Texas	Hawaii	Vermont	South Dakota	Louisiana	Delaware
	0.038	0.035	0.035	0.032	0.031	0.030	0.027	0.027	0.026	0.023
	Arkansas	North Carolina	Nebraska	Kansas	Montana	South Carolina	Nevada	West Virginia	Illinois	Oklahoma
	0.022	0.021	0.021	0.018	0.017	0.017	0.016	0.015	0.014	0.013
	Georgia	Tennessee	Minnesota	Oregon	Utah	Alabama	North Dakota	Kentucky	Michigan	Connecticut
	0.013	0.013	0.012	0.011	0.011	0.009	0.008	0.008	0.006	0.004
Virginia	Ohio	Iowa	Wisconsin	Maine	Indiana	Florida	Pennsylvania	Wyoming	New Mexico	Idaho
0.004	0.004	0.003	0.003	0.002	0.002	0.002	0.002	0.002	0.001	0.000

2011	New Jersey	Washington	Connecticut	New Hampshire	Maryland	Massachusetts	Utah	Hawaii	New York	North Dakota
	0.065	0.060	0.057	0.054	0.053	0.051	0.051	0.049	0.048	0.047
	Alaska	California	Minnesota	Colorado	Virginia	New Mexico	Nevada	Illinois	Maine	Rhode Island
	0.047	0.043	0.042	0.042	0.041	0.039	0.039	0.039	0.037	0.037
	Wyoming	Delaware	Wisconsin	District of Columbia	Idaho	Pennsylvania	Florida	Arizona	Michigan	Iowa
	0.034	0.032	0.032	0.028	0.028	0.027	0.025	0.024	0.023	0.022
	Oregon	Mississippi	Kansas	West Virginia	North Carolina	Tennessee	Vermont	Oklahoma	Alabama	Arkansas
	0.018	0.018	0.016	0.014	0.014	0.013	0.012	0.012	0.011	0.011
Kentucky	Ohio	Louisiana	Nebraska	Georgia	Indiana	Montana	Texas	Missouri	South Carolina	South Dakota
0.010	0.010	0.009	0.009	0.007	0.005	0.004	0.004	0.002	0.001	0.001

2016	New Jersey	Hawaii	Massachusetts	Rhode Island	New York	California	Alaska	Oregon	Idaho	Mississippi
	0.056	0.056	0.051	0.049	0.047	0.044	0.042	0.039	0.036	0.036
	District of Columbia	Tennessee	Connecticut	Florida	Nevada	Minnesota	New Hampshire	Pennsylvania	Delaware	New Mexico
	0.036	0.035	0.035	0.035	0.035	0.035	0.032	0.031	0.031	0.030
	West Virginia	Alabama	Colorado	Washington	Arkansas	Illinois	Oklahoma	Iowa	Vermont	Nebraska
	0.028	0.027	0.026	0.026	0.026	0.025	0.024	0.023	0.023	0.023
	North Carolina	Utah	Maine	Missouri	Texas	Montana	Ohio	Wisconsin	Arizona	Indiana
	0.022	0.022	0.019	0.017	0.017	0.016	0.016	0.014	0.013	0.012
North Dakota	Louisiana	South Carolina	South Dakota	Maryland	Georgia	Kansas	Michigan	Wyoming	Virginia	Kentucky
0.011	0.009	0.007	0.006	0.006	0.005	0.005	0.004	0.003	0.003	0.002

Source: Based on own research

Similar analyses were conducted for the EU countries (years; 2001, 2009, 2016). Their results are presented in the tables, each showing the order in a particular year under study.

Table 3: Ordering the EU countries – 2001, 2009, 2016.

2001	Finland	Switzerland	Luxembourg	Sweden	United Kingdom	Belgium	France	Denmark
	0.006379	0.006003	0.005867	0.005847	0.005201	0.004874	0.004702	0.004266
	Austria	Netherlands	Ireland	Germany	Hungary	Slovakia	Estonia	Slovenia
	0.004133	0.003551	0.003144	0.002259	0.002203	0.002101	0.001529	0.0015
	Croatia	Latvia	Greece	Italy	Malta	Bulgaria	Portugal	Czech Republic
	0.001455	0.001123	0.001027	0.001024	0.001011	0.001003	0.001002	0.001001
	Cyprus	Poland	Romania	Lithuania	Spain			
0.001001	0.001001	0.001	0.000981	0.00085				
2009	Sweden	Finland	Denmark	France	Switzerland	Luxembourg	United Kingdom	Germany
	0.075271	0.07447	0.073059	0.040661	0.038685	0.038674	0.029131	0.024386
	Belgium	Austria	Slovakia	Ireland	Estonia	Netherlands	Portugal	Greece
	0.017248	0.017037	0.015565	0.008721	0.005463	0.00428	0.004251	0.00372
	Lithuania	Hungary	Italy	Croatia	Poland	Romania	Slovenia	Bulgaria
	0.003511	0.003434	0.003344	0.002756	0.002622	0.00255	0.002544	0.002172
	Malta	Cyprus	Czech Republic	Latvia	Spain			
0.002109	0.002027	0.001855	0.001439	0.000889				
2016	Sweden	Denmark	Finland	France	Switzerland	Luxembourg	United Kingdom	Germany
	0.08468	0.082192	0.050029	0.045743	0.043521	0.043509	0.032772	0.027434
	Belgium	Austria	Slovakia	Ireland	Portugal	Netherlands	Greece	Lithuania
	0.019404	0.019166	0.017511	0.009811	0.004782	0.004316	0.004185	0.003949
	Hungary	Italy	Croatia	Poland	Slovenia	Romania	Estonia	Bulgaria
	0.003863	0.003762	0.003101	0.00295	0.002862	0.002619	0.002615	0.002444
	Malta	Cyprus	Czech Republic	Latvia	Spain			
0.002373	0.00228	0.002087	0.001619	0.001				

Source: Based on own research

3. The standard deviation method

The aim of object grouping is to create homogeneous groups (clusters) of objects based on the similarity of the internal structure of variables which describe them. The study uses a method for grouping linearly ordered objects - the standard deviation method. First, the values of the synthetic measure are calculated based on Hellwig's development measure (Panek, 2009). Next, the objects are divided into four groups which comprise objects whose synthetic variables take the values from the following four class intervals:

$$G_1: s_i < \bar{s} - S(s); G_2: \bar{s} > s_i \geq s_i - S(s); G_3: \bar{s} + S(s) > s_i \geq \bar{s}; G_4: s_i \geq \bar{s} + S(s) \quad (5)$$

where \bar{s} , $S(s)$ represent the arithmetic mean and the standard deviation respectively.

3.1 Homogeneous groups comprising objects that represent the same level of development of the phenomenon under study in the US states and selected EU countries.

In the first stage of the study, the groups of the US states representing homogeneous levels of computer and Internet use in the years 2001, 2009, and 2016 were identified. The diagnostic variables were selected based on the descriptive and formal analysis of these variables. For the year 2001, the following values of the arithmetic mean: 0.589 and standard deviation: 0.138 were obtained. Using the grouping formula presented above, the following clusters, arranged from the highest to the lowest level of development, were determined (Groups are arranged according to the level of the phenomenon, G_1 is the highest level, G_4 is the lowest level): $G_1 = \{\text{Alaska, Maryland, Washington, New York, Hawaii, Massachusetts, Mississippi, Tennessee}\}$, $G_2 = \{\text{Utah, Wisconsin, Florida, Maine, Minnesota, Connecticut, New Jersey, North Carolina, Louisiana, Pennsylvania, Idaho, Illinois, Georgia, Vermont}\}$, $G_3 = \{\text{New Hampshire, Missouri, Kentucky, Indiana, Nevada, Texas, Iowa, North Dakota, Oklahoma, Ohio, Montana, Michigan, Virginia, Arkansas, Colorado}\}$, $G_4 = \{\text{Rhode Island, California, Oregon, West Virginia, Alabama, Kansas, District of Columbia, South Carolina, Delaware, New Mexico, Nebraska, Wyoming, South Dakota, Arizona}\}$. For the year 2009 the following groups were distinguished: $G_1 = \{\text{Connecticut, Alaska, Maryland, New Jersey, Colorado, Virginia, Massachusetts, Washington, New York, California, Nevada, New Hampshire, Hawaii, Minnesota}\}$, $G_2 = \{\text{Utah, Alabama, Nebraska, North Carolina, Rhode Island, Delaware, Oregon, Ohio, Missouri, North Dakota}\}$, $G_3 = \{\text{Wyoming, Maine, Texas, Arizona, Florida, West Virginia, Vermont, Tennessee, Georgia, Oklahoma, Louisiana, Michigan, Pennsylvania, Wisconsin, Idaho}\}$, $G_4 = \{\text{District of Columbia, Illinois, Indiana, Mississippi, South Carolina, New Mexico, South Dakota, Kansas, Iowa, Arkansas, Kentucky, Montana}\}$. The last stage of the study covered the year 2016; the following groups were determined: $G_1 = \{\text{New York, New Jersey, Hawaii, California, Alaska, District of Columbia, Connecticut, Minnesota, New Hampshire, Washington, Utah, Maryland}\}$, $G_2 = \{\text{Massachusetts, Rhode Island, Oregon, Tennessee, Florida, Pennsylvania, Delaware, Colorado, Arkansas, Maine, South Dakota}\}$, $G_3 = \{\text{Idaho, Mississippi, Nevada, West Virginia, Alabama, Oklahoma, Illinois, Iowa, Vermont, Nebraska, North Carolina, Texas, Montana, Ohio}\}$, $G_4 = \{\text{New Mexico, Louisiana, Missouri, Wisconsin, North Dakota, South Carolina, Arizona, Indiana, Georgia, Kansas, Michigan, Wyoming, Virginia, Kentucky}\}$. Next, the same analysis, taking into account the same variables, was conducted for the EU member states in order to identify homogeneous groups there. For 2001, the EU countries were grouped as follows: $G_1 = \{\text{Finland, Denmark, Luxembourg, Sweden, Belgium, Switzerland, France, United Kingdom}\}$, $G_2 = \{\text{Ireland, Germany, Austria, Netherlands}\}$, $G_3 = \{\text{Hungary, Czech Republic}\}$, $G_4 = \{\text{Croatia, Cyprus, Poland, Romania, Lithuania, Spain, Bulgaria, Portugal, Italy, Greece, Malta, Slovakia, Slovenia, Estonia, Latvia}\}$. The analyses of the data for the other years led to the identification of the following groups (2009 and 2016): $G_1 = \{\text{Sweden, Finland, Luxembourg, United Kingdom, Germany, Denmark, France, Switzerland}\}$, $G_2 = \{\text{Belgium, Austria, Netherlands, Slovakia}\}$, $G_3 = \{\text{Ireland, Malta, Czech Republic, Poland, Slovenia, Bulgaria, Croatia, Spain, Italy, Hungary}\}$, $G_4 = \{\text{Portugal, Greece, Estonia, Lithuania, Romania, Latvia, Cyprus}\}$ and the year 2016: $G_1 = \{\text{Finland, Ireland, Sweden, Denmark, United Kingdom, France, Switzerland, Luxembourg, Netherlands, Germany, Belgium}\}$, $G_2 = \{\text{Austria, Slovakia, Hungary, Malta, Cyprus, Czech Republic}\}$, $G_3 = \{\text{Italy, Portugal, Greece, Lithuania, Croatia, Poland, Slovenia, Spain}\}$, $G_4 = \{\text{Romania, Estonia, Bulgaria, Latvia}\}$. The calculated number of the groups is statistically significant and there is no need for further delimitation of the groups (for each the case under consideration).

4. Conclusion

The article presents a two-stage analysis of Internet-based information processing. In the first stage of the study, a linear ordering method - the construction of a synthetic variable based on the measurement of the distance between objects and the reference standard by means of the general distance measure proposed by M. Walesiak - was used to order the US states, and afterwards the EU countries, according to the levels of Internet-based information processing in the years 2001, 2009, 2010, 2011 and 2016 (the years 2001, 2009, 2016 for the EU countries). In the second stage, a grouping method was employed to identify, among both the US states and the EU countries, homogeneous groups made up of objects characterized by the same level of development of the investigated phenomenon in the years under study (the years 2001, 2009, 2016). The analysis of the descriptive variables selected for the first stage of the study shows that the top positions on the list of the US states which emerged as a result of the ordering procedure are occupied by the wealthiest states. The top three positions in 2001 were held by Maryland, Uta and Massachusetts, in 2009–by Maryland, Connecticut, Alaska, in 2010–by Maryland, Alaska, Massachusetts, and in 2011–New Jersey, Washington, Connecticut, and in 2016 - New Jersey, Hawaii, and Massachusetts ranked as the top three. A similar correlation can be observed in the outcome of the grouping procedure – the wealthiest states form the first group, composed of the states with the highest level of Internet-based information processing. In 2001 these were: {Alaska, Maryland, Washington, New York, Hawaii, Massachusetts, Mississippi, Tennessee}, in 2009: {Connecticut, Alaska, Maryland, New Jersey, Colorado, Virginia, Massachusetts, Washington, New York, California, Nevada, New Hampshire, Hawaii, Minnesota}, and in the last of the examined years: {New York, New Jersey, Hawaii, California, Alaska, District of Columbia, Connecticut, Minnesota, New Hampshire, Washington, Utah, Maryland}. As far as the EU countries are concerned, for the synthetic variable the highest three values in the year 2001 were calculated for: Finland, Switzerland, Luxemburg, in 2009: Sweden, Finland, Denmark, in 2016 Sweden, Denmark, Finland. As for the grouping, in 2001 the first group included: {Finland, Denmark, Luxembourg, Sweden, Belgium, Switzerland, France, United Kingdom}, in 2009: = {Sweden, Finland, Luxembourg, United Kingdom, Germany, Denmark, France, Switzerland}, and in 2016: {Finland, Ireland, Sweden, Denmark, United Kingdom, France, Switzerland, Luxembourg, Netherlands, Germany, Belgium}. The results of the study indicate that the wealthiest US states and the rich EU countries provide the most favorable conditions for the development of Internet-based information processing. Major economic centres and their vicinity are conducive to higher levels of education and an ever- increasing application of advanced technologies. Less wealthy and poor states are inhabited by less educated populations so they offer fewer opportunities for the development of modern technology literacy. Taking into consideration such indicators as the unemployment rate, median family income and education level, Maryland, Alaska and New Jersey were classified in recent years as belonging to the wealthiest US states. As far as the economic growth in the EU countries is concerned, the fastest and the highest growth is observed in the Scandinavian countries. The analysis of the USA, where the Internet started being developed much earlier than in any other part of the world, and selected EU countries confirms that the inhabitants of rich, fast-developing cities or their immediate neighborhood get greater opportunity to use the Internet and apply the latest technologies.

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ZERO WASTE CONCEPT AS A PART OF ECO- INNOVATIONS IN GLOBAL COMPANIES

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Abstract. Many studies confirm the fact that current models of natural resources gaining, their manufacturing, usage and disposal in the form of waste perform the definition of unsustainability. The future of the economic growth is hidden in the capability of reusing and re-evaluation of resources. The main topic of the paper is a circular economic, which presents the idea of sustainable development, creates a beneficial and healthy relationship between the human and nature. Circular economy and its basic principles stand on the idea that all products and materials can be repeatedly used in the product cycle even after their actual usage. In such way, products and materials can become raw materials for new products and services. Replacing of primary raw materials with secondary raw materials can be a part of the solution, however, recycling is far not a final and attractive solution because it is quite power-consuming and moreover it leads to high material degradation. The aim of the paper is to show the analysis of theoretically possible solutions for existing issues in circular economy, to define and compare it with linear economic model, to show successful and inspirational examples of Slovak companies, which within their strategies of corporate social responsibility implemented the key factors of closed economies. Such global companies bring innovative recycling solutions, which go beyond the traditional recycling suggestions and apply ideas and principles of zero waste concept.

Keywords: corporate social responsibility, circular economy, eco-innovations, zero waste concept, global companies.

JEL Classification: M21, M31

1. Introduction

The essence of the current "take-go-go" system is primarily the high consumption of non-renewable raw materials. When we add other negative factors such as the use of cheap labor from developing countries, population explosion, increasing consumption and the devastating impact of man on the environment we can rightly consider the current system unsustainable; economically, ecologically and socially.

The world has limited resources. Metal, gas and oil are not unlimited, unlike our demand for them. Our current model of natural resources extraction, processing, use and disposal in the form of waste is a definition of unsustainability. That's why something needs to be changed.

In the paper we will deal with the theoretical starting points to the issue of the circular economy. We will clarify its basic principles and on practical examples we will show how these principles can work effectively in practice

2. Linear versus circular economy, zero waste concept - theoretical basics

At present, our economy is built on the so-called linear model that is based on the "mine-make-throw away" principle. This basically means that the natural raw materials, which are limited in quantity, are used, processed and we produce a number of different goods from them which we then sell to customers, consumers. They consume, wear out, and eventually throw away. The linear economy appeared to be effective at the beginning, as raw materials such as wood, oil, and coal were initially readily available and in the right amount. Together with the use of cheap workforce, businesses could maximize profits. However, such a one-way system cannot last long-it excessively consumes natural resources and produces an enormous amount of waste which of course, negatively impacts the environment. On the other hand, in addition to profitability, this type of economy brings jobs, making a significant contribution to employment creation. (Bue, 2018; Pavlovicova, 2016)

Figure 1: Linear economy model



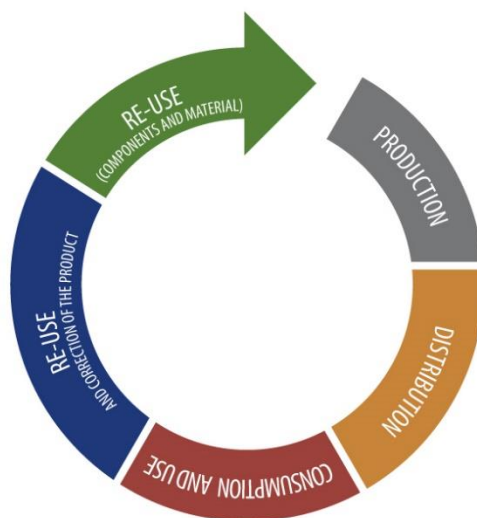
Source: Csefalvayova, P. et al.: Slovensko a cirkulárna ekonomika.

The opposite of the current traditional model of the linear economy is the new economic model, circular economy, also called circular or green economy. The role of the circular model is to ensure the competitiveness of the countries, their stable economic growth and a healthy environment. Revenue in the circular economy is based on the effective use of natural resources achieved by the efficient utilization of the materials, products and components used. Their constant return to the technical and biological cycle is the closure of material flows. In this way, the waste and the material inputs and energy costs necessary for the production of new products are minimized. The Circular Economy Institute places the following activities among the main features of the circular economy: “*use of renewable energy sources, eco-innovation and rental, sharing or support of local trade*” (Csefalvayova et al., 2017; Faria & Andersen, 2017)

The main principle of the whole circular economy model is to make the use of all products more efficient and to extend their lifecycle. In the circular economy waste is used as a potential source. Also waste that normally ends in landfills or sewage can be converted into a valuable input source. “*The main objective of every business should be to look beyond the boundaries of waste and find an effective solution to closing the loop of the circular economy to create a closed cycle of so-called closed loop*” (BLF, 2016).

Figure 2: Circular economy model

CIRCULAR ECONOMY



Source: Csefalvayova, et al.: Slovensko a cirkulárna ekonomika.

The use of materials and natural resources in circular economy is completely different from the use in linear economy. To a certain extent it benefits from nature - it has to get raw materials and resources in its original form to be able to produce something; then it designs products that are very user-friendly and can be reused, then repaired and their individual components can be disassembled to fix or store other things that we can use in everyday life. Lastly, it is important that things are made of materials that can be recycled and then reused. (Marin & Lotti, 2017)

The circular economy operates in two closed cycles - biological and technological. The waste of one cycle becomes a raw material for the next cycle, leaving waste as a category cease to exist. The biological cycle consists of organic components that under natural conditions are biodegradable into molecules that re-enter new cycles (living nature). Just as the biological cycle works, the technology cycle should work as well. The technological cycle represents the world of human production. If this cycle is closed as well as the biological cycle, we will not produce waste. We therefore have to have products on the market that will ensure that we do not have waste at the end of the life cycle, but we will produce some raw material that will be usable. However, it is necessary to separate the biological cycle from the technological one so that both can function independently and do not contaminate each other. As compost containing toxic substances is impaired, plastic in the flood of municipal waste is unusable. (Weissova & Durica, 2016; Miklencicova, 2016)

3. Circular economy and zero waste concept – examples of good practices

With examples of companies that have implemented the principles of the circular economy into practice, we meet daily and constantly accrue to them. In this chapter we will approach successful and inspirational examples of Slovak and foreign companies that have implemented the principles of a closed economy in their strategies of socially responsible business and bring solutions that go beyond recycling and apply ideas and principles of zero waste concept. (Tsai & Liao, 2017)

a. Ecodesign

The first area in which the principles of the circular economy can be applied is the ecological design of products. Within this area, for example, intelligent material selection, rational design and appropriate manufacturing processes can be used to reduce negative environmental impacts, prevent waste generation and save natural resources. (Brown, 2018; Cecere & Mazzanti, 2017; Heidenreich et al., 2017)

Examples of good practice include Crafting Plastics! Studio glasses, that are made from the new generation of plastics from renewable sources - from bioplastic. The glasses are made of compostable plastics, where the glasses are recycled at the end of their life cycle, as the glass can be recycled and the frames can be assembled to produce no waste. The biomaterial is not only compostable but the most important thing is that all its ingredients are 100% natural and therefore renewable. Besides, it is biocompatible, so we could theoretically eat it and our body would decompose it (Pavlovicova, 2018). Crafting Plastics! Studio collaborates with scientists from the Slovak Technical University in Bratislava to develop this bioplastic which contains no oil, yet it has great properties and durability. Solid and elastic throughout its lifetime, this bioplastic can be fully decomposed at a fraction of the time compared to petroleum plastics without leaving an environmental impact. (Dewick & Foster, 2018)

Another interesting example is the design for reuse = the use of repaired and refurbished production materials, simple and intuitive layout, cleaning and replacement / repair of components. This approach was applied by the Dutch manufacturers of Fairphone modular smartphone which can be broken down into smaller parts, which can then be independently manufactured, used and exchanged. Replacement parts make it easy for each phone to be repaired, that is, the phone has a long durability and is additionally produced ethically and does not contain raw materials from conflicting areas (BLF, 2016).

Another interesting example is the Swiss brand Curaprox, which produces toothbrushes and has a franchise in Slovakia as well. Curaprox toothbrushes are made of plastic that is hard to recycle. The company strives for the brushes not to end in the landfill or in the incinerators and are trying to turn them into something meaningful. Given that there is a problem with the sorting and recycling of municipal waste in Slovakia, as evidenced by many studies, Curaprox has decided that since June 2017, it will systematically collect the used toothbrushes from customers. (Pacheco, et al., 2018) From the brushes, Curaprox produced waste sorting bins, which they donated to Slovak schools along with the edification about waste sorting. The idea of making baskets from the brushes was preceded by brainstorming and determining the following conditions:

- it must be a product that cannot become waste for at least 10 years, that is, it must be something that will be long lasting,
- it must be something that, when produced, can still be recyclable,

- it must be something that serves the public (the social aspect)
- it must be manufactured in Slovakia, which was a big challenge for the company. (Blocken et al., 2018; Del Rio et al., 2017)

b. Shared Economy

We do not have to own everything because we do not use everything every day. We do not use a drill, sewing machine or ice cream machine every day. Owning things makes sense if their value increases over time. However, having things with falling value does not have an economic sense, and it is therefore more reasonable to rent such things. (De Jesus & Mendonca, 2018)

The current economic system recognizes the concept of rent but long-term borrowing is perceived as economically disadvantageous. In the circular economy, rental is the basis for new business models. Consumers become users who buy a service, that is, the flawless functioning of products, not the product itself. Companies are the owners of products and are responsible for their maintenance, repairs, energy efficiency and re-evaluation. With this model, users are not worried about repair or high one-time purchase costs. Companies are motivated to produce quality products and to design them in order to make the best possible use. Today, the biggest companies are going to model the profits they will not have on the sale of the products but they will profit more from servicing these products or from borrowing them. An example of such a model in real life can be Philips that gives light for rent, meaning efficient and trouble-free operation of the lights. The Dutch company Mud Jeans allows the annual rental of jeans. Worn out jeans are recycled and made new (Csefalvayova et al., 2017).

Too often we buy expensive items that we will use very rarely. These objects not only occupy a useful space in the home but in the large-scale production they create considerable pressure on the limited resources of our planet. A project named AjnFach was created in Slovakia in Bratislava. This is the first and only library of things in Slovakia that offers innovative, practical, cost-effective and environmentally friendly tools such as working tools, sports equipment, or various kitchen helpers. These tools can be borrowed by people on a reader's card as books in the library. (Montobbio & Solito, 2018; Hroncova Vicianova et al., 2017)

4. Conclusion

Finally, it is important that the introduction of circular economy principles into the CSR strategy is based on the company's internal environment and that such activities are not carried out only officially. It is often the case that firms that behave as being socially responsible have a certain handicap or controversy in what they do (such as oil companies, clothing companies, refineries, chemical plants that negatively affect the environment), and they like to use the motto that they are socially responsible for improving their image. It is good to know where the boundary between PR and real social responsibility is. Sustainability is not a voluntary option. It is our duty. We should not see it as a choice, but as a new way of life, a new economy that is inevitable. It is important that we get out of the linear economy where we produce something which ends up as a waste to a circular economy where we do not get waste at all. Recycling is no longer enough, the best waste is one that will not be produced.

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IDENTIFICATION OF USER REQUIREMENTS FOR SHIP SIMULATORS

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Abstract. Harmonization of the ship crew training requirements is one of the priorities supported by European projects. Inland and maritime navigation training and education have differences. It is necessary to differentiate them and try to globalize the demands on the global labour market in the water transport sector. It is important to focus on the training of ship crewmembers, their theoretical basics and practical skills. At present, simulators are a complement to practical training. One way to improve the quality of training for ship crewmembers is the process of deployment new educational technologies - ship simulators. Ship simulators have a wide range of focus and varying levels of usability. As progress of IT technologies move forward, the simulator requirements are also clearly defined. The essence of the whole function is the environment in which and how simulators work within the virtual reality. In the field of maritime transport, the International Maritime Organization (IMO) deals with the qualifications, crew requirements and training standards. It creates international regulations on the safety of the environment, legal issues and the protection of human life at sea. Minimum qualification standards for the training of crewmembers are laid down in the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW). In terms of inland waterways, different legal regimes (STCW-IN) has been applied. The main problem is the lack of uniform requirements for professional qualifications.

Keywords: Ship simulator, navigation, training, STCW, crew

JEL Classification: R41

1. Introduction

Maritime transport, as well as inland, has an irredeemable position in the world economy. The growing demand for transport increases the demand for good infrastructure and better efficiency of operation on waterways and water corridors. In order to satisfy this demand, it is necessary to constantly develop new vessels and ports have been innovated continuously. (Nakamura 2017) In recent years water transport has been on the rise. The rise in world trade in world markets in Africa, Latin America and Asia has contributed to this fact. Another reason is due to the low shipping costs. (Sykorova et al, 2016)

The result is a high demand for logistics centers and terminals focused mainly on container and bulk cargo. (Binova & Jurkovic, 2016) In addition, the process of globalization leads to greater competition between ports and shipping companies, where pressure is put on more

efficient operation. Managing such growth is a great challenge and requires good management. (Stopka & Kampf, 2016)

One of the main conditions in the field of waterway development is the qualified training of ship crews. Crew is a very important part of the transport process. It begins with loading, through transport and ending with unloading. Each crew member, particularly in terms of his own safety, protection of goods and vessels, should be properly trained to handle his / her work on board. (Slesinger et. al, 2012) Otherwise, this may have a negative impact on the control of the vessel or safety of navigation. To prevent crew failures, navigation training may also include training on ship simulators. (Kalina & Piala, 2011) These ship simulators are being used to a considerable extent, in particular to prevent real-time malfunctions. Simulators can simulate almost real navigation in virtual form. This allows training of shipboard crew members without collisions, injures, damaging or destroying vessels. Besides that, they acquire and improve their skills and experience. (Jurkovic et. al, 2017)

One of the main disadvantages of ship simulators are the acquisition costs. This is primarily about initial investments or investments to improve the expansion of already existing simulators. (Cisco & Kliestik, 2006) Compared to practical training on board, ship simulators can effectively save money for shipping companies. The institutions using marine simulators can thus train trained crew members. However, before the implementation of the ship simulator in the training process, it is necessary to know the IWT requirements. (Kutchera et al, 2018)

2. Identification of user requirements for navigation simulators

In the training of ship crew members, it is necessary to continuously increase the demands for a qualified training and training process. (Gajarsky, 2017) At present, there are many shipping companies that recruit and employ people who have almost no qualifications or appropriate education or practical training. (Grobarcikova & Sosedova, 2016) This is due to cheap labor, especially from eastern countries, and the associated wage bill savings. Unqualified personnel often imply damage to health or property. Ship simulators are currently very often used in training, in some countries more, but in others less. It is therefore necessary to identify the requirements of potential and current users for the functional range of simulators. (Kampf et al, 2016) Based on the survey of the organization (training, shipping companies) we have collected and determined requirements for ship simulators.

Table 1: Availability and type of simulator

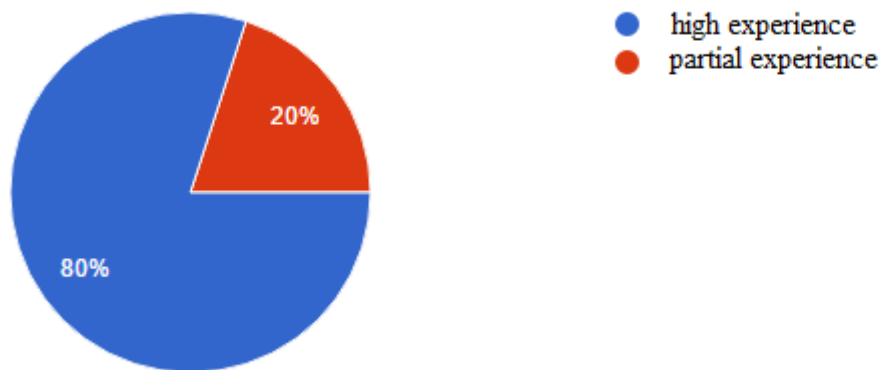
Availability and type of simulator in the IWT	Relative frequency
Ship simulator with direct use for ship crew training	80 %
Ship simulator designed for educational purposes	60 %
Scientific research on ship simulators	80 %

Source: author

The survey shows that 80 % of surveyed respondents own a ship simulator. The simulator is mainly used for training of the crew. About 80 % of institution use the ship simulator for scientific research activities. More than half (60 %) of the respondents used the simulator for education purposes.

The survey also sought to find out what kind of practical skills have the users with simulator.

Figure 1: Experience with ship simulator

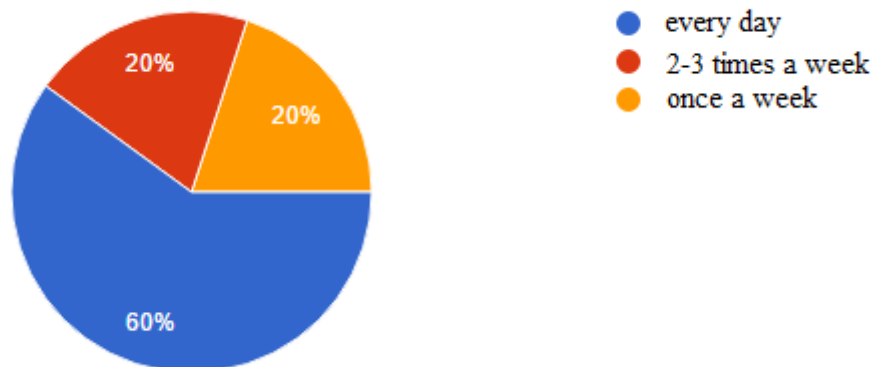


Source: author

Users who own simulators have 80 % experience of using the simulator at a high level. It can be inferred that the use of simulators is their priority. The remaining 20 % have some experience with using the simulator. We can assume that the simulator is not fully exploited.

The timeline of the ship simulator use by the institution in the IWT sector can be seen in Figure 2.

Figure 2: Timeline of the using ship simulator



Source: author

The survey results show that ship simulator uses 60 % of users every day. A further 20 % of users use the ship simulator two to three times a week, and the remaining 20 % use the ship simulator once a week.

The subject of the survey was also to find out what type of simulator (inland, marine, combined) is currently using.

Table 2: Type of ship simulator

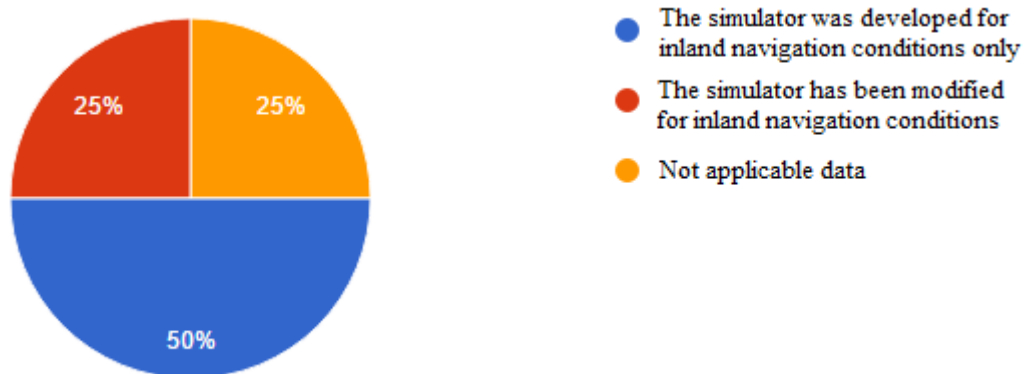
Type of ship simulator	Relative frequency
Inland ship simulator	60 %
Marine ship simulator	60 %
Combined simulator	40 %

Source: author

The survey found that 60 % of institutions own a simulator for inland navigation. Equivalent representation of the abilities has a simulator for marine navigation. 40 % of users owned a simulator designed for both modes. It can simulate the conditions for both inland and marine navigation.

The next stage of the survey found that the simulator they use is exclusively designed to simulate inland navigation or can be adapted to maritime conditions.

Figure 3: Adaptability of the simulator



Source: author

The results show that 50 % of institutions use a simulator exclusively designed for inland navigation conditions with all the parameters characteristic of simulation in this area. 25 % simulators were modified from a simulator that was designed for another type of navigation. That means that the original simulator was for marine navigation and its technical and software requirements were modified to simulate inland navigation. The remaining 25 % did not have relevant information.

Navigation devices are also an essential part of the vessel. For realistic reflection of real environment, it is necessary to equip simulator with all navigation devices. (Jurkovic & David, 2015)

Table 3: Simulator navigation equipment

Navigation device	Relative frequency
ECDIS	40 %
RADAR	40 %
GPS	20 %
AIS	40 %
Combination of above	100 %
Simulator for navigation and manoeuvring in coastal waters	60 %
GMDSS	40 %

Source: author

Survey results found that everyone has a simulator that uses all basic navigation equipment. In terms of physical simulation, simulators reflect the following environment (Table 4).

Table 4: Simulation of physical patterns

Physical pattern	Relative frequency
Current in artificial channel	80 %
Current in the natural channel	80 %
Navigation in the forage sections	60 %
Rain	100 %
Fog	100 %
Snow	0 %
Wind	0 %
Waves	80 %

Source: author

Based on the survey, we found that the simulator's greatest importance is simulating navigation in fog and rain. The second most common simulation is simulation in the artificial canal and natural river channel. We can assume that the simulator creates a number of important physical operations to simulate inland navigation and strongly influences the control of the ship/vessel. (Lebkowski, 2018) An important part of the simulation on the simulators, especially inland, is navigation through the forage sections. This is a very important part of simulation, especially because of the difficulty of navigation that can occur in these sections. Wave navigation simulation is especially relevant for marine navigation. (Skrucany & Gnap, 2014)

3. Conclusion

The results are a bit distorted and the verifiable value is not at a sufficiently high and precise level. This is mainly due to the small number of institutions in the IWT sector using ship simulators in the education process or training of ship crews. From the survey results, we can conclude that all organizations and European institutions that have a ship simulator have set parameters to meet the growing demands to obtain the most advanced and accurate version of the ship simulator. In the process of simulator development, it is important to achieve the maximum resemblance of the simulator with the real vessel. This reflects the degree of simulation quality.

The use of ship simulators is a great prerequisite for streamlining the education and training of ship crews. In the future, ship simulators should be an indispensable part of practical training and should be conducive to raising high-level professionals.

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21-ST CENTURY LOGISTICS – TIME FOR RESPONSIBLE BUSINESS AND SUSTAINABLE DEVELOPMENT IN A GLOBAL CONCEPT

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Abstract. Global problems cause constant changes in the economy, and as a result - the conditions and rules of the functioning of enterprises change as well. In the face of serious threats, it is very important to be aware of the effects of the certain business behavior which allows to look at the management of business entities not only through the prism of economic law, but also from the point of view of social aspects of human life and the functioning of the natural environment. The direction of development of the global economy of the 21st century can be changed by taking the course of sustainable development and spreading the idea of corporate social responsibility that will gradually and systematically rebuild ecosystems, return to life in harmony with nature and thus help to survive and develop next generations. The aim of the article is to analyze the aspects of sustainable development and social responsibility of modern enterprises in the area of logistics in a global perspective. The article presents the importance of sustainable and responsible logistics. Moreover, solutions in the area of logistics have been indicated, which contribute to the balancing of business development and management. The purpose of the work was realized on the basement of the quoted interpretations of the subject matter in the conducted study of literature.

Keywords: logistics, sustainable development, responsible business, globalization, management

JEL Classification: L91, Q56, R41

1. Introduction

The 21st century is specified as the era of information and common communication, consumerism or knowledge-based economy. It is also the period of the revolution of sustainable development, which over time conquers all areas of socio-economic life.

Business reality becomes more and more complicated over time. Uncertainty, changeability and complexity of the environment, risk, crisis, unstable economic situation, globalization - these are only selected phenomena confirming this fact. Global problems cause constant changes in the economy, and as a result - the conditions and rules of the functioning of enterprises change as well (Nogalski & Ronkowski, 2007). The direction of development of the global economy of the XXI century can be changed by taking the course of sustainable development and spreading the idea of corporate social responsibility that will gradually and systematically rebuild ecosystems, return to life in harmony with nature and thus help to survive and develop next generations.

The article presents the conviction that as a lever and a way for economic development, logistics of the 21st century has a chance to become one of the most important areas of the economy in which the concept of sustainable development and the idea of social responsibility of business play an increasingly important role. The aim of the article is to analyze the aspects of sustainable development and social responsibility of modern enterprises in the area of logistics in a global perspective. The purpose of the work was realized on the basement on the quoted interpretations of the subject matter in the conducted study of literature.

2. A sustainable and responsible business in a global perspective

"Whether the company is sustainable determines how it deals with its the worst area."
Grant, 2010

The words of an expert in the field of sustainable marketing and innovation in global perspective, Grant (2010) cited above, draw attention to the important and breakthrough idea of sustainable development, in this case in particular the sustainable development of organizations and entities creating broadly understood business sphere.

Sustainable development is based on two crucial concepts: the concept of basic needs (in particular the basic needs of the poorest) and the idea of limited capabilities (imposed capacity of the environment to meet the needs of present and future generations by the state of technology and social organizations). Borowiecki and Rojek (2011) refer to sustainable development as *"the process of changes in which resource exploitation, directions of investments, directions of technical progress and institutional changes remain in harmony and keep the ability to meet human needs and aspirations on an ongoing basis and in the future."* The importance of the analyzed concept is underlined by Pachniak -Radzińska, director of business development at global company DB Schenker Logistics (2014): *"sustainable development has no alternative"*.

Sustainable development is a common business goal, as well as the goal of the other participants in economic and social life (Gond et al., 2016). The implementation of the idea of sustainable development in the sphere of economic activity consists in the search for and implementation of such solutions that would be simultaneously substantiated and valuable economically, socially responsible and environmentally friendly (De Brucker et al., 2013). In the simplest terms, in sustainable business it is necessary to *"realize activities to make the company better"* (Ingaldi, 2015). As Newenham-Kahindi (2015) argues that *"the promotion of best practices in the field of sustainability has been recognized by the member corporations as one of the main pillars of organization's activity."* The essence of sustainable development of enterprises is based on the following principles: greening, integrity and prevention, cooperation in the field of environmental protection, economization, social participation, intra- and intergenerational justice, the rules of law and implementation of the rule that *"the polluter pays"* (Scherer et al., 2013). Based on the idea of sustainable development, the concept of Corporate Responsibility was created.

Corporate Responsibility (CR) is the idea of sustainable development and responsible business. There are many proposals for a theoretical approach to the analyzed sphere. The World Business Council for Sustainable Development (2018) defines the CR as *"a commitment of business to contribute to sustainable development through collaboration with employees, their families, the local community and society as a whole to raise the quality of life of all citizens."* Both CR, as well as the CSR concepts, broaden the business analysis that is mainly based on the economic calculation, with the social and environmental aspects relevant from the

point of view of the company's profit on the widest scale, preferably in a global perspective (Aguinis & Glavas, 2012).

CSR due to the lack of unambiguous translation, this term can be interpreted as: business responsibility, corporate social responsibility, corporate responsibility, corporate social responsibility. According to the assumptions of the idea, the socially responsible company implements the policy of balanced economic development, aimed at achieving a balance between the effectiveness and profitability of the conducted activity and the social interest (Kadłubek, 2015). The foundation of social responsibility is the organizational order built on the basis of activities undertaken within the following areas: human rights, work practices, environment, fair operating practices, consumer issues, social involvement, development of the local and even global community (Cheng et al., 2014).

Summing up, both the issues of sustainable development, CR and CSR include aspects that are particularly important not only in the global perspective from the point of view of the future of humanity, but also the future of the economy and the environment.

3. The importance of sustainable and socially responsible logistics in the modern economy

"Logistics make the world go round, at least in the global marketplace".
Wharton Global Forum, 2018

Modern economy demands the entities representing the logistics sector, considered a carrier system or bloodstream of economy in the local and global perspective, in particular regarding efficiency, effectiveness, minimization of costs, flexibility, cooperation, information flow, innovation and security. These conditions apply to various aspects, including the maintenance of the principles of sustainable development (Dyma, 2015). Nerć-Pełka and Wysocka (2012) mention a few modern solutions having a significant impact on the logistics sector, which combines *"not only that they simplify and accelerate the process of moving goods and inform the customer about the status of the shipment, but above all that they serve to meet the needs of both present and future generations, with a view to the natural environment"*. This idea of a sustainable logistic industry includes, among others:

- ICT technologies,
- Intelligent Transportation Systems,
- GPS,
- Internet applications,
- Electronic Data Interchange (EDI).

Holden et al. (2016) emphasize that *"both transport and logistics must be developed carefully, taking into account not only our own benefits, but also others around us as well as the needs of the broadly understood natural environment."* Therefore, a balanced approach to logistics should be referred first of all to awareness of the effects of technology and logistic processes on the social, natural and spatial environment. Sustainable logistics means (Nerć-Pełka & Wysocka, 2012):

- *"searching for solutions that reduce the harmfulness of logistic processes to the environment,*

- *striving to minimize the use of time, space and energy necessary to carry out the processes (assuming the maximization of the effects of using these resources),*
- *continuous minimization of systematic deletion of negative effects of implementation logistic processes,*
- *constant readiness for experiments and innovation in the scope of deliveries and packaging,*
- *cooperation between participants in the supply chain,*
- *using integrated IT systems,*
- *global scope of activity,*
- *strategic, partner relations with suppliers and recipients,*
- *planning and implementation of strategic concepts,*
- *adaptation of the supplier to the changing needs and expectations of the customer,*
- *focusing on minimalization of delivery time and striving for greater frequency, flexibility and reliability of deliveries.”*

On the foundations of the concept of sustainable logistics, Logistics Social Responsibility was established, which focuses on "*sustainable purchases, transport or storage, as well as on ethical criteria, human rights, safety and society*" (Rudnicka, 2011). In the simplest term, the aim of socially responsible logistics is to reduce energy consumption, reduce emissions during production, storage and transport, which in turn leads to a decrease in costs incurred by customers and contributes to the protection of the natural environment (Foerstl et al., 2015).

Issues related to the correct shaping of the impact on the natural environment and its protection constitute a huge, extremely important challenge for the logistics industry. The concept of sustainable development has a chance to emerge first of all in enterprises in which logistics is perceived as a long-term strategic imperative. There is also no doubt that ecological and sustainable logistics is an extremely important decision-making factor influencing the decisions of both companies and their customers.

4. Sustainable development and sustainable logistics – global perspectives

„...while the trends of increased globalization (...) have assisted logistics and supply chain management activities, they have also been detrimental from a sustainability perspective”.

Grant et al., 2015

All kinds of relationships and business connections in the modern world are becoming more and more complex. The nature of current global socio-economic challenges means that the implementation of the basic principles of sustainable development in business, in particular in the logistics field, will certainly not be easy. Nevertheless, recourse to the principles of sustainable development and corporate social responsibility is declared by more and more enterprises (Halme & Korpela, 2014). Sustainable development and corporate social responsibility are important concepts for all entities operating on the market. The interest in the discussed problem is increasing both in scientific areas, in the political and government spheres, and above all in the business world. According to Scherer et al. (2013) "*contemporary directions, trends and changes in the environment indicate that social responsibility will play*

an increasingly important role in creating the economic reality." In addition, due to the increasingly frequent practices of enterprises consisting in developing strategies that take into account environmentally-friendly, one may assume that interest in functional CSR standards will continue to grow, and individual initiatives will gain in importance over time.

The growing awareness of the limitations of business resources is confirmed by a report prepared by Ernst & Young (2018) based on research conducted among directors and the so-called opinion leaders. This report shows that the concept of sustainable development is getting more and more popular among both large and medium-sized companies. The problem, however, lies in the effectiveness of actions taken for sustainable development limited by internal systems. In addition, the significantly limited possibilities of measuring, observing and optimizing the impact on the balancing of development, both on a local scale and on a global scale, make enterprises approach this issue without conviction (Levy et.al, 2016). Very often the meaning of *"the voice of business on the future of our planet"* is emphasized in his statements by Buckley and Strange (2015). The President of the Responsible Business Forum also claims that in today's economy, the most important factors that can be expected to increase company's competitiveness are those operating in the logistics industry, which will respond to challenges related to corporate social responsibility at the earliest.

Cheng et al. (2014) emphasize that *"CSR, or corporate social responsibility, in the logistics industry is not just a slogan that does not lead to much. Companies are increasingly planning long-term projects, counting on market favor."* The proecological attitude in the logistics industry (the so-called eco-attitude) is increasingly gaining importance. Zhang et al (2014) clearly indicate that the role of ecological projects in the area of logistic services is systematically increasing, and the tendency to use them in practice is growing. The main environmental projects focus on such aspects as:

- resignation from road transport exclusively to intermodal transport,
- eco-driving training,
- modernization of the fleet,
- greener vehicles,
- attaching importance to the limitation of empty runs.

For the logistics industry characteristic are great opportunities of the so-called eco-functioning. This is indicated both by the theoretical premises presented in the article as well as examples from economic practice.

Long-term and, most importantly, an effective change towards sustainable development requires above all the adoption, especially in the business environment, of a proactive attitude to support socio-economic changes (Burych, 2015). Business representatives emphasize that contrary to the widely held view, long-term plans require immediate action. The coming years will show whether the presented view has a chance to influence the decisions of enterprises regarding sustainable management, both on a local and global scale.

5. Conclusion

The article presents the most important aspects of sustainable development as a new way to invest in the future. The study pays special attention to the issue of sustainable and socially responsible logistics as a lever for economic development in a global perspective.

The paper presents views not only of the world of science, but also practitioners of the field, often creators or co-creators of companies' successes in the field of sustainable development policy, managers, CSR specialists. Due the results from the literature research carried out by the authors, sustainable development is one of the most significant imperatives of shaping the modern concept of logistics, the logistics of the 21st century.

To sum up the reflection should be recalled on the complexity of the issues raised in the article, which in turn implies the need to undertake further scientific inquiries. At this point it is worth emphasizing that the unbalanced nature of modern development poses a serious threat to people, but it must be remembered that not every economic development leads to sustainable development. Ecology is one of the biggest challenges facing both contemporary logistics and the logistics of the future.

On the basis of the considerations made, it can be stated that the issue of sustainable development in relation to the sphere of logistics is an important and, at the same time, current direction of research undertaken today. The complexity and multifaceted nature of the issues raised causes that this article should be treated as a contribution to further research and not as a comprehensive analysis of the problem.

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BENEFITS OF SMART SERVICES IN MANUFACTURING COMPANIES IN THE CONTEXT OF THE GLOBAL AREA

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Abstract. In today's globalized environment it is not sufficient for manufacturers to only provide tangible products to their clients. Therefore, many manufacturing companies also deliver services and integrated solutions nowadays. Moreover, they focus on servitization by adopting 'smart services', which enable by connected product-service systems data exchange between their customers and the service providers. The purpose of this paper is to investigate which benefits of smart services are the most important for small and medium manufacturing companies. To address the research objective, a qualitative multi-case study was conducted among seven Czech electrotechnical SMEs, which have already started with smart service development. All of the companies included in the research are from the same industry – electrotechnical producers. Although they operate in one industry, they provide a wide range of products and services to their customers with varying degrees of service orientation. The empirical data consists of in-depth interviews with owners or with experienced senior managers in the case organizations. The interviews were carried out between April 2017 and January 2018. The findings indicate the main benefits for manufacturers and also for customers. The study is unique in emphasizing the problems of smart services in SMEs in the Czech Republic, where the industrial sector is still dominant in comparison to other European countries.

Keywords: smart services, manufacturing companies, smart servitization, global area, Czech Republic

JEL Classification: L8

1. Introduction

Globalization is accompanied by changes in technology, the liberalization of goods and services and greater mobility. It is about being present on the global market and develop new competitive strategies, where a strategic basis for understanding is crucial. Therefore, many manufacturers transform from industrial goods toward the provision of services. Moreover, they also add smart services to their service offerings. Smart service solutions in manufacturing companies include both hardware solutions as well as an essential service component in the current global area. Smart services can be seen as one of the enablers of servitization (Grubic & Peppard, 2016; Neu & Brown, 2008; Oliva & Kallenberg, 2003). Servitization is transformational process of shifting from a product-centric business model and logic to a service-centric approach (Kowalkowski et al., 2017). Smart services offer many benefits for both manufacturing companies as service providers and as well as for their customers. Moreover, smart services in manufacturing companies can improve value creation and profitability for both the business and customers. Benefits of smart services have been studied in some researches, but not so many studies have focused on SMEs and on one particular industry.

To fill the gap, the study presented in this paper explores current situation in the Czech electrotechnical SMEs and their attitudes to benefits from smart service provision. A qualitative multi-case study was conducted among seven Czech electrotechnical SMEs, which have already started with smart service development. The aim of the paper is to investigate which benefits of smart services are the most important for SMEs. According to the findings in the paper, the main benefits of smart service provision for manufacturers and their customers are from four main fields: differentiation from competition, product maintenance / repairs, reliability and safety of products, reducing costs.

2. Literature review

2.1 Smart services in manufacturing

Allmendinger & Lombreglia (2005) mentioned that “Soon, it will not be enough for a company to offer services; it will have to provide ‘smart services’.” Klein (2017) describes smart services as: “Smart services are technologically-mediated services actively delivered by the provider through accessing a remote asset and exchanging data through built-in control and/or feedback devices”. Beverungen et al. (2017) describe smart service as the application of specialized competences, through deeds, processes, and performances that are enabled by smart products.

In the literature, the concept of smart services could be named also differently, such as: diagnostics and prognostics, new digital technologies, remote diagnostics, remote monitoring technology or teleservices (Grubic, 2014). Examples of remote monitoring technology supporting servitized strategy are in many various industries, e.g. aerospace, machine tools, computers and telecommunication networks, transport and telecommunication networks, medical, industrial equipment, marine, industrial equipment, oil and gas and energy (Grubic, 2014).

2.2 Benefits of smart services

Smart services provide a huge range of benefits for manufacturing companies as service providers and also for their customers in the global context. Küssel et al. (2000) state that smart services are more competitive, offer new sources of revenue, higher margins, and considerable cost savings. Regarding to monetary benefits, smart services provide also a variety of non-monetary benefits. Some non-monetary benefits are seen in the opportunity to learn more from customers and their product using, establishing a basis for research and development, sales or marketing activities (Laine et al., 2010). Consequently, Wunderlich et al. (2015) emphasize smart services are gaining a considerable strategic importance in B2B and B2C contexts. Porter & Heppelmann (2014) summarize the importance of smart services: “[They] offer exponentially expanding opportunities for new functionality, far greater reliability, much higher product utilization, and capabilities that cut across and transcend traditional product boundaries”. Benchmarks present that companies offering smart services, get more than 50% of revenue and 60% of margins from services than from product sales (Allmendinger & Lombreglia, 2005). Smart services and their possibility to remotely fix the products are very beneficial especially for small companies. They enable to decrease the costs and effort of their technician (Kamp et al., 2017). In the global context, by using smart services companies could save a lot of money, because they could repair many products remotely and thus eliminate travel and labor costs and time of their employees. Moreover, they can easily share information about products with customers and others, such as partners, suppliers across the whole world.

Customers can gain many benefits from smart services, such as “the value of removing unpleasant surprises from their lives” (Allmendinger & Lombreglia, 2005). The benefits could be realized in the form of reduction of machine downtimes, optimized scheduling of maintenance, more safety, improved information flow and transparency as well as a reduction of labor costs and creation of a better work environment (Lee et al., 2014). According to literature reviewed, remote monitoring technology benefits the customer mainly through minimization of downtime and transfer of risks to the manufacturer (Grubic, 2014). Table 1 summarizes the findings about the benefits of remote monitoring technology for customers and manufacturers (Grubic, 2014).

Table 1: Benefits of remote monitoring technology

Paper	Benefits for the customer (C) and/or manufacturer (M).
1. Kiissel <i>et al.</i> (2000)	Saves time in the error diagnosis and repair (C).
2. Allmendinger & Lombreglia (2005)	Removing unpleasant surprises (C), makes performance of products and behaviors of customers visible (M).
3. Jonsson & Holmstrom (2005)	Enables comparison between different machines and settings which helps in making better and more reliable predictions of the remaining useful life, informs improvement and/or new product development initiatives (M).
4. Jonsson <i>et al.</i> (2008)	Minimization of operational hold-ups (C), getting direct access to operational data which reduces likelihood of receiving potentially erroneous and/or misleading incident descriptions from the customer (M).
5. Brax & Jonsson (2009)	Risk reduction and transfer of risks to the manufacturer (C), enables remote field services (M).
6. Gremyr <i>et al.</i> (2010)	Taking responsibility and creating security for customers (C).
7. Laine <i>et al.</i> (2010)	Enables the customers to optimize the usage and the maintenance of their machinery (C), reduces the cost of technical service and serves as platform to learn about customers and their business and about the environment that surrounds their machinery (M).
8. Grubic <i>et al.</i> (2011)	Improves performance and availability of products, improves maintenance efficiency and effectiveness, and differentiates from competitors' offers (M).
9. Westergren (2011)	Enables creation of a historical database of installed base which, in turn, helps the manufacturer to gain better understanding of customers and their business as well as of their products in the field (M).

Source: Grubic (2014)

3. Methods

Theoretical understanding of smart services is still almost at the beginning. Afterward, Grubic & Peppard (2016) conclude that there is a lack of understanding how smart services are used by manufacturing companies. Wunderlich *et al.* (2015) state that “*Despite the accelerating development of these smart services, academic research is still in its infancy. We see the need to further explore the effect that smart service has on organizations, customers and the evolving service landscape*”. Also Grubic and Jennions (2017) mention that the research in this field is predominately technology oriented and lacking the wider assessment of the technology’s value creation potential in a business context. To know more about smart services in manufacturing,

a qualitative research was conducted as a multi-case study among seven SMEs electrotechnical companies, South Moravian Region. The research investigated how smart services are provided by current manufacturing SMEs. The in-depth interviews explored following aspects: type of smart products and smart services, the length and way of smart service provision, customer perception of smart services, the reasons for starting with smart service provision, the benefits gained from smart services, barriers connected to smart service provision, gathering and using the data gained from smart services, specifics of Czech industrial market, collaboration with other firms and “learnings” for other firms which want to start with smart services. The part of the study focusing benefits gained from smart services was used for this paper.

All the case companies in the qualitative research were SMEs from the same industry – electrotechnical producers and were selected based on purposive sampling. They operate in one industry, but they provide a wide range of products and services to their customers with varying degrees of service orientation. All case companies have been implementing smart services to their companies in different level and range. Case companies mostly provided the following smart services: remote monitoring, control and diagnostics, remote repairs, preventive and predictive maintenance. The different level and wide range of smart services provides valuable insights into smart services in SMEs in different contexts. It was the aim to select companies from the same industry, but in different maturity phases in their service transformation journey. The details of the case companies are described in Table 2.

Table 2: Case company description

Firm	Respondent	Number of employees	The length of smart service provision in years
A	Owner	15	1
B	Product manager	50	1
C	Owner	10	2
D	Owner	4	2
E	Owner	25	2
F	Owner	148	2
G	Product Manager	170	More than 2

Source: Author

The qualitative research consists of in-depth interviews with owners or with experienced senior managers in the selected organizations. The interviews were carried out from April 2017 to January 2018. Each interview lasted from 50 to 100 minutes and was performed on site, which gave a chance to tour each company and get a sense of the work environment. All interviews were recorded and transcribed. After selecting the case companies, semi-structured interviews with predefined themes were conducted. The interview consisted of open-ended questions, which were based on the literature review. All interviews were done face-to-face. Open coding was used to organize the data and convert them to discrete thematic blocks. As qualitative case research is sensitive to researchers’ subjective interpretations, some checks and peer debriefing to reduce researcher bias were conducted to increase the objectivity of the study.

4. Results

The analysis of the section related to possible benefits of smart service provision identified two research questions (RQ), which were formulated in two following statements RQ1 and RQ2.

RQ1: Which benefits have you realized for your own business by providing smart services?

RQ2: Which benefits have you realized for your customers by providing smart services?

4.1 Benefits of smart services for SMEs

The benefits by smart service provision have been realized by respondents are the following ones:

- Differentiate from competition (4x)
- Provide faster, cheaper or easier product maintenance and repairs (3x)
- Gather valuable information (e.g. for service development) (2x)
- Increase reliability of products (2x)
- Realize higher prices (1x)

4.2 Benefits of smart services for customers of SMEs

The benefits for customers by proving smart services have been realized by seven respondents are the following ones:

- Increase reliability and safety of products (3x)
- Get faster product maintenance and repairs (e.g. remotely connected) (3x)
- Reduce costs (e.g. for transport, repairs) (3x)
- Gather valuable information (e.g. 24/7 control of product operations, new functions of products) (2x)
- Get comfort solution (1x)

The numbers in the brackets shows the number of respondents who mentioned the particular benefit.

5. Discussion

The focus of this paper has been an investigation of benefits connected to smart service provision for manufacturers and for their customers. The qualitative research was held in seven electrotechnical companies in the Czech Republic, South Moravian Region. Two research questions were formulated in this paper to discover which benefits are the most important for manufacturers from SMEs and for their customers.

5.1 Theoretical Implications

The research reveals the benefits from smart service provision in SMEs. The most mentioned benefits by manufacturers for their company are differentiation from competition and provision of faster, cheaper or easier product maintenance / repairs. The most mentioned benefits by manufacturers for their customers are increasing of reliability and safety of products, faster product maintenance / repairs and reducing costs. To sum up, the most important benefits according to respondents from seven case companies are in relation to Table 1 mentioned above and from four main following areas:

- differentiation from competition,
- product maintenance / repairs,
- reliability and safety of products,

- reducing costs.

The majority of research focuses on the general benefits of smart service provision for service providers or the impact, both positive and negative, from the view of the customer (Grubic et al., 2011; Grubic, 2014). For instance, Wunderlich et al. (2015) focus on perceived embeddedness of end customers and their concerns regarding risk, concluding that companies need to adapt their business models as well as organization due to changed behaviors of consumers (Wunderlich et al., 2015).

In the context of global area, it is the biggest potential of remote monitoring technology rests in preventing machinery breakdown, hence using the technology in proactive way (Grubic, 2014). The potential to act proactively in stopping or preventing breakdowns, means manufacturers are able to deliver more attractive value propositions to their customers. The transfer of risks and reduction of surprises that accompany this are such value propositions. The major risks here are non-availability of the product and its suboptimal performance. Allmendinger & Lombreglia (2005) state that services enabled by remote monitoring technology create very appealing value for customers, i.e. value of removing unpleasant surprise from their business. Similar is observed by Brax & Jonsson (2009) who concluded that customers emphasize risk reduction and transfer of risks to the manufacturer, mainly in the form of technological and operational risks, rather than cost savings.

5.2 Managerial Implications

Nevertheless, all case companies from the qualitative research agreed that smart services are the future of manufacturing. In some industries, smart services are still perceived as a possible competitive advantage, but in a couple of years, smart services will be a necessity. It is likely that sustainable competitive advantage may be achieved through complex combinations of interconnected products and services found within manufacturers, customers and intermediaries, if needed. One of the findings from the study conducted by Grubic et al. (2011) reveals that more than half of companies they surveyed characterizes capability enabled by remote monitoring technology as very relevant for their future success and competitiveness.

The literature revealed the following three benefits: cost reduction, insight into customers' needs and feedback for R&D that enables learning and knowledge creation (Grubic, 2014). Some non-monetary benefits are seen in the opportunity to learn more from customers and their product using, establishing a basis for research and development, sales or marketing activities (Laine et al., 2010).

It is still not too clear how remote monitoring technology can be used to gain insight into customers' needs and how this data can be used in R&D and what factors are essential for this. However, in the context of global area, if the problem could not be solved, a service technician was dispatched to the customer's site. When the first products with internet connection became available, the company's service quickly realized the benefits that could be gained from them (Klein, 2017). Therefore, manufacturers should use all possible benefits of smart service provision and focus on better promotion of these services to their customers and do better publicity in general (e.g. conferences, workshops, newspapers, magazines, face-to-face meetings).

6. Conclusion

Security, competitiveness and strategic view are core priorities of manufacturing companies with smart service offering in the period of globalization. The paper was focused on the benefits of smart services, which are the most important for SMEs. By reflecting on the findings of the research in seven electrotechnical SMEs, respondents identified four broad areas that are connected to benefits. The areas are the following ones: differentiation from competition, product maintenance / repairs, reliability and safety of products, reducing costs. In respect to the findings from the research and also examples found in the literature clearly point to the fact that manufacturers are still struggling to articulate benefits from smart services that would be appealing to them and to customers. More research is necessary to understand and address this problem. Therefore, future studies should investigate further how to process the benefits of smart services. The next research could be extended to other companies (with smart services) from other industries.

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TOURISM AND SOCIAL NETWORKING IN CUSTOMER COMMUNICATION

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Abstract. This article deals with the current use of communication media of travel agencies and hotels. It focuses on the use of social networks in the globalisation process. Social networks are increasingly used as carriers of marketing information to the customer and the general public. They have an irreplaceable position in the process of globalisation. Their main benefit is that they are not geographically limited. Another benefit is that they are maintained up-to-date in real time. This allows the option to focus on selected regions and a specific group of customers, based on their cultural, social and ethnic preferences and status. For companies, social media also benefit from low cost, and the ability to measure their effect. All this is very beneficial for tourism. The use of this new marketing tool can make a significant contribution to hotels and travel agencies. Interestingly, many tourism companies know these benefits but do not use them to the extent that they could. This can have a negative impact due to the globalisation of this market. The article looks at the current situation on the tourism and hotel market in the Czech Republic, compared with the situation abroad. It monitors the current use of social networks in the communication of hotels and travel agencies and looks for connections with the use of digital media in other areas of the industry. At the same time, attention is paid to the more detailed use of digital marketing by a selected travel agency in the Czech Republic.

Keywords: tourism, social networks, hotels, travel agencies, marketing

JEL Classification: M310, M15, L83, C8

1. Introduction

Tourism has been on the rise in recent years. With developments in Western society, interest in travel and accommodation is growing, especially among the middle classes. This includes an increase in the impact of media content related to tourism. In 1985, (Feifer, 1985). created the term “post-tourism” to highlight a new and symbolically effortless way of travelling. When the consumer becomes a part of mass tourism and deliberately travels according to media images rather than looking for authentic places. (Jansson, 2018) and (Garcia & Pascual, 2017). This is linked to interest in renowned destinations and hotels, which has a global overlap. As stated by (Kennelly & Toohey, 2016; Javid & Katircioglu, 2017): Globalisation has a direct relationship with tourism. At the same time, it is considered one of the positive aspects of globalisation which highlights local attractions. This industry is one of the factors facilitating globalisation and acts as one of the internal flows of the world economy alongside the flow of capital from the centre to the periphery. In other words: “Tourism is a rational and powerful reason for

globalisation and the way to globalisation is possible through tourism.” The Internet also has an impact on this because of, among other things, the rapid transfer of information.

Tourism is highly fragmented and has created a situation of “hyper- competition”. This leads to the use of social media by individual brands. They seek to increase customer engagement at cognitive, affective and behavioural levels, with the main goal of encouraging higher customer retention. Van Dijk, et al. (2011). How brands can use social media to increase the engagement of their customers is a key issue in the field of hypercompetitive tourism. (Harrigan et al., 2017) However, it is also a trend for other markets (Klepek, 2016; Capatina, et al. 2018; Hew, et al., 2018).

Globalisation, strong competition, changes in visitor behaviour and the fragmented nature of the tourism industry have resulted in exceptional changes in the management and marketing of tourist destinations as well as in the experience of visitors. For tourist destinations, a responsible attitude to tourism development is now crucial. As reported by (Marakova et al., 2016). Furthermore, minimising costs and saving time are the most important benefits for e-marketing. In addition, information on promotional offers is the most important type of information provided by e-marketing. Social media and e-mail marketing are common tools for e-marketing among travel agencies (Al-Weshah, 2018; Marco, et al. 2018; Zhang & Zhang, 2018)

This article examines how digital marketing tools are used by businesses in the tourism industry. It is based on research conducted in the Czech Republic in the spring of 2018, which includes 255 questionnaires as well as links to previous research on this issue in the Czech Republic. At the same time it monitors the selected travel agency and its use of digital marketing tools. The aim of this article is to determine how social media is mainly used in the tourism industry in the Czech Republic. It also focuses in detail on the use of websites by a selected travel agency, including an assessment of conversion ratios and user access tracking. Websites according to this research are still the most widely used communication channel in the tourism industry in the Czech Republic. This may have a negative impact on the globalisation of tourism for businesses in the Czech Republic, as in other countries digital marketing tools used are more sophisticated.

2. Material and Methods

The following research questions were asked in the article:

RQ1: How important is traditional and digital marketing for tourism in the Czech Republic?
RQ2: How do tourism businesses approach online communities? RQ3: How are websites used in the tourism industry in the Czech Republic?

The article used a questionnaire survey. This survey was carried out by the Faculty of Economics and Administration at the University of Pardubice. It focused on the use of communication tools and social networks in the marketing of tourism businesses. It was descriptive research using a judicious selection of respondents. The methodology of this article follows previous studies (Harrigan & Miles, 2014). Most questions were scalable and used a typical five-step Likert scale. The questionnaire itself had been tested in previous studies (Harrigan & Miles, 2014), (Bachmann & Kantorova, 2016). (Kantorova et al., 2015) and partly adapted to correspond to the character of the respondent and the conditions in which they operate. The basic set includes 850 travel agencies registered in 2017 in the Czech Republic.

At the same time 9,007 accommodation facilities registered in 2017 according to the Czech Statistical Office.

A pre-test was performed and the questionnaire modified. Approximately 2,000 respondents were then randomly selected and sent a link by e-mail or via social networks. The questionnaire had a total of 44 questions, most of which were mainly closed questions, some with the option of completing another answer. The survey was conducted in March 2018. Subsequently, 255 questionnaires were processed in the sample, which is 2.6% of the population. A correlation matrix was created. By transformation, the nominal variables were converted to dummy variables (binomial). This was achieved using the SPSS Modeler program; see Fig. 1.

Figure 1: Creating Dummy Variables Using SPSS Modeler



Source: Authors

The sample survey included 54% respondents from small companies (up to 10 employees), and medium-sized 40% respondents (up to 250 employees). 14 respondents (5.5%) were from large companies with over 250 employees. This corresponds to the distribution in the population.

3. Results

We also compare outputs of companies with up to 250 employees (SME) to compare with the 2015 survey as published.

RQ1: How important is traditional and digital marketing for tourism in the Czech Republic?

For companies with up to 250 employees, responses are spread out with a significant predominance in digital marketing, but with certain significance as well as in traditional marketing Tab. 1. They are similar to those reported by (Kantorová et al., 2015).

Table 1: Importance of traditional and digital marketing - up to 250 employees

N=241		I don't know	Unimportant	Rather unimportant	Rather important	Strongly important
Role of traditional marketing	Abs.	11	19	66	116	29
	Rel.	5%	8%	27%	48%	12%
Role of digital marketing	Abs.	0	6	20	94	121
	Rel.	0%	2%	8%	39%	50%

Source: Authors

RQ2: How do tourism businesses approach online communities?

Out of a total of 241 respondents, 98 respondents said that they do not make use of online communities, and 44 did not assess this question. This left 98 questionnaires that could be further processed, 58 of which were accommodation and catering facilities and 40 respondents were from travel agencies Tab. 2.

Table 2: How companies SME make use of online communities.

N=98	Mean	SD
We have a strategic approach to managing online communities	3.08	1.04
Other online customer communities are central to our marketing	3.07	1.14
We use communities to have conversations with our customers	3.59	1.03
We build our online communities with our customers	3.55	0.95
We use these communities to promote ourselves to customers	3.46	0.98
Customers use these communities mainly to make positive comments and reviews	3.57	1.03
Our online customer communities are central to our marketing	3.35	1.09
We participate in relevant customer-owned communities	3.12	0.96
We monitor and act on interactions between customers in these communities	3.2	1.12
Online communities are a way of engaging with our customers	3.34	0.93
These communities allow us to involve customers in product/service development	3.12	1.16
We proactively manage interactions in these communities	3.07	1.05

Source: Authors

Representatives of the SMEs also reported on how to create online communities. Communication with customers was in the first place, at 3.59. This is closely followed by the fact that customers primarily use these communities to make positive comments and reviews, and companies are building an online community with their customers at 3.55, but those showing that this is crucial for their marketing have a lower level of 3.35. The least positive comments concerned a strategic approach, interaction management, and the use of other communities. The use of social networking for promotion ranks fourth. Answers to the question “Which social media do they use?” showed that businesses most use Facebook, Instagram, YouTube and Twitter. Other social networks have been mentioned by businesses only exceptionally.

We followed the survey results of all sectors in 2015 for companies with up to 250 employees (Kantorová et al., 2015). Interestingly, for tourism businesses, the use of communities for promotion is in the 4th position (3.43 in 2015 and 3.46 year 2018). A significant difference was found only in building a community with customers where tourism shows significantly higher values of approval (2.95 in 2015 versus 3.55 in 2018). This points to interest in building a customer relationship, but there is no proper use of these communities - for example, customer involvement in both cases in product development is low (3.12 in 2018).

RQ3: How are websites used in the tourism industry in the Czech Republic?

In the question “What digital marketing tools do businesses use?” they most often said they use websites the most.

The method of use can be explored by analysing the selected travel agency. The selected travel agency meets the following conditions: the travel agency is already established on the market, it is a member of one of the travel agency associations and their own certificate “Czech Quality System of Services II Grade”.

In the selected travel agency, these aspects were examined as part of (Zahalkova, 2018): the sources of visitor arrivals (potential and existing customers) to the agency website, visitors based on gender and age, and facilities used by a given visitor to the travel agency’s web site.

At the same time, the conversion rate of these visits was examined. Most visits (78,18 %) to the travel agency's website are from a full-text search; i.e., from web browsers such as Google, Seznam, etc. (comprising 48.14%). The conversion rate for these visits is 1.43%, meaning that 1.43% of visitors sign a travel agreement. Due to the large number of visits, this conversion rate is assessed as positive. Second, the source of visits is the URL of the travel agency in question (22.75%), which suggests that these users have already visited the website of the travel agency and are automatically entering the site without a search engine. Visitors become customers at a rate of 1.57%, which is slightly higher than full-text searches. The impact of social networks as a source of visits is significantly smaller. Only a small percentage of users come from social networks (such as Facebook).

4. Discussion

When choosing holiday destinations, the Internet seems to be the main source of information for tourists with loyal tendencies. At the same time, traditional media such as the tour operator's brochures, hold high positions. A survey of 17 countries confirms that there are significant differences in the use of social media depending on each nationality (Almeida-Santana & Moreno-Gilb, 2017), (Amaro & Duarte, 2017). However, the results (Kim and Chae, 2018) indicate there is a positive association between a hotel's resources and Twitter use. (Chang et. al. 2018).

This is confirmed by the results of five-star hotels in Malaysia. They do not use the Facebook platform to its best. Hotel operators have trouble maintaining customer engagement and, above all, hotel operators in Malaysia have insufficient knowledge of how to measure engagement with customers (Hashim & Fadhil, 2017).

Similar findings have been made by our research and similarly by examining the situation in a selected travel agency. Overall, the use of social networks to communicate with customers is more common in the Czech Republic, but there is no strategic approach here. This communication does not make use of all the opportunities it offers - such as engaging customers in product development, which may lead to lower branding development, as (Harrigan et al., 2017) suggests: Brands need, among other things, to use social media to involve customers in their brand. It was found that engagement is a prerequisite for engaging with tourism brands.

This is also confirmed by research in Spain, which found that the intensity of use of social media significantly affects brand awareness. (Stojanovic et al., 2018) And from the point of view of globalisation, it can have a negative impact on brand building in the tourism market in the Czech Republic. Because they show the use of digital marketing tools, but more often they are social networks than social networks, and customers do not engage enough in interaction and do not engage strategically in their management.

The results of the research show that there is a higher use of social networks in tourism in the Czech Republic for building a community with customers compared to the results obtained from all sectors in 2015. This is positive, but in this aspect, the Czech Republic still stagnates abroad - research of small leading UK companies in 2014. In the UK, respondents placed customer engagement in product development in the 6th position. On the other hand, our research recorded this in the 8th position. In the same survey, the United Kingdom ranked highest in the issue: Online communities are a way of engaging with our customers (3.72). (Harrigan & Miles, 2014). In contrast, our research recorded only 3.34. This places the item in the 6th position. This in the context of globalisation brings a significant competitive

disadvantage for tourism in the Czech Republic compared to countries where social networks are more effectively used to build customer relationships.

5. Conclusion

Tourism has a cross-sectional character throughout the national economy and is linked to many sectors. Its activities have a positive impact on national economies. On the global tourism market, it is all about the destinations, not just individual businesses that compete to attract visitors. Therefore, this article can make a significant contribution to them, not just for individual tourism businesses. This article provides information on the current situation in the use of digital marketing tools in the tourism industry in the Czech Republic. It compares data obtained from surveys in other countries at the same time with similar research carried out in the Czech Republic across other sectors in previous years.

There are social networks that are more extensively used to transfer marketing information. In the process of globalisation they have an irreplaceable position because they are not geographically limited, they provide up-to-date information and can target individual segments of customers and the general public.

The article investigated 3 research questions: How important is traditional and digital marketing for tourism in the Czech Republic? How do travel businesses approach online communities? How are websites used in tourism in the Czech Republic used?

Research and comparison have shown that tourism companies are still using traditional marketing tools, but the use of digital marketing is predominant. Among digital tools, the most widely used are websites. In a more detailed analysis of the selected travel agency, it has been found that the site used can be fairly sophisticated in order to determine the conversion rate, the type of visitor the site visits, the type of device used to visit, and the type of customer who makes the purchase.

According to our research, social networks are used to a great extent. It's not just promotion that is at the heart of social networking. Communication with customers is in the first place, which includes creating a space for customers to express positive comments and reviews, and building an on-line community with customers at a later stage. This is a positive finding. At the same time, however, significant reserves have been identified in the use of social networks regarding the establishment of a customer relationship. Their use for product development, for example, has been relegated to last place, just like social networking strategies. Compared with research carried out in the UK and published in 2014, there is a significant lack of use of the potential of social networking in the tourism industry in the Czech Republic. These reserves are real warnings about globalisation pressures.

Marketing is a necessary part of development in the Czech Republic, which carries with it expenses not only for promotion. Small and medium-sized businesses will not engage in research and development, but they need to draw on information derived from research for their innovation so that they can continue to compete. Therefore support for research, innovation and marketing should be based on both knowledge of the economy and the destinations themselves as part of their regional marketing. This may be the subject of further research.

Customer privacy is a new challenge to businesses that utilise digital marketing and want to build customer relationships. It entails increased demands on data management for personalising communication activities. It is perhaps another area of research as these claims are reflected in the use of social networks.

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GLOBAL MARKET OF INDUSTRIAL ROBOTS: TRENDS AND PROSPECTS

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Abstract. The article deals with the analysis of trends in the world market of industrial robots, the distribution of multipurpose industrial robots in various countries and development of the global Industry 4.0. The purpose of the article is to define a competitiveness of countries in the world market of industrial robots, to make the forecast of global demand and production and to estimate the readiness of the selected countries for development of new industrial revolution. Methodology: A competitiveness of the leading countries in the global market of robots is estimated by using the methods of economic statistics and index method. In order to take into account the differences in the size of the manufacturing industry in various countries, it is used a measure of density of robot workers. One such measure of robot density is the number of industrial robots per 10,000 persons employed in manufacturing industry. The data of International Federation of Robotics, Forbes, World Economic Forum, Deloitte are used. Results: The ratings of the selected countries by sales of industrial robots and competitiveness of the countries in development of the Industry 4.0 are determined. 72% of world sales of industrial robots are the share of 5 countries: China, Japan, USA, Republic of Korea and Germany. The automotive industry continues to lead global demand for industrial robots. The forecast of global demand for robots till 2020 and 2025 is made.

Keywords: industrial robots, Industry 4.0, global demand in the market of robots, density of robot workers

JEL Classification: F14, F63, L63, L64

1. Introduction

Researchers note approach of the fourth industrial revolution. The first revolution has been based on development of metallurgy and trade until the end of the 19th century. The second industrial revolution was based on increase in scientific knowledge and improvement of quality of management. In the second half of the 20th century the third industrial revolution which is characterized by digitalization of business processes and formation of the international networks of multinational corporations has begun (Alcacer et al., 2016). The transition to information technologies, nano- and biotechnologies, robotics, 3-D printers, new technologies in energy, etc., will lead to qualitative shifts in the global production, the formation of new industries and the diffusion of innovations into old industries (Glazyev et al., 2018).

New industrialization relies on the principles of inclusive development, covers all range of productions, both traditional, and new (Silin et al., 2017). The concept of 4.0 is based on linkage of virtual and physical parts of business processes along a supply chain. Новая промышленная

революция отражает virtualization of material and people by attached barcode, electronic devices and tools, cyber physical system (Jirsak et al., 2016). Glas and Kleeman argue that Industry 4.0 is not limited to the technical dimension of digitalizing business as it is the usage of smart products and services within an appropriate technical environment – industrial internet of things (Glas & Kleeman, 2016). Slusarczyk concludes that the concept of Industry 4.0 is a great opportunity for improvement in competitiveness (Slusarczyk, 2018).

We agree, that the core idea of Industry 4.0 is to use the emerging information technologies to implement Internet of Things, Internet of Services and Internet of People so that business process and engineering process are deeply integrated making production operate in a flexible, efficient, and green way with constantly high quality and low cost (Wang et al., 2016). Pfhof et al. offered the following definition: Industry 4.0 is the sum of all disruptive innovations derived and implemented in a value chain to address the trends of digitalization, autonomization, transparency, mobility, modularization, network-collaboration and socializing of products and processes (Pfhof et al., 2015).

The concept of a Smart Factory increases the information transparency and enables the autonomous control of a manufacturing facility (Horak, 2016). At "smart" factories and the plants, on the one hand, all business processes are decentralized, on the other hand, each of them defines efficiency of all production in general. Robots have become standard equipment in modern manufacturing sites, providing fast and reliable routine operations. All components at smart factories are processed with use of Big Data and computers that realizes within the Industry 4.0 the concept of the Internet of Things and involves consumers in production of the company. It is expected that in the future buyers will be able to make the final products, having bought a program algorithm and having printed goods on 3-D printer. Industry or external platforms play the key role in developing of smart factories.

Gawer and Cusumano defined industry platform as products, services or technologies of leading organizations, which serve like foundations upon which a larger number of firms can build further complementary innovations (Gawer & Cusumano, 2014). The platforms leaders enhance value to users at early market stages (Cennamo, 2018). Platforms and the cloud, an essential part of what has been called the "third globalization", reconfigure globalization itself. Firms tend to locate R&D activity in countries with similar levels of industrial technology development (Choi and Contractor, 2016). The consequence is a radical reduction in the cost of information and communication technology tools (Kenney & Zysman, 2016).

It is difficult to predict consequences of new industrialization for global economy. For instance, the logistic activities are declining in times of Industry 4.0 with automated supporting processes and sensor controlled internal supply and external supply chains across companies and means of transport (Hofbauer & Sangl, 2018). Many researchers predict threat for labor markets. The robots will substitute for low-skilled workers and reduce the share of human labour in total production costs (UNCTAD, 2016). Many jobs will disappear. Job complexity will grow. Global virtual work, supported by information communication, have benefits for knowledge workers (Nurmi and Hinds, 2016). Sung assumes that machines will operate independently or will coordinate with humans to produce customer-oriented manufacturing (Sung, 2018).

The smart factory in the industry 4.0 is a compact unmanned production, that is why the greatest chances of success belong to the countries which substantially robotized the industrial enterprises and can quickly integrate industrial robots into information networks and platforms with use of artificial intelligence. The purpose of the article is to define the trends and prospects

of development of the world market of industrial robots and to estimate the readiness of the selected countries for development of new industrial revolution. Several criteria of competitiveness of the countries are considered: density of industrial robot workers, readiness for the future of production, global manufacturing competitiveness index. The group of the leading countries in development of the industry 4.0 is defined.

2. Trends and prospects on development of the global market of industrial robots

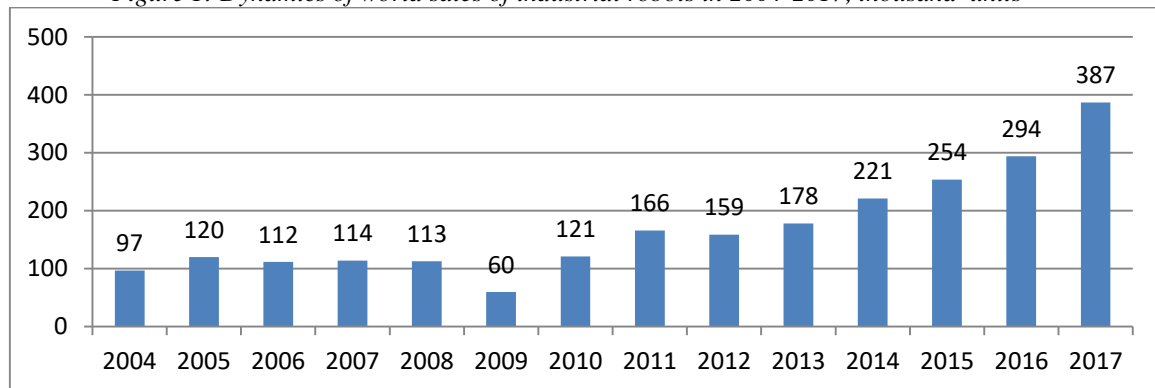
Growth rates of the global market of industrial robotics advance growth rates of world GDP: from 2011 to 2017 the average annual growth of sales of industrial robots was 13 percent. According to statistical data of International Federation of Robotics global sales of industrial robots reached the new record of 387,000 units in 2017 (figure 1). That is an increase of 31 percent compared to the previous year.

At the same time the total amount of the market of robots taking into account the software and services of integration (integrators are the engineering firms which project, build and install robotic systems and also carry out resale or distribution for other companies), exceeds \$40 billion, and 91 percent of all industrial robots are installed in the sector of manufacturing industry. Industrial robotics grows due to rapid robotization of the Chinese economy and while growth of service robotics has deeper reasons: the most part of world economy is service economy. For this reason service robotics shows more significant growth at rather smaller figures in absolute value in comparison with industrial robotics.

China saw the largest growth in demand for industrial robots in 2017, up 58 percent. In comparison, sales in USA increased by 6 percent – in Germany by 8 percent compared to previous year. In China within four years has been created branch of robotics from the beginning, as a result China was ahead of leaders of last years (Japan, Korea, the USA). 72 percent of world sales of industrial robots are the share of five countries: China, Republic of Korea, Japan, the USA and Germany.

China has more than 35 percent of world sales. According to the opinion of the head of robotics laboratory of Sberbank of Russia A. Yefimov, China copied others innovations until it began to turn out. In the country the supporting ecosystem is created, each regional Chinese government actively supports robotics and regularly reports on growth of level of robotization of production. In China a large number of the people have a work experience in the United States and Europe. Chinese have created attractive terms for foreign experts that came to train them and to share experience. At the same time without state financing the Chinese robotic ecosystem is nonviable.

Figure 1: Dynamics of world sales of industrial robots in 2004-2017, thousand units



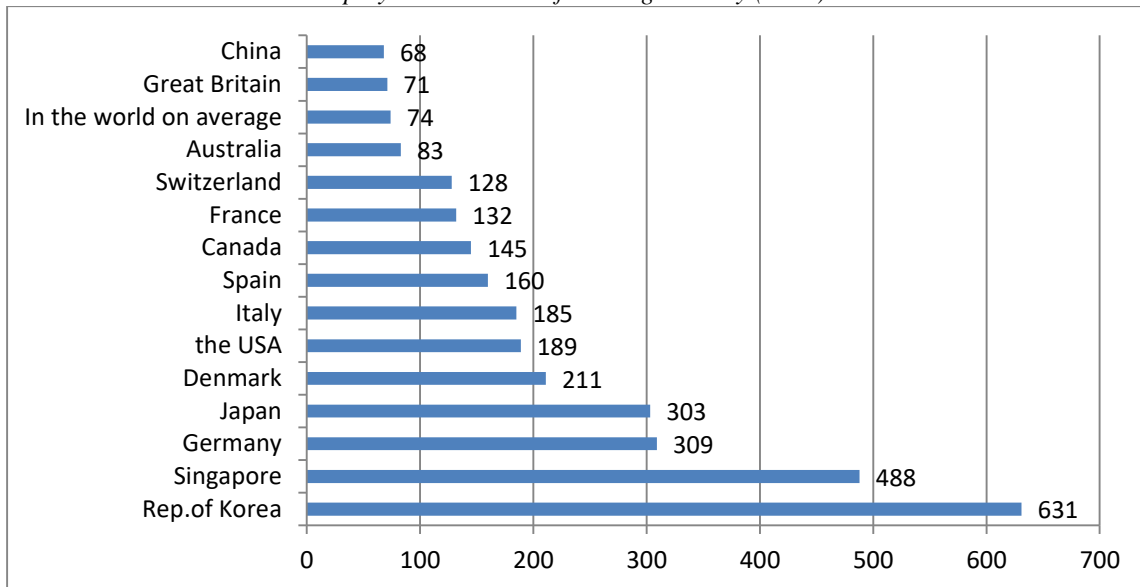
Source: Forbes statista 2018, International Federation of Robotics

The automotive industry continues to lead global demand for industrial robots: in 2017, around 125,500 units were sold in this segment or 33 percent – equivalent to growth of 21 percent. The strongest growth sectors in 2017 were the metal industry (+55 percent) and 12 percent of world sales, the electrical/electronics industry (+33 percent) and 30 percent of world demand, the food industry (+19 percent) and 3 percent of total sales. Recent years witnessed increased trend of robots deployment in food sector. The domain of robotics has incredibly increased the productivity as compared of the manual production systems (Iqbal et al., 2017). Robots essentially have the potential to transform the processes in food processing and handling, palletizing and packing and food serving.

The competitiveness of the countries in the world market of robots can be estimated using indicator of "density of robot workers", that is calculated as installed industrial robots per 10,000 employees in the manufacturing industry. Korea, Singapore, Germany, Japan, Denmark, the USA, Italy, Spain, Canada, France, Switzerland and Australia have the greatest density of robots, which is above the average world level (figure 2).

In the Republic of Korea purchases of industrial robots at suppliers of automobile components have significantly increased. At the same time in the country the sector of Information and Communication Technologies (ICT) has a high level of development. It has become a national priority and has received the large subsidies from the state. As a result of 99 percent of households have broadband Internet connection, 17 percent of GDP of Rep. of Korea are the share of ICT (Kondratyev, 2015). The Rep. of Korea demonstrates a high competitiveness in the global digital economy and the world industry.

Figure 2: The countries with the highest density of robot workers, installed industrial robots per 10,000 employees in the manufacturing industry (2016)



Source: Forbes statista 2018, International Federation of Robotics

The market of industrial robots of the USA, third largest in the world, continues steady growth thanks to automation of production for the purpose of strengthening of positions of the American industry in the world market, returns of production from other regions of the world. Besides in 2017 the USA has taken the 4th place in the world on the level of innovative development (Global Innovation Index 2017). Global innovative index connects a large number of the multinational companies which are the most important structural units of new economy (Andreeva et al., 2016). It is possible to conclude that today Asia is the biggest sales market of industrial robotics and occupies more than a half from world market capacity.

According to IFR estimates, the world operational stock of industrial robots will grow approximately from 1,828 thousand units at the end of 2016 to 3,053 thousand units at the end of 2020 that corresponds to average annual growth rates in 14% in 2018-2020. Experts of Laboratory of Sberbank consider that by 2020 the basis of the market of industrial and service robotics will be made by collaborative industrial robots manipulators, logistics systems, pilotless vehicles of delivery of values, personal robots assistants and industrial exoskeletons for reduction of tiredness and increase in labor productivity of employees. The collaborative robot is the robot designed for direct interaction with the person within a certain joint working space.

The growth of industrial robots continues at an impressive pace worldwide. Key trends are digitalization, simplification and human-robot collaboration. Future robot interfaces will allow intuitive interaction via touch, speech or a gestural information and provide smart factory operating (Czinki & Bruhm, 2012). Robots will acquire new skills through connection with the virtual data and machine leaning process.

According to forecasts of Nasdaq Global Information Services, the world market of robots will grow from 26.9 billion. USD in 2015 to 42.9 in 2020 and 66.9 billion USD in 2025. At the same time the share of industrial robots will grow from 11 percent in 2015 to 16 percent and 24 percent in 2020 and 2025 respectively.

According to IFR the major robotics trends are collaboration between humans and robots without protective barriers and digitalization. As a result industry 4.0 is linking the real-life

factory with a virtual one, vision and sensing devices are coupled with analytics platforms. Robots will provide more flexibility in the production processes, increase a productivity, low-volume high-mix production.

3. Methods and Results

Taking into account the essence and main features of the Forth industrial revolution, the authors offer to evaluate the competitiveness of countries in development of industry 4.0 as a sum of 4 indicators, measured in points:

1) density of industrial robot workers of the country, in relation to the average density in the world (Statistical data of International Federation of Robots),

2) global manufacturing competitiveness index in relation to the average world score (Statistical data of Deloitte Touche Tohmatsu Limited Global Consumer and Industrial Products Industry Group and the Council on Competitiveness, 40 countries),

3) readiness for the future of production – structure of production, including complexity and scale of country's production (Assessment results on 100 countries of The country Reading project team collaborated closely with members of the World Economic Forum's Future of Production community – which consists of over 50 companies, 26 governments and nearly 30 academies),

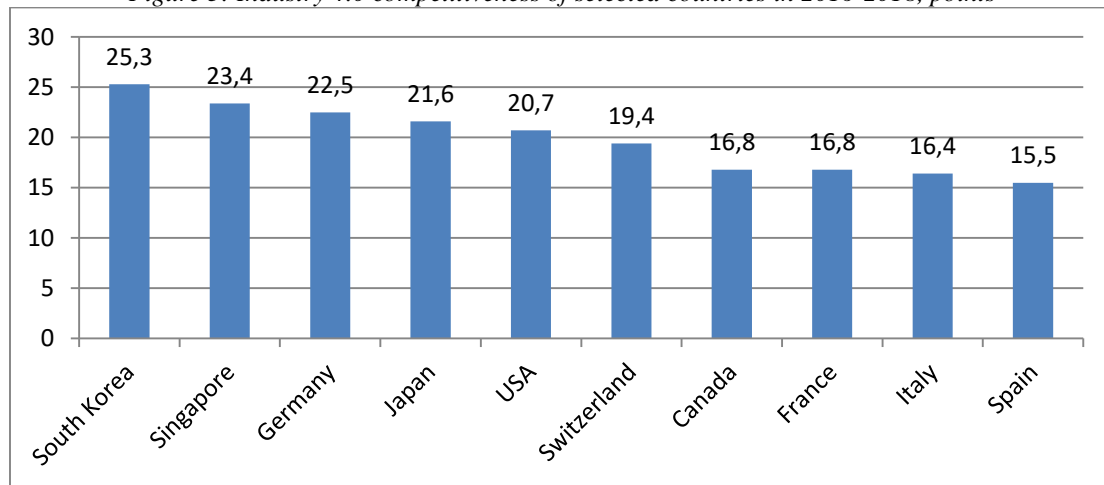
4) readiness for the future of production – drivers of production (technology and innovation, human capital, global trade & investment, institutional framework, sustainable resources, demand environment).

Readiness is regarded as the ability to capitalize on future production opportunities and be agile in responding to unknown shocks. Structure of production means a country's current baseline of production. Drivers of Production show the ability to transform production systems in the relation to the Fourth Industrial Revolution (Readiness for the future of Production Report 2018). The 100 countries are included in the assessment, which is comprised of 59 indicators.

The authors selected 10 countries with the highest density of robot workers to assess their ranking on Industry 4.0 competitiveness. The results are shown in Figure 3.

According to authors assessment Republic of Korea, Singapore, Germany, Japan, USA, Switzerland, Canada, France, Italy and Spain demonstrate the highest readiness for Industry 4.0. The linkage of robotization with automation technologies and three-dimensional printing affords to raise a productivity and decrease the costs of small-volume production dramatically.

Figure 3: Industry 4.0 competitiveness of selected countries in 2016-2018, points



Source: Calculated by the authors

4. Conclusion

Global sales of industrial robots grow on an exponential curve, exceeding forecasts of the International Robot Federation, and by 2025 can reach nearly 67 billion dollars. According to IFR the major robotics trends are collaboration between humans and robots without protective barriers and digitalization. The greatest stock of robots is in China, R. of Korea, Japan, the USA and Germany. At the same time on density of robot workers Republic of Korea, Singapore, Germany, Japan, Denmark and the USA are in the lead. In the future demand on pilotless passenger transport, robots for commercial spaces, logistic robots and pilotless cargo transport, industrial exoskeletons will grow at the highest rates. The biggest progress in developing of Industry 4.0 is achieved by Republic of Korea, Singapore, Germany, Japan, the USA.

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DIGITALIZATION AS A FACTOR OF FORMATION OF NEW ECONOMIC OPPORTUNITIES UNDER GLOBALIZATION CONDITIONS

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Abstract. The paper discusses feasibility of the introduction of the digital economy in the country economy. Its levels are presented in the form of markets and sectors of national economies, platforms and technologies, where competencies for the development of markets and sectors of the economy are formed. Competencies include mobile devices, Big Data technologies and analysis of arrays of data on advanced algorithms, cloud services, Internet of things, quantum technologies, location technologies, robotics, wireless communication, virtual currencies, 3-D printing, smart sensors. Numerical technologies are listed and discussed in detail such as digitalization - "smart" way of working for business, digital city, digital nation, digital state, digital finance, digital education, open data. The features of the digital economy include dependence on telecommunications networks and computer equipment, the basing of economic activity on the platforms of the "Digital" economy, high growth rates of goods and services, personalized service data, direct interaction of producers and consumers. The models of digital economy development are proposed. Possible risks in the digitalization of national economies in the context of globalization are discussed, such as the rapid imposition and borrowing of Western technologies, the degradation of one's own competencies, the reduction of the level of data security, the loss of privacy, the reduction in the number of jobs of low and medium qualification, the increase in complexity of business models and interaction schemes, the sharp increase in competition in all spheres of the economy, the changes in the models of behavior of producers and consumers, the need to revise the administrative and tax codes.

Keywords: Digital economy, development models, economic effects.

JEL Classification: E21, E23, M10, R10

1. Introduction

The digital economy is becoming a daily reality of modern society, thanks to its use the efficiency of all industries is increasing. Qualitatively and quantitatively possibilities of using modern computer technologies are increasing, almost all operations can be performed through the computer - paying for services, booking tickets or queues, searching for necessary information, etc. Information in the era of digital economy plays a crucial role, it becomes a major intangible asset of great value (Lapidus, 2018; Zhuravleva, 2017; Kazanskaya & Palkina

E.S., 2016). Thus, it is no surprise that many explorers discuss various aspects of digital economy in recent papers (Teece, 2018; Frischauf, N. et al., 2018; Rudenkol et al., 2018; Bacache-Beauvallet & Bloch, 2018).

In this paper we are going to explore digitalization of economy as a factor for formation of new economic opportunities under globalization conditions. First of all we are going to discuss essence and levels of impact of digital economy and models of development of digital economy in different spheres. Then we will analyze economic effects and risks in the introduction of digitalization under globalization conditions (by the example of Russian economy).

2. Digital economy: its essence and levels of impact

The digital economy is represented by the following three levels which in their close interaction affect the lives of citizens and society as a whole:

- 1) markets and sectors of the economy where specific subjects interact;
- 2) platforms and technologies where competences are formed for the development of markets and industries;
- 3) the environment that creates conditions for the development of platforms and technologies and for the effective interaction of subjects of markets and industries. It covers regulation, information infrastructure, personnel and information security. The development of digital economy of Russia is based on main trends of the third and fourth industrial revolutions (Rozenberg & Batraev, 2018).

Today modern digital technologies include: mobile devices, Big Data technologies and analysis of arrays of data using advanced algorithms. Cloud services, "Internet of Things", quantum technologies, location technologies, robotics, wireless communication, virtual currencies, 3-D printing, intelligent sensors and much more.

Let's consider some digital technologies in more detail. For example, let's take Big Data. This technology is a set of approaches, tools and methods designed to process structured and unstructured data (including data from various independent sources) in order to obtain human-readable results. Big Data technology began to develop rapidly in 2010, and presently it is quickly expanding into the modern era. At the moment there are many software solutions that allow processing Big Data including those from IBM, Oracle, Microsoft, Hewlett-Packard, EMC and others.

Examples of information sources for which methods of working with large arrays of data prove necessary are GPS signals from cars for a transport company, information on transactions of all bank customers, etc.

Another popular technology now is virtual currency. Virtual (digital/electronic) currency is money that does not have a material embodiment, which can be used as a full-fledged money symbol. To perform operations such as the issuance of currency units or transfers Block Chain technology is used.

For the effectiveness of processes and full interaction all subjects and objects of economic relations must acquire a digital component.

Let's consider basic features of "Digital" economy. These include:

- 1) Dependence on telecommunications networks and computer equipment.

This difference is a key difference between the digital economy and the real one. With the disappearance of telecommunications networks and computer equipment the digital economy becomes impossible since all forms of virtual economic activity are based on them.

2) Economic activity is based on Platforms of "Digital" Economy.

"Digital" Platform is a digital environment (software and hardware complex) with a set of functions and services that serves the needs of consumers and producers as well as realizing the possibilities of direct interaction between them. In today's world there are quite a large number of companies based on the principles of the Platform business model, the brightest examples are Uber and Airbnb. Discussing aspects of digital platforms in digital economy is a rather popular subject according to recent papers (Nechushtai, 2018; Watanabe et al., 2018; Just, 2018).

3) High growth rates

Thanks to Internet products and services have become more accessible. This has led to the demand growth for products and the growth of digital economy.

4) Personalized service data

Thanks to such technologies and innovations as Big Data, 3D printing, wireless communication and others it is possible to produce goods and provide services that meet the needs and requirements not just of an average customer but of each individual client.

5) Direct interaction of producers and consumers

The development of information and communication technologies allows producers to "directly" contact consumers. The CroudMortgage technology emerged which is a mobile application through which borrowers can borrow money not from banks but directly from people who have free cash.

3. Models of development of digital economy in different spheres

Digitalization is an "intelligent" way of working for business

A digital organization is a company that with the help of information technologies has built its internal processes and interaction with the client in such a way as to give customers a new, convenient experience. Digital strategy is a strategy for introducing new technologies to bring organization and services to a new level of efficiency and customer focus.

Digital State

Such a state will become open, transparent and accessible. More openness will be provided by new statistics based on big data. This means more information and common sense, fewer errors, checks and abuse.

Digital nation

The population is increasingly turning to Internet as a source of information. The level of consumption of social networks is growing, and the number of digital devices used by Russians is expanding. According to the results of the ROCIT study (the Regional Public Center for Internet Technologies) the level of digital literacy of Russians in 2016 was 5.42 on a ten-point scale (JSCo «Russian Railways», 2016).

Digital city

A smart city should provide a comfortable and safe stay for residents and visitors improving the quality of life of citizens and ensuring sustainable business development. Smart management of urban infrastructure becomes an urgent need - cities consume up to 2/3 of all world resources, and the effectiveness of this consumption should be increased. Elements of intelligent infrastructure are in more than 2500 cities around the world. The concept of digital (smart) city and its economics is recently discussed by some researchers (Rossi, 2016; Fuentes et al., 2017)

Open data

City authorities are one of the largest sources of data that gather in diverse spheres of socio-economic life. Data can be opened - i.e. are uploaded for free access on Internet so that they can be reproduced, distributed, processed, combined and reused.

Thus, direct and indirect effect of the distribution of open data in the European Union will make up 1.9% of GDP by 2020. McKinsey Global Institute estimates the potential economic effect at the global level as \$5.5 trillion per year (Soldatova, 2017).

Digital finance

The Bank of the Future is a digital bank that uses mobile platforms and cloud services to personalize offers for customers. E-commerce will actively spread in social networks. Some Internet companies (Facebook, Pinterest and Instagram) have already implemented the "buy" buttons on their websites. 20% of consumers of banking services in Europe confirm that they are ready to purchase financial services from Internet companies - Facebook or Amazon. The phenomenon of digital finance is discussed by some explorers (Brammertz & Mendelowitz, 2018).

Digital Education

Digitalization is the main trend that determines the transformation of the education system around the world. New technologies help prepare specialists whose skills and knowledge will be in demand in the future. 85% of the surveyed IRI experts note an acute shortage of qualified IT staff.

The fields of education, science, research, culture and the media are key areas for the introduction of new digital achievements and in themselves are the most important factors contributing to the further development of digital technologies.

Digital Medicine

The development of medicine will accelerate due to digitalization. The costs for the provision of medical services will decrease and their quality will grow. "Smart" health care should evolve according to the model of a virtual hospital, where doctors and patients can interact (including remote interaction), and all the necessary information is instantly available online.

Transition to telemedicine is a new vector of digitalization of health care in the country. The level of digitalization of the Russian health care system is still far behind many developed countries.

4. Economic effects and risks in the introduction of digitalization

Thanks to the introduction of digital technologies and the entry of Russia into Industry 4.0 many economic effects are expected. The digital economy provides much more diverse, informational, educational, scientific, entertaining content - faster, better and more convenient.

The economic effects of introducing digitalization in Russia include the following:

- increasing the productivity and safety of workers;
- a higher standard of living for citizens;
- increasing the competitiveness of companies;
- optimization of production and logistics operations;
- increasing the productivity of equipment;
- increasing the efficiency of the labor market;
- reduction of resource consumption and production losses;
- increasing the efficiency of R&D and product development.

The digitalization of the Russian economy will become an important source of long-term economic growth. This understanding is at the highest level of the country's leadership. In July 2017 the Chairman of the Government of the Russian Federation Dmitry Anatolyevich Medvedev signed the Digital Economy of the Russian Federation Program (The program "Digital Economy of the Russian Federation", 2017), which defines the main goals, objectives, directions and timeframes for the implementation of the main measures of state policy to create the necessary conditions for the development of the digital economy in our country (Volofov et al., 2018; Hagberg, 2017)

Digitalization will contribute to improving the quality of life of citizens. This will include new employment opportunities, growing consumer purchasing power, affordable and high-quality medicine and education, social lift and increased involvement, convenient digital services and public services, attractiveness of the economy for skilled personnel, national, economic and public security, etc.

If we consider such an economic opportunity as improving the productivity of equipment then we can talk about reducing equipment downtime and repair costs as well as increasing the utilization of equipment.

The potential effect for Russia's GDP from the digitization of the economy by 2025 is estimated at 4.1-8.9 trillion rubles, which is 19-34% of the total increase in GDP (Harchenko & Konyuhov, 2017).

At the same time in addition to the benefits of introducing digitalization there are also risks as some researches write in their papers (Curran, 2018). New risks and problems are linked with the development and widespread adoption of "digital" technologies, and among them the main are the following:

- 1) The rapid imposition and borrowing Western technologies, the degradation of national competencies;
- 2) Decrease in the level of data security, loss of privacy (The program "Digital Economy of the Russian Federation", 2017);
- 3) Decrease in the number of jobs of low and medium qualification;
- 4) Increase in the level of complexity of business models and interaction schemes;
- 5) The sharp increase in competition in all spheres of the economy;

- 6) Changes in behavioral patterns of producers and consumers;
- 7) The need to review the administrative and tax codes.

5. Conclusion

The emerging prospects for the introduction of the digital economy create a wide field for the growth of new risks that can not be quantified. They are characterized by a lack of reliable information on the links between the causes of the occurrence of risks and the onset of adverse consequences. The presence of the above mentioned risks and problems, which are practically not calculated and analyzed (because of absence of scientific knowledge in the relevant field), suggests that the risk assessment in this case has the nature of assumptions (Krulikovskiy & Kozlova, 2018; Eremeychuk, 2017; Hess & Constantiou, 2018)

To summarize, it should be noted that Russia will need a lot of time to create competitive industries in key sectors of the digital economy. The first step in this direction is a large-scale application of IT-technologies while taking into account emerging risks and the search for methods for their minimization.

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THE IMPACT OF GLOBALIZATION ON THE DEVELOPMENT OF HUMAN POTENTIAL IN AN INNOVATIVE SOCIO-CULTURAL SPHERE AND OPPORTUNITIES FOR SOCIAL ENTREPRENEURSHIP

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Abstract. The globalization of the world gives opportunities for a new, “global” demand, an exchange of new products and services and cultural enrichment to be created. Globalization is what eliminates market’s boundaries by creating innovative opportunities for the entrepreneurial business. It also contributes to achieving new, higher levels of technological development. In the following paper both the essence of entrepreneurship and innovation’s manifestation, as well as the theoretical foundations of the activities connected to the prerequisites of entrepreneurial work in Bulgaria are examined. The level of entrepreneurship varies in different countries and in their differing stages of socio-economic development. It is also connected to the impact of certain factors on entrepreneurship and their role in generating new entrepreneurial opportunities. Entrepreneurship depends on the focus of the research aiming to determine its essence. The entrepreneurial process is defined by various economical and social factors. Eastern European countries have compulsorily gone through the transition to market economy and through the serious monetary and economic measures for regulation at the time of the transition period; later they went through the “managerial” or management-dominated economy and through “entrepreneurial” economy or entrepreneurship-dominated economy. Facilitating access to employment and supporting the social inclusion of vulnerable groups by creating suitable conditions for their professional integration in the sphere of social economy in Bulgaria is realized through the implementation of strategies and national programs.

Keywords: globalization; entrepreneurship; economy; socio-economic development

JEL Classification: A-A1-A10

1. Introduction

Globalization is an important factor for the worldwide economy’s development. It is a phenomenon that leads to both prosperity and in the same time to problems in different spheres of society. “Globalization” is a term commonly used as a synonym for the increasing internationalization that supposes the shift of influence from national governments to transnational corporations. The process itself is connected to the distribution and

interpenetration of ideas, capital, technology, and elements of culture. In the face of economic globalization a new necessity might have emerged: a necessity for consideration and/or re-consideration, as well as one for an analysis of its impact on the economic and social development of separate regions and especially a necessity for an effective management of the factors that influence those processes. Globalization influences the regional distribution within the framework of every national economy differently. The impact of globalization on the development of human potential in an innovative socio-cultural sphere and the opportunities for social entrepreneurship shape the tendency for the formation of an economic model of economies of a larger size. (Harrison, 2014) Having in mind the set of factors that constitute such global economic model, which includes newer and newer technologies, new markets, etc., the contribution of science on bringing forward non-technological innovations (marketing or organization related ones) will become more and more important. The role of the human factor, the approaches and the mechanisms for impacting people is more clearly defined due to the efforts of the scientific community. Accordingly, the result from the scientific contribution will be measured through using people as the most valuable asset and possible carrier of a continuing advanced competitive advantage for every economic entity.

2. Problem analysis

According to research of various authors, it is indicated that technological and economical globalization, without even aiming for it, at the end imposes uniformity in economic life, in people's environment, in cultural heritage and in various other areas.

New views on the world order and on Europe, related to the processes of globalization, regional integration, free movement of capital and profits, have been established since the beginning of the new millennia. The liberal model for economic development, connected also to the privatization of social activities, to the withdrawal of the state from the active social policy and social defense, has been accepted in a number of countries. Other countries, mostly from the member states of the European Union (EU), and the community as a whole implement strategies and policies for economic development in terms of social security and raise the idea for establishment of a social policy adhering economic development. The dynamic globalization and integration processes in the economic area continue to be accompanied by poverty and unemployment, by stronger differentiation between the rich and the poor, by education, jobs and social security being difficult to access by a vast majority of people. A significant amount of human potential remains unused for the purposes of economic development and increasing income. The access to increasing wealth, financial resources and labor and social rights remains strongly restricted for many people. Thus, the social expectations from the globalization and the integration remain barely fulfilled. Globalization, integration and economic development, at the moment being based especially on competition and new technology, are supposed to have their social dimensions: they should increase employment and income rates; they should fulfill human potential opportunities more effectively; they should secure broad access to economic and social resources; they should decrease, and not increase the gap between the poor and the rich – worldwide, in Europe and in every separate country. The concept of economic development is changing. The 21st century economy, the new economy, is an economy based on knowledge invested in new production technologies and management, on higher education and professional qualification of the people who work. The economic growth is predetermined by these investments and by the competition for their more effective implementation and development. Steady economic growth is accepted as a natural foundation for achieving social security and development and for society's social

cohesion. It is stressed in the approved documents of the European Council that human resources are Europe's most important factor and they should be at the centre of the Union's policy. It is considered that investments in human resources and the implementation of an active and dynamic social state will give Europe's place in the new economy a capital meaning. Consequently, in recent years the focus is put on the social dimensions of the development of the economy and the society, on the opportunities for everyone willing to participate in the production as well as in the distribution of the wealth that has been created. Thus, economic aims, strategies and policies are more imminently connected to people and to their participation. It is also a more reliable way to monitor the meaning behind the development of globalization, integration, competition, education, healthcare and other social activities' processes. In other words, Thomas Friedman says that analysts have always been inclined to measuring society according to the classical standards of economic and social statistics – GDP, unemployment rate in the relevant society or the unemployment rate of adult women. Statistical data such as that is very important and it reveals a lot of facts. However, according to him, there is another statistic that is much harder to measure, which seems to him even more indicative – whether or not there are more memories than dreams or more dreams rather than memories in your society. (Friedman, 2006)

In the face of intensively occurring processes of globalization and exacerbating competition, the European Union has accepted three interconnected aims: an accelerated and steady economic growth founded on the economy of knowledge and education; achievement of a full and quality employment rate; ensuring of social security and cohesion, or in other words – development of a social and joint economy, a people's economy; participation of everyone in the creation and utilization of the economic wealth.

The development of companies is linked to the development of human resources, so at the first place of companies' priorities should be the interest to develop the potential of human resources according to (Durana & Chlebkova, 2016). *However, distance and direction measures are constructed and used to contrast occupational mobility following involuntary job displacement and total occupational mobility. Displacement involves specific capital loss. Some voluntary occupational mobility, for example, promotions, reflects augmented skills rather than specific human capital loss* (Robinson, 2018). Moreover, when it comes to the mobility of human capital, there is a positive correlation between internationally mobile workers and the enhancement of innovation performance of their units due to many different factors (Wright et al., 2018). Also, some analysis show that in some cases (the US for example) the average immigrant from a middle-income or poor country increases their wage by a factor of two to three upon migration (Herndrincs & Schoellman, 2018). We believe that the same may apply to regions all over the world.

“The international division of labor is changing due to shifts of labor-intensive production to countries with lower labor cost with corporate governance, technology-intensive production and research kept in wealthy countries significantly increasing the development differences among countries including employment opportunities.” (Davidekova & Gregus, 2017)

Enterprises' flexibility is determined to a great extent by the flexibility of the personnel that they hire. The globalized society's workforce at the moment should not only be highly-qualified and competitive, but also open to constant changes and having specific for the relevant sphere personal characteristics such as motivation and attitude towards work.

The impact of globalization on entrepreneurial development is not unequivocal – it can be both positive and negative. On the one hand, globalization stimulates the process of achieving

economies of scale but it also creates more competition. This phenomenon has a negative impact on the opportunity for small-sized enterprises to survive. In the same time globalization eliminates market limits by creating new possibilities for entrepreneurial business. It also contributes to attaining new higher levels of technological development. World's globalization reveals opportunities for establishing a modern, "global" demand, as well as opportunities for the exchange of new products and services, and cultural enrichment. Industrial structures are another important factor in stimulating entrepreneurial activities. Also, when it comes to the financial prospects of globalization, according to Barbopoulos et al. firms initiating international business operations via earnout-financed cost-benefit analysis enhance their value more than acquirers in domestic acquisitions (Barbopoulos et al. 2018).

The socio-cultural sphere is a very important part of every country's national economy and the question of entrepreneurial activity within this sphere is of the same importance. This sphere results from the society's division of labor and the goods created in it are of a social or of a market type.

The development of entrepreneurship in an innovative socio-cultural sphere is an important factor for achieving a steady economic growth, which would have an impact not only on the financial, but on the spiritual and physical well-being of members of society as well. Defining characteristic innovative traits of the socio-cultural sphere presumes some changes in the entrepreneurial approach and in the activities that an entrepreneur undertakes in order to achieve their goals that would have an impact both on certain individuals and on society as a whole. On the whole, sometimes, innovations enhance the value of existing products and services. At other times, they render existing business models obsolete, disrupt value-networks, prompt providers to rethink who their customers are, and lead customers to rethink what they value (Kumaraswamy et al., 2018).

Moreover, analysis suggest that home and home institutions shape immigrant entrepreneurs' ability to identify non-ethnic business opportunities. Also, their actions, which in any case break socially constructed boundaries, also change the social structure of a country (Griffin&Olabisi, 2018).

"Social entrepreneurship is perceived as a legitimate and innovative solution to social problems. Yet, when one looks at the literature one finds that the social problems that the SE movement seeks to address and how these problems are identified and defined are not studied". (Hervieux & Voltan, 2016) However, the turbulent processes of globalization reveal new and better opportunities for application of different entrepreneurial models through the free movement of qualified personnel, the scientific and technological progress, and use of established practices worldwide. Also, *employment correlates positively with local labor market diversity, but negatively with neighborhood diversity* (Hemet & Malgouryes, 2018).

The development of innovations in entrepreneurship is tightly connected to the socio-cultural factors that shape society. Entrepreneurship can be demonstrated through the creation of a new type of service or through the further development of an already existing one, which would not only satisfy a particular consumers' necessity, but also contribute to solving a particular problem in society. An example for such a manifestation is the educational start-up called "Red Paper Plane"- an innovative company that creates educational missions, through which consumers develop their skills and inclinations on the basis of design thinking. The missions of the company are being used by private and state schools, kinder gardens and many other institutions not only in Bulgaria, but in many foreign countries.

Using an unbalanced data set (and different indicators) for BRICS member states Salifou K. Coulibaly, Cao Erbao and T. Metuge Mekongcho prove their hypothesis that not only economic integration and relations between local and global entities, which are a result of the free movement of goods and capital, but also innovations and the development of small and medium-sized entities have both contributed to the fast economic development of the researched countries. (Coulibaly et al., 2018). Economic globalization and entrepreneurship, whose innovative progress is inextricably bound up with the former, are capital factors that directly impact and contribute to economic growth and advance.

2.1 European Union and Entrepreneurship

Entrepreneurship for the European Union is a key factor for increasing competitiveness, for creating places of employment and for ensuring economic growth. It is important for society as a whole.

EU's policy in regards to entrepreneurship is aimed at: stimulating entrepreneurial initiative in Europe; overcoming the insufficient ability for taking risks; ensuring and supporting a favorable business environment; restricting businesses' growth barriers; balancing risks and benefits from entrepreneurship; building a society that appreciates entrepreneurs.

The single internal EU market is the largest uniform market in the world. Over 25 million enterprises function on its territory. Bulgarian entrepreneurs are able to take advantage of the chances given by the EU market: an extended market of goods and services; technological production regeneration; larger investments; opportunities for absorption of structural funds. At the same time this market offers Bulgarian entrepreneurs a number of challenges as well: high competitive pressure, strict regulations for manufacturers in relation to preserving the environment, as well as in relation to the quality and safety of goods, necessity for additional investments.

It is also important to mention that analysis suggests that broader labour mobility theories should accommodate multilevel contextual factors (e.g., the different attributes of the source and destination firms, as well as of mobile individuals) when studying the effects of employee mobility on organizational outcomes, and consider different mechanisms through which mobile employees may affect destination firms (Rocha et al., 2018).

Moreover, analysis exist pointing at the phenomenon, *“that in the presence of social mobility, the political preferences of an individual depend on the potentially conflicting preferences of her "future selves," and that the evolution of institutions is determined through the implicit interaction between occupants of the same social niche at different points in time”* (Acemoglu et al., 2018).

As prerequisites for the successful integration of Bulgarian entrepreneurs in the EU can be indicated the following: creating a favorable business environment for development of social entrepreneurship; preparation and support for entrepreneurship in terms of EU's regulations; good awareness of the EU's laws and harmonization between the former and Bulgarian law, etc.

Entrepreneurship's development in a particular country is tightly connected to the so-called business environment. The more predictable and stable it is, the more successful entrepreneurship's development will be. Economic, political, socio-cultural, technological, ecological and geographical conditions may or may not create prerequisites for entrepreneurial progress. Entrepreneurship is a key factor for economic growth of Central and Eastern Europe

in a period of economic transformation, as well as constantly changing social conditions and systems of values. A characteristic feature for entrepreneurial activity in this region is the fact that entrepreneurs here play a much more important role as opposed to the ones in countries with developed economies due to two main reasons: the lack of enough support from the state and its institutions and the “released genie from the bottle”, i.e. the strong motivation of Eastern European entrepreneurs – a combination which in the end is much more ineffective than the one acting in the countries with developed economies.

Tackling the challenges of the complicated business environment, on one part, and taking advantage of the arising opportunities both suppose and require a higher level of education, relevant set of competencies, experience, etc. are required from today’s entrepreneurs. As representatives of the contemporary and at the same time successful Bulgarian entrepreneurs, dynamic entrepreneurs establish and manage enterprises that increase their business growth, have an active market behavior, often (but not always) use advanced technology and take a high but calculated risk. They significantly contribute to the economic development; they ensure new places of employment and bring monetary revenues for the country. In essence, they are defined as drivers for economic growth in Bulgaria.

The topic about social economy and social entrepreneurship is known worldwide, however, it is comparatively new in Bulgaria. Legislative and sociopolitical limits for entrepreneurship and private initiatives were attributed after the beginning of the reforms in 1989. The first entrepreneurs appeared in Bulgaria. There were several driving motives for Bulgarian entrepreneurs established in the circumstances of a transition from central-planned economy to market one (the period of capital accumulation). In studies, conducted immediately after the beginning of the transition by researchers, the biggest number is the one of private business representatives who indicate as their main motive for starting a business their wish to receive high financial results. Later on, this motive was replaced by their motivation for independence, for taking control in their own hands, for working by themselves and for realizing their own ideas. A large number of entrepreneurs indicate acquiring high financial results as their first motive, of course. Those entrepreneurs, whose motive for taking up a new business is developing and practically establishing their searches in a particular field, are not small in number either. Their aspirations are related to their desire to self-express. Businesses with furniture decorated in a special way, with small technical appliances for everyday life and for jewelry and attire are examples of such.

Different types of entrepreneurship can be identified according to the main objective, direction and the problems that are being solved, as well as according to different indicators, with our attention being focused on social entrepreneurship. Social entrepreneurship constitutes of activities, directed towards solving important public issues, with them also bringing income for the entrepreneur,

People involved in social economy and social enterprises are an important stimulus for the creation of socially accepting places of employment and social innovations. According to the Bulgarian Development Bank (BBR) social businesses in our country are developing and are growing in number. Many of them are innovative, with a strong business potential and they can attract interest and financing.

The number of male entrepreneurs exceeds the number of female entrepreneurs (approximately three times) in Bulgaria as well as in countries with developed market economies. The number of entrepreneurs (male and female) is highest in the interval of people between the ages of 26 and 55, with the most active ones being between the age of 36 and 45.

Our research on the topic shows that the Bulgarian entrepreneur is highly educated and has a rich work experience before starting up a business. Many of the people who establish a company are people who have been involved with a particular type of activity, which has build their knowledge and skill that become foundation for their business. They have considerable experience; a network of personal contacts created; they believe they can succeed more if they undertake a venture of their own. The fact that most of them have engineering degrees is not surprising, reason being the fact that they have grown as professionals before the beginning of market reforms when production was leading and market was ensured. Bulgarian entrepreneurs today have considerable challenges – both financial and engineering ones that bring forward different difficulties. However, hardships have two sides – they can be discouraging or provoking the search for innovations.

3. Conclusion

Social entrepreneurship in Bulgaria is not common and widely developed. It is more so a new type of activity that is still in the process of developing by learning from the long years of practice abroad. It is not only financing, but the creative approach that are a barrier that Bulgarian people have to overcome. Awareness is also very important – every entrepreneur must be informed of the opportunities at hand either for financing or just for sharing their idea. Last but not least the most important element for a social enterprise is the people in it. Despite the slow implementation of social entrepreneurship in Bulgaria, the successful models of such working and providing employment on the territory of the country businesses are the answer to questions related to the meaning of social entrepreneurship and the social effect of applying the principles of social economy. The essence of every social enterprise created is based on its public importance and the activities involved in it have a long-lasting social effect. It is of great importance for an entrepreneur, after successfully testing a social niche, to find collaborators, partners and mentors who can help them apply innovative management models. At the moment it is very important for a legislative basis, which would encourage social entrepreneurship and social economy in Bulgaria, to be created.

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WEB-BASED GEOGRAPHIC INFORMATION SYSTEMS AS A PART OF SMART CITIES GOVERNANCE IN THE AGE OF GLOBALIZATION – A CASE STUDY

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Abstract. Globalization and good governance influence each other. Good governance can attract global activities. On the other hand, globalization can support an increase of the level of the governance. Good governance is a pre-condition for sustainable development at the regional, national, and global levels. Simultaneously, it is a component of the development of a society. Public administration authorities as governance bodies make many decisions. Most of the decisions are spatially oriented, i.e. they include a particular location. Thus, geographic information systems (GIS) are used as a tool for data processing. Web-based GIS systems are widely used as a tool offering an interactive presentation of spatial data to inhabitants. Some of the solutions can also allow citizens to take an active role, e. g. to submit some information like reporting faults in the city. These applications support several key attributes of good governance: participation, responsiveness, transparency, and accountability. The case study provides an overview of how Web-based GIS are used by municipalities to inform or include inhabitants into public activities and affairs. Two former districts in the Pardubicky region, the Czech Republic, are chosen for the case study. These two districts consist in total of 227 municipalities. The number of inhabitants varies from 52 to 90 335 so both very small and large municipalities are included. The covered municipalities use five different commercial Web-based GIS solutions. The solutions are compared from the point of view of available functionality and a level of inhabitant involvement. Possible links to the size of cities are discussed. Some results are visualised by maps.

Keywords: smart cities, e-Participation, Web-based GIS, good governance

JEL Classification: R59, H83, D83

1. Introduction

Cities are very important for people. Globally, more people (55 % of the world's population) contemporary live in urban areas whereas only 30 % lived in urban areas in 1950 (World Urbanization Prospects, 2018). The contemporary aim of cities is to provide good living conditions for their inhabitants, meet their various needs (Kopackova, 2018), and further develop sustainably. Sustainable development is even perceived as an inclusive globalization (Gawor, 2008). Competitive Sustainable Globalization together with Competitive Sustainable Manufacturing were proposed as a new approach to address both global and local aspects of contemporary challenges (Jovane et al., 2017). So, sustainable development is deeply connected

to modern cities development planning as a specific issue (Williams, 2010) and it can be used as a measure of the success of e-government (Kopackova, 2017). Barbosa et al. (2013) proposed a new model for evaluation of e-government performance with focus on social nature of it.

Nowadays, a concept of smart cities supports the sustainable development of modern cities. In general, innovative technologies, and new economic and social approaches represent key activities supporting smart cities development. Particular smart cities projects are very different, they focus on different aspects of the further development (Albino et al., 2015).

Many definitions of smart cities exist (Albino et al., 2015). They demonstrate complexity and scope of issues included in the smart cities concept. For example, Caragliu et al. (2011) defined a city to be smart when “*investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance.*” Albino et al. (2015) concluded that the reason of the existence of so many definitions might be in describing two different kinds of domains. The first group represents hard domains, e.g. buildings, waste management, water management, energy grids, and transportation. Soft domains comprise the second group, e.g. social issues, governance, education, policy innovations. Information and communication technologies used in smart cities support information sharing and integration between government agencies and external stakeholders (e.g. citizens) which represents another important benefit (Pereira et al., 2017)

Batty et al. (2012) presented a typology of smart city functions, which represent various views, later on understood as components. The components include the smart economy, smart people, smart governance, smart mobility, smart environment, and smart living (Batty et al., 2012), (Albino et al., 2015).

All the components are spread in the city so space issues are very important. Smart cities need quality spatial data and geographic information systems to assure spatial intelligence (Roche, 2014), good services, good governance (OGC, 2015), and inclusion of citizens into public affairs (e-Participation). Vazquez-Burguete et al. (2016) suggested that citizens do not have enough knowledge about their role and smart cities concept itself. Zheng (2017) pointed out the importance of functionality of applications used to involve citizens in public affairs and increase citizens' e-Participation usage.

Smart cities can include citizens in data collection. Benouaret et al. (2013) proposed a crowdsourcing framework for a large-scale citizens participation. Panek and Benediktsson (2017) used emotional mapping to engage cyclists to express their emotional reactions to routes and places.

The main aim of the paper is to evaluate how Web-based geographic information systems (GIS) are used by municipalities to inform or include inhabitants in public activities and affairs. Two former districts in the Pardubicky region, the Czech Republic, are included in the case study. The solutions are compared from the point of view of available functionality. Possible links to the size of cities mentioned. Some results are visualised in a form of maps.

2. Web-based Geographic Information Systems as an e-Participation tool

Spatial information and spatially-oriented decision making have become an inevitable part of peoples' lives. Many spatial data is already available online. So, the importance of Web-based GIS is today indisputable. Desktop GIS applications provide too complex user interface with many functions. Their utilization requires appropriate skills and knowledge. The necessity

of installation in a PC represents another disadvantage. Correctly designed Web-based GIS prevents a user to make mistakes because of his/her insufficient knowledge (Komarkova et al., 2007). Utilization of tablets and mobile phones as a client's device represents a contemporary trend, which corresponds to the smart cities concept. Another advantage of Web-based applications is that data are maintained by the publisher.

In many cases, the online presentations are interactive, in other cases, they still provide limited functionality. Importance of an adequate functionality was emphasized by Zheng (2017). A number of specific functions required by end-users of Web-based GIS applications is limited (Komarkova et al., 2011). They need to be able to zoom and pan (to move around their area of interest). Users usually need to control data visualization (to set, which data layers will be visible). Spatial and attribute database queries (i.e. searching according to location and/or attributes) and features identification represent the first group of analyses. Network analyses, like path optimization, belong today to the highly required functions but they are suitable just in adequate applications. Results saving, printing, and sharing is another group of required operations (Komarkova et al., 2011). Bugs et al. (2010) showed that Web-based GIS may support participatory urban planning. Importance of a careful choice of a suitable participation tool is pointed out by Afzalan et al. (2017).

3. Case Study

The case study covers two former districts in the Pardubický region, the Czech Republic, namely Pardubice District and District Ústí nad Orlicí. These two districts consist in total of 227 municipalities. The city of Pardubice is the regional capital. It had 90 335 citizens by January 1, 2018. On the other hand, the smallest municipality was Holotín with 52 citizens. In total, there were 186 municipalities with less than 1 000 citizens, 31 municipalities with 1001 – 5 000 citizens, 9 municipalities with 5001 – 20 000 citizens by January 1, 2018. There were no municipalities with 20 001 – 90 334 citizens (CSO, 2018). Terrain of the Pardubice District is mostly flat and there is a high concentration of industry. On the opposite, the Ústí nad Orlicí District covers mountainous areas and provides less urbanized environment (BusinessInfo.cz, 2017).

In total, 95 of the covered municipalities used 5 different commercial Web-based GIS solutions as geoportals or map portals by March 20, 2018: Cleerio (<https://www.cleerio.com/map-application/>), Gepro (<http://www.gepro.cz/produkty/geoportal-gepro-2/>), GObec (<https://www.gobec.cz/mapovy-server/>), Marushka (<https://marushka.geostore.cz/>), and T-mapy (<https://www.tmapy.cz/hlaseni-zavad>). All the solutions provide zooming and panning. T-mapy solution is implemented only once and it is implemented in a specific form of fault reporting application so it is not fully comparable to the other solutions. Table 1 describes the basic functionality of evaluated Web-based GIS solutions. Evaluation is based on the visiting all Web sites of included municipalities, in detail on the following Web sites: <https://maps.cleerio.cz/borek-pardubice>, <http://geoportal.gepro.cz/obce/574821#/>, <https://www.gobec.cz/dritec/>, <http://mapy.ceska-trebova.cz/marushkapublic/>, <https://hlaseni.tmapy.cz/#575500>. As it can be seen from URLs, almost all Web-based GIS sites are run at the side of provider, not by municipalities themselves. Marushka is the only exception.

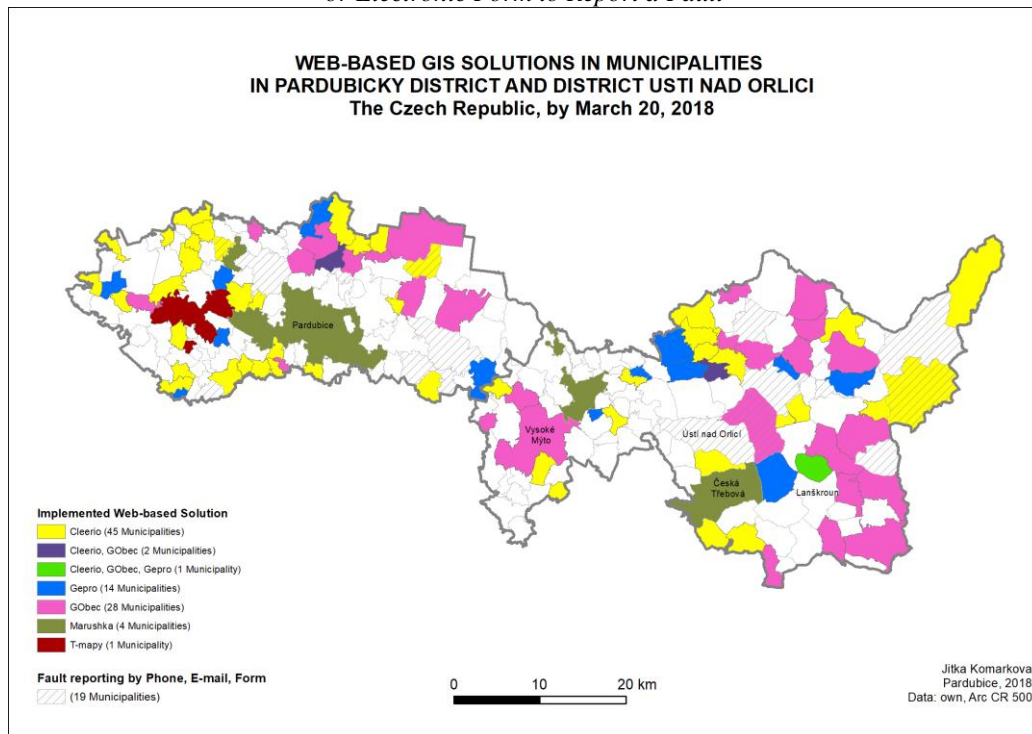
Table 1: Overview of Basic Functionality of Implemented Solutions

Solution	Turning Layers On/Off	Distance/area measurement	Coordinate information	Printing
Cleerio	Click on the layer name	Y	N	Y, choice of size, orientation, additional information available
Gepro	Checkbox	Y	Y	Y, choice of size, orientation, additional information available
GObec	Checkbox	Y	Y	N
Marushka	Checkbox	Y	Y	Y, choice of size, orientation, additional information available
T-mapy	Click on the layer name	N	N	N

n – not available, y – available

Source: authors

Figure 1: Spatial Distribution of Utilization of Web-Based GIS Applications and Utilization of Phone, E-mail or Electronic Form to Report a Fault



Source: Authors, based on data Arc CR 500 and own data

One of the functions, which may be very interesting for citizens, is fault reporting, e.g. public lighting failure, litter, or a hole in the pavement. Only three of the municipalities with Web-based GIS have implemented this functionality. Two municipalities offer a specialized mobile application. Out of these, the cities of Pardubice and Ceska Trebova offer both a specialized mobile application and electronic form. Fig.1 shows implemented solutions and it points out municipalities, which still provided only phone, e-mail or electronic form for fault reporting by March 20, 2018.

4. Results and Discussion

Web-based GIS applications can provide an environment able to involve citizens in public affairs, i.e. to support e-Participation. Zheng (2017) pointed out that rich functionality supports citizens' involvement in public affairs.

The paper focuses on fault reporting functionality. The following ways of fault reporting are taken into account:

- Phone, E-mail, electronic form (PEF)
- Web-based GIS application, which allows location of the fault in the map (WebGIS)
- Mobile application (MA)

The evaluation is conducted at two levels. At first, all municipalities over 1 000 citizens in the Czech Republic are included. Next, all municipalities of the former Pardubice District and Usti nad Orlici District (highlighted by violet colour in Fig. 2) are included. Some of the municipalities have implemented more than one way so a sum of municipalities with different ways of fault reporting may be higher than the total number of municipalities.

Table 2: Ways of Fault Reporting in the Czech Republic in Municipalities over 1 000 Citizens

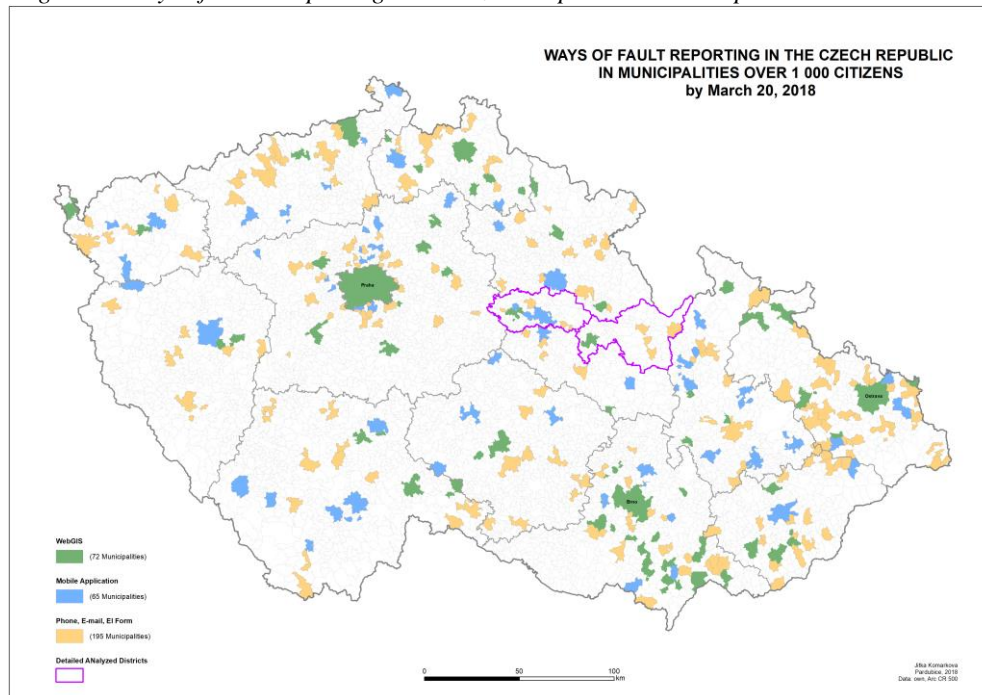
Number of citizens	1 000 – 5 000		5 001 – 20 000		20 001 – 50 000		Over 50 001	
No of municipalities	1170		212		44		18	
Fault Report	No	Share [%]	No	Share [%]	No	Share [%]	No	Share [%]
Nothing	998	85	101	48	16	36	0	0
PEF	126	11	65	31	19	43	16	89
WebGIS	31	3	29	14	6	14	6	33
MA	21	2	25	12	11	25	8	44

Source: Authors

Table 2 reveals that larger cities are more interested in providing more tools for citizens to allow them participation in public deals. Mobile applications have become popular. Some cities have their own application (e.g. Brno), more of them use “general” applications like “Dej tip” or “V OBRAZE”.

Table 3 describes results for the two districts. The only city over 20 000 citizens is the city of Pardubice (90 335 citizens). It offered both phone and a mobile application reporting. The last line of the table shows number of Web-based GIS used as a general-purpose geoportal.

Figure 2: Ways of Fault Reporting in the Czech Republic in Municipalities over 1 000 Citizens



Source: authors, based on data Arc ČR 500 and own data

Table 3: Ways of Fault Reporting in the Pardubice District and District Usti nad Orlici in All Municipalities

Number of citizens	0 – 100		101 – 500		501 – 1000		1001 – 5000		5001 – 10000		10001 – 20000		Over 20 000	
	No	[%]	No	[%]	No	[%]	No	[%]	No	[%]	No	[%]	No	[%]
Number of municipalities	12		120		52		31		5		3		1	
Fault Report	No	[%]	No	[%]	No	[%]	No	[%]	No	[%]	No	[%]	No	[%]
Nothing	12	100	116	97	48	92	24	77	1	20	1	33	0	0
PEF	0	0	3	3	3	6	7	23	3	60	2	67	1	100
WebGIS	0	0	1	1	1	2	0	0	1	20	0	0	0	0
MA	0	0	0	0	0	0	0	0	0	0	1	33	1	100
WebGIS – general app	3	25	50	42	26	50	10	32	3	60	2	67	1	100

Source: Authors

Implementation of this kind of services has started and number of available Web-based solutions and mobile applications is increasing. It is now important to focus on the quality of applications as pointed out by Simonova and Novak (2016).

5. Conclusion

Globalization can promote good governance as showed Asongu (2017). Good governance can improve the conditions of life of people in cities. Globally growing population requires a

high quality of life. Web-based GIS applications can provide an interactive online tool to publish spatial data and provide information to citizens and tourists. These applications can be used as an interactive tool to involve citizens into public affairs and local governance.

The paper describes the utilization of Web-based GIS as a tool for fault reporting. It provides two levels of view. At first, municipalities of the Czech Republic with more than 1 000 citizens are included. Next, all municipalities of the Pardubice District and District Usti nad Orlici are included. Utilization of Web-based GIS is increasing. It has become a part of Web sites of many cities and even small municipalities as far as ready-made solutions are provided and hosted by service providers, which take care of base data as well. Municipalities do not need to employ a skilled administrator and own a necessary hardware and software. Additionally, popularity of mobile applications increases along with availability of suitable applications as it can be seen from the data.

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COMPETENCE CENTERS AS AN INSTRUMENT TO COMMERCIALIZE TECHNOLOGY DEVELOPMENTS IN THE CONTEXT OF GLOBALIZATION

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Abstract. In the context of anti-Russia sanctions and in the implementation of a new policy aimed at export promotion and import substitution, a focus on stimulating innovative activities at different levels of governance towards better research and development and the creation of breakthrough technologies should be its importance direction. In this respect, competence centers that are focused on the knowledge generation and rapid commercialization, that are accommodated with unique physical, technical, intellectual and human resources and act as national and/or world leaders in one or more areas of science and technologies is a promising instrument in the context of the intensifying world innovation processes. While centers of competence in the developed countries contribute to the global competitiveness of the countries, regions, companies, and universities, in Russia, this process is in its infancy and their creation has barely begun. Narrative flow: 1) review of the literature that in one way or another considers the theoretical aspects of the processes of globalization, regionalization, and cluster development and outlines the directions for the study of competence center issues; 2) classification characteristic of the instruments to commercialize Russian technology developments in the context of globalization; and 3) Russian practices in the creation and expansion of competence centers, including the Pilot Innovative Territorial Cluster initiative for Pharmaceuticals, Biotechnology and Biomedicine (the Kaluga Region).

Keywords: globalization, regionalization, innovative clusters, competence centers

JEL Classification: F63, O31, R11

1. Introduction

Internationalization is a basic concept for the globalization interpreting: a process of development of external international operations (Piercy, 1981) and also a process of gradual increase of company involvement in international activities, enhancing the companies export positions (Johanson & Vahlne, 1977). National innovation systems, which are "... national institutions, motivating structures and competencies determining speed and direction of technological knowledge/ education in the country" (Patel & Pavitt, 1994), as well as their subsystems: territorial, sectoral, spatial, etc., are of key importance for ensuring global competitiveness.

A trend of modern innovation processes is the systems globalisation, when the global strategy of innovation expansion is related to the production factors, having a clear territorial reference, and fits into the socio-cultural context of potential consumers regional markets (Boschma, 2005; Jha & Krishnan, 2013). Thus, the key to the innovative economy development is improvement

of regional innovation systems (Makarov et al., 2016). Regional innovation system is an association of various actors of innovative activity, contributing to the processes of regional economies cauterization. World experience, first of all, experience of the USA and Germany, shows that regional globally-oriented clusters are one of the effective forms to organize "points of innovative growth", being the most promising for the Russian Federation moving in the direction of export-oriented economy development, entering into global added value chains (GAVC). Global innovation processes require consistent creation of the global added value chains, transfer and expansion of modern competencies, choice of strategic partners and creation of international high-technology alliances (Simachev et al., 2014). Thus, creation of effective regional innovation systems is associated with implementation of such a priority as establishment of monopoly in high-tech links of global added value chains. In other words, countries seek to create higher added value in the international division of labor, and they achieve this by means of, among other, activation of regional innovation processes on a cluster-network basis.

Open innovations that stimulate commercialization of technological developments (TDC) and aimed at creating new opportunities by launching of joint market for new products and services using complementary knowledge of different partners are becoming increasingly important in the cluster-network economy. Geographical proximity and direct social interactions are important for open innovation; the clusters are concentrated in certain high-tech zones (regional hotspots) (Grossfeld & Rolland, 2008).

A number of studies have shown that tendency of innovation to spatial clustering is associated with transfer of implicit knowledge (Audretsch & Feldman, 1996; Debresson, 1989). In terms of increasing innovation activity in Russia and its regions, it is important to focus on the "learning economy" model. In our case, the learning process is understood not just as accumulation of knowledge or access to information, but as a process of developing new areas of competence and skills (Lundvall & Johnson, 1994). In the context of globalization, high-tech innovation processes are structured differently; they include technological competencies as a part, which are institutionalized in the form of competence centers (CC). In Russia, there are just a few studies on this topic; some of modern directions of their analysis are presented in the Table 1.

Table 1: Competence centers: sources review

Researcher	Direction
S.A.Zaichenko Centers of excellence in the system of modern scientific policy // Foresight. 2008. Vol.2. No. 1. p. 42-50.	A concept of "centers of excellence" is defined, their types are distinguished, nature is defined, evolution is shown and analysis of the world and Russian experience of forming and developing of such structures is carried out.
A. Snurnitsyn Model of strategic competence centers comes to Russia //CIO. 2008. No. 10. p. 26-29.	The article describes strategic CC as a tool of scientific and technological development in Russia.
A. S. Burnasov et al. Baden Württemberg region, Germany: society, economy and innovation. Yekaterinburg: Publishing House of Ural State university, 2012. - 264 p.	A concept of "competence cluster" is defined; experience of cluster development in Baden Wurttemberg region is described.
L. D. Gitelman, M. V. Kozhevnikov Competence centers are a progressive	Features of CC as structures aimed at active search, transfer and accumulation of new knowledge and unique experience are emphasized; their classification characteristic is given.

form for organization of innovation activity. // Innovation. 2013. No. 10. p. 92-98.	
F. V. Zayats, V. V. Vinokurov, V. V. Kulabukhov Creation and development of competence centers and technological excellence centers in JSCAvionica. 2013. No. 12. p. 98-102.	Creation and prospects of development of a special avionics competence center "Innovative technologies" by one of the institution of the military-industrial complex of Russia for development, production and entering market of new innovative products are described.
A. I. Glukhova Development of model and structure of the corporate competence center // Master's Journal. Social and economic sciences. Economy. 2015. No. 1. p. 316-322.	The essence and structure of the corporate competence center are defined.
E. V. Latypova, Innovative potential of competence clusters in the knowledge economy //Issues of Economics and Law. 2015. No. 5. p. 139 - 143.	Interpreting of concept of "competencies cluster" as a kind of concentration of various interrelated skills of individual specialists to solve common problems in the system of innovative development.
I. V. Rozhdestvensky, O. I. Rozhdestvensky, A. Y. Tarshin A model of effective technological transfer system in universities and scientific organizations of the Russian Federation. 2015. No. 11. p. 106-109.	A model of the Center for Technologies and Competencies Marketing and Transfer focused on overcoming the communication barrier between developers, industry and university administration is developed. A system of goals and indicators for organization of such a center was created.
V. N. Kiselev Global added value chains: challenges and prospects for Russian science and innovation //Innovations. 2017. No. 10. p. 17-23.	It is proved that the corporate competence of a potential participant of global added value chains plays a key role in choice of partners for outsourcing of certain activities, especially R&D.
S. V. Chemezov et al. Diversification, competences, problems and tasks. New opportunities. 2017. No. 4. p. 3-26.	The unique technological competence (UTC) of teams of specialists is a basis of Centers of Global Excellence. New opportunities for commercialization and diversification based on unique technological competence implementation are defined; it is shown that the technology is derived from competence.

Source: Compiled by the author

Analysis of Russian sources showed that, at the moment, there is a period of rapid reflection and there is no stable scientific interpretation of this category. In each paper, the category is interpreted in own way. Meanwhile, a large number of approaches to the analysis of the essence of this category allow accelerating the process of its conceptualization.

2. Tools for commercialization of technological development results in the context of globalization

Trends in development of world science, production and consumption are associated with the acceleration of the process of creating new knowledge, emergence of new technological competencies that stimulates the process of development, production and entering market of new technologies, products, and, ultimately, achievement of global excellence by economic entities. In such a state of affairs, technological competencies become not only a key factor of competitiveness, diversification of activities and sustainable development of countries, regions, businesses and organizations, but also one of the effective tools for commercialization of technological developments.

In Russia, it is the commercialization of technological developments problem that is the most pressing in terms of the activation of innovative processes at various levels of their

implementation. One of the promising directions for the problem solution is improvement of existing and introduction of new TDC tools.(Table 2).

Table 2: Classification characteristics of the technological developments commercialization tools

Approach	TDC tools
Global	<ol style="list-style-type: none"> 1. Global competence centers (Global centers of excellence); 2. Global added value chains; 3. Clusters of competencies; 4. Global business universities; 5. National contact points (Russia-EU); 6. Network platform for implementation of joint multilateral projects based on the ERA-NET mechanism; 7. BRICS TTN information and communication system for technology and knowledge transfer; 8. International cooperation program organized by the Fund of support of small enterprises development in scientific-technical sphere; 9. The International Innovative Nanotechnology Centre (Dubna); 10. TNC; 11. Small high-tech companies in the newest field (startups).
National	<ol style="list-style-type: none"> 1. Competence centers of the National Technology Initiative (public-private partnership) on cross-cutting technologies; 2. Foresight of scientific and technological competences; 3. Triad: forecast-plan-program; 4. Innovation infrastructure, including predictive-technology functions; 5. RVC, JSC
Regional	<ol style="list-style-type: none"> 1. Innovative clusters of competencies; 2. Regional foresight of scientific and technological competences; 3. ROSNANO nanotechnology centers in the regions; 4. ROSNANO technology engineering companies in the regions; 5. Special economic zones of technical and innovative type; 6. Regional innovation centers; 7. Regional innovation infrastructure; 8. Regional venture funds; 9. Small innovative companies.
Sectoral	<ol style="list-style-type: none"> 1. Industry foresight of scientific and technological competences; 2. Industry venture funds; 3. Small innovative companies.
Corporate	<ol style="list-style-type: none"> 1. Centers of technological (innovation) competencies; 2. Open innovation centers; 3. Global added value chains; 4. Corporate foresight centers of scientific and technological competence; 5. Program of cooperation of corporations and universities; 6. Corporate venture funds; 7. Programs of innovative development of state corporations; 8. Small innovative companies.
University	<ol style="list-style-type: none"> 1. Competence center; 2. Foresight centers of scientific and technological competence; 3. Business universities; 4. Small innovative companies, including startups and start-up studios; 5. Innovative infrastructure (business incubators, technology parks, technology transfer centers, etc.); 6. Technical entrepreneurship training program.
Institutional (funds)	<p>Development institution:</p> <ol style="list-style-type: none"> 1. Development Fund of SKOLKOVO Center for Elaboration and Commercialization of New Technologies; 2. Fund of support of small enterprises development in scientific-technical sphere; 3. RUSNANO Fund for infrastructure and educational programs;

	4.RVC Seed Fund; 5.RVC Infrastructure Fund, etc.
Other	Alternative stock exchange platforms

Source: Compiled by the author

As can be seen in Table 2, a cross-cutting tool for the TDC stimulation is one of the competence centers. In the Russian practice, under the sanctions of Western countries, a process of technological competences institutionalization can be realized in the most productive way at the regional, corporate and university levels (Tables 2 and 3).

Table 3: Competence centers in Russia: current situation

Regional	Clusters of competencies: 1.Pilot innovative territorial clusters (pilot ITC) – 27; 2. Production clusters-22; 3.Innovation clusters – leaders-11.
Corporate	CC of the State ROSTEC Corporation: 1.The Clusters of competencies and technological excellence of Avionica,JSC in the avionics thematic areas: "Aviation electronics"; "Complex control system of the aircraft"; "Control systems of the special machinery"; "Software system for avionics"; "Innovative avionics technologies"; 2.CC for the control and registration systems of Izmeritel,JSC, leader of instrument engineering in the Russian Federation; 3. The Center for open innovation of "Avtomatika" group of companies; 4. 5 clusters of competences in the basic directions of Roselectronika, JSC, etc.
University	1.St. Petersburg National Research University of information technologies, mechanics and optics:5 Centers of excellence on the basis of international laboratories (Photonics and natural sciences, "Smart materials", life and health sciences, intelligent technologies and robotics, information technologies in the economy, social sphere, art), etc.;; 2. R & D University 20.35: competences in cross-cutting technologies (artificial intelligence and big data analysis, application of distributed registers, Internet of things and cybersystems, virtual and augmented reality, neurointerfaces).

Source: Compiled by the author

Some examples of the competence-based approach implementation for the innovation activity activation are given in Table 3. Since 2008, this approach has been purposefully applied in the State ROSTEC Corporation, promoting effective commercialization and diversification of enterprises of the national defense industry, in innovative clusters, territorial "growth poles", as well as in the most advanced national research universities of business type.

3. Competence clusters in Russia

As it was noted above, forming and developing of productive regional innovation systems is based on cluster-network cooperation. At that, exact cluster model should take into account two types of "knowledge flows", that is, flows of local and global scales. The more businesses in a cluster build up their interlocking networks, the more information and news about markets and technologies enter the internal networks, and the more dynamic becomes the environment from which local players benefit (Bathelt, Malmberg & Maskell, 2002). An interesting feature of the strategic centers of excellence – creation of territorial conglomerates (clusters) which unites the capacities and infrastructure of the laboratories themselves, contractors and spin-off companies and other private companies (Zaichenko, 2008).

A term "competence cluster" first appeared in Russian scientific publications in 2012 (Burnashov et al., 2016.). Clusters of competence are a territorial form of integrated R & D works of a higher order, formed as a result of research cooperation of a group of innovative companies

(of the same or different profiles), research organizations (research institutes and laboratories), universities and higher schools in the region and they can include one or a group of technological clusters and parks. Their distinctive feature is the final integration of all stages of the innovation process within the region (Burnasov et al., 2016).

The world experience also shows that the University's connecting role in the cluster should be a key. A university is a science, competence and education at the same time. The cluster should train qualified personnel... and have, among other things, training programs. Clusters need to be related to local universities and laboratories (Wessnerand & Wolff, 2012).

Russia started implementation of cluster policy in 2008, but it became the most effective in 2012, resulting in creation of 27 pilot innovative regional clusters located in regions with a high level of innovation development, which are science cities, special economic zones, industrial parks, 22 industrial clusters (2015) aimed at import substitution and 11 cluster-leaders (2016) aimed at Russian companies entering to foreign markets and integration into global added value chains.

Cluster development in Russian regions shows a generally positive trend which is especially visible in relation to the pilot innovative territorial clusters specializing, in particular, in the field of advanced technologies; efficiency of these efforts can be assessed in a period of four years from 2012 to 2016. Data on one of the pilot innovative territorial clusters are given in Table 4.

Table 4: Activities of the cluster "Pharmaceutics, biotechnology and biomedicine" (Kaluga region) in 2013 and 2016

Indicators	2013	2016
1. Number of employees in organizations-members of the cluster (pers.)	5380	10500
2. Volume of goods shipped by the members of the cluster (bn. rubles)	17.8	35.3
including volume of shipped innovative products (%)	70	-
3. R & D costs of cluster enterprises (mln.rubles)	917	4445
4. Volume of investments in fixed capital (bn. rubles)	13.5	51.72
5. Gross Regional Product (GRP) of the region (Kaluga region) (mln. rubles)	292841	373403.5
6. Share of internal research and development costs, % of GRP	3.10	2.49
7. Number of patents received	10	No data
8. Number of patent applications filed: a. international, b. national, c. regional	a. – 3; b – 4; c – 4	No data

Source: compiled and calculated by the authors based on: <https://www.gisip.ru/#!ru/>; <http://map.cluster.hse.ru/list> (date of extraction - 24.05.2018)

As it can be seen, most of the indicators have positive dynamics: for the first and second positions, growth is 2 times, for the third and fourth, respectively, – 4 times. And volume of innovative products shipped is fairly high. At that, situation in the sphere of intellectual activity (number of patents and patent applications) requires changes toward its increase that would increase competitiveness in the domestic and, in the future, in the foreign market. To do this, it is necessary to increase and continuously update technological competence, strengthen ties with related clusters located in other regions and countries. The State should develop a mechanism of R & D localization for Russian and foreign investors.

At the same time, the future of clusters of competencies, and, in general, "...development of cluster potential in Russia will largely depend on the ability of at least some of the clusters to move to a model of sustainable development in the near future" (Kutsenko, 2015). It should not be overlooked that aggregation of activities of cluster members destroys its core competencies. It is necessary to clearly define the activities, products and technologies that are strengths, unique competitive advantages of the cluster (Abashkin et al., 2012).

This cluster meets requirements of the world standards and includes well-balanced main components: industrial production of finished dosage forms, research and development of original pharmaceutical substances and "active molecules", training of specialists for the pharmaceutical industry. The core of the cluster are the world's largest manufacturers of medicines- Group of companies STADA CIS, "Berlin-Chemie / Menarini (Italy), "NovoNordisk"(Denmark), AstraZeneca (UK), included in the top 50 finished drugs manufacturers by sales in the commercial market, as well as Russian companies "NIARMEDIC"and"Sfera-farm" and more than 30 small and medium-sized innovative companies. The undoubted competitive advantage of the cluster is effective use of the scientific and production potential of the first science city of Russia - Obninsk, a multi-profile research complex: 12 research institutes, 20 research centers, including the A. Tsyb Medical Radiological Research Center, Obninsk Institute for Nuclear Power Engineering (OINPE) Obninsk, State Scientific Centre of the Russian Federation – Institute for Physics and Power Engineering named after A.I. Leypunsky. Well-developed educational system with qualified personnel, including: branch of Obninsk Institute for Nuclear Power Engineering - National Research Nuclear University "MEPhI", "Kaluga State University named after K. E. Tsiolkovsky". Ready for use industrial sites with infrastructure: industrial parks "Grabtsevo"(Kaluga),"A-Park"(Kaluga), "Vorsino" (Borovsky district), Obninsk municipal industrial zone (Obninsk), Zone of innovative development (Obninsk). (Valaskova & Gregova, 2017)

4. Conclusion

1. A range of theoretical and methodological studies on technological competencies and CC is insufficient and further in-depth researches in this area are required.

2. International experience shows that CC contribute to global competitiveness, but, in Russia, this process is not yet developed properly although some experience has been accumulated at corporate, regional, university level.

3. In Russia, cluster policy as a clear, interrelated, effective system of goals, means and methods of their achievement, tools and mechanisms of management is absent. The work on its formation should start with legislative regulation of cluster development in the Russian Federation. There is a need to develop a framework law on cluster development in Russia. Only the law which dramatically reduces the risk of its misunderstanding and application can give the cluster policy a legal basis.

4. It is advisable to carry out continuous monitoring of the indicators of CC, including clusters of competencies, in order to identify their bottlenecks and problems.

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THE IMPACT OF ICT USE ON THE COMPETITIVENESS OF THE EU TRANSPORT SECTOR IN GLOBAL MARKETS

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Abstract. Transport and communication are two factors that shape the economic reality to a large extent and affect nearly all market players. This results to a large extent from the complementarity of functions performed by these two factors. Transport is the basis of the European integration process as a factor affecting three of the four freedoms that underpin the single market: the free movement of people, goods and services. The transport sector of the European Union is an area of great importance from the economic, social and environmental point of view - a developed and efficient transport network supports trade links, promotes economic growth, creates new jobs and improves overall competitive position. It is also a sector facing many challenges related to such phenomena as progressive urbanization, increasing emphasis on reducing negative environmental impact, traffic congestion, or lack of integration between different modes of transport. The way to reduce the impact of these challenges is to increase the efficiency and innovation of the European transport sector in global markets through the wider use of modern information and communication technologies (ICT). The aim of the article is to show the role attributed to ICT solutions for increasing the efficiency and competitiveness of the European transport sector. Considering the complicated relationship between the development and dissemination of ICT and their impact on transport, analysis of EU transport policy documents has been carried out in view of the approach to various types of ICT solutions that can be implemented in the European transport system.

Keywords: European Union, European Union policies, ICT, transport sector

JEL Classification: O14, O19, O52

1. Introduction

Transport is of great importance for economy and society. In the perspective of European integration it is perceived as one of the most important factors affecting the coherence of this process and for maintaining the competitiveness of the EU economy (Banister, 2011). At the same time, the transport sector is the largest user of energy in the European Union (Letnik et al., 2018) and its environmental impact is still one of the most important challenges and problems addressed in EU transport policies (Andres & Padilla, 2018). The way to reduce the negative impact of the transport sector on the environment while improving its efficiency and competitiveness on the global market is a wider use of ICT solutions (Gerboni et al., 2017) and innovation (Wiesenthal et al., 2015).

Taking into account the growing role of ICT in various areas of the economy, including the transport sector, the article analyses the EU transport policy documents to show the role and impact of ICT solutions on the EU transport sector. When analysing documents in the field of EU transport policy, one should remember about the level of complexity of this sector resulting

from, among others, a large number of transport modes considered, a wide and heterogeneous group of stakeholders, diversification in expectations and capabilities of individual member states (Ponti et al., 2013) and a changing perspective (Aparicio, 2017). The struggle between balancing the economical and environmental priorities is reflected in the European Union transport policies (Dyrhauge, 2014).

2. Methods

The analysis of EU documents in the area of increasing the use of ICT potential as a means to improve the competitiveness of the EU economy has allowed to identify key areas in this regard (Kos-Łabędowicz, 2016). Due to the fact that some of the identified areas concern the broadly understood transport sector of the European Union, which is also considered crucial for further internal integration and competition on the global market, it is reasonable to analyse EU transport policy documents from the perspective of ICT usage, all the more considering the dependencies between development of information and communication technologies and transport as well as the complement role of ICT solutions for the transmission of information relevant to the transport of people and goods (Kos-Łabędowicz, 2015). Analysis of the content of 12 selected documents related to the EU transport policy has allowed the identification of three groups of documents in terms of including in their content ICT solutions and the role attributed to them. The first group includes documents in which ICTs are mentioned but main focus is elsewhere. The documents included in the second group indicate ICT solutions as important tools to implement the assumed activities in the field of EU transport policy. The documents assigned to the third group indicate ICT solutions as crucial for achieving the objectives set for both transport sector and whole Community (Kos-Łabędowicz, 2018). In the tab. 1 EU transport documents analysed separately were assigned to the three established groups.

Table 1: Analysed EU transport policy documents divided according to the role attributed to ICT solutions

Date	Title of the Document	Main Focus
1 st group - ICT solutions are present but main focus is elsewhere		
2001	White Paper: European transport policy for 2010: time to decide	Modern transport system should be sustainable
2008	Greening Transport	Setting price signals for transport users that will reflect real cost of their choices
2009	A sustainable future for transport: Towards an integrated, technology-led and user friendly system	Review of past policies and basis for further consideration for development of further policies
2016	A European Strategy for Low-Emission Mobility	Shift to low-emission mobility is essential for ensuring EU's competitiveness and catering to mobility needs of people and goods
2 nd group - ICT solutions are seen as important tools for fulfilling objectives set from transport policy perspective		
2006	Freight Transport Logistics in Europe - The key to sustainable mobility	Advanced logistic solutions are needed to optimise European transport system
2007	Freight Transport Logistics Action Plan	Logistics has a key role in ensuring sustainable and competitive mobility in Europe
2007	Green Paper: Towards a new culture for urban mobility	As a majority of EU's population lives in urban areas, urban mobility requires rethinking
2008	Action plan for the deployment of Intelligent Transport Systems in Europe	Acceleration and coordination of implementation of solutions for road transport management in the form of Intelligent Transport Systems (ITS).

2009	Action Plan on Urban Mobility	List of integrated actions related to the urban mobility
2009	Green Paper: TEN-T: A policy review. Towards a better integrated Trans European Transport Network at the service of the Common Transport Policy	Policy review pointing to the need of placing climate change objectives in the centre of further TEN-T policies
3 rd group - ICT solutions are seen as important tools for fulfilling objectives set for transport sector and whole Community		
2011	White Paper: Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system	Staying competitive in the transportation area, supporting mobility and at the same time ensuring sustainability and reaching emission reduction targets
2016	A European Strategy on Cooperative Intelligent Transport Systems, a milestone towards cooperative, connected and automated mobility	The potential of cooperative, connected and automated vehicles to boost EU's industry competitiveness and ensuring transition to low-emission mobility

Source: (Kos-Labędowicz, 2018; Eur-Lex, 2008)

Most documents were qualified for the second (6) and the first groups (4). Nevertheless, due to the stated goal of this paper, the documents from the second and third groups will be subject to a more detailed analysis.

3. Results

The analysis starts with the documents regarding the EU transport policy and the broadly understood transport sector that are qualified for the second group. For each document, the theme and the area within the transport sector on which it focuses is briefly described. Next, the types of ICT solutions mentioned in a given document are indicated along with role assigned to them and specific application examples are mentioned, if present. The documents are analysed in tab. 1 order and their summary is presented in tab. 2 and tab. 3.

The first of the analysed documents concerns freight transport logistics in Europe and points to the need to increase the efficiency of the European transport system using advanced logistics solutions. This is due to the rapid growth of freight transport (especially road transport) and the intensification of the negative effects associated with it (e.g. air pollution, noise, congestion, dependence on fossil fuels). Increasing efficiency through ICT solutions is aimed at eliminating the limitations resulting from the existing capacity of the European transport system. Modern logistics solutions can affect the improvement of efficiency of individual modes of transport as well as facilitate the integration of different modes promoting greater use of more environmentally friendly ones. In terms of ICT solutions, their key role in tracking and tracing of cargo is indicated, regardless of the type of transport. Among the specific solutions listed are: satellite navigation system GALILEO, the Long-range Identification and Tracking (LRIT), River Information System (RIS) and Automatic Identification System (AIS), SafeSeaNet, rail transport, telematic application for freight (TAF) and the European Railway Traffic Management System (ERTMS). Among the technologies and standards concerning the transfer of necessary information, solutions such as radio frequency identification (RFID) common messaging standards (e.g. EDI/EDIFACT) and new communications platforms (e.g. XML) are mentioned. Attention is also paid to the need to implement modern solutions for managing road infrastructure at the level of individual Member States in the form of intelligent transport systems (ITS). The readiness of enterprises to implement ICT solutions is also brought to attention, but without details. The document adopts a systemic approach to the problems and

challenges facing the European transport system with an indication of the important role of modern logistics solutions, including ICT (Eur-Lex, 2006).

The second of the analysed documents is an action plan referring to the previous document and needed actions related to freight transport, including legal regulations, establishing transport corridors, simplifying procedures for transporting goods, etc. The document refers to all previously mentioned technologies, with the indication that ITS are important enough to be elaborated in a separate document. One should notice the proposed concepts of e-Freight and e-maritime as essential for increasing the efficiency of the flow of goods regardless of the means of transport and dedicated to maritime transport respectively. (Eur-Lex, 2007a).

The 2007 Green Paper (Eur-Lex, 2007b) addresses the challenges facing the urban transport system in the EU and the provision of mobility for its inhabitants. As in the case of freight transport, the reason for taking action is the increasing inefficiency of the transport system resulting from excessive use of private cars for travel and the resulting problems (e.g. congestion, environmental pollution, noise). The proposed changes in urban mobility mainly concern promoting different than a private car modes of transport (e.g. collective, pedestrian, bicycle transport), reducing the need for relocation (e.g. tele-working, tele-shopping) and increasing the efficiency of existing transport infrastructure (e.g. ITS, traffic restrictions, bus-lanes, Park & Ride, etc.) and fleets (e.g. hybrid or electric vehicles) through the use of modern solutions. Solutions taking advantage of ICT should be distinguished, such as the already mentioned ITS or systems that collect and process data and provide information to relevant decision makers: those responsible for providing public transport services and the travellers themselves. City cards, intelligent toll systems, driver support systems, monitoring, intelligent vehicles, car-sharing and carpooling are other examples of modern solutions based on ICT aimed at improving urban mobility.

As previously mentioned, a separate, dedicated action plan is devoted to the development of the Intelligent Transport System in Europe (Eur-Lex, 2008). This document focuses on the use of ITS in road transport system management and its integration with other transport modes based on the aforementioned solutions such as GALILEO, RFID and eFright. The defined six priority areas of activities indicate the need for a comprehensive approach to all elements of the system with particular emphasis on security of information and users.

The urban mobility action plan (Eur-Lex, 2009) takes into account the ICT solutions proposed in the previous document in this area, but the emphasis is placed on system solutions and support for local administration in the implementation of individual activities and exchange of experiences and good practices.

Table 2: Analysis of EU documents of the 2nd group in terms of identified ICT solutions

Document title	Focus	Transport mode	ICT solutions included
Freight Transport Logistics in Europe- The key to sustainable mobility	Freight Transport	- rail, - road, - river, - maritime.	- general use tracking and tracing cargo and vehicles systems, e.g. GALILEO, LRIT, RIS etc., - communication standards, e.g. RFID, EDI etc. - road infrastructure management systems – ITS, - solutions for enterprises but without specifics.
Freight Transport Logistics Action Plan	Freight Transport	- rail, - road, - river,	- as in previous one: general use tracking and tracing cargo and vehicles systems, communication standards, ITS,

		- maritime.	- two new concepts: e-Freight and e-maritime.
Green Paper: Towards a new culture for urban mobility	Urban transport	- individual urban, transport, - public urban transport, - infrastructure and fleet management.	- systems for infrastructure and fleet management, e.g. ITS, - systems supporting decision making, e.g. Dynamic Passenger Information Systems, - tools facilitating new types of transport solutions, e.g. car-sharing or carpooling, - tools increasing effectiveness of existing solutions – e.g. electronic ticketing systems, parking spaces management system.
Action plan for the deployment of Intelligent Transport Systems in Europe	Road Transport	- road.	- broadly defined road infrastructure management systems – ITS, - general use tracking and tracing cargo and vehicles systems, e.g. GALILEO, LRIT, RIS etc., - integration of the vehicles into transport infrastructure, V2I, V2V, - solutions for travellers, e.g. HMI, eCall.
Action Plan on Urban Mobility	Urban transport	- individual urban, transport, - public urban transport, - infrastructure and fleet management.	- similar to those included in Green Paper: Towards a new culture for urban mobility (Eur-Lex, 2007) with minor revision and focus set on systematic approach to actions providing sustainable urban mobility for cities' residents.
Green Paper: TEN- T: A policy review. Towards....	Trans- European transport network TEN-T	- air, - rail, - road, - river, - maritime.	- broadly defined ITS systems for different modes of transport.

Source: (Eur-Lex, 2006, 2007a, 2007b, 2008, 2009a, 2009b)

The first of the analysed documents qualified for the third group indicates the need to transform the European transport system in order to ensure the implementation of general EU development goals such as economic growth or job creation. Apart from the indicated activities aimed at achieving such goals and creating A Single European Transport Area, the need to use a variety of tools to manage individual transport modes (such as SESAR, ERTMS, RIS, ITS) and the eFright concept are mentioned, but without any specific technical solutions (Eur-Lex, 2011). The last of the analysed documents expands and complements the concept of ITS (Eur-Lex, 2008) using mobile technologies to create a cooperative and automated system (C-ITS) enabling comprehensive mobility services for people and goods integrating different means of transport. This document largely describes the assumptions of the new system with an indication of the growing importance of communication technologies (e.g. 5G networks and satellite communications). The development of the new system and the possibility of offering modern mobility services are in line with general EU development objectives (economic growth) as well as contribute to minimizing the negative impact of the transport system on the environment (lower energy consumption and low-emission mobility). This document describes the concepts, indicates the need to use ICT, but does not provide specific technical examples (Eur-Lex, 2016).

Table 3: Analysis of EU documents of the 3rd group in terms of identified ICT solutions

Document title	Focus	Transport mode	ICT solutions included
White Paper: Roadmap to a Single European Transport Area...	Sustainable transport enabling economic growth and job creation.	Whole transport system	General system management tools, e.g. RIS, ITS.
A European Strategy on Cooperative Intelligent Transport Systems...	Innovative and cooperative transport system for energy efficient mobility services.	Road transport.	New systematic approach to Cooperative Intelligent Transport Systems

Source: (Eur-Lex, 2011, 2016)

4. Conclusion

The analysed documents concern various aspects of the transport sector, from the most general ones describing the entire EU transport system to more specific ones focused on specific transport modes or specific transport sector areas (such as urban transport). In the majority of documents, ICT solutions are indicated as a way to implement the activities assumed in a given area, but the solutions mentioned relate either to tools and systems concerning a given mode of transport on a pan-European level or technical solutions which can improve certain transport processes (e.g. GALILEO system or dissemination of RFID technology).

ITS is regarded as particularly important in the analysed documents for improving the efficiency of the transport sector, irrespective of its area, and for reducing its negative impact on the environment. Particularly in the documents focused on ITS and C-ITS, the potential possibilities and expected results related to the widespread implementation of these solutions in the European transport system are described comprehensively. Nevertheless, when analysing the documents regarding the state and directions of the European Union's transport policy, one should remember that policies without their consistent implementation will not cause desired and expected changes in the efficiency and competitiveness of the transport sector (Marsden & Docherty, 2013; Gossling & Cohen, 2014). Expected changes brought by effective implementation of transport policy are vast and concern variety of social, economic and environmental issues like energy efficiency (Ziolkowska & Ziolkowski, 2015) or sustainability (Robinson et al., 2011; Simionescu et al., 2017). New tools supporting planning and implementation of different aspects of transport policy are developed and brought for the use by decision makers (Tuominen et al., 2014)

Further research directions should refer to the assessment of implementation of activities regarding the use of ICT in the EU transport sector and the resulting improvements in its effectiveness and competitiveness, both on the European and national levels.

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GLOBAL TRENDS IN INTELLIGENT DEVELOPMENT OF URBANIZED AREAS

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Abstract. Contemporary urban areas are usually multi-million cities, agglomerations and metropolises, whose development was determined by historical, spatial, economic, social and political factors. The concentration of economic and social activities in these areas causes many negative effects influencing the conditions and quality of life of residents. Existing problems, development opportunities and expectations of the residents are different in different cities. Constant urban population growth requires preparation of proper development plans and responsible management of these areas. There are also new cities which are built from scratch (so-called greenfield development), that are expected to guarantee residents a high quality of life. Intelligent urban development is based on the concept of a smart city as a modern city of the future, assuming sustainable urban development based on innovative technologies. The aim of intelligent technologies used in the cities is to improve their functionality and to support the residents and provide them with comfortable, economic and safe lives. The smart city concept is the subject of broad deliberations in the literature and there are many different definitions that emphasize technical, social, institutional and environmental aspects. Six essential components that make up a smart city are often listed: smart governance, smart economy, smart mobility, smart environment, smart people, smart living. Different phases of intelligent cities development are also described. The aim of the article is to present global demographic, technological and innovative trends in the development of urban areas in the aspect of smart cities of the future.

Keywords: smart city, smart mobility, sustainable city, metropolis, smart living

JEL Classification: O13, O18, O50, R58

1. Introduction

Urbanization is one of the most characteristic global phenomena of the twentieth and early twenty-first centuries (Jedwab, Christiaensen & Gindelsky, 2017). Contemporary urban areas are usually multi-million cities, agglomerations and metropolises, characterized by a high concentration of population and socio-economic activity. Urban development has a long history in which various urban-creating factors such as: geographical (convenient location), economic (industrial and service activities), political (power centres), religious (places of worship), social and cultural played a significant role. The course of urbanization processes in the world is not homogeneous. In most of the highly developed countries, the increase in the urban population has been slowed down. The outflow of people from the city centres to the outskirts is common. In the group of developing countries, urbanization processes have the highest pace in the world (Gozgor & Kablamaci, 2015). Dynamic migrations from overpopulated villages to the cities cause many problems and conflicts which may include, in social dimension, poverty, homelessness, unemployment and crime (Glaeser, 2014). In the environmental dimension, the

main problem is air pollution and noise, the lack or poor technical conditions of water distribution and purification facilities, sewage disposal, uncontrolled garbage dumps, lack of greenery, building barracks for housing (slums and favelas). They have a decisive impact on the degradation of the natural environment and lowering the quality of life of inhabitants in the urbanized areas. Proper planning the development and later on responsible management of these areas is especially important considering the constant growth of urban population (Mitra, & Nagar, 2018). Transport systems of cities, which determine their economic and social mobility, are also important factors to consider. The key challenge facing urban mobility is traffic congestion resulting from urbanisation and a high dependence on cars in urban areas. Traffic congestion has many negative direct (e.g. poor air quality or road safety problems) and indirect (e.g. social cohesion or sustainable development) impacts on the urban environment (Moya-Gomez & Garcia-Palomares, 2017). Addressing mobility needs and limiting the adverse effects on society, economy and environment require application of holistic approach combining improvements to the effectiveness of the transport system with various demand-oriented measures (Zawieska & Pieriegud, 2016). Demographic and socio-economic changes (e.g. population ageing or suburbanisation), combined with regulatory and financial limitations provide unique set of challenges facing urban mobility of particular cities (Glaeser & Steinberg, 2017).

Improving the unfavourable phenomena related to the expansion of urban centres is one of the priorities of global development, included in a number of international documents. The principle of sustainable development is one of the basic rules used both to assess the state and shape the spatial structure of cities. The growth of the urban population is accompanied by another global trend (especially in European countries): the ageing of the population (Bacci, 2018). Due to their functions, current problems and expectations of residents, different conditions and development opportunities cities greatly differ from each other. In addition to historically shaped and constantly developing cities, there are also so-called „cities built from scratch” - modern cities of the future that are expected to guarantee residents a high quality of life. More and more often, the terms smart city, intelligent city etc. are used for them. The aim of the article is to present global demographic, technological and innovative trends in the development of urban areas in the aspect of smart cities of the future.

2. Methods

Urbanization leads to numerous economic, spatial and social transformations. The measure of urbanization is the index specifying the percentage of population living in the cities in relation to the rural population. There is no uniform definition of a city in the literature on the subject. There are many definitions of cities due to various criteria used to define them (Fox, 2018). The European Commission together with the OECD developed the definition of a city, based on the minimum population density and the number of inhabitants (Strzelecka, 2017). The problem is also how to determine the number of inhabitants of particular urban areas, which results from the methodology of counting how many people live in a given city (Uchiyama & Mori, 2017). The city is not a static creation and the number of its inhabitants and people staying temporarily in its area is constantly changing. In addition, so-called slums, where counting the precise size of their population is significantly hampered, are present in the majority of the world's largest cities. An important factor in counting the population of the city is how we define its limit. In a simplified way, you can count only residents in the administrative area of the city or in the entire urban agglomeration. There is no doubt that cities are places where a lot of people live and work, and that they are the centres of administration, transport and commerce.

But defining cities' geographical borders is more problematic and various international organizations use different criteria. Attempts to indicate definitions include various ideas like "city proper" (defined according to administrative boundaries), "urban agglomeration" (defined according to continuous built-up area) or "metropolitan area" (defined according to the interconnectedness of nearby areas) (United Nations, 2016).

There is also no standardized methodology for defining a sustainable city, but there are a number of guidelines in the literature that should be met to make the city sustainable (Mapar et al., 2017). The concept of a smart city as a modern city of the future assumes sustainable urban development based on innovative technologies, used to increase the functionality of cities in the aspect of economical, effective and ecological management (Lyons, 2016). There are different approaches to defining smart cities, which result from the adoption of a specific criterion narrowing their description by referring only to technological aspects or extending this concept also to the social sphere. Many publications review the definition of a smart city, highlighting the changes that have occurred in them as a result of the development of the concept (Bibri & Krogstie, 2017). Smart mobility as one of the elements of the smart city concept is essential for the functioning and development of the city and the quality of life of the residents (Kos, Tomanek & Krawczyk, 2018).

3. Results

The increase in the urban population results from the influx of rural population to cities and it is reflected in the increase of the population of multi-million cities. Table 1 presents changes in the number of inhabitants in selected cities above 10 million inhabitants in the years 1990-2025.

Table 1: Population of urban agglomerations with 10 million inhabitants or more in 2011 and their average annual rates of change, selected periods, 1990-2025

Urban agglomeration	Population (milions)			Average annual rate of change (percentage)	
	1990	2011	2025	1990-2011	2011-2025
Lagos, Nigeria	4.8	11.2	18.9	4.08	3.71
Dhaka, Bangladesh	6.6	15.4	22.9	4.02	2.84
Shenzen, China	0.9	10.6	15.5	11.89	2.71
Karachi, Pakistan	7.1	13.9	20.2	3.16	2.68
Delhi, India	9.7	22.7	32.9	4.03	2.67
Beijing, China	6.8	15.6	22.6	3.96	2.66
Shanghai, China	7.8	20.2	28.4	4.52	2.43
Manila, Philippines	8.0	11.9	16.3	1.89	2.26
Mumbai (Bombay), India	12.4	19.7	26.6	2.20	2.12
Kolkata (Calcutta), India	10.9	14.4	18.7	1.33	1.87
Mexico City, Mexico	15.3	20.4	24.6	1.38	1.32
Los Angeles-Long Beach-Santa Ana, USA	10.9	13.4	15.7	0.99	1.13
São Paulo, Brazil	14.8	19.9	23.2	1.42	1.08
New York-Newark, USA	16.1	20.4	23.6	1.12	1.05
Buenos Aires, Argentina	10.5	13.5	15.5	1.20	0.98
Paris, France	9.3	10.6	12.2	0.62	0.97
Rio de Janeiro, Brazil	9.6	12.0	13.6	1.05	0.93
Moskva (Moscow), Russian Federation	9.0	11.6	12.6	1.22	0.56
Tokyo, Japan	32.5	37.2	38.7	0.64	0.27

Source: (United Nations, 2012, p. 8)

Table 2 presents the forecasted number of inhabitants of urbanized areas according to their size and the level of development in year 2011.

Table 2: Population distribution of the world and development groups, by area of residence and size class of urban settlement, 2011 and 2025

Development group	Area of residence and size class of urban settlement (member of inhabitants)	Population (milions)		Percentage distribution	
		2011	2025	2011	2025
World	Urban area	3.632	4.643	100	100
	10 million or more	359	630	9.9	13.6
	5 million to 10 million	283	402	7.8	8.7
	1 million to 5 million	775	1,128	21.3	24.3
	500,000 to 1 million	365	516	10.1	11.1
	Fewer than 500,000	1,850	1,967	50.9	42.4
More developed regions	Urban area	964	1,043	100	100
	10 million or more	105	136	10.9	13.1
	5 million to 10 million	54	81	5.6	7.8
	1 million to 5 million	210	229	21.7	21.9
	500,000 to 1 million	87	111	9.0	10.7
	Fewer than 500,000	509	485	52.8	46.5
Less developed regions	Urban area	2,668	3,600	100	100
	10 million or more	255	494	9.5	13.7
	5 million to 10 million	229	321	8.6	8.9
	1 million to 5 million	567	900	21.2	25.0
	500,000 to 1 million	278	405	10.4	11.2
	Fewer than 500,000	1,339	1,480	50.2	41.1

Source: (United Nations, 2012, p. 9)

Table 3 shows the percentage share of population of urban areas on individual continents in the years 1970-2050.

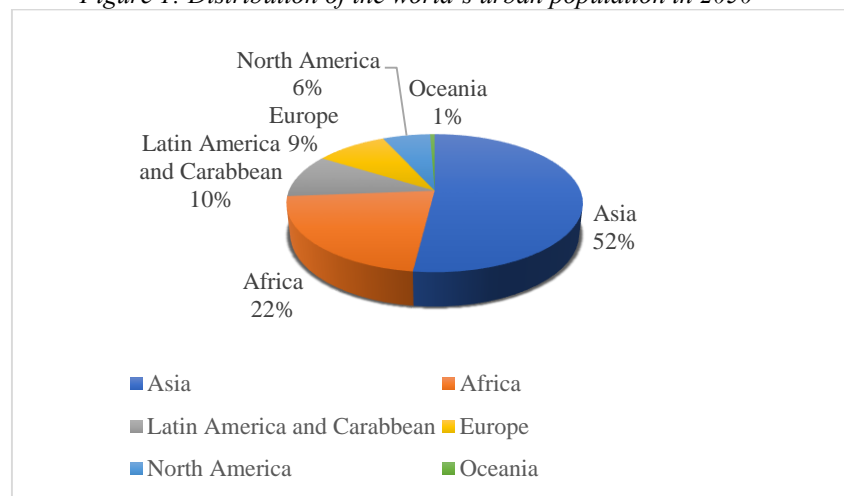
Table 3: Percentage urban by major area, selected periods, 1970-2050

Major area	Percentage urban				Rate of urbanization (percentage)		
	1970	2011	2030	2050	1970-2011	2011-2030	2030-2050
Africa	23.5	39.6	47.7	57.7	1.27	0.98	0.96
Asia	23.7	45.0	55.5	64.4	1.57	1.10	0.74
Europe	62.8	72.9	77.4	82.2	0.36	0.31	0.30
Latin America and the Caribbean	57.1	79.1	83.4	86.6	0.80	0.28	0.19
Northern America	73.8	82.2	85.8	88.6	0.26	0.22	0.16
Oceania	71.2	70.7	71.4	73.0	-0.02	0.05	0.12

Source: Source: (United Nations, 2012, p. 11)

2018 Revision of the World Urbanization Prospects published by the Population Division of the United Nations Department of Economic and Social Affairs estimates that Northern America is currently the most urbanized region as 82% of its population lives in urban areas. The degree of urbanization is estimated at 81% in Latin America and the Caribbean, 74% in Europe and 68% in Oceania. The population living in urban areas in Asia is now close to 50% and Africa is still the least urbanized continent in the world, with the level of urbanization at 43% (United Nations, 2018). Figure 1 shows the forecasted distribution of the world's urban population in 2050.

Figure 1: Distribution of the world's urban population in 2050



Source: (United Nations, 2012, p. 11)

As the data in the presented table show, the global trend is the increase in the population of urban areas. This is also confirmed by the data contained in the report of the United Nations (2016). It is predicted that by 2050, the largest increase in urban population will be in the countries of Africa and Asia. Also, the increase in the number of inhabitants in urbanized areas concerns mainly cities with a population of over one million (especially multi-million cities). In addition to demographic changes associated with urbanization processes, an important trend is the ageing of societies, especially in European countries. The increase in the share of older people in the population structure is usually due to two factors: a decline in the number of births and an increase in life expectancy due to the development of medicine and continuous improvement of living conditions. In the European Union (EU) countries, the first one in which the urbanization processes began, the population of 65 and over increased by 2.4% in 2006-2016 (16.8-19.2%). For EU countries, a further increase in the number of older people is forecasted until 2080. The forecast also distinguishes the age group over 80 years, in which the highest increase in the number of people will take place (2016-5.4%, 2020-5.9%, 2030-7.2%, 2050-11.1% and in 2080-12.7%). The share of people aged 65-79 will grow slower (2016-13.8%, 2020-14.5%, 2030-16.7%, 2050-17.4% and in 2080-16.4%) (Eurostat, 2018). In the world, the percentage of population over 60 years old in 1950 was 8%, in 2000 10% and the forecast for 2050 indicates 21%. These mega trends will set new requirements and expectations of the population of urban areas as to conditions and quality of life. An important aspect is the use of innovative technologies especially in relation to the city's transport system in order to ensure sustainable urban mobility.

4. Discussion

Already, the attractiveness and quality of life in cities is assessed using a number of complex indicators and indices - the so-called Urban Indicators, which are tools for monitoring sustainable urban development. Indices like City Development Index (CDI), Sustainable Cities Index, The Green City Index, Smart City Index, The Global City Indicators Program (GCIP), Quality of Life Index, Quality of Life in European Cities, etc. can be included among most popular. The UN, EU and other international organizations undertake a number of different activities to contribute to the sustainable development of urban areas (Lutzkendorfa & Balouktsi, 2017).

In May 2014, a set of ISO standards 37120:2014 Sustainable development of communities – Indicators for city services and quality of life, was published (and revised in July 2018) by the International Organization for Standardization in Geneva, and ISO 37101:2016 Sustainable development in communities - Management system for sustainable development - Requirement with guidance for use was published in July 2016. Standardized indicators help to develop plans and policies of various sectors in a city, manage them, measure progress, assess the performance and use the experience of comparable cities. ISO 37120:2014 defined the measurement methodology and the set of indicators to assess cities performance and quality of life using 100 indicators, of which 46 are of a basic nature and 54 are considered additional. All indicators were divided into 17 main thematic groups describing the concept of sustainable development and quality of life. These were: economy, education, energy, environment, recreation, safety, shelter, solid waste, telecommunications and innovation, finance, fire and emergency response, governance, health, transportation, urban planning, wastewater, water and sanitation. In the assumptions, the ISO 37120 standard is a tool for: assessing cities and measuring progress, comparing cities with each other and developing best practices and mutual learning (ISO, 2014). ISO 37120:2014 can be used by any city, municipality or local authorities regardless of its size or location.

ISO 37101:2016 standard established requirements for a management system for sustainable development in communities (cities included), consistent with the concept and policy of sustainable development. The intended results include (ISO, 2016): sustainability management and support for community resilience, considering its territorial boundaries, improving the community's contribution towards sustainable development; assessment of the community's progress in achieving sustainable development goals and the achieved level of smartness and resilience, compliance with obligations set out. ISO 37101:2016 aims to help communities achieve greater resilience, intelligence and sustainability by implementing strategies, programs, projects, plans and services, as well as demonstrating and communicating their achievements. ISO 37101: 2016, the same as ISO 37120:2014, applies to all communities regardless of their type, structure or size.

5. Conclusion

Currently, 70 percent of global GDP is generated in cities in which 53 percent of the world's population lives. It is forecasted that 70 percent of the world's population will live in cities in 2050, which means that sustainable urban development is important for the future. The increasing number of people living in cities (especially in multi-million ones) and the ageing population pose many problems on the local and global level (Gudowsky et al., 2017). The urbanization process has enormous environmental effects both on the local and global level. Development of cities limits arable and green areas and increases levels of greenhouse gas emissions. Growing city populations challenge the capacities of existing energy and water supplies as well as all vital city systems (e.g. sewer systems or transport infrastructure). To avoid negative influences posed by urbanization processes actions must be taken on the city and municipal levels. The sustainable development goals should be pursued together with other economical and social goals (e.g. reducing poverty or social exclusion) (Bibri, 2018). Various cities' development indicators can be used as tools supporting different stakeholders in promoting and establishing policies aiming at achieving sustainable development of the urban areas globally. Cities are expected to play a key role in the implementation of a development strategy focused on smart, sustainable and inclusive growth. The use of innovative technologies, especially in the area of transport systems of cities and the promotion of

alternative forms of transport should contribute to the development of cities friendly to the communities living in them.

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WAGE PREMIUM FROM COMPUTER AND INTERNET SKILLS IN POLAND

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Abstract. The rapid technological change and globalization of labor markets makes computer and internet skills belong to the group of key competences required by employers nowadays. These skills allow to quickly acquire information from various sources located worldwide, process it efficiently and communicate with others. Based on the human capital theory, we can expect that acquiring these skills should have a positive impact on productivity and hence also on earnings. We aimed to find out whether computer and internet skills have an impact on the earnings of Poles at their main job. We estimated an extended Mincer wage equation using OLS and the Heckman correction for self-selection to employment. We drew on data from three waves of the Human Capital Balance survey (2012-2014), where information on computer and internet skills, both general and specific, was self-reported by respondents. By using this database, we managed to control for a wide range of individuals' characteristics, including several different skills, thus reducing the endogeneity bias. Our analysis shows that after controlling for several individuals' skills and a variety of other individual characteristics, the wage premium from general computer and internet skills amounts to 12-17% in case of individuals residing in Poland. This can justify incurring public and private expenditures on teaching these skills at schools.

Keywords: computer skills, internet skills, wage premium, wage equation

JEL Classification: I26, J24

1. Introduction

The rapid technological change and globalization of labor markets makes computer and internet skills belong to the group of key competences required by employers nowadays. These skills allow to quickly acquire information from various sources located worldwide, process it efficiently and communicate with others. On the basis of the human capital theory we can expect that acquiring these skills should have a positive impact on productivity and hence also on earnings. Investigating the impact of computer skills on earnings seems important as the results of such analyses may affect individuals' education and training decisions, as well as their career development, but also they may be a source of recommendations for educational policy. The empirical literature on the wage returns to computer skills is not conclusive - while most studies show a positive impact of computer skills on earnings, some other studies find no impact at all.

We aimed to find out whether computer and internet skills have an impact on the earnings of Poles at their main job. We estimated an extended Mincer wage equation using OLS and the Heckman correction for self-selection to employment. We drew on data from three waves of the Human Capital Balance survey (2012-2014), where information on computer and internet

skills, both general and specific, was self-reported by respondents. By using this database we managed to control for a wide range of individuals' characteristics, including several different skills, thus reducing the endogeneity bias.

We contribute to the literature in two ways. Firstly, according to our best knowledge, this is the first study on economic returns to computer skills in Poland, but also in transition economies in Central and Eastern Europe. Secondly, this is one of very few studies that draws on self-reported data indentifying not only various types of computer skills but also the level of skills with respect to each type.

The paper proceeds as follows. In the first section we overview the empirical literature on the wage returns to computer skills. In the second and the third sections we present data and the method of analysis. The results are presented in the fourth section. At the end of the paper we summarise the most important findings.

2. Review of literature

Most of the studies on the wage returns to computer skills rely on self-reported measures of computer use at work, implicitly assuming that individuals possessing computer skills are allocated to jobs where these skills are used. The studies of this type that employ OLS wage regression typically show positive wage returns to computer use (see: Krueger (1993), and Autor *et al.* (1998) for the U.S.; Daldy & Gibbson (2003) for New Zealand; Dolton & Makepeace (2004) for the United Kingdom; DiNardo & Pischke (1997), and Spitz-Oener (2007) for Germany). However, these positive wage returns may potentially be biased as a result of endogeneity of computer skills. More recently some studies address this problem by applying fixed effects or instrumental variables method (see: Karshinsky (2004) for the U.S.; Dolton & Makepeace (2004) for the UK; Di Pietro (2007) for Italy). They find that computer use does not yield any wage premium on average, but positive wage returns are obtained by some specific groups of individuals (Dolton & Makepeace, 2004), or by workers performing some specific tasks (Di Pietro, 2007).

There are also a few studies where a more sophisticated measure of self-reported computer skills was used. Pabilonia & Zoghi (2005), who used instrumental variables to control for unobserved heterogeneity in their study for Canada, found that there is positive wage premium on computer skills as measured by computer experience, that is the number of years one used computer at work in his/her career. In turn, Borghans & ter Weel (2004), and Peng & Eunii (2011) based their measure of computer skills on the type of computer tasks performed by workers, with elementary skills including word processing, intermediate skills referring to the use of spreadsheets, and advanced skills referring to the use of programming applications at work. These studies brought mixed evidence. Peng & Eunii (2011), drawing on the U.S. data from the Current Population Surveys, found that employees are rewarded for the depth of computer skills, that is the more advanced the computer skills the higher the wage premium. Borghans and ter Weel (2004), using the data from the British Skills Survey, found that while the ability to write documents and to carry out mathematical analyses yields significant labour market returns, the ability to effectively use a computer has no substantial impact on wages.

Finally, the most recent studies draw on the PIAAC data where computer skills are measured objectively. Hanushek *et al.* (2015) find small positive wage returns to computer skills, although their study is not focused on these skills. Lane and Conlon (2016) demonstrate more substantial returns to computer skills in their analysis. Besides, they find that proficiency in computer skills often entirely compensates for lower formally recognised qualifications in the labour market.

Falck *et al.* (2016), using instrumental variable method to control for unobserved heterogeneity, find that computer skills yield substantial positive wage returns in the countries covered by the PIAAC survey.

3. Data

We draw on data from the Human Capital Balance (BKL) survey for the period of 2012-2014. This survey collects information on human capital resources of individuals residing in Poland and on their situation in the labour market. The yearly sample consists of ca. 17600 individuals at the working age, that is women aged 18-59 and men aged 18-64.

Importantly for this study, the survey provides information on computer and internet skills of respondents, which are drawn from three questions. The first question aimed to assess the general computer and internet skills, defined as the ability to "operate computer and use internet". The other two questions were to assess more specific computer skills, that is:

- "basic knowledge of the MS Office package",
- "knowledge of specialized programs, ability to write programs or create websites".

Respondents were asked to assess these skills using a five-level scale, that is from 1 (low) to 5 (very high).

Another important feature of the database is that it contains information on eleven other skills of respondents (see footnote 3). The level of each skill is self-reported by respondents using a five-grade scale. Obviously, these subjective assessments may be subject to misreporting. However, we argue that due to a vast variety of the skills reported, this set of skills as a whole is a good proxy for respondents' abilities and motivations.

Our sample was restricted to individuals who were employed or self-employed in the period of 12 months before the survey and who reported their average earnings over that period. However, in order to estimate the model with Heckman correction, we also included the unemployed and economically inactive in the sample. After imposing all these restrictions, the sample consisted of 52,850 respondents, of which 14,143 were employed or self-employed.

4. Method

The basic methodological challenge with estimating the wage premium from any sort of individual's skills is the potential endogeneity of these skills which may result in biased OLS estimates of the wage premium. Unfortunately, we do not have any variable in our database, that might serve as a good instrument for computer skills, so we were not able to use IV method to eliminate this bias. Thus, we decided to reduce the bias as much as possible by including a vector of other individuals' skills in the wage regression. We argue that these skills reflect individuals' abilities and motivations to some extent, and so they may have impact on individual's computer skills and on earnings at the same time. Hence, after including the vector of other skills in the wage equation, the endogeneity bias of the OLS estimator should be reduced.

In order to assess the wage premium from computer skills we used OLS to estimate the following wage equation:

$$\ln(W_i) = COMP_i\beta_1 + SKILLS_i\beta_2 + X_i\beta_3 + v_i \quad (1)$$

where the dependent variable $\ln(W_i)$ represents the natural logarithm of the average hourly net earnings obtained in the period 12 months before the survey, $COMP_i$ is a vector of variables representing computer skills, $SKILLS_i$ covers other respondents' skills, X_i includes other factors that may have an impact on earnings, and v_i is a random error.

The vector $COMP_i$ covers the following three types of computer skills:

1. *general computer and internet skills*, which represent the ability to "operate computer and use internet",
2. *knowledge of basic software*, which represents "basic knowledge of the MS Office package",
3. *knowledge of specialized software, programming or creating websites*.

We recoded respondents' assessments of these skills (ranging from 1 to 5) into three levels:

1. *no skills* - for value 1 (low) on the five-level scale. In fact "low skills" seem to be something more than "no skills", but as the answer "no skills" was not available to respondents and the first available answer was "low", so we assume that individuals having no computer skills chose the answer "low", while those having low skills chose the answer "basic", which is the second lowest available level of skills.
2. *intermediate skills* - for values 2 (basic) and 3 (medium) on the five-level scale,
3. *advanced skills* - for values 4 (high) and 5 (very high) on the five-level scale.

In order to eliminate outliers from our sample, we dropped 0.2% of observations with the highest and lowest values of the hourly net earnings. The linear regression model was estimated using OLS, by computing heteroscedasticity-resistant variance estimations.

Finally, as our OLS estimates may suffer from a selection to employment bias, we applied the correction procedure proposed by Heckman (1979). Our exclusion restriction was gender interacted with having a child aged 0-3 years.

5. Results

Table 1 presents the OLS estimations of the wage equation. Estimation 1 shows that unconditional correlation of general computer and internet skills with hourly net earnings is strong and positive. But when we include other respondents' skills (S_i), and the other control variables (X_i) to the model, this correlation declines substantially (see estimations 1-3) - the wage premium from advanced computer skills declines from 36% to 17%, and from intermediate skills - from 19% to 12%. This seems to be evidence that abilities and motivation have impact on both computer skills and earnings. After including other respondents skills to the model the estimate of the wage premium from computer skills declines because the other skills reflect respondents' abilities and motivations, and so the bias resulting from endogeneity of computer skills is reduced. But anyway, the wage premium from advanced general computer and internet skills, which amounts to 17%, seems to be quite high (see estimation 3).

Our basic measure of computer and internet skills is a rather general measure of skills as it covers both the ability to use and create computer programs, as well as the ability to carry out various tasks using internet, including the ability to create internet websites. When we included two additional, more specific measures of computer and internet skills to the model, the wage premium from general skills decreased to 10% and 12 % for intermediate and advanced skills,

respectively (see estimation 6). The wage premium from using basic computer software, like the MS Office package, amounts to 3% and 8% for intermediate and advanced skills, respectively. More sophisticated computer and internet skills, like using specialized computer programmes, creating programmes or creating websites, yield a wage premium of 2% and 7% in case of intermediate and advanced skills, respectively. So it seems that both the ability to use computer for general purposes, like word editing, and for more sophisticated ones, like programming or creating websites, yield a wage premium of a similar size.

Table 1: OLS estimations of the wage equation

Model specification		(1)	(2)	(3)	(4)	(5)	(6)
General computer and internet skills	intermediate	0.193***	0.152***	0.120***	0.121***	0.117***	0.101***
	advanced	0.365***	0.242***	0.174***	0.181***	0.154***	0.123***
Knowledge of basic software	intermediate				0.062***	0.043***	0.033**
	advanced				0.172***	0.100***	0.079***
Knowledge of specialized software, programming or creating websites	intermediate				0.031***	0.019**	0.018*
	advanced				0.120***	0.083***	0.072***
Other skills				yes			yes
Other control variables			yes	yes		yes	yes
Number of observations		14,143	14,143	14,143	14,143	14,143	14,143
R2		0.056	0.198	0.208	0.075	0.204	0.212

Notes: ***/**/* stand for 1%, 5% and 10% significance respectively

Source: Author's own analyses based on the Human Capital Survey data

Table 2 presents the estimates of the wage premium from computer and internet skills corrected for selection to employment using the Heckman two-step procedure. The exclusion restriction that we used in the selection equation was gender interacted with having a child aged 0-3 years, as we assume that the need to take care of very small children is an important obstacle to working, especially for women. We find that the corrected estimates are a bit lower than the OLS estimates. For example the wage premium from advanced general computer and internet skills amounts to 16,8% now instead of 17,4% (see estimations 3 in Tables 1 and 2). But these small changes in the estimates do not affect our conclusions.

Table 2: Heckit estimations of the wage equation

Model specification		(1)	(2)	(3)	(4)	(5)	(6)
General computer and internet skills	intermediate	0.129***	0.145***	0.112***	0.066***	0.111***	0.095***
	advanced	0.304***	0.234***	0.168***	0.135***	0.148***	0.118***
Knowledge of basic software	intermediate				0.048***	0.042***	0.031**
	advanced				0.160***	0.098***	0.078***

Knowledge of specialized software, programming or creating websites	intermediate				0.031***	0.019*	0.017*
	advanced				0.108***	0.082***	0.070***
Other skills			yes				yes
Other control variables		yes	yes			yes	yes
Number of observations	52,850	52,850	52,850	52,850	52,850	52,850	52,850
chi2	62.61	3.998	6.126	65.21	3.769	5.420	
Prob > chi2	0	0.0456	0.0133	0	0.0522	0.0199	

Notes: The selection equation includes also female x having a child aged 0-3 years; ***/**/* stand for 1%, 5% and 10% significance respectively

Source: Author's own analyses based on the Human Capital Survey data

6. Conclusion

After controlling for several individuals' skills and a variety of other individual characteristics, we find that computer and internet skills yield a substantial wage premium in Poland. Those individuals who report their general computer and internet skills as advanced earn 17% higher wages. But we identify positive wage returns to specific computer skills too. Individuals with advanced knowledge of basic software, like the MS Office package, earn 8% higher wages, while those with advanced skills in using specialized software, programming or creating websites earn a wage premium of 7%. (Danyal et al., 2011)

These findings can be explained by human capital theory as investments in computer skills yield a positive wage premium. Thus, our findings can justify incurring public and private expenditures on teaching computer and internet skills at schools. The progressing globalisation and growing demand for computer skills suggest that these investments will yield wage returns in the future too.

Obviously, our analysis is subject to some limitations, mainly resulting from the nature of the data that we use. Firstly, the information on computer and internet skills is self-reported, so it may suffer from misreporting bias. Secondly, the method of estimation that we used does not allow us to claim the causality of the identified relationship. Although we substantially reduced the endogeneity bias by including the measures of eleven skills in the model, we cannot claim that we managed to eliminate this bias completely.

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PUBLIC WI-FI NETWORKS IN THE GLOBAL ENVIRONMENT AND THEIR SECURITY

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Abstract. The given study discusses an important element of today's worldwide public life – public Wi-Fi networks and security threats that are connected with their use. We discuss the international security statistics of public Wi-Fi usage and the methods of its misuse by attackers. The aim is to get the reader familiarized with the topic that is often widely discussed, however without broader knowledge of general public. The security of this public service significantly depends on its users and their rightful actions. Security threats are even more serious, since this service is provided in globalized environment on the places such as airports, hotels, restaurants and more and more often also local “free Wi-Fi” zones in various metropolitan areas. Combined with wide spectrum of users migrating in short periods of time throughout the world, this is a significant security problem also from the view of globalization trends. It is good to realize that public Wi-Fi networks can be compared to a sandpit on a children's playground. It also has a set of rules and duties for provider regarding sand treatment and construction elements, but parents still have concern about their children when they play there. They worry that children can find unwanted or health threatening objects there, which sometimes unfortunately happens. Public Wi-Fi is similar, with one exception - the attacker and threats can be anywhere.

Keywords: Wi-Fi, security, access point, attacker, wireless networks

JEL Classification: K24, O33, K15

1. Introduction

Connecting to public Wi-Fi networks in shopping malls, cafes, restaurants, at the airports, in hotels, trains and other publicly accessible spots is considered as something natural by majority of people. People often trust these networks into such extent that they connect to internet banking or use them for on-line shopping (as we got to know from below mentioned surveys). Only a few people realize that their on-line activities can be monitored by third party with the intention to misuse the information which are sent or received via internet. What do users risk and how can they protect themselves when connected?

This issue is discussed by various authors of articles or studies worldwide. It is necessary to say that nowadays, the issue of public Wi-Fi security needs to be solved. In recent years, a significant increasing in development of Wireless networks is noticed; they become an entire part of the Internet and demonstrate effectiveness in handling communication for reduced public LAN and military applications (Mekhaznia & Zidani, 2015).

2. Public Wi-Fi network

Public Wi-Fi network is understood as free, without necessity to pay. Some commercial services are trying to use the business models for Wi-Fi, but on the other hand, many communities, cities and individuals build public, free Wi-Fi networks. These groups, communities and individuals often follow general connectivity agreement, in order to share these networks openly. Free Wi-Fi use is often considered as the future of the internet. Many cities and municipalities joined with local and community groups in order to help them spread free Wi-Fi networks.

Public Wi-Fi networks are now widely available in many countries. Though undoubtedly convenient, such networks have potential security and privacy risks (Sombatruang & Sasse, 2016). Some smaller countries, cities or municipalities have already built free Wi-Fi hotspots and free internet access, for example Tonga or Estonia are countries, which built many free hotspots. At the beginning, people could only connect to internet only on spots dedicated for this purpose - mostly on the places with high density of people, such as shopping malls, airports, hotels and schools. Later on, the need for using of internet grew and therefore the need for public form of Wi-Fi appeared also on the places with less people, such as cafes and restaurants. Nowadays, it is possible to connect to free Wi-Fi also in public transport, buses, trains and city streets. The newest tests and trial operations launch Wi-Fi networks also at the aeroplanes.

Security of Wi-Fi networks applies to the user as well as provider, considering the fact that this network can be attacked and misused by third parties (hackers), which can harm the user. On the other hand, this network can be also misused by the users, for dishonest activities and practices, which can harm the provider themselves. Currently used wireless communication technologies suffer security weaknesses that can be exploited allowing to eavesdrop or to spoof network communication (Vondracek et al., 2018).

3. Analysis of various statistics of public Wi-Fi network usage

Following part provides the results of various statistics focusing on public networks. These statistics were prepared by various companies, such as Norton, Statista, Forbes and others. They were realized worldwide, therefore the results are evaluated within different ethnic, political, environmental or ethic attributes of countries and communities. Around 15 500 participants from 15 global markets took part (Australia, Brazil, Canada, France, Germany, India, Italy, Japan, Hong Kong, Mexico, Netherlands, New Zealand, United Arab Emirates, England and the USA). These statistics were held between the years 2016 and 2017.

One survey asked to provide gender and age. The same amount of men and women took part. The youngest of them were from 18 to 24 years of age (18%). The majority of respondents belonged to young generation at the age group from 25 to 34 (32%). Young generation is in everyday contact with new technologies. This group was followed by older generation from 35 to 44 (20%), which was 2% more than the youngest generation. Other groups followed - people from 45 to 54 (14%) and from 55 to 64 (11%). The smallest group of respondents (5%) were people above 65 and older.

The most often used public Wi-Fi spot was that in a hotel, probably due to a fact that there is a high amount of visitors in hotels who use this service. The second most often used places were cafes and restaurants (30%). They are favoured mostly by young people. Next were workplaces, where connections are mostly provided via company intranet (25%). People spend a lot of time waiting for their flights at the airport, therefore airports got to the next place.

Airports are followed by trains and buses, which are mostly used by people from 18 to 24 who travel to school. 16% of people use hotspots in shopping centres. These results may seem confusing, since there is a high number of people in shopping centres and we would not expect it to be on the last place. This can be explained by the fact that there are a lot of cafes and restaurants in the shopping centres, and this research focused only on shopping centres and their own public Wi-Fi.

Respondents were asked to say how often they visit public Wi-Fi networks. 40.2% said they never use it. 17% use it once in a few months, 12% use it once a month or once a week. The least amount of people, 8.2% of them claimed they visit public Wi-Fi network at least once a day. We can assume the last group consisted mostly of students, who may not have access to paid networks.

This survey also asked about the devices used for accessing public networks. The biggest group (42%) uses mobile phone to access the internet. Another 25% used personal or company laptops. Tablet is used by 21% of respondents. 8% of people use smart watches, and only 4% of people said they do not use any of the devices above. 2% of people claimed that they are not sure what kind of devices they use for accessing public networks.

Surveys asked about the purpose of usage of public Wi-Fi as well. 55% of people use Wi-Fi to log in to their e-mail accounts and social networking websites, despite the fact there is the highest number of personal information there. Next activities contain sharing photos (38%), logging into work accounts or other accounts (24%), sharing of their location (17%), sending files (15%), providing personal information for shopping, delivery of items etc. (14%), controlling of smart systems at home via smartphones (7%) and internet banking usage (20%) or providing credit card information (12%). We can assume that people who use public networks have no problems realizing payments and shopping. It is risky considering the fact that attacker who steals this data needs only a relatively short time to transfer money from the account of the attacked to his own account. Only 19% of asked people said they did not use Wi-Fi for any of the above mentioned activities. We can assume that they use internet only for obtaining information such as weather forecast, current news etc.

Surveys also focused on the feeling of people while using public networks. 7% of people described it as very dangerous. This group consists probably of people who understand the usage and threats of public Wi-Fi networks or have a bad experience with their usage. 15% of people feel very secure on public Wi-Fi. Here, we can see the difference between users and their information about this topic. 46% of people said they feel less safe when using public Wi-Fi and 32% of people said they felt a bit dangerous. The feeling of safety is higher than that of danger. We can conclude that majority of people perceive public Wi-Fi as their own home network, where high risk is not present. These people were probably not well informed about the threats of these networks or did not have bad experience with usage of such networks.

Only 1/3 of people can distinguish between secured and unsecured network to which they are connecting. Other 2/3 of people cannot distinguish or could not answer this question. Only 1/3 of people could say that the applications they use communicate via secure transmission. Other 74% could not answer this question.

Applications which create VPN (Virtual Public Network) to secure people against tracing and stealing of information are not often used. Only 25% of users know the purpose of VPN connection and use it, 29% does not know what VPN is at all. 40% of people do not use this kind of connection.

One of the surveys also evaluated the average speed of public Wi-Fi networks in Mbit/s. Countries with the highest speed are Lithuania, Croatia, and Estonia. The average speed there is somewhere between 13 to 15.5 Mbit/s. They are followed by other countries, mostly members of the European Union.

One survey conducted in 2014 dealt with reports of attacks on public networks. Most of them happened in China (43%) mostly due to the fact that there are around 610000 hotspots in Asia (the biggest number in the world). China is followed by Indonesia (15%), and the USA (13%). Next Asian country is Taiwan (3.7%). South Korea, also an Asian country only got 1.4% of attacks, which may be linked with its strict regime and regulations of usage, providing and following of the internet operation. Other countries got 16% together (each one of them with around 1.2%) (Statista – The portal for statistics, 2017, Symantec, 2017).

4. Ways of obtaining personal data

Deployment of public wireless access points and the prevalence of portable computing devices has made it more convenient for people on travel to access the Internet. On the other hand, it also generates large privacy concerns due to the open environment. However, most users are neglecting the privacy threats because currently there is no way for them to know to what extent their privacy is revealed (Cheng at al., 2013).

Many public Wi-Fi networks are not secured or have publicly accessible passwords, for example on pieces of paper or displayed on the entrance door of the cafes. Therefore they are easily accessible for hackers and often used for such purposes. If the hacker wants to get between the user and the pages he visits, he needs to see the user information he shares with the website (Majstor, 2003). This can be achieved on public Wi-Fi with minimum effort. The existing public Wi-Fi networks have several vulnerabilities, which are caused by eavesdropping stations in the same network. The main problem is that all stations in the same network have the same pre-shared key after the association. The attackers can derive an encryption key by eavesdropping on the four-way handshake procedure (Noh at al., 2018).

“WEP Cracking” (WEP key deciphering) - This method of the so called deciphering keys belongs to favourite ways of obtaining data from the side of attackers. Attacker needs 5 to 10 million packets and relies on the fact that during the attack, the user does not change the WEP key. Attackers use Open-source applications such as AirSnort and WEPCrack and need only to capture communication between access point and client (Zandl, 2003). WEP cyphering is not recommended anymore, however it can still be found in older solutions.

“MAC Attack” - MAC address for access point is discovered in the same way as WEP key. If no WEP is activated, the attacker only filters communication between access point and client and searches for MAC address header. If WEP key is used, the attacker must at first decode the WEP key. However, he only needs the off-line analysis of captured data frames. In case the attacker obtains the MAC address, he can use it in his client card and perform as a legitimate user (Zandl, 2003).

“The Man in the Middle” - Majority of hackers use the so-called “Man in the middle” method (further on abbreviated as MITM). Attacks of this type are performed by attacker, who enters between the access point and a client and interrupts the operation between them. He captures and decodes data, which are transferred between the access point and client during the association process. This way, the attacker obtains basic information about the user, as well as the access point. Such information can be IP address of both devices, associating ID of the client

and SSID of the access point. With such information, the attacker is able to create a fake access point closer to the user (on a different channel) and change the users' connection to this fake access point. Data, which are collected on a fake access point, are forwarded to the real one. Client, as well as the access point believes that they communicate directly. In reality, their communication is mediated and eavesdropped by "man in the middle". The attacker can collect all the data including passwords this way (Zandl, 2003).

"Evil Twin" - This method is a variation of already mentioned attack type MITM. Hackers create a dishonest hotspot for Wi-Fi network, which can pretend to be a different hotspot with stronger signal. It is an artificially created hotspot with the similar name as the original hotspot in the given cafe, restaurant or a hotel. After connecting to this network, the user is in the hackers hands. Hacker can see all the data being sent and collects them via this network. User is not aware of this attack. This connection looks like the ordinary connection. This way of hacking is very harmful and unpleasant. It is very easy for hackers to create a similar network and provide users with the feeling of being connected to legitimate router, with better signal and faster connectivity as the main benefits. Some hacking techniques can attract more computers to their network thanks to the automatic connection. They do it by sending fake certificates and credentials resembling routers, which were in the past used by the visitor (Baxter, 2015).

"The Packet Sniffer" - MITM and Evil Twins are not the only strategies for hackers to obtain data used by public Wi-Fi networks. Some of them use software called "The Packet Sniffer" to collect data about their victims. Device used for scanning packets captures all packet data flowing through the network interface (for example network card in a computer). Network administrators can use this method to monitor and solve problems with network operation. Unfortunately, the problem arises when hackers use these devices to monitor packets and perform the monitoring of network operation. They collect the information which users send through public Wi-Fi connection and use them for their own interests (Baxter, 2015).

"Hijacking Cookie Sessions" - The last misused weakness is stealing of cookie files. Cookies are small amounts of files which internet browser accepts when user visits a website. Such type of files is used for distinguishing of individual users for better aimed advertisement. They can precisely identify the repeated visit of given user and are often used to simplify their re-connection. This function is best seen as an elective option of "remember me" or "do not log off". Hacker again monitors the whole data operation on the network, but he mostly focuses on cookie files. After successful obtaining of cookie files, the analysis of webpages that cookies come from starts. Hacker subsequently visits the websites on his browser and uses the stolen file. Websites evaluate such activity as the re-logging of the user to server and hacker is not asked to provide the hostname or password – he is automatically redirected to websites. Nowadays, it is possible to steal cookie files only from websites without secure connection "http". Huge corporations such as Microsoft, Google, Facebook, Twitter and others connect all their users only via "https" protocol, which is secured. Another type of protection against these attacks is to log off, always after the end of activities on the website. After log off, the cookie files lose validity. The attacker is subsequently logged off as well, and cannot use cookie files anymore (Bates, 2016).

"Denial of Service" - Such attacks are not attacks in the true sense of the word; they are not used for theft of user data and penetration to networks. These attacks are focused on overloading of the network and its discarding. The attacker floods the access point with pointless data in huge amounts. Access point tries to evaluate this data and becomes flooded, or transfer zone

becomes flooded. This slows down or completely disables connection of other users to the network. DoS attack is usually a mischievous joke of people who discovered that it is possible to harm somebody and make his life worse this way. In worse case, DoS slowly becomes “Man in the middle” and it aims to disconnect the user from the real access point and connect him to the fake one subsequently. Therefore it is necessary to thoroughly evaluate and monitor all DoS attacks to access points (Zandl, 2003).

5. Obtained information

The amount of data is huge and types of data which are obtained by monitoring of public Wi-Fi networks vary. It can be the list of last visited hotspots, which smartphones connected to in the last few days, hostname and type of mobile phone used etc. Such information is displayed next to MAC address. Some manufacturers and some older types of smartphones did not secure these data. Then, it is possible to discover what kind of articles the user read, what words he translated via Google Translate, check videos viewed by users, words found by search engine, email conversations, or other personal data. Moreover, the attackers are able to filter the specific device based on MAC address (Brejcek, 2014).

Increasingly, users access online services such as email, ecommerce, and social networking sites via 802.11-based wireless networks. As they do so, they expose a range of personal information such as their names, email addresses, and ZIP codes to anyone within broadcast range of the network (Klasnja et al., 2009).

Web page capturing - With the use of wireless network analyser, it is possible to capture Wi-Fi signals, technically called 802.11 packets. Packets appear real time in very rapid tempo. If the sufficient number of packets is captured, it is possible to launch the analysis and discover what was “sucked in” from signal captured. Packets, which include HTML codes, can show which websites the user visited. If the attacker focuses on websites with unsecured connection - http, he can precisely determine what users do inside their web browsers. For example, after connecting via POP3 without cyphering, it is possible to directly see the logging information. By such way, it is possible to provide the chance to configure the email client and start receiving and sending messages for user in his name (Geier & Kreuziger, 2013, Macko, 2017).

Capturing of logging information on FTP - If user decides to connect to public unsecured hotspots and uses FTP for downloading, recording and sharing files (FTP – File Transfer Protocol – protocol for transferring files), he should stop doing it. Most of FTP servers use connection that is not ciphared, therefore login information and content are sent in plain text. Attacker can simply capture this information (Geier & Kreuziger, 2013).

Account theft - Computers are not the only devices that are prone to information theft. For demonstration, we can use rooted Android smartphone and DoidSheep application. Such application can be used to obtain access to private accounts on popular web services such as LinkedIn, Facebook, Gmail, Yahoo and Microsoft. This application searches for unsecured log-ins to these websites and subsequently creates the list of them. Although this application does not capture passwords, it can misuse the vulnerability, which enables attacker to open the given web with help of current instances of other people. This provides the attacker full access to the victims account (Geier & Kreuziger, 2013).

6. Conclusion

As network communication increases by using public WiFi to check e-mail and handling Internet banking, the danger of hacking public routers continues to rise (배희라 et al., 2016). It is difficult to satisfyingly solve the security in public Wi-Fi networks. Most of the public Wi-Fi networks work fully without any securing mechanisms and focus mostly on number of logged customers. Everything else is left to belief and abilities of users. Most security problems come from incorrectly configured device parameters (Anastasia et al., 2017). As seen on results from the surveys made, huge amount of people do not have necessary skills in this area. To increase the overall security of public Wi-Fi networks, effort of both sides is necessary. Users should be more informed and cautious. They should use supplementary applications for higher security during Internet visits. It would also be necessary to introduce basic user education in this area (Kovacova & Vackova, 2015). Providers should care more about security, monitoring, analysis and monitoring of their networks. Nowadays, the development of technologies and their improvement is rapid, securing systems are progressing. Hand in hand with this progress, the attacking techniques are progressing as well. Therefore we should not only depend on the development and removal of weaknesses made by manufacturers of such devices, but mostly on our own thinking and use such measures that will limit the risk level on such networks to minimum.

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APPLICATION OF DIGITAL ECONOMY GLOBAL TRENDS IN RUSSIAN TRANSPORT SYSTEMS

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Abstract. One of the global trends of modern industries development is digitalization. According to McKinsey experts forecast, Russian GDP growth caused by digitalization will be approximately 19% by 2030. The most significant effects will be created in infrastructure industries that include transport. Nowadays transport industry in Russia is at the beginning of digitalization process. There is a necessity of rapid information technologies implementation in different transport systems. JSC “Russian Railways” has developed a project “Digital Railway” which determines main directions of digital technologies strategic development in transportation. These new technologies provide not only internal efficiency growth (deserted and resource-saving technologies, transport infrastructure monitoring systems, safety technologies), but also the growth of transport services quality and customer focus (virtual and cloud client services, online sales, special mobile applications for transportation planning and travel time assessment). Particular interest is related to digital technologies implementation in passenger transport. The result of passenger transport digitalization is the emergence of intermodal transport systems that provide high degree of passenger transport modes cooperation. These systems are based on transport modes specialization, which ensures the effective way of available resources allocation, travel time economy and market demand satisfaction with high level of transport services quality. To create intermodal transport systems, it is necessary to apply digital technologies. For example, Big Data to analyze the intensity of passenger traffic on the route, simulation to determine capacity requirements. Digitalization transforms the model of transport services market and lead to a new ways of interaction between transport companies, infrastructure providers and passengers.

Keywords: digitalization, railway transport, intermodal transport system

JEL Classification: R120, R480, R580

1. Introduction

The use of digital technologies is viewed as a global trend in the world’s economy. In particular, the development and implementation of digital technologies have brought about completely new forms of spatial interaction and communication with significant and unprecedented impacts on transport, commerce, tourism, migration and social networks. (Kourtit, 2016; Weissova et al., 2015)

Digitalization has effects on various spheres of human life and can be undoubtedly viewed as a socio-economic process. Its distribution occurs unevenly in various economic sectors. According to BCG experts who were evaluating the effects of digital technologies on various economic sectors, one can single out from among them those in which fundamental changes have already occurred (media sphere); the sectors on which digitalization has already had a significant impact, but it has not yet been fully evaluated (telecommunications, insurance, banking). Transport along with metallurgy, machine building and automobile industry is referred to industries in which the impact of digitalization is difficult to assess, as the main changes are yet to come. The article makes an attempt, on the basis of highlighting the specific features of railway transport as a sphere of activity, to outline the main directions of using digital technologies here and to formulate (presumably to estimate) the economic effects, consequences, opportunities (results) of their application. The main attention is paid to passenger transportation, in particular, the possibilities of using digital technologies in transport systems of large cities. The points of contact between two different areas of application of digital technologies in transport have been identified, namely, railway transport and the urban transport system. (Remeikiene et al., 2018)

2. Digitalization of the transport industry

Recently, a number of authors consider transport to be a sphere of activity where the use of the digital economy should bring positive effects primarily to the so-called "share economy" (or "collaborative economy") as a result of the more efficient use of resources, shared use of infrastructure, fuller capacity utilization.

Corporate projects in the sphere of digitalization are implemented in transport. Thus, the project "Digital Railway" has been developed and is implemented at JSCo RZD. (Lapidus, 2018) The program "Digital Railway" includes the directions of the development of digital technologies of RZD holding which are included within the program "Digital Economy of the Russian Federation", including: big data; industrial Internet; wireless technology; neurotechnology and artificial intelligence, and others. (Tsvetkova & Gammelgaard, 2018)

E.N. Rosenberg and V.V. Batraev highlight the following main directions of the strategic development of digital technologies in railway transport (Rosenberg & Batrayev, 2018):

- increase in security based on smart systems;
- virtual and cloud-based client services;
- infrastructure status monitoring;
- new rolling stock;
- increase in energy efficiency;
- unattended operation;
- multimodal transportation.

The implementation of innovative projects in the sphere of the enumerated areas will allow us to move to a new level of transport and logistics services both in the provision of infrastructure services and in transportation activities.

Table 1: Directions for using digital technologies in rail transport

Type of activity	Applications of digital technologies
Passenger transportation	interoperability (coordinated development) of transport systems;

	use of mobile devices and applications to provide services and information, to plan routes and travel times; implementation of smart station control systems: interactive provision of information, smart engineering infrastructure control systems.
Freight transportation	maximum utilization of electronic trading platforms in business practices; implementation of paperless technology (electronic document flow); a system that tracks movements of goods, carriages, containers, "door-to-door", real-time information on their actual and predicted locations.
Traffic control	application of automatic control systems ("automatic train driver").
Infrastructure management	automated traffic management based on satellite navigation; use of train-borne information and measuring systems integrated in rolling stock design ("Lastochka" electric train) ensuring complete automation of the diagnostics of infrastructure elements.

Source: author's compilation

3. Configuration of multimodal passenger transportation on the basis of digital technologies

The above-mentioned effects (opportunities) of using digital technologies in the direction of the "share economy" can, in our opinion, be even more vividly manifested in the development of transport systems in large cities. (Lyakina et al., 2017) In Russia, digitalization in this area is developing with some lag, since the evolution of urban transport replicates the sequence of events in western cities with a lag of several decades. (Blinkin & Zalesskiy, 2016) A number of tendencies and specific features of their development can be highlighted that provide the appropriate conditions for implementing digital technologies here. (Noel et al., 2018)

First, it is the relative compactness of the territory within which a necessity arises to ensure high mobility of the population and, as a consequence, an appearing number of restrictions (possibilities for extensive development of transport infrastructure, environmental consequences and traffic safety, etc.). (Ossewaarde & Reijers 2017)

Second, modern agglomerations are characterized by passenger traffic of various intensities (such as high-intensity ones between specialized zones and of much less intensity within a zone), which implies the interconnected use of various types of transport to provide the final service of moving the passenger from point A to point B. (Volkova et al., 2016)

The provision of the required level of mobility within the restricted territories of modern agglomerations is possible only on the basis of the development of public transport and, first of all, of high-performance, rail (metro, fast tram, urban train), and also of its cooperation with other types of transport. If the passenger chooses between public and private transport, the prioritization of public transport is only possible under the conditions of the appropriate level of quality of the offered service. And this can be ensured only given the interconnected and coordinated development of various types of public transport at a qualitatively new level and the emergence of smart transport systems that solve various traffic problems using information technologies. (Makino et al., 2018; Zerrahn et al., 2018)

The main opportunities of using digital technologies in urban transport systems are presented in Table 2.

Table 2: Opportunities for using digital technologies in urban transport systems

Technology	Brief description	Application area
Big Data	A set of approaches, tools and methods for processing structured and unstructured data of huge volumes and significant diversity for obtaining human-readable results	Analysis of passenger flows by directions, sections and routes in order to optimize amount of traffic, loading of vehicles
IoT -internet of things	The basic idea of this concept is the ubiquitous interaction and cooperation of various objects and things in order to achieve the set goals through RFID tags, sensors, transmitters, mobile phones, etc.	Storage of data on passengers, automated fare collection, mobile travel planning applications
Simulation modeling	A group of research methods in which the object of research is replaced by a model describing its properties with the required accuracy, and experiments are performed with this model, incl. with the use of special software.	Experiments on servicing passengers in cash desks, passenger hubs in order to optimize the available capacities

Source: author's compilation

In addition, the possibilities of using IoT technology for regulating traffic density in urban areas and preventing traffic congestion have been identified. (Saravanan & Kumar, 2015), (Garcia & Tomas, 2018)

Thus, new forms and opportunities for interaction between different types of transport and a new quality of a unified transport system, a high degree of consistency while minimizing travel time, are created. New transport services appear and develop that take into account the needs of an individual customer, the so-called Mobility as a Service, or MaaS. (Hensher, 2017) The future's urban mobility is characterized by the following specifics: new forms of movement; new forms of vehicle control; changed business models of ownership and use; mobile technologies that provide and expand the capabilities of individuals; and opportunities for carrying out events without the need to travel. (Lyons, 2018; Munoy, 2018)

The development of multimodal transport services is one of the priority directions of innovative development of transport. The concept of a "digital seamless transport system" developed by B.M. Lapidus can be the methodological base for cooperation of types of transport in passenger transportation. (Lapidus, 2017; McDonald, 2018; Moravcikova et al., 2017)

The assessment of the public efficiency of the new transport systems is an important, not fully resolved issue. Thus, a number of authors suggest using the cost estimate of reduced travel times as the basis for assessing the effects of multimodal transport. However, it remains unclear how to estimate the time spent on leisure and recreation, and the reduced transport fatigue (Wardman, 2016). An important problem is the impossibility of correctly assessing the effects of digitalization while retaining the existing model of interaction between participants in the urban transport system and regulating bodies, retaining the current taxation regime, ownership form and other legal aspects of interaction (Docherty et al., 2018), (Hensher, 2018)

4. Conclusion

The article has defined the main directions for development of digital technologies in railway transport. The development of multimodal transportation and the formation of "seamless" transport systems has been proven to be one of the directions of innovative development of

transport. The main directions of using digital technologies in the provision of multimodal services in passenger transportation have been highlighted. digitalization of passenger transport services should be based on the intensive use of available information technologies and a change in the approach to regulation of public transport systems based on breakthrough digital solutions in this area.

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EVALUATING THE INNOVATIVE CAPACITY OF THE REGION AS A REGIONAL GROWTH TOOL

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Abstract. Many issues related to the innovative capacity at the global and regional levels growth such as methodological approaches to a comprehensive assessment of its utilization level, strategic management are still insufficiently studied. The issue of the equilibrium between the innovative capacity components in the growth of innovative economy needs further investigation. The purpose of the study is to develop a methodology for assessing the innovative capacity of the regional economic system, which facilitates the activity of its strategic growth in line with the latent opportunities identified. The paper discusses the innovative capacity through the lens of identifying latent reserves and the possibility of determining strategic prospects for its development, which is understood as the aggregate of resources owing to innovation activity development in the region, as well as the latent opportunities available within the expanded model that correlates innovative capacity elements to set up its strategic prospects. The method of complex multivariate evaluation of innovative capacity of the region is substantiated developing certain strategic growth options for latent reserves of its components and the capacity at large. The paper proposes the existing tested methodology of complex multivariate evaluation of the regional innovative capacity based on the additive and taxonomic approaches mainly aimed to determine the level of innovative capacity and identify hidden reserves being means of regional development. The paper presents leasing means that are part of a complex system of factors when assessing the regional innovative capacity.

Keywords: capacity, evaluation, innovations, tools/means, region.

JEL Codes: M00, M14, M21

1. Introduction

Currently, the challenges associated with the transition of the Russian economy to the innovation-based growth consisting in a crucial restructuring of growth options, new approaches to the justification of priorities, and significant modernization of methods and forms of resource to be used at all levels of the innovation system are becoming especially topical. In this context, one of the most important options in the formation of innovative growth of the economy is its regional aspect.

The existing imbalances in the socio-economic growth of Russia's regions predetermine the availability of a different level of innovative capacity and necessitate an own model of switching the regional economy to an innovative way. This goal can be achieved if each Russian

Federation constituent has strategic growth priorities for the innovation activity based on a comparative integrated assessment of innovation capacity that considers regional socio-economic characteristics, various factors influencing the region's innovative capacity.

Theoretical and applied fundamentals of the innovation capacity analysis are described in V. Goncharov, S. Yermasov, G. Zhits, D. Ilyasov, I. Kladchenko, D. Kokurina, S. Kravchenko, F. Meerson, S.V. Mokichev, V. Perlamutrov, A. Saveliev, V. Fridlyanov, A. Khodykin, F. Yansen and other researchers. The matter of assessing the region's innovative capacity as well as the influence of various factors on its growth is referred to in Ye. Alpeyeva, Yu. Baklanova, I. Golovaya, Ye. Goryachevskaya, A. Dyrdonova, O. Moskvina, S. Steksovaya, A. Sukhovei, A. Trukhlyayeva, L. Ushvitskyi, R. Hlavacek et al.

The study targets at the design of a methodology for assessing the innovative capacity of the regional economic system, which facilitates the activity of its strategic growth in line with the latent opportunities identified.

The scientific novelty of the study is as follows:

1. The existing approach to the meaning "region's innovative capacity" becomes wider looking through the lens of identifying latent reserves and the possibility of determining strategic prospects for its growth;
2. The classification of the innovative capacity growth factors in relation to the regions;
3. The method of complex multivariate evaluation of the region's innovative capacity based on additive and taxonomic approaches;

The practical significance of the conclusions and results revealed by the scientific research lies in the possibility of using the main provisions, methods of evaluation, conclusions and proposals in the practice of state regulation of improving the innovation capacity management to provide favorable conditions for the innovative economy growth.

2. Body of paper

2.1 Theoretical aspects of the region's innovative capacity content

At the present stage of world growth, the orientation towards the innovation sector is becoming generally recognized followed by the global economy of a new type meaning the innovation economy, which uses an effective system of introduction of new technological solutions in various fields of activity. The development and increase of the innovation activity performance is of great importance for Russia and, especially, for each of its regions as the investments in the real sector of the economy.

A comparative analysis of approaches to determining the innovative capacity of the region made it possible to identify four approaches: resource, structural, as well as approaches based on the ability of the system to transform and on the possibility of implementing innovation in conjunction with the availability to accept its results. The ambiguous interpretation of the characteristics, properties and components of the region's innovative capacity necessitated the theoretical justification of its definition as a set of realized resources for the innovation activity growth in the region, as well as the presence of latent opportunities within the expanded model of the correlation between the innovative capacity elements used to develop its strategic prospects, (Kaneva & Untura, 2017)

Innovative capacity of the region has emergent properties; its structure can be represented as a system of interpenetrating and interconnected capacities (components). The various components of the region's innovation capacity can be divided into two groups of factors that influence its growth:

- 1) factors that form the innovation capacity such as personnel, production engineering, research engineering and financial components; these types of capacities can be attributed to the resource block;
- 2) factors of availability for using innovative capacity such as infrastructural, informative, institutional components.

In terms of the effect on the innovative capacity growth, we propose to divide the factors into two groups: contributing and hampering the innovative capacity growth. Some factors may have a dual nature of effect on the innovation capacity of the region and differentially influence its growth under certain conditions (Table 1). In addition, there are mobile and immobile factors since many factors can be immobilized from other regions under the conditions of globalization of the economy.

According to the classification criterion "degree of control", the following types of factors are distinguished: external (weakly controlled or uncontrolled, as well as factors that are heavily influenced by national policy) and internal (controlled factors that can be influenced at the regional level).

Also, in terms of innovation capacity, it is necessary to significantly increase investment, improve their structure, ensure high performance of the regions, on the one hand, develop and implement a more effective investment regional policy, and on the other hand, complete and timely provision of planned investments with appropriate financial resources.

Table 1: Factors that give rise to the region's innovative capacity

Factors of the region's innovative capacity, in terms of control	Factors of the region's innovative capacity, by source of origin	Contributing the innovative capacity growth	Hampering the innovative capacity growth	
Ability to mobilize into the regional economy (mobile/immobile)	Internal	HR-related	High qualification of personnel	Shortage of highly skilled management personnel
		Production engineering	Increase in investments per capita	Low involvement of industrial companies in innovation processes
		Research engineering	Patent growth and commercialization	Small share of innovative products in total output
		Financial	Financial backing by state	High risks and payback periods for innovative projects
		Organizational and managerial	High innovation activity of undertakings	Unavailability of undertakings to managerial and technological innovations
	External	Infrastructural	Advanced innovative infrastructure	Lack of liaison between undertakings, research and financial organizations
		Informative	Introduction of modern information technologies in innovation activities	Insufficient details on new technologies

		Institutional	Making legislative framework that stimulates innovative activity	Imperfect legislation, non-transparency of state institutions
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Source: Author's development

Thus, the proposed concept and structure of the region's innovative capacity are key to developing an assessment of the region's innovative capacity, which will allow the constituent to actually reduce risks and increase the efficiency of investments in the real sector of the economy.

2.2 The method of comprehensive multivariate evaluation of region's innovative capacity

The study of conceptual approaches to assessing the region's innovative capacity makes it possible to distinguish in Russian practice the application of the following methods: rating approach, regulatory approach, the approach based on the integrated innovative capacity of the region, the method of comprehensive multivariate evaluation, correlation-regression analysis, unambiguous quantification using the taxonomic method. According to the authors, the latter is the most objective evaluation since it produces a "conditionally reference model" used to calculate the distance of the investigated object from the reference standard, thus making it is possible to identify latent reserves for the innovative capacity growth. (Jucevicius et al., 2017)

At the same time, the authors assume that the innovation capacity is 100% employment of the region's capabilities. In practice, the available capabilities cannot be used for 100%. Therefore, for the purposes of assessing the level of implementation of the innovative capacity of the region it makes sense to present it in the following form: a set of explicitly used resources and unused hidden capabilities. The scope of the region's innovative capacity assessment is to identify, first of all, unused hidden capabilities, reserves since their implementation enables identification of the main options of strategic innovation capacity growth.

The existing methods for assessing the innovative capacity of the region consists of six stages. The first stage is the selection of a set of indicators for each category of innovative capacity components. The second stage is the grouping of regions that are different in terms of the innovation activity level in order to build a conventional reference model. The third stage is the calculation of the indicators of regions for assessing their innovative capacity. The fourth stage provides a matrix of indicator values and determination of reference values for each indicator. A conventional reference model is built by identifying the best values of the component. The fifth stage develops a matrix of standardized indicators relative to the reference value by the formula 1.

$$x_{ij} = \frac{a_{ij}}{\max_j a_{ij}}, \quad (1)$$

where i – indicator numbering ($i = 1, 2, 3, \dots, m$), m – the number of indicators, j – region numbering ($j = 1, 2, 3, \dots, n$), n – the number of regions, a_{ij} – the values of i -indicator of j -region, x_{ij} – standardized i -indicator.

The sixth stage calculates the integral rating by the additive method of criteria convolution and the distance calculation method (taxonomic method).

1) The additive method of criteria convolution implies the construction of an integral criterion in the form of a simple or weighted sum of local criteria:

$$R_j = \sum_{i=1}^m K_i X_{ij} , \tag{2}$$

where K_i – the weighting factor of criterion significance determined by expertise, R_j – rating number (integral criterion) for j -region.

The presented method does not consider weighting factors, as they are often subjective and are not effective to get an accurate picture of the innovation capacity indicators.

2) The distance calculation method considers the distances between some actual object and its ideal representation. If the values of the best indicators of regions actually achieved over a certain period of time are taken as most preferable ones, then the value of the integral criterion can be calculated by the formula:

$$R_j = \sqrt{\sum_{i=1}^m (1 - X_{ij})^2} , \tag{3}$$

where R_j – rating number (integral criterion) for j -region, X_{ij} – standardized i -indicator for j -region.

2.3 Testing the proposed method

For a comprehensive assessment of the innovative capacity of the regions, eight elements were identified, which in turn are described by 19 estimated relative indicators calculated from the data of state statistics bodies (Table 2).

For the conventional reference model of innovation capacity, regions with different levels of innovation capacity growth were selected according to the RA Expert-provided data for 2017: Moscow, Moscow Oblast, St. Petersburg, Nizhny Novgorod Oblast, Sverdlovsk Oblast, Novosibirsk Oblast, Chelyabinsk Oblast, Tatarstan, Samara Oblast and Krasnoyarsk Krai. The group included regions with a lower level of innovative capacity: Krasnodar Krai (rank 20), Altai Krai (rank 30), Zabaikalsky Krai (rank 50), Khabarovsk Krai (rank 60), Pskov Oblast (rank 70), Mari El Republic (rank 80), Chukotka Autonomous Okrug (rank 83). (Makarova, 2017)

Table 2: Performance indicators of the region's innovative capacity

Components of region's innovative capacity	Indicators
1. Research engineering	1.1. The share of innovative products in the total volume of shipped products, %;
	1.2. The number of issued patents for 100 people engaged in research and development, pcs.
2. Production engineering	2.1. Investments in fixed assets per capita, Rubles
	2.2. Suitability of fixed capital assets, %
3. HR-related	3.1. The share of R&D personnel in the population employed in the region's economy, %
	3.2. The share of researchers with academic degrees in the total number of personnel engaged in research and development, %
4. Financial	4.1. The share of expenses for technological innovations, %;
	4.2. The ratio of investment in fixed assets to GRP, %

	4.3. Ratio of internal R&D costs to GRP, %
5. Informative	5.1. The share of organizations that used personal computers
	5.2. The share of organizations that designed a website
	5.3. The number of computers per 100 employees
	5.4. The ICT cost in % to GRP
6. Organizational	6.1. The share of organizations that carried out innovative activities, %
7. Infrastructural	<i>7.1. The number of innovation infrastructure organizations per 100 innovation-active undertakings</i>
8. Institutional	<i>8.1. The share of private companies in all region business, %</i>
	<i>8.2. The share of R&D companies in all region business, %</i>
	<i>8.3. The number of small businesses per 1000 people</i>
	<i>8.4. The number of innovation-active undertakings per 1000 people</i>

Note: Italicized indicators proposed by the authors for assessing the innovative capacity of the region
Source: Author's development

Calculation of the initial and standardized indicators produced a conventional reference model using the maximum indicators of each component (Table 3). The largest number of reference indicators is taken by Moscow (4 off), among which the largest indicators are the information and human resources.

Table 3: Data on reference values and regions in 2017

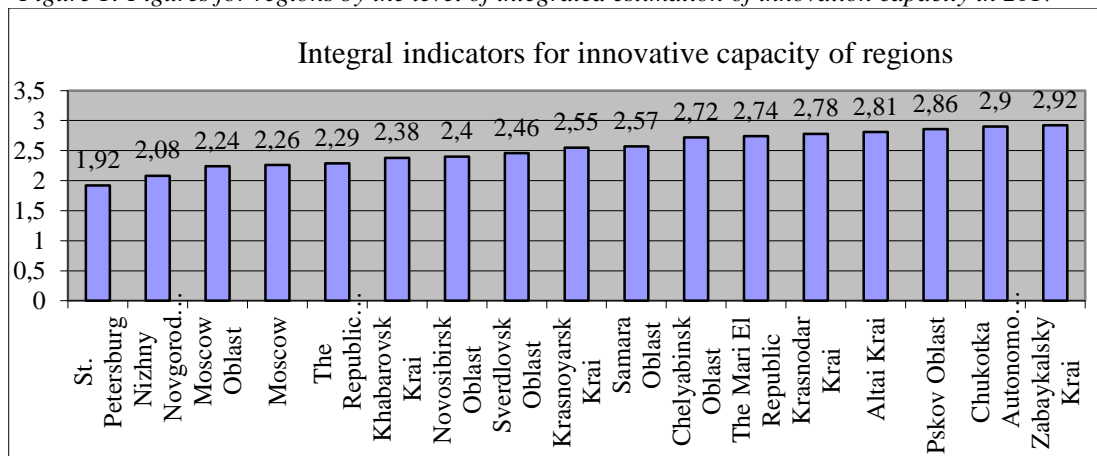
Innovative capacity component	Indicator consecutive number (as per Table 2)	Reference indicator value	Reference region by indicator
Research engineering capacity	1.1.	15.6	The Republic of Tatarstan
	1.2.	71.8	The Mari El Republic
Production engineering capacity	2.1.	97495	Khabarovsk Krai
	2.2.	68.1	Zabaykalsky Krai
Human resources	3.1.	3.78	Moscow
	3.2.	24.8	Khabarovsk Krai
Financial muscle	4.1.	6.11	Chelyabinsk Oblast
	4.2.	57.75	Krasnodar Krai
	4.3.	5.2	Nizhny Novgorod Oblast
Information capacity	5.1.	100	Moscow
	5.2.	72.1	Moscow
	5.3.	63	Moscow
	5.4.	3.5	Novosibirsk Oblast
Organizational capacity	6.1.	17.7	Nizhny Novgorod Oblast
Infrastructure capacity	7.1.	4.9	The Mari El Republic

Institutional capacity	8.1.	92.2	St. Petersburg
	8.2.	0.11	Moscow Oblast
	8.3.	368.7	St. Petersburg
	8.4.	10	St. Petersburg

Source: author's development

The calculation of the integral rating estimation using the additive method of criteria convolution and the distance calculation method shows the following data (Fig. 1):

Figure 1: Figures for regions by the level of integrated estimation of innovation capacity in 2017

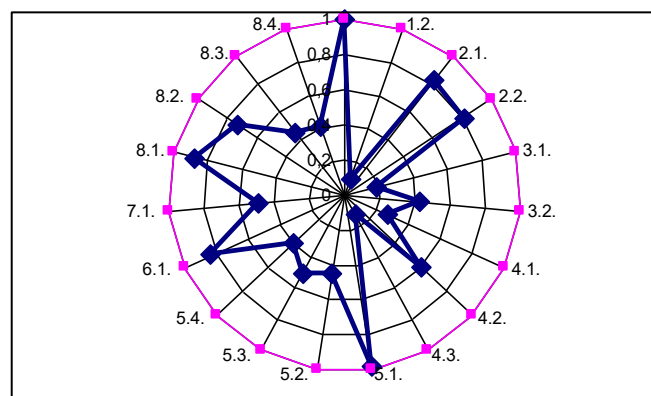


Source: Author's development

The region with the lowest integral index of innovation capacity, which means the shortest distance from the reference value, shows the best estimate.

The ratio of the indicators of the innovative capacity components for the Republic of Tatarstan and their reference values can be graphically presented owing to the distance calculation method.

Figure 2: Figures of the innovative capacity components for the Republic of Tatarstan in 2017



Source: Author's development

3. Conclusion

The analysis shows that out of the 19 innovative capacity indicators, 7 are satisfactory, and 2 of them are equal or approaching the reference values, but 12 are clearly unsatisfactory and even critical; they can be called downsides in the innovative growth of the Republic of Tatarstan

and inhibit the entire innovative process. The strongest indicators in the innovative growth of the Republic of Tatarstan is 1.1. The share of innovative products in the total volume of shipped products.

The smallest distance to the reference values are demonstrated in the indicators 2.1. Investments in fixed assets per capita; 2.2. Suitability of fixed capital assets; 6.1. Level of innovation-active undertakings; 8.1. The share of private companies in all region business; 8.2. The share of R&D companies in all region business, %. The distance of these indicators range from 0.15 to 0.27, so they can be identified as having the greatest capabilities in raising the level of innovative capacity.

The following indicators show the greatest distance to the reference: 1.2. The number of issued patents for 100 people engaged in research and development, pcs.; 3.1. The share of R&D personnel in the population employed in the region's economy, %; 4.1. The share of expenses for technological innovations, %; 4.3. Ratio of internal R&D costs to GRP, %. These indicators show the maximum difference with reference values – the capacity takes only 10-23% of the possible 100%.

Analysis of the innovative capacity components for the Republic of Tatarstan and their distance from the reference values allows us to conclude that the weakest innovative capacity components for the Republic of Tatarstan are financial, information, and institutional. The implementation of measures to develop these identified capacity options is a tool for regional growth.

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PERCEIVED SENSITIVITY OF PERSONAL DATA IN THE GLOBALISED WORLD: COMMON PERSONAL DATA AND HEALTH-RELATED DATA

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Abstract. Personal data is described as information belonging to a natural person. Due to the rapid technological developments in the world and globalisation, new rules about personal data protection were needed – in the European Union, so-called GDPR (General Data Protection Regulation) has become into force. The aim of this paper is to found out whether the degree of perceived sensitivity of selected personal data (namely common personal data and health-related data) is influenced by gender or not. From the results, it is obvious that the degree of perceived sensitivity is independent on respondents' gender (however, there is one exception: "Name of your general practitioner" is a kind of personal data when men and women have a different view of perceived sensitivity). Besides this it was found out that data such as "Personal number", "Public identity card number", "Passport number", "Driver's licence number" and "Gun licence number" are considered as sensitive, whereas "First name" absolutely belongs to general data. Furthermore, "Your height", "Your health insurance company" and "Name of your general practitioner" are also understood as rather general data. Presented findings can be used in business practice, especially in the area of loyalty programmes. Customers, who are interested in any loyalty programme, need to register and give required information about them. It is obvious that high degree of perceived sensitivity of required personal data means low willingness to give such personal data and also it leads to considerable effort to protect such data in our globalised and connected world.

Keywords: data protection, sensitive data, personal data, GDPR

JEL Classification: M10, M38, C89

1. Introduction

Some personal data is perceived as particularly sensitive – European Commission (n.d., B) presents a list of this data, especially emphasizes racial and ethnic origin, religious/philosophical beliefs, political opinions and last but not least health-related data. Health-related data can be also called as medical data which should be specially protected (European Union Agency for Fundamental Rights and Council of Europe, 2018).

In connection with EU regulation, personal data protection is one of topical issues in the European Union. Since May 25, 2018, a new regulation No. 2016/679, called General Data Protection Regulation (hereafter referred to GDPR) has become into force. This Regulation deals with personal data of natural persons and its protection which is considered as one of the fundamental human rights. (EUR-Lex, 2016)

GDPR defines personal data as information belonging to natural person who is called “data subject”. This data subject can be identified e.g. by means of name, identification number, or through some specific factors such as physical, physiological, cultural etc. characteristics. A special sub-group of personal data is sensitive personal data, mentioned above in the first paragraph of this Introduction. (EUR-Lex, 2016)

The purpose of GDPR is explained especially with regard to the rapid technological developments and globalisation; besides this, economic and social integration (within the internal European market) is also mentioned. These days, personal data are often distributed across borders and so there was a necessity to determine clear rules in order to protect such data. GDPR is an example of harmonising legislative processes that are seen as necessary in the current stage of globalisation (Zsarnoczky, 2016). However, the rules contained in GDPR are not applicable to data which is purely used for personal or household activity. (EUR-Lex, 2016)

As stated above, GDPR distinguishes also particularly sensitive personal data which include racial or ethnic origin. Further, there is a mention of photographs because some photos can be processed through specific technical means which allow identification of natural persons. This particularly sensitive personal data should not be processed, however, in some specific cases it is allowed. (EUR-Lex, 2016) In general, it is worth noting that companies are allowed to collect only such personal data which is necessary for fulfilling customers’ orders. The amount of required personal data should be adequate – if there is a company what offers dresses to its customers, then it will not be adequate to ask customers about their political opinion (European Commission, n.d., A). Nevertheless, customers have an opportunity to give explicit consent to the processing of such data which is not absolutely necessary for business transactions. Companies need to explain the specific purpose of this processing very clearly. (EUR-Lex, 2016)

From the academic and practical point of view, protection of sensitive personal data is discussed in many different ways. Instead of the term ‘sensitive data’, it is sometimes used the term ‘confidential data’ (Hannah & Robertson, 2015). Since much personal data is in the digital form, the issue of data protection is strongly connected with security in the area of cloud-computing (e.g. Hyseni et al., 2018) or various registration systems and online platforms which have a form of large databases full of sensitive data (e.g. Railiene & Ivaskeviciute, 2016 deal with this topic). When preparing campaigns which are based on relationship marketing, it is crucial to keep in mind that this action is connected with the duty of customers’ data protection (Salgovicova, 2015). Especially e-shops need to determine rules thoroughly how they work with personal data of their customers in order to keep the legal duties (mentioned e.g. by Hedvicakova & Munsterova, 2016 or Kulyk & Skodova Parmova, 2017). When developing a mobile shopping application, the most important attribute is just level of data protection (Balan, 2017 or also Asghar et al., 2008).

There is no surprise that customers are afraid of potential misuses of their personal data when shopping online (Valaskova, 2016). Protection of private data is not only a matter of companies

and enterprises but also of social networks (mentioned e.g. by Ionescu et al., 2014, Estivill-Castro & Nettleton, 2015 or Limba & Sidlauskas, 2018).

2. Aims and Methods

The aim of this paper is to determine whether the degree of perceived sensitivity of selected personal data is influenced by gender or not. Selected personal data which was analysed in this paper is presented in Tab. 1 – this data was divided into three Groups: I, II and III.

The degree of perceived sensitivity was found out through a five-point scale: 1 = very sensitive personal data, 2 = rather sensitive personal data, 3 = undecided (neutral), 4 = rather general data, 5 = general data.

Table 1: Selected personal data

I. Basic personal data	II. Further personal data	III. Health-related data
First name	Phone number (private mobile)	Your overall current state of health
Surname	Phone number (home fixed line)	Your weight
Birth name	Public identity card number	Your height
Address of permanent stay	Passport number	Your blood group
Address of temporary residence	Driver's license number	Currently used medicine – over-the-counter
Age	Gun licence number	Currently used medicine – prescription
Date of birth	Your signature (its graphic form)	Your health insurance company
Personal number	---	Name of your general practitioner
---	---	Allergies you currently suffer from
---	---	Serious illnesses you suffered from

Source: Own processing.

This paper presents a part of conducted research, focused on the degree of perceived sensitivity of selected personal data. Necessary data for analysis was collected by means of a printed questionnaire. Totally 431 fully completed questionnaires were collected from October until December 2017. The sample consisted of 217 men and 214 women and this sample was balanced (it was tested by means of Chi-square goodness of fit test: Chi-square = 0.021, degrees of freedom = 1, p-value = 0.8851). The youngest respondent was 18 years old and the oldest one was 85 years old.

Data was analysed using Chi-square test of association and basic method of descriptive statistics (mean), subsequently semantic differential was used in order to show the results graphically.

3. Results and Discussion

In this section, connection between the degree of perceived sensitivity of selected personal data and respondents' gender is analysed. Subsequently, data is presented in the visual form, using semantic differential.

a. Connection between the degree of perceived sensitivity of selected personal data and respondents' gender

In order to find out whether there are connections between the degree of perceived sensitivity of selected personal data and respondents' gender, the Chi-square test of association was used (according to Davis and Pecar, 2010). The null hypothesis (Ho) stated gender and degree of perceived sensitivity are not associated. The alternative hypothesis (Ha) stated gender and degree of perceived sensitivity are associated, i.e. the degree of perceived sensitivity is dependent on respondents' gender.

The detailed results are summarized in Tab. 2 – it is obvious that the degree of perceived sensitivity is independent on respondents' gender (however, there is one exception).

Table 2: Statistic results – (in)dependence between the degree of perceived sensitivity and respondents' gender

Group	Selected personal data	Chi-square statistic	P-value	Interpretation (if level of significance = .05)
I	First name	2.72	0.61	Ho - unambiguously
	Surname	1.70	0.79	Ho - unambiguously
	Birth name	1.52	0.82	Ho - unambiguously
	Address of permanent stay	2.63	0.62	Ho - unambiguously
	Address of temporary residence	2.31	0.68	Ho - unambiguously
	Age	1.73	0.79	Ho - unambiguously
	Date of birth	1.77	0.78	Ho - unambiguously
	Personal number	2.32	0.68	Ho - unambiguously
II	Phone number (private mobile)	1.22	0.88	Ho - unambiguously
	Phone number (home fixed line)	5.15	0.27	Ho - unambiguously
	Public identity card number	1.66	0.80	Ho - unambiguously
	Passport number	2.22	0.69	Ho - unambiguously
	Driver's license number	2.81	0.59	Ho - unambiguously
	Gun licence number	5.07	0.28	Ho - unambiguously
	Your signature (its graphic form)	1.93	0.75	Ho - unambiguously
III	Your overall current state of health	4.17	0.38	Ho - unambiguously
	Your weight	6.70	0.15	Ho
	Your height	0.67	0.96	Ho – absolutely unambiguously
	Your blood group	6.88	0.14	Ho
	Currently used medicine – over-the-counter	3.01	0.56	Ho - unambiguously
	Currently used medicine – prescription	2.24	0.69	Ho - unambiguously
	Your health insurance company	5.01	0.29	Ho - unambiguously
	Name of your general practitioner	9.59	0.05	Ha (p-value = 0.04797)
	Allergies you currently suffer from	2.77	0.60	Ho - unambiguously
	Serious illnesses you suffered from	4.88	0.30	Ho - unambiguously

Source: Own processing.

Note: $df = 4$; level of significance = .05, than chi-square statistic has to be higher than 9.49 for supporting Ha.

It can be seen from Tab. 2 that only “Name of your general practitioner” is a kind of personal data where the degree of perceived sensitivity is dependent on respondents’ gender (p-value = 0.04797). In this case, there is the biggest difference between men and women in the option “very sensitive personal data” – three times more men than women consider name of their general practitioner as something what is very sensitive. Despite this fact, respondents generally claim that name of their general practitioner is rather general data.

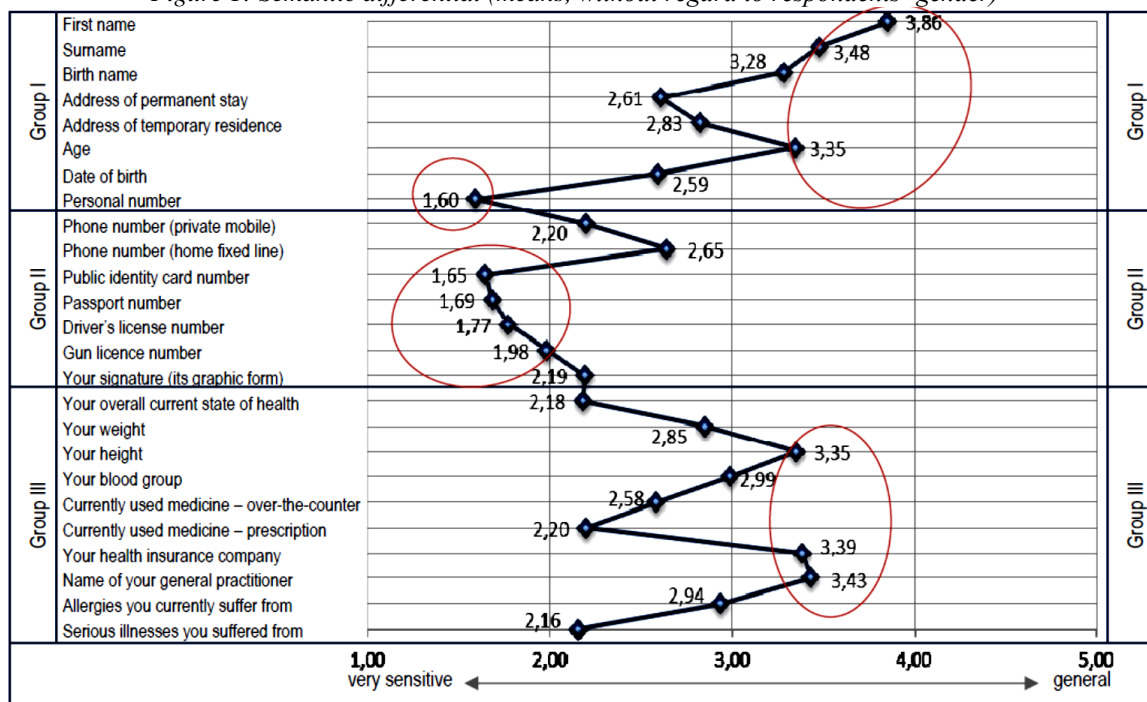
On the other hand, “Your height” is a kind of data where the degree of perceived sensitivity is not dependent on respondents’ gender (p-value = 0.96). It means men and women have the same opinion on the degree of perceived sensitivity.

Both “Your height” and “Name of your general practitioner” belong to the Group III – so it can be quite surprising that there are so big differences between men and women (“Your height” => men and women have the same view of sensitivity of this data; “Name of your general practitioner” => men and women have a different point of view).

b. Perceived degree of sensitivity of selected personal data – semantic differential

Because in the majority of analysed selected personal data there is no connection with respondents’ gender (see Tab. 2), means were calculated and then semantic differential was created – see Fig. 1.

Figure 1: Semantic differential (means, without regard to respondents’ gender)



Source: Own processing.

Note: 1 = very sensitive personal data, 2 = rather sensitive personal data, 3 = undecided (neutral), 4 = rather general data, 5 = general data.

The lower the number in Fig. 1, the higher the perceived sensitivity is. Fig. 1 shows that data such as “Personal number”, “Public identity card number”, “Passport number”, “Driver’s licence number” and “Gun licence number” are considered as sensitive, whereas “First name” absolutely belongs to general data. This result could be anticipated because first name is used for addressing people quite commonly.

“Surname” and “Age” are also considered as rather general data from Group I. As for the Group III, “Your height”, “Your health insurance company” and “Name of your general practitioner” are also understood as rather general data.

Respondents were not able to decide whether “Blood group” is rather sensitive or rather general kind of data (mean = 2.99).

From Fig. 1 is also obvious that no one of the analysed selected items was on average evaluated between 4.00 and 5.00 – nothing is considered as absolutely general data. The next interesting finding is the fact that on average respondents did not evaluate any of selected items in Group III as very sensitive, although it could be assumed that just this kind of data respondents would like to protect the most.

c. Business implications

The above presented findings can be used in business practice, especially in the area of loyalty programmes which are one of the tools in marketing communication, used not only by business companies but also by educational institutions (). In general, loyalty programmes are based on systematic collecting personal data and its further processing. Customers, who are interested in any loyalty programme, need to register and give required information about them. Despite the rules of GDPR, it is obvious that high degree of perceived sensitivity of required personal data means low willingness to give such personal data and also it leads to considerable effort to protect such data.

The above presented results suggest which data it is adequate to require during the registration for loyalty programmes (or loyalty clubs), without the potential members have a feeling of discomfort. As for analysed special kind of health-related data, presented results can be useful for companies in the pharmaceutical retail. In the Czech Republic, there is a chain of pharmacy stores called Benu which offers loyalty programme – its members have an opportunity to use medicine counselling (Erbenova, 2017) which means that it is first necessary to give information on currently used medicine.

Last but not least it can be deduced that GDPR also helps to the consumer protection when consumers/customers are considered as vulnerable market participants (Gubiniova et al., 2017).

4. Conclusion

From the results it is obvious that the degree of perceived sensitivity is independent on respondents' gender (however, there is one exception: “Name of your general practitioner” is a kind of personal data when men and women have a different view of perceived sensitivity).

Besides this it was found out that data such as “Personal number”, “Public identity card number”, “Passport number”, “Driver's licence number” and “Gun licence number” are considered as sensitive, whereas “First name” absolutely belongs to general data. Furthermore, “Your height”, “Your health insurance company” and “Name of your general practitioner” are also understood as rather general data.

Presented findings can be used in business practice, especially in the area of loyalty programmes. Customers, who are interested in any loyalty programme, need to register and give required information about them. It is obvious that high degree of perceived sensitivity of required personal data means low willingness to give such personal data and also it leads to considerable effort to protect such data in our globalised and connected world.

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STRATEGIES OF THE HUMAN CAPITAL DEVELOPMENT IN CONDITIONS OF ACCELERATING DIFFUSION OF TECHNICAL INNOVATION UNDER INFLUENCE PROCESSES OF GLOBALIZATION

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Abstract. With all the varieties of assessments of the processes of globalization, the fact that this phenomenon is fundamentally linked with the acceleration of the diffusion of technical innovations is indisputable. It is becoming more and more difficult for traditional enterprises to achieve such high efficiency criteria set by new technologies. Under these conditions, managers of traditional enterprises try to conduct modernization in order to maintain competitiveness. To do this, they invite specialists with higher education in hope that they will manage independently to introduce technical innovations into the traditional technological process. In such a way quite often they temporarily achieve the desired economical result, including money saved on personnel development. However, failures in the work of new technology, which cannot be eliminated by specialists who have not passed through necessary training program, often lead to risks of uncompensated loss of efficiency. Nevertheless, this approach has become widespread despite the managerial full understanding of its palliative. Further development of the organization cannot be carried out without the introduction of technical innovations. This fact, in its turn, requires changes in the development strategy of the organization labour potential. The proof of this statement is presented in economical and mathematical models that consider the correlation of the expenses on operation of new machinery, investments in personnel development and changes in production efficiency.

Keywords: globalization; uneven development; modernization; human resources, the strategy of human resources development.

JEL Classification: O33, O34, J24, E24

1. Introduction

From an economic point of view, globalization means increased competition, which is related to the subjects involved, with many terrified consequences. The emergence and continuous development of the global information infrastructure has significantly accelerated the diffusion processes of technical innovations. In turn, the implementation of innovations requires the development of special programs of retraining and professional rotation of staff.

At the same time, economic entities are forced to make a choice based on the criteria of "price-performance" when choosing development programs. Besides, the choice of development path according to the given criteria is largely determined by the corporation's financial capabilities.

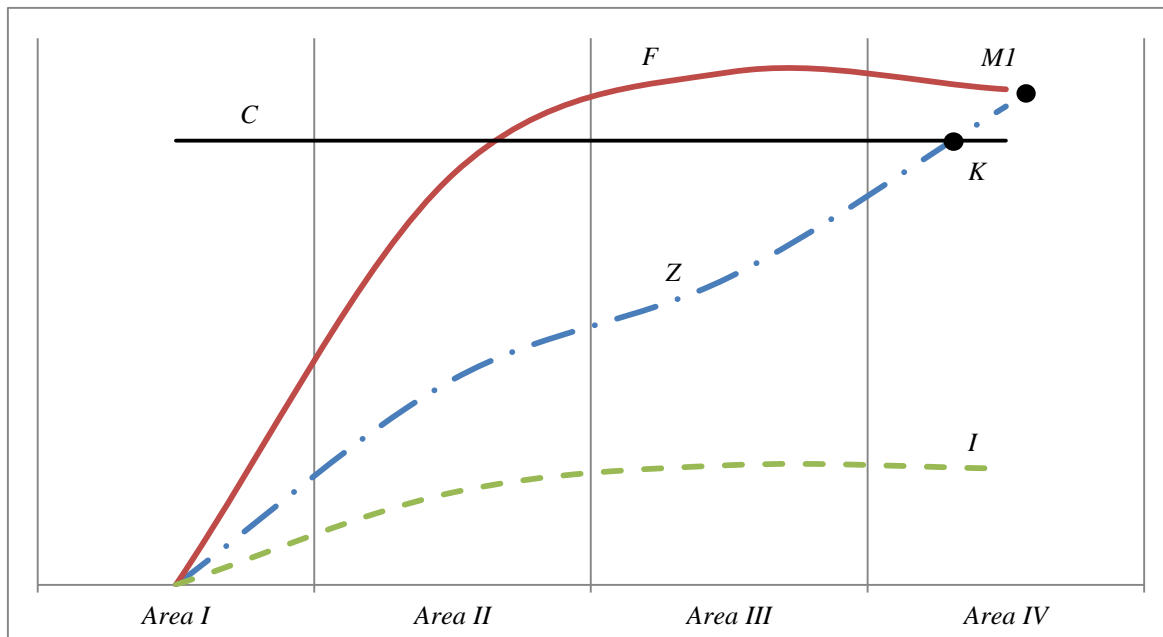
Innovations as the decisive factors of economic production have been in the highlight of world science since the 30'ies of the XX century. The study of the impact of globalization on the nature of innovative economic development shows the strengthening of diffusion processes of innovations at the sectoral and intersectoral levels, on the one hand, but also the growing unbalance of innovation development of some territories and even countries. (Meiss et al., 2018) From the world practice of innovative development, it is known about formation of the global scientific centers, engaged in development of innovative projects and testing of inventions developed at the enterprises of different countries. (Razminiene & Tvaronaviciene, 2017) The formation of innovation clusters significantly affects the competitive ability of numerous dynamically developing medium-sized enterprises, providing jobs for numerous of citizens in many countries. In the context of global competition, the implementation of innovations in such enterprises involves an increased economic risk of the organization sustainability loss.

2. Body of paper

As it is known, the process of technological development has two main forms: evolutionary and revolutionary. Evolutionary form of development is connected with modernization and the equipment functioning in the enterprise due to the inventions improving its effectiveness. (Razminiene & Tvaronaviciene, 2017) In turn, the revolutionary forms of technological development include radical changes of technology, which result in a real change of traditional technical systems to their innovative types. As a result, there are significant changes in the structure of the technological process or its total change. (Doman & Doman, 2013). All this together allows to achieve radical increase of production efficiency. However, the price of such innovative systems can be many times higher than the price of conventional units. For this reason, many companies in the context of limited financial resources, including, especially, the phase of the cyclical economic crisis recovery, create hybrid industries in which conventional technical systems are combined with the new technology. In this regard they are forced to buy some «technical generics». It is a question of some copies of original innovative technological samples which are cheaper than original products but concede them in criteria of reliability and efficiency. However, the expenditures for purchase both the original innovative technology and its generics are very high. For this reason, due to the lack of financial resources, companies impose restrictions on other activities of the organization including the development of human capital assets. (Kim & Lin, 2017) Besides, in the context of the intensive diffusion of technical innovations the global markets show a growing shortage of designers, engineers, production personnel, have sufficient qualification for the effective assimilation and operating of technical innovations. (Davidson & Sly, 2014) In this situation, the reduction of investment in personnel development is possible and gives a short-term effect at the initial stages of new technology assimilation but then is accompanied by greater risks of a sharp decline in production efficiency due to the increasing number of failures of the technical system, the poor quality of its repair and the increasing periods of its downtime.

Figure 1 shows the simulation model of the process of the new technical system assimilation in the context of large financial investments planning for the assimilation of the new technical system upon the condition of limited investments for human capital development.

Figure 1: A simulation model of production efficiency dynamics under the influence of changes in equipment maintenance costs and investment in human resources



Source: Compiled by the author on the basis of the study.

Z - the cost of maintenance and repair,

F - production efficiency,

I - investment in human capital,

C - the level of maximum permissible costs,

M1- the point characterizing the level of maximum permissible costs for the equipment operating, which provide sufficient production profitability,

K – production costs which are incompatible with the criteria for efficient use of new technologies.

I area is a situation of new technology's implementation. It is characterized by a basic investment in the installation of new equipment, and the initial modular training of personnel in the maintenance of new equipment.

In II area the equipment is brought to the project work mode, and at the same time efficiency increases, but the maintenance and repair costs of the equipment increase due to its unplanned stops and failures. Besides, the staff incurs a noticeable shortage of knowledge, which leads to lower productivity.

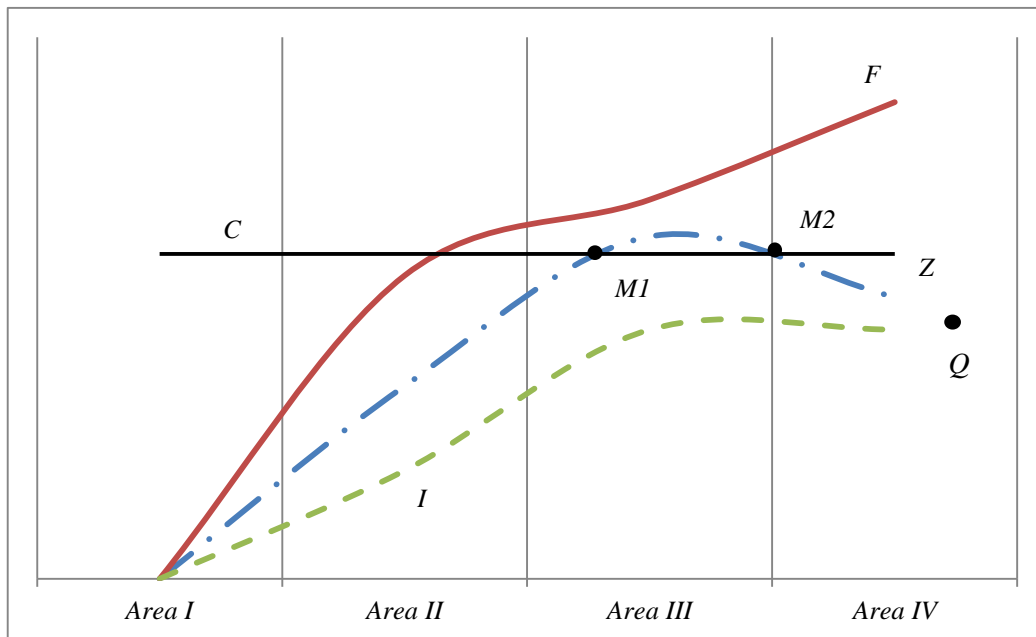
III area there is a decrease in production efficiency as a result of the increase in equipment maintenance costs. They begin to exceed the level of maximum permissible costs, which leads to a significant decrease in the production profitability. The current situation is caused by the increase in the duration of equipment stops and incapacitation of key units. The latter is due to the lack of proper qualification of employees, necessary for the timely debugging and repair of equipment. The management of companies tries to encourage employees for its efficiency in normal hours, which leads to a sharp increase in the labour intensity of staff, but does not significantly improve the quality of repair works.

IV area is characterized by increased adverse trends in production costs and its reduced efficiency. At the same time, investments in human resources decline due to lower profitability and reduced financial resources.

Quite often, to reduce the costs of new equipment assimilation, the tasks of implementing the project of its implementation are entrusted to the most experienced engineers of the organization. They are entrusted with realization of business objectives for accelerated implementation of new equipment in production and detailed instruction of specialists which in the future will have to serve it. (Blanchard & Olney, 2017) Unfortunately, the plans for implementation of new equipment in this case are often not successful, because the implementation terms are calculated retrospectively based on the standards of implementation of conventional units. (Larsen et al., 2018) Besides, the entire responsibility for the failure of the implementation plans lies with the engineers, and it contributes little to the problem solution, because their experience in operating of conventional technical systems does not compensate the lack of knowledge on use of new equipment. (Schymik, 2018) The latter significantly reduces the possibility of making optimal decisions on the implementation of new technology in production.

Investment in human capital is crucial for the effective implementation of new technology in production. (Blanchard & Willmann, 2016) The volume of investments should be planned on the basis of the results of a special audit to identify the real knowledge of staff for learning the new professional competencies necessary for maintenance of new equipment. (Pain et al., 2018) The latter requires the development of new programs for personnel further training and the creation of new departments for the development of human capital of the organization. It should be mentioned that in the world practice of human resources management the researches are carried out to optimize human resource's development programs in order to reduce costs and time of specialists training for implementation of company's innovative programs. (Milani, 2012) In particular, it is proposed to make greater use of IT-technologies. E-Learning offers a number of additional benefits: it allows accelerating, and in some cases to improve the process of experts training, increases motivation for training in the areas actual for increase of production process efficiency and eliminates restrictions in time and space. (Meschi et al., 2016) Some companies organize training online, providing round-the-clock access and online training, as well as customization of programs depending on the students' needs. (Ensher et al., 2002) Of course, e-learning has its drawbacks, for example, some employees experience dissatisfaction due to the lack of personal communication with the mentor in solving certain problems in the maintenance of equipment. Therefore, it is possible to recommend a combination of remote learning with real trainings on stands. Besides, modern training programs offer opportunities for real self-assessment of professional skills and necessary directions for its improvement. However, it is obvious that the combination of e-learning with real training can reduce costs compared to traditional teaching methods. (Boubakri et al., 2013) In practice, the active personnel training for assimilation of technological innovations allows to increase the efficiency of innovative programs implementation (Figure 2). This figure presents the economic and mathematical model (EMM) of dynamics of changes in production efficiency depending on the changes in production costs and the results of investments in the company human capital.

Figure 2. Economic and mathematical model of changes in production costs and the results of investments in the company human capital



Source: Compiled by the author on the basis of the study.

Q – the point of the optimal cost plan for the implementation and assimilation of innovations,

M1 - the point characterizing the level of maximum permissible costs for the equipment operating, which provide sufficient production profitability,

M2 - the exit point from the maximum permissible costs for the equipment operating.

I area defines the implementation of the structurally close technical system considered in the model on the Figure 1. In this case, the implementation of the technologies was also accompanied with the modular training of employees. At the same time, production costs began to increase at the same rate as in the case presented in the Figure 1.

II area is characterized by a higher rate of production costs due to the desire of management to quickly bring the equipment to the design capacity. However, the understanding of the fact of objective complexity of quality equipment service without proper training contributed to the decision of significant increase of investments in human resources of the organization, most of which was invested in staff training.

III area was characterized by a decrease in production efficiency by increasing the cost of new equipment maintenance, which was not fully assimilated by the staff yet, as well as a high level of investments in employees training. Besides, the cost increase reached a critical level.

IV area - this area was characterized by an increase in production efficiency due to the qualified equipment maintenance by the organization personnel. As a result of sufficient investments in personnel training there is a significant reduction of operating expenses from downtime of the equipment at the expense of its better service. (Remington, 2017) There are reasons to believe that the increase of investments in human capital contributes to a significant reduction in the cost for efficiency of the technical system, which together provides the necessary increase in production efficiency.

3. Conclusion

Globalization enhances the process of innovative changes in the production process by accelerating the diffusion of innovations. In these conditions, companies are forced to support the strengthening of innovation policy by increasing financial investments in improving the production technical base, while there are tendencies in the reduction of investments in company's human capital that is perceived in some companies as secondary costs that do not have a significant impact on the increase in efficiency of the technological innovation's implementation. (Cappelli & Montobbio, 2016) Our studies have shown that these ideas and similar to them ideas about the value of human capital for the efficiency of innovation policy implementation appear incorrect. Investments in human capital have a double effect. Firstly, the qualification of the organization personnel and learning new professional competencies of the unique innovative technologies use are increased, at the same time, the terms of its implementation are reduced, the high use efficiency and reliability are ensured, which together allows to achieve system synchronization of production systems functioning, thus to achieve an optimal level of the production processes interaction. Secondly, a qualified equipment maintenance achieved by adequate investments in company's human capital, contributes to a noticeable reduction in equipment operating costs: reduces downtimes, reduces the frequency of its emergency failures, reduces the duration of repairs and the risk of unscheduled stops due to failures of its functioning. (Gonchar & Kuznetsov, 2018) The achievement of these results can significantly reduce the operating costs for the implementation and maintenance of technical systems, and increase in production efficiency assures in high return on investments in human capital and their unique value in the implementation of the organization innovation policy.

This paper is an output of the science projects: Personnel management in terms of active innovation policy and the project of Influence of corporate social responsibility on the population life quality.

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GLOBAL PERCEPTION OF THE USE OF ECO-PRODUCTS IN THE INTERNET SPACE

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Abstract. Turbulent development of the Internet sales represents a new business phenomenon that brings higher profits to companies. The reason for this is, above all, the growing globalness of the Internet access as a space for effective use of marketing tools that are constantly improving in the Internet environment. Internet sales make online marketing more effective. Its aim is not only the purchase itself, but also its subsequent repetition as a positive feedback, as well as customer satisfaction. Repeated visit to the online store or re-purchase can be accomplished by influencing the consumer behavior of the target customers. In order to know if vendor measures to achieve customer satisfaction are effective, we need to know their satisfaction with sales. This is an area, that is significantly affected by the different trends and results of specialized surveys and technical solutions. The paper will present a part of the results obtained from the complex research of international and Slovak companies, which are important online sales networks dealing with the sale of "healthy foods" with a wide selection of healthy and environmentally friendly nutrition. Healthy nutrition, as well as the constant degradation of the various components of the environment, including the soil, has become a global problem, which needs to be paid proper attention primarily from a global perspective. At present, strong pressure is being put from the side of consumers themselves and their needs in the field of organic nutrition, by which they force the company to deal with the issue.

Keywords: globalization, internet space, marketing communication, Internet sales, organic food.

JEL Classification: M31, O31, Q50, Q56

1. Introduction

Turbulentný rozvoj internetového predaja predstavuje nový podnikateľský fenomén, ktorý prináša spoločnostiam vyššie zisky. Dôvodom je predovšetkým stále výraznejšia globálnosť spojená s dostupnosťou internetu ako priestoru pre efektívne využitie marketingových nástrojov, ktoré sa v internetovom priestore neustále zdokonaľujú. Internetový predaj zefektívňuje onlinový marketing. Jeho cieľom je nielen samotný nákup, ale aj jeho následné opakovanie, ako prejav pozitívnej spätnej väzby a zároveň aj spokojnosti zákazníkov. Opakovanú návštevu internetovej predajne, či opakovaný nákup, je možné doceliť ovplyvnením spotrebiteľského správania cieľových zákazníkov. Na to, aby sme vedeli, či sú opatrenia predajcov na dosiahnutie spokojnosti zákazníka účinné, musíme poznať ich spokojnosť s predajom. (Visser et al., 2018)

Najväčšou bariérou zvyšovania environmentálnej spotreby je podľa prieskumov vysoká cena biopotravín a ich relatívne úzky sortiment ale aj nedostatočná informovanosť zo strany

mnohých prevádzkovateľov takýchto typov predajní či už v onlinovom priestore ale aj v kamenných predajniach. Ďalšia bariéra je nedostupnosť rôznych kategórií produktov.

1.1 Internetové obchody

Internetový priestor ponúka rýchlo sa rozvíjajúce možnosti pre obchodovanie na internete. Všetky výhody predaja na internete môžu využiť mnohé spoločnosti bez ohľadu na ich veľkosť. Internetové obchodovanie zahŕňa viacero rôznych foriem podnikateľských ale aj obchodných transakcií. (Snihur et al., 2018) Autor Suchanek (2012) do tejto oblasti zaradil priamy predaj konečným zákazníkom uskutočňovaný on-line. Patrí sem ponuka tovaru, objednávka tovaru, rôzne platobné brány, poskytovanie obchodných informácií medzi podnikateľskými subjektmi, nadväzovanie a udržiavanie obchodných vzťahov, uzatváranie zmlúv a pod. Pri takomto type obchodovania existuje viacero typov elektronických obchodných vzťahov či už medzi podnikmi a ich klientmi v závislosti od predmetu podnikania a tiež rôzne spôsoby využitia internetu pre tento účel.

Najčastejšie sa v elektronickom obchodovaní vyskytujú modely B2B (transakcie medzi firmami), B2C (oblasť predaja koncovým zákazníkom) a C2C (transakcie medzi zákazníkmi napríklad prostredníctvom online aukčných serverov), ale aj rôzne iné modely, ktoré poskytujú svoje služby a produkty v internetovom priestore. (Jurisova, 2015)

V súčasnej dobe môžeme internetový priestor považovať za neoddeliteľnú súčasť života populácie, umožňuje im využívať špecifickú stránku internetu a to na nákup realizovaný prostredníctvom internetových obchodov tzv. e-shopov. (Cen et al., 2017) Pri tomto type elektronického obchodovania, teda prostredníctvom e-shopu je dôležitý prvý dojem, resp. prvý nákup zákazníka, ktorý si v prípade pozitívnej skúsenosti získa jeho dôveru, a ten sa v krátkom čase rozhodne pre kúpu. Autor Dorcak (2012) definuje e-shop ako on-line marketing určitej firmy, ktorého ciele spočívajú v snahe zredukovať náklady na realizáciu predaja, ako aj zvýšiť dopyt po tovaroch a službách oproti kamennému obchodu. (Baloria & Heese, 2018)

Internetový obchod vo veľkej miere môže fungovať viacerými spôsobmi. Vo forme „doplňku“ kamenného obchodu (určený pre odber tovaru – brick-and-mortar marketers). Tento typ obchodovania sa využíva z dôvodu zníženia nákladov na realizáciu predaja ale zároveň má veľký vplyv na zvýšenie dopytu po produktoch. (Weissova et al., 2015) Taktiež môže internetový obchod fungovať v rámci onlinového priestoru ako samostatný systém (bez kamenného obchodu - click-only marketers) s cieľom dosiahnuť zisk a to najmä na základe predaja produktov a služieb, ale aj podpory produkcie zisku tvorbou dopytu, využitím podpory predaja alebo uľahčením komunikácie s obchodnými partnermi. A posledným typom obchodovania je ako doplnok tradičnej obchodnej siete (click-and-mortar marketers). V závislosti od výberu jedného typu obchodovania môžu spoločnosti vstúpiť na internetový trh, stačí si len vybrať cieľ na základe, ktorého bude takýto typ obchodovania využívať. (Koteles & Kusa, 2015). Podľa údajov z retailmagazínu, 2018 môžeme konštatovať, že v roku 2017 internetový predaj na Slovensku vzrástol medziročne o 15 % čo znamená, že spotrebitelia minuli cca 937 mil. €. Taktiež počet e-shopov na Slovensku presiahol hranicu 11-tisíc. Tento počet je veľmi vysoký, ale čo je dôležité pre úspešnosť fungovania v onlinovom priestore je zvoliť si správnu stratégiu, stanoviť si čiastkové merateľné ciele, vhodne zvoliť cieľovú skupinu a ponúkaný tovar vzhľadom ku vysokej konkurencii. (Clark & Shepherd, 2018)

Elektronické obchody môžeme rozdeliť na dve základné skupiny a to na globálne a lokálne elektronické obchody. Globálne sa sústreďujú na produkty doručiteľné po celom svete, pričom k fyzickému doručeniu môžu využiť dostupnú globálnu logistickú infraštruktúru. Lokálne

obchody oproti tomu hľadajú svoju konkurenčnú výhodu v kvalite doručenia produktov v danej lokalite. Preto je dôležité vyriešiť otázku, čím sa v tomto vysoko konkurenčnom prostredí odlišiť. Mnohé spoločnosti práve z tohto dôvodu hľadajú svoju konkurenčnú výhodu v oblasti sortimentu alebo lokálnych služieb zákazníkov. (Donat, 2000)

Autor Dorcak, (2012) popisuje postup fungovania elektronického obchodu v štyroch krokoch: objednávka tovaru v elektronickom obchode, elektronický obchod kontaktuje výrobcu objednaného tovaru, výrobca dodáva tovar do elektronického obchodu a elektronický obchod expeduje tovar zákazníkovi. Podľa jednotlivých krokov vstupujú do tohto procesu tri subjekty a to zákazník, elektronický obchod a výrobca, pričom tento proces môže ešte zahŕňať využitie kuriérskych služieb, bankových služieb pre overenie platobných kariet a spracovanie platieb a pod.

1.2 Funkcie a nákupné správanie spotrebiteľov internetového obchodu

Internetové obchody ponúkajú pre zákazníka rôzne funkcie, ktorých úlohou je predovšetkým zabezpečiť rýchly a bezchybný priebeh nákupu. Správne zvolené funkcie by mali byť súčasťou každého e-shopu, ktoré sú základom pre budovanie si vzťahov a spokojnosti zákazníka. Autori Sedlak a Mikulaskova (2012) rozdeľujú funkcie na bežné a nadštandardné. Je nutné, aby každý e-shop obsahoval už na začiatku prvú skupinu funkcií – teda bežné, resp. základné. Tieto zabezpečujú plynulé a bezproblémové prevádzkovanie e-shopov, sú zároveň nevyhnutnou súčasťou pre ich existenciu. Nadštandardné alebo voliteľné/doplňkové funkcie plnia skôr funkciu zvýšenia atraktivity samotného e-shopu. (Whiteside & Barclay, 2018)

Bežné funkcie:

- Vyhľadávanie na stránkach
- Výber spôsobu platby
- Výber spôsobu dopravy
- Filtre tovaru
- Evidencia objednávok
- Napredávanejšie produkty
- Napojenie na sociálne siete
- Množstvo záznamov
- XML zdroje.

Nadštandardné funkcie:

- Atribúty produktov
- Súvisiace produkty
- Onlinové platby
- Podpora mien
- Podpora jazykových verzií
- Onlinové sledovanie stavu objednávky
- Fakturačný systém
- Diskusia o produkte a komentár k produktu
- Skladové hospodárstvo
- Vernostné systémy
- SMS správy.

Internetové obchody využívajú tie funkcie, ktoré ale musia vychádzať z potrieb samotného predajcu či je orientovaný pro-zákaznícky a využije možnosť výhody pre zákazníka a navyše

si tým zabezpečí konkurenčnú výhodu napr. v jednoduchšej orientácii v produktoch alebo v informáciách pre zákazníka, ako aj pre seba samého. (Gineikiene & Diamantopoulos, 2017; Gao et al., 2018)

Pri nakupovaní cez internet môžeme pozorovať určité rozdiely v porovnaní s nákupom v kamenných predajniach. Pri elektronickom obchodovaní musia predajcovia brať do úvahy viaceré faktory vplývajúce na nákupné správanie, nakoľko každá webová stránka či elektronický obchod sa musí prispôbiť zákazníkovi z rôznych kultúr a sociálneho prostredia. Taktiež internetové obchody poskytujú zákazníkovi ľahšie a rýchlejšie porovnávanie samotných produktov a cien. Zásadným rozdielom pri nákupe na internete je obmedzenie len na zrakové vnímanie. (Brav et al., 2018) Vzhľadom nato, že si zákazník nemôže tovar vziať do ruky, vyskúšať ho a komunikovať face to face s predajcom, je dôležité, aby internetové obchody ponúkali produkty formou obrázkov, spolu s popisom produktov. Samotný priebeh nákupu by mal spĺňať určité kritériá, ktoré zabezpečujú rýchly a jednoduchý nákup. Zákazník je spokojný s rýchlym vybavením bez komplikácií či zložitých úkonov, a predajca získa obrat dokonca pri spokojnosti si môže budovať dlhodobjší vzťah a lojalitu so zákazníkom. (Malikova, 2015)

Samotný spotrebiteľ, resp. cieľová skupina zohráva dôležitú úlohu v celkovom trhovom mechanizme. Práve spotrebiteľ je ten, ktorý sa rozhoduje na základe určitých podnetov či investuje alebo neinvestuje svoje finančné prostriedky do kúpy produktu. Zelení spotrebiteľia vnímajú zelené produkty kladne, niektorí majú vytvorený neutrálny vzťah k zeleným produktom, ale nájdu sa medzi nimi aj takí, ktorí prechovávajú skeptický či dokonca odmietavý postoj k tomuto segmentu produktov. (Weber et al., 2018) Dôvodom nenakupovania nie je len nezáujem o životné prostredie, environmentálne témy, ale často aj negatívna skúsenosť s kúpou zelených produktov a služieb. Veľkým problémom sú vyššie ceny za takéto produkty, ktoré zákazníci nie sú ochotní zaplatiť. Veľký podiel nedôvery môže zákazník cítiť v tom, že nevidí a necíti dostatočné prepojenie medzi kupovanými produktmi, spoločnosťou, ktorá tieto produkty vyrába a životným prostredím. Je to akási nedôvera zo strany zákazníka.

Problém nedôvery nie je len problém slovenského spotrebiteľa ale jedná sa aj o globálny problém, ktorý je nutné odstrániť. (Stam et al., 2018; Hernandez & Guarana, 2018)

1.3 Výsledky prieskumu realizovaného v spoločnosti zameranej na predaj bio produktov

V rámci riešenia prvej etapy projektu VEGA č. 1/0708/18 „Aspekty využívania koncepcie SoLoMo marketingu na zvýšenie povedomia o ekoinováciách“ bol realizovaný pilotný prieskum, ktorého sa zúčastnilo 250 respondentov a bolo im položených 19 otázok. V príspevku bude použitá iba vybraná časť získaných výsledkov. Prieskum bol rozdelený do dvoch častí a jeho cieľom bolo zistiť záujem respondentov o životné prostredie, zelené produkty vo všeobecnosti, aké je spotrebiteľské správanie pri zelených produktoch, ponuka zelených produktov v internetovom obchode, taktiež aká je frekvencia nákupov zelených produktov nakupovaných prostredníctvom internetu a zelených marketingových aktivít spoločnosti v zmysle koncepcie SoLoMo. Taktiež jedným z čiastkových cieľov bolo zistiť, aká je spokojnosť zákazníkov s predajom cez internet vo vybranom internetovom obchode a identifikovať príčiny prípadnej nespokojnosti.

V tomto príspevku uvádzam výsledky získané zo spoločnosti, ktorá vznikla v roku 2015. Okrem samotného internetového obchodu je prevádzkovateľom dvoch kamenných predajní. **Spoločnosť** sa zameriava na predaj „zdravých potravín“ so širokým výberom produktov zdravej výživy, napr. potravín pre celiakov, diabetikov, ľudí s intoleranciou mliečnej laktózy,

raw a vegánskych potravín, ale tiež aj prírodnej kozmetiky a drogérie. Cieľovou skupinou tejto spoločnosti sú v prevažnej miere mladí priaznivci zdravého životného štýlu, matky s deťmi a mladé páry, čo sa potvrdilo aj v samotnom prieskume, pretože najväčšiu časť výskumného súboru tvorili mladší respondenti vo veku 19-29 rokov 48,8 ďalej nasledovala skupina vo veku 30-40 rokov 30 % a do 18 rokov 15 %. Najviac 80 % navštevujú tento internový obchod práve ženy. Z dotazníkového prieskumu ďalej vyplýva, že respondenti najčastejšie nakupujú zelené produkty v supermarketoch a nie cez internetové predajne a dôvodom kúpy je ich zdravie, zdravie ich detí, rodiny, kvalita zelených produktov Toto zistenie môžeme považovať za nepriaznivý fakt, ktorý ovplyvňuje nákupné správanie viacerých spoločnosti, ktoré prevádzkuje svoje bio predajne na internete. (Allerd, 2018) Najčastejším dôvodom pre nekúpu zelených výrobkov bol práve fakt, že neexistuje zelený variant produktov (63%) a fakt, ktorý je často spájaný s vyššou cenou (85 %) – respondent chce ušetriť, preto si daný zelený výrobok nekúpi. Respondenti sa orientovali aj v označovaní zelených produktov, kde za najčastejšie poznané označenie radili eko-logo Európskej únie. V prieskume sme sa zamerali aj na informácie o aktuálnych ponukách a zľavách zo strany spoločnosti, respondenti v tejto časti uvádzali, že najviac informácií získavajú zo sociálnych sietí ako facebook alebo instagram, z kamennej predajne alebo cez letákovú reklamu. Taktiež nás zaujímali preferencie a očakávania respondentov na základe ich vlastných preferencií, postojov a skúseností. 76 % z opýtaných očakávajú predovšetkým výhodné ceny a zľavy, ktoré spoločnosť poskytuje len v malej miere. 45 % respondentov uviedlo, že o poskytovaných zľavách nebolo informovaných. (Mendelova & Zauskova, 2015; Zauskova & Grib, 2016))

Na základe jednotlivých hodnotení vo výskumnom súbore prevládajú respondenti s celkovým skóre 16-20 bodov (57 %), teda s najvyšším, piatym, stupňom spokojnosti. Čo znamená, že väčšia časť oslovených respondentov je vo veľkej miere spokojnými zákazníkmi s ich rastúcimi požiadavkami v danom eshope. Ďalej sa prieskum zameriaval aj na funkcionality, resp. čo všetko respondentom na stránke chýba, čo by mohlo viesť k zlepšeniu ich nakupovania v tejto spoločnosti. To, čo respondentom najviac chýba je samotná širšia ponuka produktov (52 %), výraznejšie zľavy a nižšie ceny (26,9 %) a kvalitnejšie články v blogu“ (20,2 %). Spokojnosť s komunikáciou v danom internetovom obchode bola hodnotená ako priemerná, a práve týmto faktom si minimalizuje možnosť ovplyvniť nákupné správanie svojich stálych a potencionálnych zákazníkov. Na záver je potrebné konštatovať, že podľa hodnotenia indexu spokojnosti zákazníka významného pre predajcu má pre prevádzkovateľa eshopu najväčší význam sa zaoberať oblasťami akými sú samotný nákup, cenová politika a rýchlosť dodania.

2. Conclusion

Znehodnocovanie životného prostredia a jeho jednotlivých zložiek je dnes predmetom mnohých diskusií, predstavuje celosvetový problém, ktorému je nevyhnutné venovať pozornosť aj z globálneho hľadiska. Internet naštartoval priemyselné elektronické obchodovanie, ktoré sa rozvíja rýchlejšie ako kedykoľvek predtým. Oblasť podnikania však internet ovplyvnil aj novou možnosťou ponuky a predaja tovaru prostredníctvom onlinového priestoru. Veľkou výhodou pre takéto nákupy sú spravidla nižšie ceny, širšia ponuka produktov, možnosť kúpy tovaru počas celého dňa, úspora času, dovoz tovaru domov, možnosť rýchleho porovnania cien.

S rýchlym rozvojom interventových obchodov súvisí aj ponuka kvalitných služieb pre zákazníkov. Zákazník produkty nielen hodnotí ale sa aj rozhoduje či ich kúpiť, alebo nekúpiť,

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MOBILE-FIRST AS A GLOBAL TREND OF CITIZEN-ORIENTED GOVERNMENT SERVICES

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Abstract. The paper deals with the issue of global trends of the increasing popularity of smartphone usage by citizens. A tendency to automation, electronization, easy availability smart devices and interdisciplinary of sciences are also bringing new challenges to the public sector. The public administration faces new opportunities and innovations how to make services better, user-friendly and more available. The transformation of public services to digital form is a driving factor in the process of globalization. Individuals are accustomed to having a mobile device, providing sufficient performance for retrieving real-time information, communication and be in nonstop contact by usage of the mobile Internet. This is significant in the commercial sector, which created some applications for mobile devices primary and desktop version is launched secondary. Due to the European Union initiatives, penetration of the mobile internet and mobile devices in the last years has also grown. The driving forces of globalization have changed way how people think and work. The governments extend communication ways by creating native support for mobile devices. It also provides some basic design manuals with the focus to end-user – citizen. The contribution points to the current state of implementation of eGovernment strategies, mobile internet penetration, preferred channels of communication with public authorities, as well existing mobile applications providing by states. The results of research deal with the requirements of Slovak citizens to government applications, as well as barriers and security risks. Conclusions and recommendations for the public sector mobile applications are formulated based on the citizens' requirements identification.

Keywords: eGovernment, electronic services, public administration, user experience, mobile devices

JEL Classification: I24, H83, O38

1. Introduction

The informatization of society became one of the current issues over the last few years. The global trend of massive development of information and communication technologies causes changes also in society. The impact and the consequences of the technologies to the society are gradually being reflected in the area of public administration, as well. In the past, the public sector was often regarded as not enough progressive. (Cordella & Tempini, 2015)

The gradual interest of countries in modernisation of public administration's processes focused on citizens allows to react to changes and needs of society more quickly, to develop sophisticated services leading to more effective ways of interaction and search for

collaborations with the commercial sector. (Stofkova & Stofko, 2016) In this context, the term eGovernment is used. It refers to an effort of public authorities to use the modern technologies for innovation of public services, increase citizens' participation by creating multichannel access to increase transparency and decrease administrative burden. (Simonova & Novak, 2015)

The penetration of mobile devices increases thanks to the intuitive usage, decreasing of acquisition costs and improvement of mobile operators' pricing policy. That's the reason why strategy called "mobile first" is also discussed more frequently in the public sector. The change in approach lies in a primary suggestion and launch of electronic service on a mobile platform, and subsequently, other access points are derived. (Ebbers et al., 2016)

a. Multichannel access to public services

The states are investing in building of infrastructure primarily in order to increase country's economic development. Current development of eGovernment is one of the pillars in the frame of building modern, open and transparent country. (Gasova & Stofkova, 2017) According to the survey carried out by McKinsey company, the total use of global digitalization's potential of public administration could save 1 trillion American dollars yearly. This could be done only by making the costs more effective and optimizing the operations. (McKinsey, 2015)

Nowadays the legislation of many countries defines the oral, documentary and electronic forms of communication with public authority's organs. Support nodes – access places, through which interaction between citizens and organs of public authority can be done – join the given forms. Every access place supports the chosen combination of communication channels. In Slovakia, **the access places** include:

- Workplace of public authority's organs - the place of personal contact with a worker or possibility of telephone or e-mail contact with this workplace.
- Registry of public authority's organs - a workplace where delivery of written contact is possible (in person or via post operator).
- Specialized portal - online public authority's portal with services allowing electronic communication.
- Central portal of the public authority - central portal ensuring online communication with all public authority's organs
- Integrated service place - assisted place for electronic communication with chosen public authority's organs
- Contact centre - providing information about public authority's outputs and its organs' activities electronically, via telephone. (Deputy Prime Minister's Office for Investments and Informatization, 2017)

According to Gil-Garcia and Martinez-Moyano, the creation of multichannel variants represents a form of product placing in a multichannel context. It is necessary to pay attention to rules which create positive user experience and simple usage of the service. Pieterse with colleagues point out the importance of distinguishing the citizens' preferences. The expansion of communication channels is often regarded as a fulfilment of a certain organisation's aim rather than being focused on the improvement of services' quality and achievement of higher citizens' satisfaction. In this case, the creation and expansion of channels can be counterproductive, leading to the decrease of their usage. (Carvalho & Brito, 2012)

The eGovernment still faces low public interest. despite of building the modern platforms and expansion of digital channels. According to the European Commission 13% of Internet users feel potentially lost in the electronic public administration. They also prefer personal contact to avoid electronic form of communication after not being satisfied with the service. It is possible to increase return and usefulness of the newly built initiatives, in the meaning of “**Digital first**”, with optimization of every channel regarding the current trends, including the penetration of mobile devices. Taking inspiration from the best practice from the commercial sector can make public services popular and more used by citizens. (EU Action Plan 2016-2020)

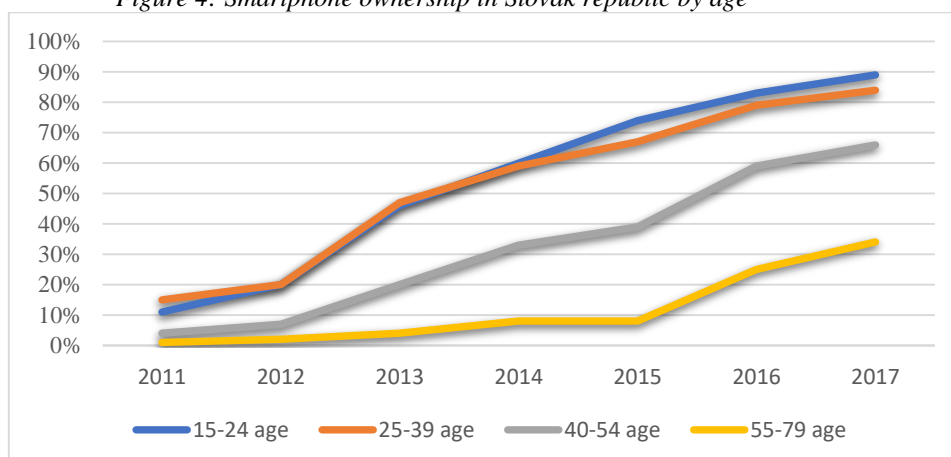
Mobile first strategy

An increasing potential of mobile devices in the future was already mentioned by Wroblewski in 2009. The **mobile first strategy** represents a new access to creation of user interface of web applications. It is based on balancing the importance of small screens and the computer ones, rather than on their prioritizing. Besides the importance of smartphones and their growing popularity, there is also one secondary key element – it teaches how to suggest and think in a simpler way. (Lindgren & Jansson, 2013)

The designers of application are forced to design the limited size of display area in order to display the most important elements of the service. The reduction in elements decreases data difficulty and positively affects the speed of loading. The global promotion of **Mobil First thinking** helps to replace elements, increases intelligibility, implements more simple linear providing of information and enlarges the size of control elements. (Majernik et al., 2016)

The smartphones have changed the way telephones look like in recent years. According to GfK agency, the sale of smartphones made up approximately 80% of total sale of mobile devices in Slovakia in 2017. There was an increase of sales, however, it was not equal among all segments of population from 2011 to 2017 (the period is illustrated in the Figure 1). Smartphones gain the biggest popularity among people in the age between 15-39. According to this survey the use of smartphones decreases with ageing. (Kocan, 2017)

Figure 4: Smartphone ownership in Slovak republic by age

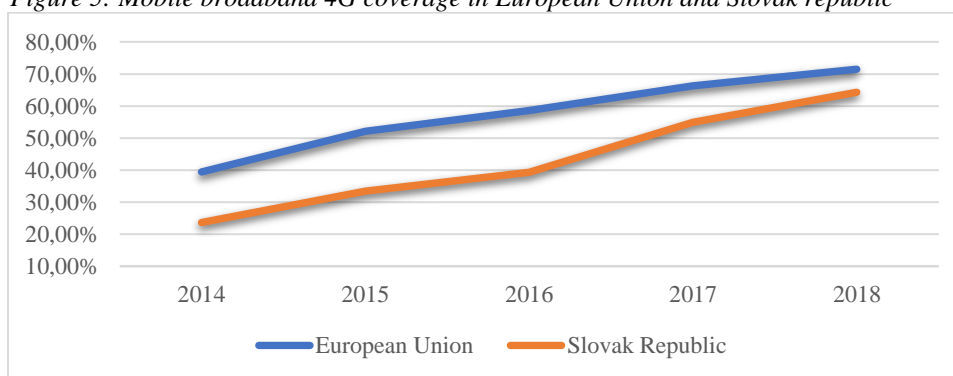


Source: Own processing by Kocan R., 2017

The reason for decreased **use of smartphones** among older generation include the absence of ability to use mobile phone for something else than calling, and limits caused by age – sight, fingers’ ability, distrust and adaptation to new technologies. (Shareef, 2016)

The availability of mobile network coverage is tightly connected to expansion of communication channels. The interaction between public authority's organs via Internet is a global phenomenon. (Akerman et al., 2015) It also confirms the interest of the European Union in implementation of digital transformation regarding establishment of uniform digital market. The Figure 2 illustrates continuous support leading to establishment of the fast 4G mobile connection. The increase of the 4G Internet covered area within the EU from 2014 to 2018 was more than 30% (39.4% in 2014, 71.5% in 2018). The situation is comparable in Slovakia, where mobile operators make effort to cover more and more areas. Currently, 64.3% of the area is covered by the 4G Internet. (DESI 2018)

Figure 5: Mobile broadband 4G coverage in European Union and Slovak republic



Source: Own processing by DESI, 2018

The ownership of a smartphone does not guarantee its full use. According to DESI survey performed in 2018 almost 80% of the owners use access to the Internet via their mobile phones. This proportion makes up only 40% in Slovakia. The intensity of use depends on the age, place of residence and user's income. Choosing an access to a service via smartphone is affected mainly by the simple use which results from applying of the service regarding the mobile first strategy. According to DESI the use of mobile devices within the older generation is expected in the future, mainly because of elimination of barriers – available prices, simple controlling, Internet coverage and positive reviews. (OECD, 2011)

2. Mobile applications of government in global context

Nowadays there is a new trend representing an orientation on using the mobile devices as access points to public administration's services. The interest in mobile devices increases. Especially the commercial sector offers a wide variety of applications which are user friendly. The applications within the public sector make up only a small part of all applications. According to Kushu the Mobile Government is a strategy which includes implementation and use of all types of mobile technology, services, applications and devices improving the benefits for eGovernment users, including citizens, enterprises and public administration organs. The mobility represents an advantage and offers wide range of possibilities to stay in contact with citizens. The basic benefits for citizens as final customers include the fast access to information, unlimited availability, mobility, platform freedom, faster reactions from public institutions and possibility of local information offer. The creation and design of applications for the public sector bring more effectivity regarding connecting the citizens. It also helps to implement innovative solutions and leads to an increased interest mainly within the younger generation, and faster information flow and personalization, as well. (Lara et al., 2018)

a. Methods of research for customer expectation on mobile application

The main aim of the primary research was to distinguish mobile application user's requirements. The requirements and expectations can be divided into following categories: **safety, user environment, experience** and **technical** securing. Another part of the research was dedicated to the current use of existing mobile applications preceded by an analysis of public sector's mobile applications which are known and available in the app stores. There is also carried out an analysis of mobile 4G connection's development and penetration of mobile devices based on the secondary research.

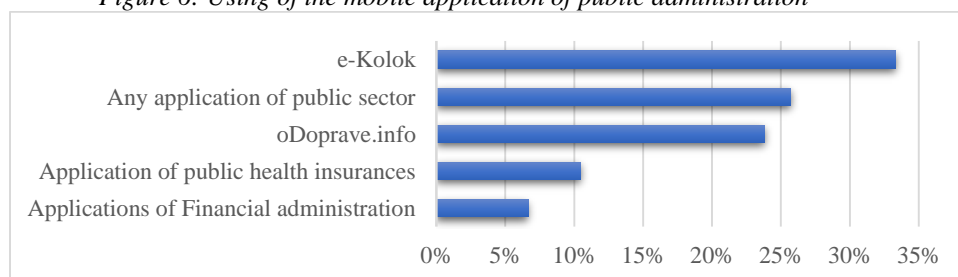
3. Discussion

The mobile application's market grows steadily every year. Based on the results received from the respondents, the operation system Android dominates the market, followed by iOS. More than 82% of respondents claim that they use the possibility of supplementary **app's installation**. The most popular of them are communication tools and social networks which are installed by more than 65% of the smartphone users. They are followed by applications offering navigation and information about traffic (33%). Applications provided by public institutions with national activity in Slovakia, Figure 3, are used only by a small number of smartphone owners.

The most commonly used public mobile application of is payment for judiciary and administrative fees. The application E-kolok is available for both, Android and iOS platform. The development started in 2016 and it is possible to make payments from V4 countries and Austria, as well. The application requires registration and subsequently it is necessary to choose an appropriate service. Afterwards the payment is being performed electronically via credit card. The result of payment is displayed via QR code which serves as an evidence of payment. Other functions include an overview of the mostly used services, payed and cancelled fees.

The 21% of respondents using state's mobile applications claim that it is important for them to have information about current traffic situation. Project oDoprave is a part of National Traffic Information System of Slovak Republic. It includes complex information about traffic situation on Slovak roads. The main functions are display of road situations based on GPS, possibility of voice notifications, reports on traffic situations with photos, information about cycling roads and information about weather or legislation connected to traffic and driver's obligations.

Figure 6: Using of the mobile application of public administration



Source: Own processing

The 10% of respondents use applications about health care which are available in the insurance companies. Its installation offers the possibility of a virtual insurance card and European Health Insurance Card. It also includes online information about the rights to have a health care or records about doctor visits.

The least used applications include mobile apps of Financial administration of Slovak Republic. They offer information about current tax situations, waiting time on the borders and other data from financial administration’s list. In order to prevent avoiding tax obligations, they also provide application which is used for verifications of documents and control mark. More than a quarter of respondents stated that they do not use any of the mobile applications connected to the state’s services.

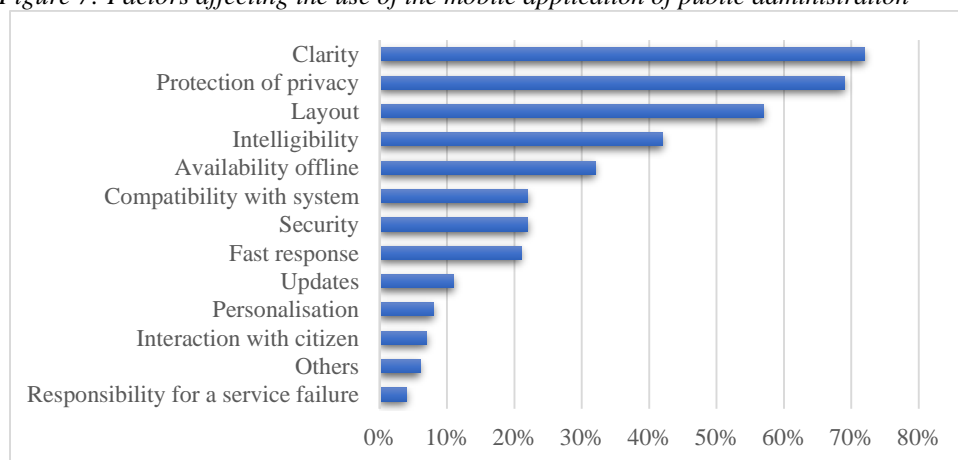
The services of electronic public administration are going through a progress. Global trends include strengthening of public services’ position, the ability of active reacting to requirements, developing the services connected to citizens and optimizing of the display on mobile devices. Identification of the factors - Figure 4 which affect the citizens’ use of mobile applications represents potential opportunities for improvement, increase of its use and awareness. For 72% of the respondents, application’s **clarity** belongs to the key factors which affect the app’s use. We can add even more factors to this one – the **layout** is important for 57% of respondents. Another factor is **intelligibility**. The given factors are positively affected by the **Mobile first** strategy. Combination of the right font size, keeping the basic navigation controls and apt information create a supposition of a successful application. In some applications we can often find only responsivity which comes from the desktop version.

The **privacy protection** is important for 69% of respondents. The reason for this may be a fear of misuse of personal data. Security of confidential communication is a key when carrying out transactions. This problem is partially solved by GDPR but the information about growing attacks on data centres make a negative effect. Strengthening of cybernetic security is a long-term trend in the area of the public sector, too

The **fast response** is important for 21% of respondents. People see smartphones as devices which save time. Users do not want to click too much to get to a result. The result should come out without tedious forms which users need to fill in. Besides removing of unnecessary elements and optimizing of the speed, it is important to think about used mobile connection and possibility of attachment insertion which should not limit the speed of application.

The least important factor (given only by 4% of respondents) when using mobile applications is **responsibility** for a service failure.

Figure 7: Factors affecting the use of the mobile application of public administration



Source: Own processing

During the creation of electronic public services, it is important to picture a citizen for whom the service is made. **Citizen-oriented design** may seem like a matter of course when using and combining different techniques for the service’s design. This process is important and in the

public sector often forgotten. Despite many precautions in the bureaucracy, there is a gap between citizen's expectations and real service. Formally, the project is done but the improvement of interaction with public authority's organs is not happening.

4. Conclusion

The innovation and expansion of traditional communication channels in the public sector seems to be a necessary supposition within the interaction between the public administration and final users – citizens, entrepreneurs, public authority's organs. The users expect consistency within the access to a service via mobile phone, working station, personally or mediated. Each important branch of economy offers a multichannel access. The growing trend of globalization and creation of a uniform digital market has transformed from the product's creation to a creation of good user's experience.

In recent years, a growing penetration of mobile devices attracts the attention in commercial and public sector. The orientation on the creation of mobile applications needs a change in the approach to services. The strategy "Mobile first" is not only about creation and design of applications for mobile devices, but it also affects the way of thinking – it teaches to think in a simpler way.

The development of mobile government serves as a supportive device for eGovernment. During the creation of applications, public authority's organs should pay higher attention mainly to the layout and clarity of the services, and also to the cooperation with the commercial sector. The share of experience between public and commercial sector, using the best practice and creating a synergy between the communication channels would allow more effective and faster communication when dealing with the citizens' life situations.

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GLOBALIZATION AND INTELLIGENT INNOVATION

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Abstract. In the global economic environment, the application of innovation is a continuous process that should reflect global trends and changes at the markets. At the present time, a great attention is paid to the intelligent innovations, which represent any autonomic change with a positive impact on consumers. Such innovations increase the comfort for consumers and concurrently they represent more effective, economic, healthier and safer solutions. Thought this kind of intelligent innovations is not so usual in Slovakia, to a certain extent they are present on the Slovak market. In this paper, we focus on intelligent and active packaging, the occurrence of which we have mostly noticed in the market. We examined a perception of intelligent and active packaging, their availability and perception of their functionality as well as other requirements using the Kano model concept. Subsequently, the identified innovation status is shown in the innovation perception typology matrix, which illustrates the impact and the competitiveness of innovations within the individual age categories of respondents. The survey was carried out as a part of the global research and it identified generally low awareness and knowledge about intelligent and active packaging. Mainly for transnational corporations, such innovations can potentially represent a competitive advantage on the global market.

Keywords: globalization, packaging, innovation, intelligent and active packaging.

JEL Classification: O31, O32

1. Introduction

Enhancing the competitiveness of the economy at a national level is based on innovation. The role of innovation is important not only globally but also plays an important role in national competitiveness to gain a competitive advantage of a country (Gregova & Dengov, 2014). Ensuring competitiveness and high growth rates of the economy requires considerable investment in the sector of innovation. In the current economy, small and medium-sized companies must also resist the strong pressure of international competition. These companies often face challenges in raising capital for innovation, combined with increasing their competitiveness at a national level or in the global economy and may, therefore, have limited access to new technologies or innovations (Paskrtova, 2014). As Krajnak & Meier (2016) states, at present globalization affects practically the whole economy. The consequence of globalization tendencies is an expanding market space where a company can be active. Globalization and the technological revolution in the market give rise to that knowledge and innovation become the main competitive advantage of companies.

Nowadays in the global context, the successful company should be able promptly react to changing market conditions, fulfil the customers' needs and be competitive. One way to achieve this goal is through an innovation – new products and services that are original, different from other and fulfill market requirements. Actual approaches decline the term intelligent innovation. One of the earliest authors of the concept of intelligent innovation is Cogliandro (Loucanova et al, 2016, 2018) who considers intelligent innovation as a multidimensional process supported by a culture of strategically balanced and creative problem solving, intuitive sense for market and pursuit of success. Intelligent innovation and success are the result of better performance of many tasks, including management, motivation, finance, decision making and coordinating authority responsibilities. Intelligent innovation attempts to prove, promote, explain and provide information about the status of the subject and, if necessary, manage it. The term of intelligent innovation is not so usual in Slovakia, however intelligent innovation are present in the market. Loucanova et al (2016, 2018) based on the essential definitions of innovation defines intelligent innovation as “any autonomic change with a positive impact on the customer”. They increase the comfort of the customer and concurrently represent more effective, more economical, healthier and safer solution.

As a result of global change and progress in recent decades, significant changes are evident in the approach to packaging materials and packaging techniques (Kaputa et al, 2017). Innovative packaging is the result of creative, unconventional thinking beyond the usual thinking framework. The continued quest for innovation in food and beverage packaging is mostly driven by consumer needs and demands influenced by changing global trends, such as increased life expectancy (Lord, 2008, In Brody et al., 2008). Traditional food packages are passive barriers designed to delay the adverse effects of the environment on the food product (Brody et al., 2008). On the other hand innovative smart packaging systems can generate an enhanced product by utilizing non-traditional packaging functions to provide safer and securer, more nutritious or appealing food products, while being environmentally friendly. In addition, smart packaging technologies can be further optimised by the incorporation of nanotechnology, which can be utilised actively or intelligently, to enhance or extend package function (O' Callaghan & Kerry, 2016). Food industry also has been tremendously changing from passive packaging to innovative packaging to cope with global trends, technological advancements, and consumer preferences (Mlalia et al, 2016). Adoption of suitable packaging technologies by the food industry can be useful to extend the shelf life, improve quality, safety, and provide information about the product (Biji et al, 2015). Besides, innovation systems will improve the quality of consumer life, the product's quality and consequently decrease the number of retailer and consumer complaints (Dobrucka & Cierpiszewski, 2014).

Active packaging changes the condition of packaged food and prolongs the shelf life or increases security while maintaining the quality of the packaged food at the same level. Intelligent packaging monitors the status of packaged food and provides information on quality during transportation and storage (Yam et al., 2005).

Over time consumers' attitude towards the product packaging has changed. According to earlier studies, the packaging has been described as an indispensable part of the product; more recent studies indicate its change to an attractive part. However, the first impression of the packaging to the purchase does not persist if the packaging is not "user-friendly" and functional. The packaging must be simple to use, providing relevant information and fitting into storage (Löfgren & Witell, 2005). Many consumer behaviour studies investigate the perception of packaging by consumers - product rating influences the purchasing intentions and attitudes of consumers (Kauppinen-Räsänen & Luomala, 2010, Wilke et al., 2011, In Prakash & Pathak,

2017). Consumer attitudes towards active and intelligent packaging vary from country to country. According to Brennan & Crandison (2011), active packaging materials are generally accepted in the US, Australia, Japan, but much less in European countries. On the other hand, some intelligent packaging materials are more widespread in European countries. The reasons for these different attitudes are not clear but may be partly due to cultural differences and lack of understanding of the features and benefits.

Obviously, innovation management cannot exist without examining consumer preferences and attitudes, because new product acceptance is ultimately an important factor of success. This approach can help clarify, predict or influence adaptation or refusal of innovation as regards (Trommsdorf & Steinhoff, 2009). In the paper, we focused on intelligent and active packaging, the occurrence of which we have mostly noticed on the Slovak market (Loucanova et al, 2017, 2018). The aim of the research was to determine the awareness and attitudes of consumers towards intelligent and active packaging in Slovakia.

2. Methodology

To determine the awareness and attitudes of consumers towards intelligent and active packaging in Slovakia the Kano model was applied. The aim of the model is to identify customers' opinion according to the requirements of selected object. We examined the perception of intelligent and active packaging, their availability, and perception of their functionality, voice performance, freshness indicators, and attractiveness of these packages for customers, perception of advertisement for intelligent and active packaging and perception of price.

The first step is to identify the criteria that customers consider when purchasing the selected product in active or intelligent packaging and what are their main purchasing problems. Based on their responses, the requirements (future variables in Kano models) are generated. According to that pre-queried customer requirements, a positive and negative question are formulated to every single requirement and a questionnaire is formulated. The respondents during the survey can response within the range of the Likert scale. The survey was conducted between September and December 2016 and 767 respondents were involved in the survey.

For each variable, individual responses to the positively and negatively asked question by the Kano cross rule (Table 1) are individually evaluated to specify the requirements for intelligent and active packaging as a survey object. This approach classifies individual measured variables into requirements, characterized by Chen et al. (2010) and Ullah & Tamaki (2011) as follows:

- Mandatory requirements (M) are obligatory requirements that customers consider as normal and are automatically expected, their fulfilment is reflected in customers' satisfaction, their deficit and failure is reflected in customers' dissatisfaction immediately as they realize it.
- One-dimensional requirements (O) are those product attributes that lead to fulfilment and satisfaction - the higher the degree of compliance with these requirements, the customers are more satisfied, but customers do not automatically expect them in comparison to the mandatory requirements.

- Attractive requirements (A) are requirements with clear impact on customers’ satisfaction. If attractive requirements are not met, it does not reflect customer dissatisfaction, because they did not expect them.
- Reverse requirements (R) are contradictory or exactly opposite, represent product attributes where customers react oppositely.
- Irrelevant requirements (I) do not have any influence on customers, their presence or absence does not affect their satisfaction or dissatisfaction
- Questionable requirements (Q) represent controversial responses, which relates either to incorrectly formulated questions or a lack of understanding by customers.

Table 1: The Kano Model to evaluate customer requirements

		Negatively formulated question				
		Strong agree	Partially agree	Neutral attitude	Partially disagree	Strong disagree
Positively formulated question	Strong agree	Q	A	A	A	O
	Partially agree	R	I	I	I	M
	Neutral attitude	R	I	I	I	M
	Partially disagree	R	I	I	I	M
	Strong disagree	R	R	R	R	Q

Source: Ducar et al., 2006.

Categorized customer requirements are then expressed in percentages where the highest percentage category identifies the specific category of the studied packaging attribute. In order to generalize the results of the research a multifactor analysis and subsequently the innovation perception typology matrix is carried out. The innovation status is calculated as the sum of the points assigned to the individual identified categories of the parameters examined according to the above methodology, where M = weight 3, A = weight 2, O = weight 1, I = weight 0, R = and Q = weight -2. The impact of the innovative status for every age category is calculated as the weighted average of each percentage of the resulting parameter of the specified customer requirement identified by the Kano model. Subsequently, the innovation status and the impact of innovation for individual age categories is shown in the innovation perception typology matrix, which illustrates the impact of the studied innovation on individual age categories and the competitiveness of the surveyed object within these age categories.

3. Result and discussion

In the research, we focused on intelligent and active packaging, the occurrence of which we have mostly noticed on the Slovak market. We examined a perception of intelligent and active packaging, their availability, a perception of their functionality and other requirements by using the Kano model. Subsequently, we evaluated the impact and the competitiveness of the innovation within the individual age categories by identifying the innovation status. It is calculated as the sum of the points we assigned to the individual identified categories of the parameters examined according to the methodology. The impact of this innovative status for every age category is calculated as the weighted average of the resulting parameter of the specified customer requirement identified by the Kano model. The innovation status is shown in the innovation perception typology matrix (Table 2).

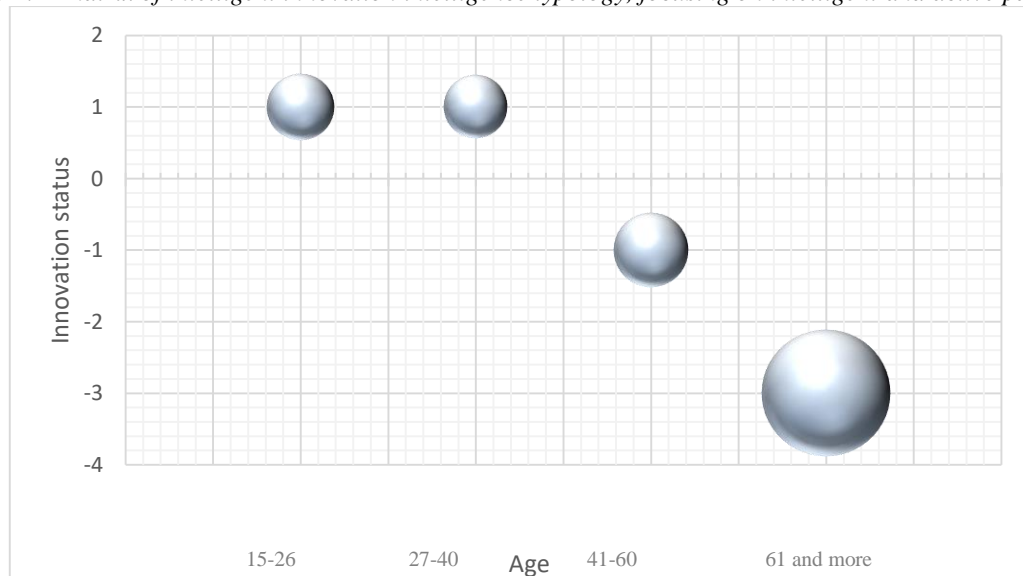
Table 2: Basic data for compiling a typology matrix focusing on intelligent and active packaging

Age / Parameters	15-26		27-40		41-60		61 and more	
Concept of intelligent and active packaging	A	2	A	2	I	0	R	-1
Availability	I	0	I	0	I	0	I	0
Awareness	R	-1	I	0	R	-1	R	-1
Functionality	I	0	I	0	I	0	I	0
Voice performance	I	0	I	0	I	0	I	0
Attractiveness	I	0	I	0	I	0	I	0
Advertisement	I	0	I	0	I	0	I	0
Freshness indicators	Q	0	Q	0	Q	0	Q	0
Price	I	0	R	-1	I	0	R	-1
Innovation status		1		1		-1		-3
Age / Parameters	15-26		27-40		41-60		61 and more	
Concept of intelligent and active packaging	40,72	2	38,5	2	37,63	0	36,97	-1
Availability	55,20	0	46,52	0	51,55	0	56,10	0
Awareness	44,34	-1	42,25	0	46,91	-1	46,67	-1
Functionality	57,46	0	60,97	0	59,79	0	61,82	0
Voice performance	51,14	0	58,29	0	55,15	0	57,58	0
Attractiveness	47,06	0	52,40	0	52,06	0	49,70	0
Advertisement	47,51	0	56,15	0	45,88	0	49,09	0
Freshness indicators	32,58	0	31,55	0	43,30	0	35,15	0
Price	52,94	0	43,32	-1	44,33	0	53,33	-1
Factor size		4,12		3,74		5,21		15,22

Source: Loucanova et al., 2017

Subsequently, the identified innovation status and the impact of innovation on individual age categories are illustrated in the innovation perception typology matrix, see. Figure 1.

Figure 1: A matrix of intelligent innovation intelligence typology, focusing on intelligent and active packaging



Source: The results of authors' research

Intelligent and active packaging has different impacts on customers in different age categories. The positive impact in terms of increasing the competitiveness of products in Slovakia through intelligent and active packaging can only be seen in the age category 15 to 26 and then 27 to 40. This finding points out that in the case of products designed for these target groups, the implementation of intelligent elements for innovation creation represents an

increase in the competitiveness of these products. On the contrary, these innovations are differently perceived by the elderly respondents. The age categories 41-60 and especially older respondents are specific by experiencing such innovation with negative satisfaction. With increasing age this dissatisfaction is higher, see. Figure 1. The research results have clearly confirmed the theoretical basis noting consumers' fears of innovation, especially more in terms of technical innovations (Rogers, 1995). The customer awareness of intelligent innovations in Slovakia is still at a very low level. Customers do not positively evaluate their features. This fact is apparent in particular from the frequency of identified Irrelevant (I), Questionable (Q) and Reverse (R) requirements by the Kano model (see Table 2). The concept of intelligent and active packaging itself is attractive for respondents from 15 to 40 years old. On the basis of the findings, it is possible to recommend what measures it is necessary to choose for the appropriate distribution policy of the given innovations so that customers meet their requirements and their satisfaction is fulfilled. It is appropriate, to innovate such reverse requirements (R), which do not influence the customer, in a way that will represent the competitive advantage of the product in the future.

4. Conclusion

The results of the Kano model confirm that the customer awareness of intelligent innovations in Slovakia is still at a very low level. Customers do not identify their individual parameters and therefore do not positively evaluate their features. Increasing awareness of such innovations could ensure a more positive approach of the customers to the given innovations, because as Rogers (1995) says, the customers are accepting the innovation when they feel no threat at all (it is in the case they are sufficiently informed) and, basically, that innovation will become a tradition (Rogers, 1995). Also, according to Odecka & Bráthena (1997), it is often the case people have a really negative attitude towards the innovations because they lack clear explanation. Therefore the company must understand the customer's needs and attitudes and subsequently find the right way of communication with customers.

In the future, intelligent and active packaging has the potential to represent a competitive advantage for products to meet customers' needs and to increase their satisfaction. Definitely, innovation diffusing and management cannot exist without customer research because acceptance of innovation is ultimately an important factor of innovation success not only in the domestic but also global market (Parobek et al, 2015, 2016).

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MAIN DISPLAYS OF CHOSEN SYSTEMS BEHAVIOR IN GLOBAL WORLD

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Abstract. Globalization is a phenomenon mainly in last few decades. Globalization – its displays and consequences influence our surroundings and because of that human existence more and more. It is more complex and more dynamic global and globalization issue. Besides positive tendencies, it brings also a lot of negative tendencies that influence humans and force extra efforts and flexibility that is not limitless. We can extract few main systems that we need to deal with in nowadays and especially future world. And the responsibility is on all of us. Nowadays planetary society is, systematically taken, a very complex system with highly stochastic behavior. The variety of behavior is basically endless. Is such a complex system even manageable? Is capable of homeostasis? Can we get to know the system? In the past we thought that with the development of computers and exact methods of management the world will become easier to know and easier to manage. And what of this really happened? In this paper are briefly characterized displays of some important systems behavior of nowadays-globalized world. Systems their complexity of inner and outer links and their behavior are mainly driven by nowadays processes. These systems and processes have in them pros and also cones that can hive crisis consequences. In the paper author mentions especially systems with relation to humans and their existence. He wants to emphasize the need to study the system relationships on a global level and also from the point of safety risks view.

Keywords: globalization, system, management, safety risk, systems behavior

JEL Classification: H0, H7, O0, R0, Z0

1. Introduction

Globalizace, její projevy a důsledky, ovlivňují člověka stále více. Je tomu také opačně, kdy člověk ovlivňuje globalizaci. Jde vývojově o naléhavější, složitější, tíživější a dynamičtější problém. Kromě kladů přináší celou řadu záporných jevů, které ovlivňují bytí člověka a kladou stále vyšší nároky na jeho přizpůsobivost, která není nekonečná. Kladou také vyšší nároky na řízení procesů a řídicí procesy. V životě člověka a společnosti neustále probíhají sdělovací a rozhodovací procesy. Jejich nedílnou součástí je schopnost poznávání a v případě rozhodovacích procesů pak schopnost předvídání. Každé rozhodování je o budoucnosti. Tato budoucnost může být jen několik desetin sekundy, ale také desítky let vzdálená. (Nozawa, 2017)

Důsledky svých rozhodnutí nese jen člověk sám, ale také jeho okolí, jeho bližní. Čím výše je člověk postaven na hierarchickém výtahu k moci různého typu, tím více budou důsledky jeho rozhodování ovlivňovat věci, jevy a procesy ve společnosti, živé i neživé objektivní realitě.

V dnešním globalizovaném světě žítí a řízení připomíná jízdu rychlým a nespolehlivým automobilem v temném, neznámém, nebezpečném a dlouhém tunelu, kdy sice si přejeme vyjet z něj, ale nevíme, co nás pak čeká. Spíše spoléháme na to, že to vše dopadne dobře a že případné další problémy bude následně za nás řešit někdo jiný nebo se nějak vyřeší samy. (Pagel, 2017)

Otázky globalizovaného světa, které si klademe jsou mnohé. Na výsost důležitou je, kdo řídí tento svět? Je to samopohyb, který je proporční či disproporční, harmonický či disharmonický? Je obecně prospěšný? Komu a čemu prospívá a komu a čemu škodí? Jaký je kardinální vztah člověka, společnosti a jejich umělých výtvorů, přírody jako rozhodujících činitelů vývoje? Kdo a co jsou subjekty a objekty řízení? A které prvky, podsystémy a systémy jsou významné a rozhodující.

K řešení uvedených otázek a problémů lze využít celé řady přístupů, postupů a metod. Už v minulosti vzdálené méně či více si lidé kladli otázky o světě, příčinách a následcích vývoje a roli člověka v něm. Nevíme nakolik si tyto otázky kladli obyčejní lidé, ale částečně víme, že si tyto otázky kladli učenci, zejména filosofové. Časem se jakožto možnost poznávání světa vyvinula disciplína, kterou její zakladatel Norbert Wiener nazval kybernetikou a definoval ji sám jako vědu o řízení a sdělování v živých organismech a ve strojích. Vyvinula se a vyvíjí se systémová teorie, která poskytuje metodický a metodologický návod ke zkoumání objektivní reality (Fishel, 1996).

Člověka jako bytost vybavenou mnohými schopnosti konstruktivní či destruktivní povahy, obklopuje velmi mnoho systémů, které jej ovlivňují a které on sám také ovlivňuje. Tyto systémy také ovlivňují sebe navzájem, někdy spolu úzce souvisejí či jsou relativně izolovány, a jsou v sobě různě obsaženy, jsou ve vzájemné závislosti či rozporu. Není možno je všechny vyjmenovat. Připomeňme si aspoň některé z nich:

- Systém člověk – člověk
- Systém člověk – příroda
- Systém člověk - potraviny
- Systém člověk – společnost
- Systém člověk – čas
- Systém člověk – informace
- Systém člověk – stroj
- Systém člověk – materiálně
- Systém člověk – duchovno
- Systém člověk – bezpečnost
- Systém příroda – příroda
- Systém stroj – stroj
- Systém příroda – stroj
- a další

V další části příspěvku budou rozebrány některé systémy významné pro poznávání a řízení procesů v globalizaci (Novak, 2010; Taubinsky & Rees-Jones, 2018)

2. Systém člověk – člověk

Jde zřejmě o systém nejdůležitější. Neboť člověk je tvor společenský, ačkoliv se to v dnešním světě příliš nenosí. Je propagována individualita, sobeckost a izolovanost. Přitom rozvoj lidské společnosti a člověka se bez spolupráce neobejde. Jsme na sobě stále závislejší a také ohroženější. Významnější, než v minulosti jsou vztahy mezi lidmi, jejich vzájemné působení, psychika lidí jako odraz poznávání okolí člověka i sebe sama, jeho niterných

racionálních i emotivních procesů. Lze říci, že je to vztah nejdůležitější pro samotné přežití člověka. Je to však také vztah nejsložitější a nejzranitelnější. Konflikty mezi lidmi nabývají v dnešním přetechizovaném světě dříve nebývalých rozměrů. Technika a technologie působí na člověka nesmírně mnoho v různých oblastech žití a jsou do značné míry determinantami mezilidských vztahů. Lidé ztrácejí zájem o společenské dění a lze pozorovat i pokles pudu sebezáchovy, což potvrzují i lékaři. (Parsons et al., 2018)

Role člověka v globalizaci představuje složitou modifikaci věčného i věcného problému - vztahu bytí a vědomí. Tímto problémem se v rovině teorie od pradávna zabývali především filosofové. Postupně i odborníci jiných disciplin. Přes naléhavost potřebnosti řešit roli člověka v dnešním světě lze vidět jistou bezradnost a neschopnost jak teoretické fronty, tak společenských řídicích struktur v rovině politické, ekonomické a dalších. Ani vysoké školy nesehrávají svou roli jak ve vztahu k posluchačům, tak ve vztahu k veřejnosti. (Lim, 2017; Taubinsky & Rees-Jones, 2018)

3. Systém člověk – příroda

Na základě poznatků z minulosti je evidentní, že člověk pochází z přírody, byl, je a bude její integrální součástí. Díky přírodním zdrojům žije. Využívá a dnes spíše zneužívá nad únosnou mez její bohatství. Je také povinen se zpětně k přírodě chovat šetrně ve svém vlastním zájmu. Zdroje přírody nejsou nevyčerpatelné. Přesto, že se poměrně často apeluje na vztah člověk k přírodě, zdá se, že okamžité ekonomické a mocenské zájmy jsou důležitější. Je to krátkozraké. (Kliestik et al., 2018)

Klimatické změny, které prožíváme v posledních desetiletích a zejména v posledních letech jsou naprosto zřejmé. Vědci se ptají o to, zda je příčinou tohoto vývoje člověk a jeho využívání zdrojů planety, či jde o periodicky se opakující jevy na Zemi, které už tady několikrát byly. K poznání však neexistují písemné záznamy. Některé vědecké výzkumy poukazují na to, že člověk nemůže příliš či vůbec ne ovlivnit přírodní procesy. Další výzkumy ukazují na trend nebezpečného chování člověka. Asi bude pravda někde uprostřed. Co je znepokojující, je chování lidí ve vztahu k přírodě, jejímu znečišťování civilizačními produkty – odpadky různého druhu, včetně nebezpečných chemických. Dále je to znečišťování vody, půdy, vzduchu. Elektromagnetický a světelný smog je rovněž nebezpečný. (Hung et al, 2018)

4. Systém člověk – potraviny

Člověk pro svou existenci potřebuje některé základní komponenty, jako jsou jídlo, voda, vzduch, teplo, světlo i tma, mezilidské kontakty. Bez toho by nebylo života. Naprosto nejzákladnější jsou pak první tři vyjmenované. Ty se prolínají do celé řady subsystémů a prvků, jsou ve vzájemné interakci a mají značnou a pestrou varietu jejich chování.

S využitím systémového přístupu můžeme produkování potravin a jejich využití dělit na mnoho podsystémů. Mezi zásadní patří podsystém zemědělství (který je sám o sobě vysoce složitým podsystémem), podsystém půdy, podsystém vody. Dalším podsystémem je výroba potravin. Významným podsystémem je také potravinová bezpečnost, která je důležitá pro bezpečnost lidí a státu. V dnešní složité společnosti se řádné fungování těchto podsystémů neobejde bez rovněž složitého podsystému řízení. Adekvátním řízením lze mnohé kladně či záporně ovlivnit. (Capaldo et al., 2017)

Můžeme zatím říci, že v tzv. vyspělých zemích není pro většinu jejich obyvatel problém pít, jíst, dýchat. Bereme tuto, desítky let (cca po druhé světové válce) trvající samozřejmost, jako

něco trvalého. Vývoj ukazuje, že tomu tak nemusí být napořád. Žel plýtváme jídlem, nevážíme si ho. Na druhou stranu se uvádí, že asi deset procent žáků základních škol v České republice nemá na obědy a péči státu jsou pro ně obědy zdarma. Je to docela ponižující. Obecně se také konstatuje, že kolem deseti procent obyvatel České republiky trpí chudobou a má problémy s obstaráním základních životních potřeb, včetně potravinových. Proto se pořádají potravinové sbírky. Je to důstojné? (Harstad & Mideksa, 2017)

Neuvědomujeme si kolik práce, energie a nákladů celkově produkce potravin vyžaduje. Člověk je závislý na potravinových zdrojích fauny a flóry a jejich případné či nutné úpravě. Původní optimismus o relativním dostatku potravin pro obyvatelstvo se mění. Ukazuje se řada limitů omezujících zabezpečení potravinami. Zemědělství je mnohdy na okraji pozornosti, zejména v České republice není řízeno takřka vůbec, zemědělská politika v podstatě není. Zemědělství není jen výroba potravin, ale také významná péče o půdu, vodu, ráz krajiny a má také značný vliv na život venkova. (Toman et al., 2012)

Rozhodující tekutinou pro život člověka je voda, kterou poskytuje příroda v různém složení, dostupnosti, kvantitě a kvalitě. Problém vody je, že, stále složitější a naléhavější, což ukazují zejména poslední roky, kdy množství srážek a jejich rozložení prostorové i časové je nedostatečné a nerovnoměrné. Jde nejen o vodu pitnou, ale také o vodu užitkovou, vodu pro zavlažování. Platí věčná lidská pravda – kdyby nebylo na zemi vody, nebylo by života.

Půda je nenahraditelným zdrojem pro život člověka. I v této oblasti jsme marnotratnými lidmi. S půdou zacházíme obdobně jako s vodou, nevážíme si ji. Půdy silně ubývá, statistiky to prokazují. Půda je vyvíjející se složitý dynamický živý systém. Přežití a prosperita všech suchozemských společenstev přirozených i umělých závisí na tenké vrchní vrstvě země. Půda je nejcennějším přírodním bohatstvím. Je v podstatě neobnovitelným zdrojem. Její úrodnost je třeba udržovat tak, aby hospodaření bylo trvalé. Je přirozenou součástí národního bohatství státu. Půdu je proto nutné chránit pro současnost, tak pro budoucnost. Při nedostatečné péči může půda relativně snadno nabýt vlastností vyčerpaného a obtížně obnovitelného či vůbec neobnovitelného přírodního zdroje. (Henderson, 2018)

5. Systém člověk – společnost

Role společnosti v globalizaci je poněkud jiná než dříve a také rychle se mění. Společnost není jen prostý souhrn jednotlivců, jak se někdy propaguje. Společnost je zde proto, aby na základě využívání potenciálu jednotlivců a materiálních podmínek objektivní reality umožňovala svoji existenci a vytvářela podmínky pro důstojný život každého jednotlivého člověka. Jde o mnohostrannou činnost. K tomu si vytváří různé formální i neformální organizace národního i mezinárodního charakteru. Jednou z jeho významných organizačních struktur je stát. Stát a jeho instituce tu jsou, nebo by měly být, pro lidi. Mají zabezpečit podmínky pro jejich život. Stát má racionálně a optimálně využívat výsledků ekonomické základny k zajištění jistého stupně stability společnosti, její soudržnosti. To jsou podmínky pro dobrý vývoj. (Weiss et al., 2018)

Společnost, podobně jako jednotlivci, je na složité křižovatce řady cest, které vedou do neznáma. Nejsou to tři cesty jako v pohádkách dětství. Lze říci, že žádná cesta nevede do ráje, byť se to tak někdy říká. Jde jen o volbu té nejméně nepříjemné, špatné cesty, která se jeví jako nadějná a později je třeba nutno tuto nadějnost korigovat. (Willmott, 2017)

Společnost nabízí dvě základní tendence. První tendence je pokrok v technice a technologiích, které umožňují člověku lepší a zejména pohodlnější život. Informační systémy

a technologie, dopravní systémy, stroje odstraňující těžkou práci atd. Na prvním místě by mělo jít o zdraví, jakožto prvního předpokladu k fungování společnosti. Sice si neustále zdraví přejeme, ale mnohé pro to neděláme. Pokrok v medicíně je nebývalý. Nové medikamenty, nová přístrojová technika, nové léčebné postupy zachraňují a prodlužují život. Jsou potlačovány či léčeny choroby, které dříve byly neslučitelné se životem. Druhá tendence je však jiná, vznikají nové choroby či gradují stávající choroby se kterými si nevíme rady. Autor těchto řádků si vzpomíná na své dětství, kdy vědci předvíдали v šedesátých letech minulého století vymýcení rakoviny zhruba koncem devadesátých let. Skutečnost je jiná. Při objevení antibiotik se zdály jejich účinky všespasitelné. Nyní se ukazuje, že tomu tak zdaleka není.

Výše uvedené některé klady pokroku mají také své negativní důsledky. Informační technologie nás mnohdy činí závislími. Stroje mají řadu nežádoucích či dokonce škodlivých vlastností. Jsou často nebezpečné, hlučné, znečišťují životní prostředí, automobil se dnes stává zbraní hromadného ničení, léky působí škodlivě svými vedlejšími účinky, počet tzv. civilizačních chorob roste. (Caldara & Kamps, 2017)

Společnost je také zasažena válkami, přírodními a technogenními katastrofami, skandály, podvody, násilím nejružnějšího druhu, novými chorobami, lhostejností a dalšími negativními faktory. Schopnost sebezničení je nevídaná. Jsou uvedené problémy řešitelné a je vůle je vůbec řešit?

6. Systém člověk – politika

Je to systém silně specifický. Jeho specifická spočívá v tom, že je zřejmě nejvíce zasažen emocemi. Definice politiky je řada a více či méně vystihují její podstatu. Jedna z definic říká, že politika je každodenní péče o blaho občana. Tato definice je vlastně ideální a takřka pohádková. Skutečnost je jiná, jak se denně můžeme přesvědčovat. (Giroud & Mueller, 2017) Na Slovensku se říká, že politika je panské huncútstvo. Nemálo lidmi je odsuzovaná a politici jsou ke konci společenského žebříčku prestiže povolání. Politika je však vysoce důležitá pro fungování společnosti a světového řádu. Mělo by tedy povolání politika být vysoce prestižní a také zodpovědné. Politika a politici by měli rozhodovat o všech možnostech, způsobech i směrech a cestách rozvoje společnosti a každého jednotlivce cestou vytváření potřebných podmínek. Dochází ke dvěma krajnostem v idejích i jejich praktickému naplňování. Jedna krajnost spočívá ve snaze rozhodovat o všem a občanu nařizovat co nejvíce, což může směřovat až k diktátorství. Druhá krajnost spočívá v bezbřehé volnosti a liberalismu, může to však být jen manipulace lidmi v důsledku neschopnosti a rezignace na řízení společenských procesů ze strany elit. Obě krajnosti jsou nebezpečné pro člověka a společnost. (Baranik et al, 2017)

Zejména v posledních desetiletích se nikoliv politika, ale finance a ekonomika dostává do hlavní role. Politiku určují banky a nadnárodní společnosti a politika i politici jsou v jejich závěsu a jsou jimi determinováni. Často se politiky stávají byznysmeni, a o řadě psychopatických osobností v politice se raději nezmiňovat. Lidé se rádi nechávají manipulovat a tato vlastnost se politiky využívá či spíše zneužívá. Volby jsou pak záležitostí emocionální a nikoliv racionální. (El Ghoul et al., 2017)

7. Systém člověk – bezpečnost

Člověka a celou společnost po celou dobu jeho existence obklopují prvky prostředí, které nejsou v souladu s jeho zájmy a potřebami. Jeho konání i existence jsou také určována hrozbami a riziky. Jednou ze základních lidských potřeb je bezpečí. Předjímat a předvídat důsledky svých

rozhodnutí je někdy dost obtížné a často i nemožné, což vzbuzuje rizikovost. Podíl rizikovosti s rostoucím vývojem společnosti roste. S rizikovostí úzce souvisí bezpečnost. Ta je důležitým pocitem pro člověka a pro celou společnost. Pojem bezpečnost je svým obsahem i rozsahem velmi proměnlivým hybridem obecnosti i konkrétnosti. Bezpečnost je stav, kdy hrozby a rizika jsou pro systém na co nejnižší možné úrovni. Pojem bezpečnost lze chápat z hledisek různých stupňů významnosti. Od nejnižší úrovně bezpečnosti člověka, po nejvyšší úroveň bezpečnosti lidstva. Z jiného pohledu pak jej můžeme chápat jako bezpečnost různých oblastí existence, např. tělesnou i duševní, potravinovou, surovinovou, energetickou, epidemiologickou, informační, ekologickou, vojenskou a další (Novak, 2016).

Lidstvo prožilo ve dvacátém století dvě světové války, do té doby nejstrašnější jaké kdy poznalo. V obou válkách padly a byly zraněny desítky milionů lidí, byla rozvrácena společnost, zničeno množství přírody, měst, vesnic, továren a materiálních statků. (Bonatti et al., 2017; Gopinath et al, 2017) Příčin byla řada. Základní příčina spočívala v nezvládnutí mírového života lidmi, kteří za stav společnosti odpovídali. A také vědeckotechnický pokrok, který umožnil nasazení v té době vyspělých technologií a technických prostředků. Ejhle – to, co mělo sloužit lidem je ničilo! Bereme si z toho poučení? Takřka každý den se ukazuje, že nikoliv. Kolik rozhodnutí k řešení problémů vojenskou silou ještě budeme přijímat? Nehrozí, že vládnoucí psychopati emotivně přijmou rozhodnutí o použití jaderných, chemických či biologických zbraní? (Adelino, 2017)

Některé objektivní podmínky vyvolávající růst významu bezpečnosti. Ohrožení existence člověka a společnosti v důsledku rozporů mezi člověkem a přírodou, mezi člověkem a člověkem, mezi člověkem a společností atp. Značný růst řady rozdílů (finance, materiál, rasy, náboženství, přístupy ke zdrojům atd.) ve společnosti, a tím růst hrozeb a rizik. Podcenění faktorů obecné i zvláštní bezpečnosti a nebezpečnosti. Růst složitosti objektivní reality a jejího řízení – nejsme schopni tuto složitost řídit (úplná varieta chování systémů a jejich prvků), problém svobody, determinismu, dirigismu, multikulturalismu, migrace, terorismu, atd.

8. Conclusion

Článek se pokusil připomenout některé základní systémy společnosti a jejich vybrané problémy, kterým je třeba věnovat pozornost. Pozornost ve smyslu poznávacím a také ve smyslu řídicím (přetvářecím). Problémy současného světa a života člověka nejsou jednoduché. Vyvíjí se společnost světa dle našich přání? Je problematika vědeckotechnického vývoje žádoucí? Jsme vůbec schopni či ochotni problémy řešit? Jsou řešitelné? Autor nemohl a ani nechtěl nabízet řešení, chtěl jen upozornit.

Dějiny civilizací jsou významným zdrojem pro naši současnou civilizaci. Ukazují, že hodně událostí probíhalo ve své podstatě podobně. Jen jako bychom tu historii nechtěli znát, nechtěli se poučit. Je nám věčně souzeno chyby opakovat? Potenciál techniky a technologií je tak silný, že je schopen tuto planetu skoro zničit. To nikdy v historii lidstva zatím nebylo. V tom je velké nebezpečí.

Člověk v éře globalizace prožívá analogicky to, co obecně prožíval a prožívá s rozvojem civilizace vůbec. Avšak v éře globalizace jsou jeho prožívání podstatně jiná. Člověk dneška prožívá neustále řadu velmi silných rozporů, které svojí povahou jsou sice hybnou silou vývoje, žel také vývoje nežádoucího. Je třeba je řešit. Přejme si, aby tato řešení byla prospěšná.

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PRODUCTION OF COMPLEX KNOWLEDGE-BASED SYSTEMS: OPTIMAL DISTRIBUTION OF LABOR RESOURCES MANAGEMENT IN THE GLOBALIZATION CONTEXT

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Abstract. Modern science-intensive projects, such as the design and production of chip, are characterized by a rapid change of technical and technological bases, time constraints in the development and market launch of the product. In such conditions, there is a need for optimal planning and work distribution management. The author had previously proposed a mathematical model aimed at finding the distribution of works by performers, which fit in a given time and minimizes the total costs of the work of performers. However, a number of questions arose: "What if it is necessary to involve third-party performers? What if in the context of globalization it is more cost-effective to give part of the work to other companies? How to determine what is more cost effective – to give to third-party companies or to perform the work on their own?" The answers to these questions will help to give the proposed mathematical model of the distribution of work, taking into account the possibility of attracting third-party performers. This problem belongs to the class of NP-complete algorithms for which there are no exact efficient (non-exhaustive) algorithms. To solve this problem, the author developed a heuristic algorithm based on splitting works on the fronts. The information management subsystem of works distribution on performers is developed. For example, the project design-center microelectronics were carried out testing of the system.

Keywords: labour management, knowledge-based system, microelectronics, design centre, heuristic algorithm, information management system

JEL Classification: M12, M59, L63

1. Introduction

At the global level, the production of complex knowledge-based systems (Conforti et al., 2015; Gupta et al., 2010; Hernandez, 2012; Klein & Hirschheim, 1985; Salles, 2015) is paramount to strengthening the well-being of any national economics.

Suppose you want to implement some project (for example, product development, production of pilot batch, test and run in a series) within the microelectronics design center (Achkasov et al., 2012; Fujii, 1997; Novikova, 2014). For its implementation it is necessary to perform n works distributed by m performers, that is, to solve the problem of work distribution (Barbosa & Souza, 2017; Burkov & Burkova, 2014; Chentsov, 2011; Conforti et al., 2015; Huang et al., 2010; Kamoche, 1996; Lupin et al., 2015, A; Lupin et al., 2015, B; Maritan &

Lee, 2017; Novikov, 2018; Novikova et al., 2013; Novikova & Novikov, 2015; Tripathy & Eppinger, 2013; Varthanan et al., 2013; Zhang & Wong, 2016; Kliestik et al., 2018).

The person making the decision, in accordance with the provisions of the decision support systems (Barbosa & Souza, 2017; Borges et al., 2014; Gupta et al., 2010), you need to answer the questions: "What if you need to attract third-party human resources (Lepak & Snell, 2002)? What if, in the context of globalization (Shastry, 2012), it is more profitable to give part of the work to other companies? How to determine what is more profitable-to give to third-party companies or to do the work yourself?"

2. Methods

Research methods are based on the theory of control systems, optimization; apparatus of computational mathematics; theory of software development; methods of modular, structural and object-oriented programming; structural and parametric modeling. The main method of research is mathematical modeling, based on the use of the apparatus of modern management theory, in particular – system analysis, game theory, the theory of collective choice and the theory of management of organizational systems.

3. Results

Baseline data

- $K(p)$ – set of works, immediately preceding the work i ; $K(p) \subset I$, $i \in I, p \in I, p < i$;
- t_{ij}^{\min} и t_{ij}^{\max} – minimum and maximum duration of work i by the contractor j ;
- h_i – the starting time, before which work i can't start;
- d_i – the directive time (moments of completion of works).

Limitations

1) the j -th performer may start work i not earlier than any work prior to work i will be performed,

$$\min_{j \in J_{st}} x_{ij} \geq \max_{(i-1) \in J_{st}} \max_{k \in K(p)} y_{(i-1)k}, \quad i \in I; \quad (1)$$

2) the duration of the works

$$t_{ij}^{\min} \leq (y_{ij} - x_{ij}) \leq t_{ij}^{\max}, \quad i \in I, \quad j \in I_{st}; \quad (2)$$

3) order of works execution

$$x_{ij} \geq y_{ik}, \text{ либо } x_{ik} \geq y_{ij}, \quad i \in I, \quad j \in I_{st}, \quad k \in I_{st}; \quad (3)$$

4) fulfillment of the specified initial time

$$\min_{j \in J} x_{ij} \geq h_i, \quad i \in I^H, \quad (4)$$

5) implementation of policy deadlines

$$\max_{j \in J} y_{ij} \geq d_i, \quad i \in I^D, \quad (5)$$

6) the number of assignees (each work i is performed by one of $R(i)$):

$$\sum_{j \in R(i)} e_{ij} = 1; \tag{6}$$

$$x_{ij}, y_{ij} \in T. \tag{7}$$

Any solution that satisfies (1) to (6) is valid, hence we obtain a distribution of performers to work.

Objective function

Let's set an optimization task. Let's translate (5) from constraints to the target function. We will introduce a penalty for violation of deadlines:

$$f = \sum_{i \in I} \sum_{j \in J_{st}} \lambda_i (d_i - y_{ij}) e_{ij}. \tag{8}$$

We obtain the task of minimization function ($f \rightarrow \min$) under restrictions (1)-(4), (6), (7).

If the optimal value of the objective function $f_{\min} \geq f_{lim}$ is obtained as a result of the solution of equation (8), it is not advisable to involve third-party contractors. Otherwise, part of the work should be given to third-party contractors.

The criterion for the selection of works for third-party contractors is the total cost – S , which includes:

- the cost of remuneration of regular employees S_1 ;
- the cost of contracts for the performance of individual works on the project, concluded with third-party contractors S_2 .

The value of S_1 depends on the time of execution of the entire project and is determined by the salaries of staff members.

$$S_1 = \sum_{j'' \in J_{st}} d_{end} \cdot c_{j''}, \tag{9}$$

where d_{end} – is the total project execution time (the end time of the last work minus the start time of the first work), $c_{j''}$ – remuneration of the j'' -th full-time contractor.

The value of S_2 is the money that is paid to third parties for the performance of a certain amount of work:

$$S_2 = \sum_{i' \in I_{ct}} \sum_{j' \in J_{ct}} z_{i'j'} \cdot c_{i'j'}, \tag{10}$$

where $c_{i'j'}$ – cost of the i' -th work performed by the j' -th third-party contractor.

Objective function

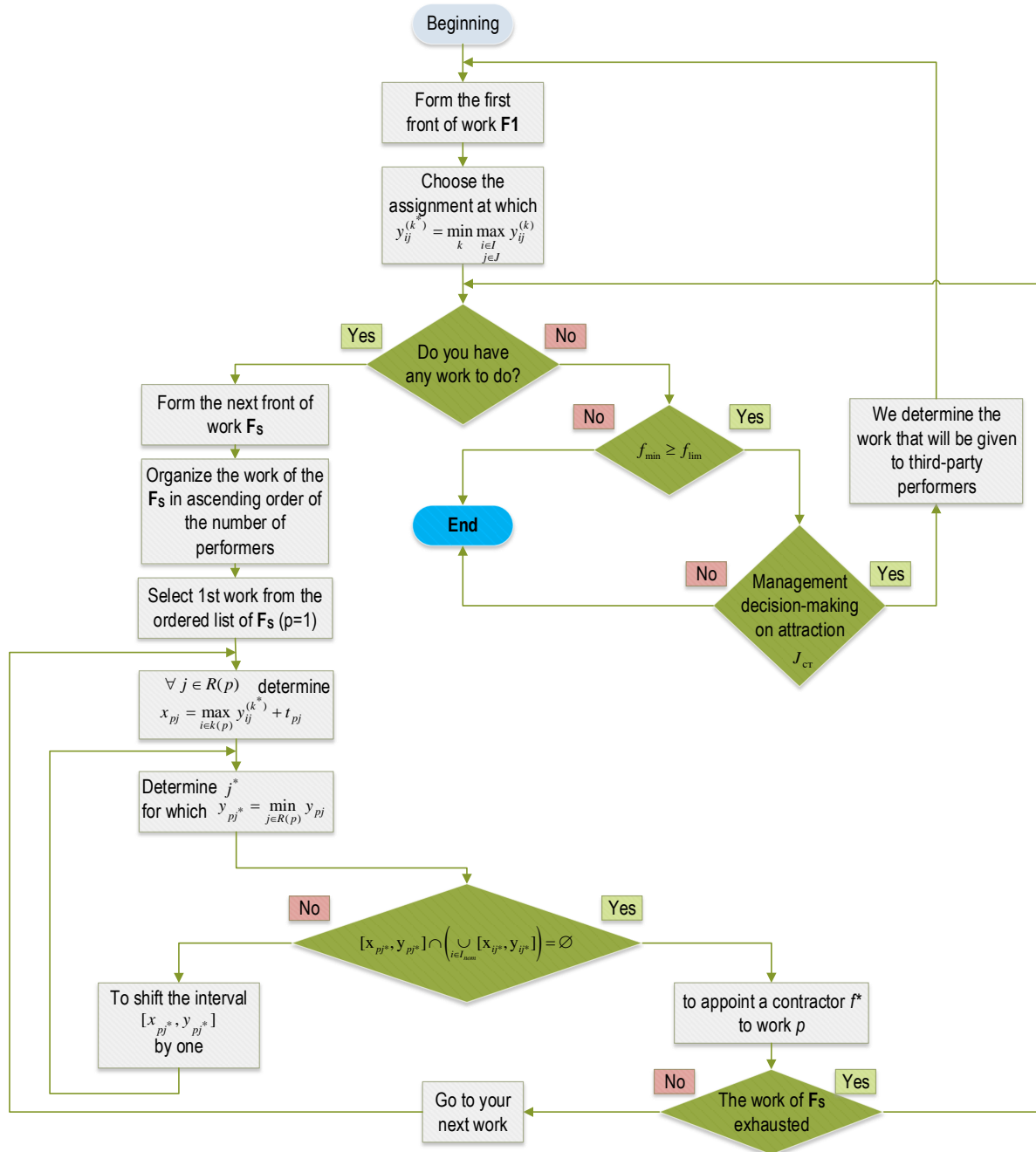
$$S = \sum_{j'' \in J_{st}} d_{end} \cdot c_{j''} + \sum_{i' \in I_{ct}} \sum_{j' \in J_{ct}} z_{i'j'} \cdot c_{i'j'} \rightarrow \min \tag{11}$$

Restrictions (1)-(7) hold for all $i'j'$, such that $i' \in I, z_{i'j'} = 0 \forall j' \in J_{ct}$.

The task of works distribution by performers belongs to the class of NP-complete, for which there are no exact effective (other than full search) algorithms (Novikov, 2018; Novikova, 2014).

To solve this problem, we propose a heuristic algorithm based on the division of works by fronts. The block diagram of the algorithm is shown in figure 1.

Figure 1: Block diagram of the algorithm of work distribution by performers within the project



Source: Authors based on the data from own research

4. Discussion

The solution of the task of works distribution at the global level by classical methods (network planning, branches and borders, Gantt) is not possible, since the time of execution of the work depends on the contractor, the appointment of the contractor for a specific work occurs only after the optimal distribution of previous works and depends on the time of execution of previous works, there is also almost always the possibility of execution of works by other performers.

The problem belongs to the class of NP-complete problems, i.e. there are no effective algorithms for determining the optimal solution other than the full search. To solve this problem, we propose a "frontal" bounded search algorithm. This algorithm is based on the ideology of "greedy" algorithms, that is, algorithms in which the work included in the solution under construction can not be excluded from it in the next steps of construction. For each cycle of planning a lot of work is formed – the front of work. On the set of works from the work front, a strict linear order is given. The front refers to a set of works for which the start and end time intervals can be calculated at a given iteration of the algorithm (all works for which the previous works are already distributed among the performers are included in the front of work). When building the front of work, we should not forget that work i , for which the start and end intervals are not yet defined, falls into the front of work, if $K(i) = 0 \vee K(i) \neq 0$ (all work from the set $K(i)$ has already been performed).

5. Conclusion

The developed mathematical model is aimed at finding the distribution of work in the context of globalization by the performers, which fits in a given time and minimizes the total cost of the performers by reducing the time of their work. The developed mathematical model provides the decision-maker with objective information about the timing of the project and the possibility of reducing them.

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BREAKTHROUGH POSITIONING OF INNOVATIVE PRODUCTS IN THE GLOBAL ECONOMY: APPROACHES AND PROBLEMS

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Abstract. Factors of corporate competitiveness are changing in the context of globalization. Today, those who can create and realize a unique innovative development concept will be able to succeed, which will form the basis of their active actions in the chosen direction. Evaluation of the corporate competitiveness in the global market under the New Economy is not an easy task. The global market dictates all the new requirements, the nature of competition on it is quite complicated. The market with the ability to correctly position and effectively implement the image policy, this will allow the company to take its unique market position and secure a sustainable competitive advantage. The paper suggests a new methodology for selecting and comparing the investment attractiveness of innovative and pseudo-innovative products using modern marketing approaches to positioning, developed by the authors and based on the Cagan-Vogel breakthrough positioning model and the modified GE / McKinsey matrix. Investors can identify those innovative and pseudo-innovative products that use the correct positioning methods for their group and thus are potentially more successful with the help of the proposed tool. This methodology allows us to identify such strategic areas for the promotion of global innovative and pseudo-innovative products of various types investing in which you can rely on more than an average profit with specific types of social, economic and technological positioning (SET-factors). The proposed toolkit allows investors to compare potential investments in the innovative sector of the global economy and reduce the level of investment risks.

Keywords: breakthrough positioning model, marketing policy, innovation product, competitiveness.

JEL Classification: M31, L26

1. Introduction

In the modern global world, the speed of innovation is constantly growing, leadership in the New Economy depends on them, otherwise the competitiveness of the national economy is reduced, the technological gap is increasing, and the country's income level is falling. (Kirillovskaya et al., 2016; Gregova & Dengov, 2015; Novikov & Gregova, 2017) "The institutions of the market and market competition are undergoing a certain transformation in the conditions of New Economy". (Volkova et al, 2017) Thus, the problem of promoting innovative products is becoming increasingly serious in the context of globalization, because just a weakness of the chosen promotion strategy often leads to a low degree of market coverage

of innovations and even a complete collapse of innovative developments and its producers. (Tulyakova et al, 2017; Dengov & Gregova, 2015) A lot of promising innovative developments never reach the stage of market promotion, and a lot of innovative products created on their basis cannot find their consumer audience or the degree of their market coverage is very low. (Lyakin & Rogov, 2017; Altunyan & Kotcofana, 2016)

2. There is a problem of fake innovations

Mostly this problem is due to the fact that most innovators are not able to correctly convey their ideas to potential investors and companies that could implement innovative products on the basis of these developments. Innovative companies, most often created by a team of innovators, usually are not able to correctly position their products on the market. (Moore, 2010) As a rule, innovators do not have advanced promotion skills, and professional marketing managers do not understand the specifics of innovative products and the opportunities that can impact on their successful positioning and consolidating in the leading market position. In addition, most innovative companies do not have a free budget in order to actively promote their products and hire promising marketing specialists. As a result, the market is filled with fake innovations. This includes, for example, known schemes for obtaining the status of an innovative company through "innovative" cogs and nuts, which allows them to overcome 40% threshold in the innovative component of the finished product. (Ermakov & Kirillovskaya, 2013) It should be noted that massive pseudo-innovation has a very negative impact on the current economic policy: society does not have enough funds for an innovative breakthrough, while a significant part of these funds is spent on stimulating the production of such "deceptions", which are promoted with the help of the most modern marketing technologies. (Korostyshevskaya & Urazgaliev, 2016; Volkova et al, 2017; Lyakin, & Benson, 2016)

Fake innovations are most often promoted by large companies with large capitals and a developed marketing infrastructure, which allows these companies to carry out competent market promotion of their "innovative products". It should be noted that pseudo-innovation is much quicker for the manufacturer to generate revenue, because they have much lower costs for the actual development and the skills of their promotion are much better worked out. Real innovative products are much more difficult to promote, because the properties of these products are not fully understood by marketing specialists. As a result, the risk of their incorrect positioning and choosing of the wrong potential audience is high. (Ermakov & Kirillovskaya, 2013; Kliestik & Dengov, 2015).

Thus, most large companies that have free resources to implement innovative developments and promote innovative products are more willing to work with fake innovations, as more profitable in the short term, less expensive, less risky and much more understandable for their marketing services. For the same reason, these companies are more likely to adopt the pseudo-innovative ideas of less competitive firms, rather than risk releasing innovative products to unknown innovators and developers. Moreover, fake innovations cause short-term innovative growth of the country's economy, in the territory of which their manufacturing companies operate. This is encouraged by the state of these countries, although it does not provide an opportunity for a transition to sustainable innovative growth in the long term. (Korostyshevskaya & Urazgaliev, 2016; Korhonen & Lyakin, 2017; Gregova & Dengov, 2016)

Thus, it can be concluded that small innovative firms that make up the majority on the market (especially Russian ones) and who are much more likely to promote real innovative products, do not possess the necessary skills of promotion and resources for its implementation. Large

companies that have both the resources and the ability to advance are more likely to issue and promote fake innovations that provide them with quick, but short-term market success, government incentives and stronger growth prospects. As a result, the technologies of innovation promotion do not develop to the proper degree, because these technologies are not needed to promote fake innovations.

Analyzing common methods of promoting innovative products, we have to state the fact that most of them are focused on promoting either high-tech or fake innovative products. At the technology level, there are no special differences between these types of products, the differences are mainly in the choice of the market segment. In addition, non-technological innovations do not distinguish in a special group from the point of view of the specifics of promotion, without realizing what factor determines the potential for their market growth. With regard to fake innovations, this factor is most often a high potential profit with low production costs. For high-tech products and products created on the basis of non-technological innovations, these will be other factors that are not actually taken into account in the promotion, although they can be taken into account intuitively.

3. Effective strategy for promoting innovative products

To develop an effective strategy for promoting innovative products, it is necessary to correctly identify the main factors that are responsible for the success of the market position of these products. In addition, when promoting innovative products, an integrated approach is needed, in particular, to consider innovations in all five areas of their application, as, for example, J. Schumpeter advised: Products (services), Technologies, Organizational structures, Markets, Raw materials. (Schumpeter,1982)

In particular, the development of an effective promotion strategy involves the selection of a specific positioning tool, depending on the expression of the innovative properties of the product and its membership in a typical group on the scale of technology-design, corresponding to the positioning map, creating by J. Cagan, C.M. Vogel: (Cagan & Vogel, 2001)

- Generics lying on the crosshairs of low-level design and low-tech;
- Products «kitch», characterized by a high level of design with a low degree of technology (exactly in this position fake innovations are usually promoted);
- High-tech, characterized by a low level of design with an emphasis on the technological component;
- Breakthrough products, maximally combining technology and style, with which the SET-gap is closed.

Examples of the first products are any type products that do not stand out among competitors except at a low price. Consequently, these products can be leaders in certain conditions, but, as a rule, they achieve the leading position by minimizing the costs of their production and saving on the output scale. With a significant relative market share, these products can achieve market success. Some generics used to be high-tech or kitch products, it could even be breakthrough, but with time the technologies of these products have become familiar, the elitism of the product has weakened, due to the wide range of substitutes satisfying the consumer, and the breakthrough idea has outlived itself or also became typical. Thus, generics can be represented as a winning variant of “cash cows” (this means that, like a similar group of products using the BCG matrix, they will generate more profits than they spend on maintaining them on the market, because they are bought from old memory), and in losing - weakening “dogs” (niche

product that brings a small income). Although for generics there are winners, but leadership here relies solely on mass. These products cannot ensure the growth of the company or their leadership is short-lived, although there are some exceptions.

High-tech products are rarely focused on a broad market; the technologies in them are the determining factor. They are made for a narrow audience segment that understands the technological exclusivity of the product. Thus, when promoting these products, you should choose market correctly and then they will be able to achieve sustainable leadership and ensure the growth and high competitiveness of the whole company. For example, the technology of transport traffic safety, proposed by ZAO «NPP System Technologies» or technology of 3D displays (Japanese corporation Nitto Denko or German company SAX3D). It is possible for these products to gain a leading position in a broad market, but then the consumer audience is still filtered according to the principle of adherence to advanced technologies, and this audience is ready to pay for the opportunity to use these advanced technologies before others.

As for breakthrough products, they reach the leading positions only by combining the idea of promotion, the availability of an exclusive technology (that makes this product unique) and the correct price orientation (it means that the product cannot be cheap, because a low cost is uncharacteristic for unique products). Примером эффективного использования прорывной стратегии является продукция компании Apple. This is an amazing example of the promotion when a product defect has become the basis of its uniqueness. Historically, Apple products have been poorly integrated with other devices and equipment from other producers. But as a result of the company's promotion strategy, this shortcoming provided an exceptional feature of the company's products and intensified the excitement around it. The company's products clearly have a pronounced technological component; they cost significantly above the average and are produced in small batches in order to artificially restrict access to their receiving. The company tried to reduce the cost of a significant part of the product. This is due to the growing number of competitors offering replacement technology at significantly lower prices. As a result, such measures have led to a decrease in the value of company's brand.

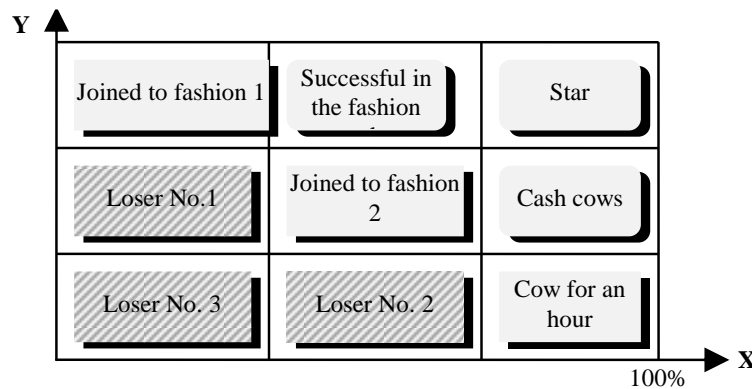
Four positions of products corresponding to the scale of technology-design require significantly different approaches to market positioning. Moreover, typical areas of priority investment for market promotion for these product groups will be set differently.

For example, for generics products it is necessary to carry out positioning based on the social and economic component, since the technology factor for them is practically insignificant, the technological component of these products is usually well developed and typical for their market. For kitch-products promotion will be based on the priority of social and technological factors, since the economic component determines its belonging to this group of products and without a high level of its development it is impossible not only to dominate these markets, but also to achieve even a small degree of this products recognition. For high-tech products the emphasis on promotion should be on social and economic components, because the technology factor determines the involvement of products in this group (and therefore may not be so significant in the analysis). For breakthrough products the emphasis should be on economic and technological components, because social lies at the base of their active marketing strategy. Thus, the social factor ensures the "stylistic uniqueness" of the breakthrough product and gives it the opportunity to stand out in the market. However, to achieve a leading position in accordance with this strategy, a breakthrough product can only by focusing on the economic and technological components.

As a result of this presentation of the SET-gap characteristics, the application of standard methods of market positioning of products, for example, the GE / McKinsey methodology, will give a different picture of the representation of dominant positions and losers for different types of products.

For generic areas of winners and intermediaries can be interpreted as follows (see Fig. 1):

Figure 1: Matrix of positioning of generic products on the market

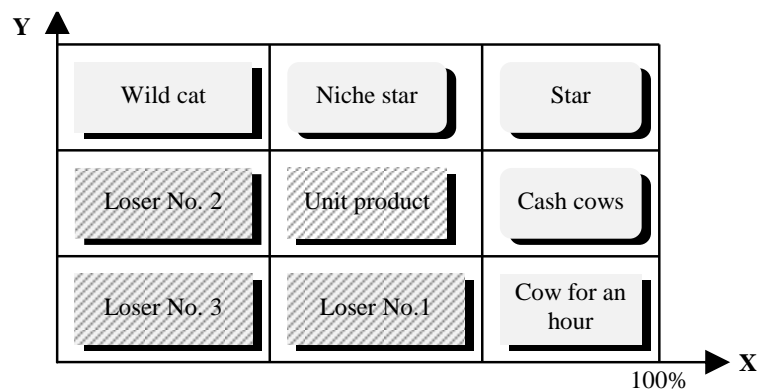


For generics, competitiveness and market attractiveness indicators will take into account their social and economic orientation. For these products, the area corresponding to the winner of No. 1 on the McKinsey matrix can be called a “star”, similar to the BCG matrix. This area will correspond to the product's leadership in the market achieved by the company through economies of production's scale.

The position “successful in the fashion”, as a market position, suggests that the company was able to integrate into the existing strong demand for a certain demanded product group. The position will provide leadership at low costs as long as there is demand, and it does not begin to decline. The position of “cow for an hour” is bought according to old memory, but the market itself is briefly living, which does not allow it to achieve a sustainable competitive advantage. «Joined to fashion » are focused on producing products that are in demand today at a low price, but their position is stable enough as demand is stable, while the position of the former is slightly better than the second, but both can only be considered in the short term.

For high-tech products the positioning matrix will be slightly different (see Fig. 2).

Figure 2: The matrix positioning of high-tech products on the market



For these products, the high level of technology development is the determining factor, so if the company was able to determine for itself the market on which to promote its product with

unique technological characteristics, then it is able to take the leading market position. Products, whose market is determined correctly, go through the stages of the “wild cat” and “niche star” sequentially, and are able to achieve a leading position and become a “star” as a result.

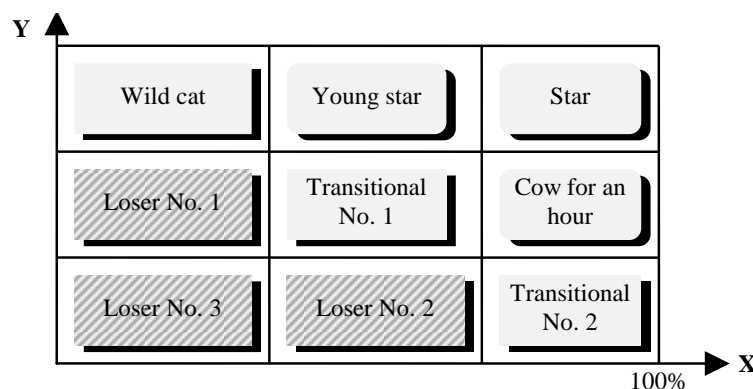
“Wild cat” in this interpretation, as well as similar products in the BCG matrix, is an invader of resources, a product for which it is permissible to use aggressive advertising, the fate of which on the market is still unclear. If the selected promotion strategy will be successful and the company will have enough resources to implement it, “wild cat” can become a “niche star”. In the case of high-tech products, a young star, corresponding to the leading market position and high costs of maintaining it, will be the leader in a certain segment of the market whose needs can be most satisfied with this product or whose consumer audience is better able to assess the innovative qualities of this product. And in the case when this product can be promoted to a wide consumer audience and lead on a broad technological market or create its own (possibly specific) market, it will become a “star” in the classical sense.

When the attractiveness of the market is reduced and the attention to other products of this group is weakened, the star can provide a transition to the “cash cow” position. This will bring the company a sustainable profit, surpassing the costs of maintaining a market position, for a certain period. In fact, a “cash cow” for high-tech products is a niche position. This product is bought by those consumers who perceive the value of its technological differences or individual convenient qualities, even in comparison with new and more fashionable products of competitors today.

“Cow for an hour” is a product that has joined the technology leader already at the stage of weakening the attractiveness of its market, i.e. the position of products resulting from technological (innovative) copying, which is often used by Chinese producers. In this case, companies do not spend effort and do not have large development costs, but copy the competitor's technological product when it becomes widely available and can be comprehensively studied for the technological differences that make up it. In this position the product will bring profit to the company exceeding the costs of its promotion for a very short time, because the market itself is already dying out.

For the “kitch” products, the positioning matrix will have slightly different positions (see Fig. 3).

Figure 3: The positioning matrix for “kitch” products



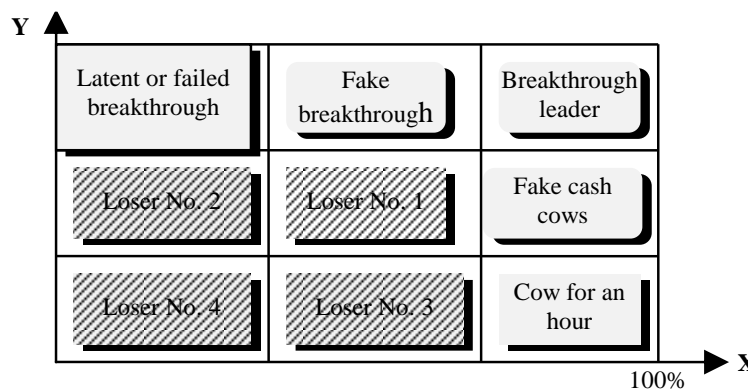
So, the “wild cat” for this group is a product whose idea of advancement has been formed already, but the actual advancement of which has not been realized yet. Due to the fact that these products do not have technological differences, their novelty consists in presenting the

product in an exclusive market for which the product will be presented or offered atypical ways. Such as, for example, granite circles for heating food during long ceremonial events. The idea of using a granite plate to maintain the food temperature is actually new, because different types of heating devices for food have been used since ancient times, and the heat conductive properties of granite are known very well and the product does not possess any new properties.

If the idea of promoting a product works, then it becomes a “young star”, i.e. begins to lead on a certain narrow segment of the elite consumer market group, which considers the use of such “unique” products as an indicator of their solvency. If this product is in wide fashion with the exalted public, then it becomes a classic star. When such a star loses market appeal, then the producer does not need to support it further, so that such a product usually leaves this position. At the same time, there are other companies that see the success of the “kitch” leader and are trying to join this market. As a result, there is a “cow for an hour”, a product that is able to generate resources for a short period of time, while some representatives of the elite market of the former star still want to purchase this product, but soon their attention will shift to another fashion product. Perhaps the “cow for an hour” is positioned on a slightly different consumer audience, but with the old idea, but in view of the fact that this target group is not as solvent as the primary one, the duration of prosperity in this position will again be low.

The matrix for breakthrough products will also be very different from those already considered (see Fig. 4).

Figure 4: Positioning matrix for breakthrough products



The difference of the positioning matrix for a breakthrough product, first of all, lies in the fact that it has more losing positions. When implementing another strategy, these positions could provide some success in the market, but failing to close the SET-gap, as breakthroughs are absolutely not sustainable. Thus, to maintain losing breakthrough products does not make any sense. (Baulina & Klyushin, 2017)

The position of “wild cat” in this case is replaced by “latent or failed breakthrough”, which means having a breakthrough idea of promotion and technological (innovative or socially popular) product properties or choosing an incorrect breakthrough idea. If the idea was good, then the product can become a “breakthrough leader” with the complete closure of the SET-gap, and with a certain “slack” of the individual components of the product (most often technological innovation), it will become “fake breakthrough”. Fake innovation products often fall into the position of “fake breakthrough”, because with insufficient innovation technologies cannot provide a SET-gap in all three areas.

Weakening the attractiveness of the market for a breakthrough product will mean the transition to the field of “fake cash cows”, which for the outside world seem highly profitable, but in fact, their holding on the market requires constant significant costs. Thus, as an attractive component of the product portfolio, these goods will be untenable. "Cows for an hour" here represent the products of competitors who are trying to join a market that seems profitable, but in fact it is already losing its attractiveness, so the exploitation of this position is short-lived and not very profitable.

4. Conclusion

Thus, the considered differences between the main areas of positioning matrices for products of different groups in terms of technology and design allow to choose and realize a strategy of promotion to the market more intelligently, influencing the competitive status of the product or varying the markets on which these products are supposed to be promoted. Active actions to strengthen the competitive status will make it possible to advance the positioning matrix, shifting the product into more attractive areas. In case of failure of the selected strategy, it is possible to promote the product in a different status in the context of the "technology-design" plane, which can provide the product with better market indicators.

Innovative products, the status of which is poorly defined, and the prospects are not particularly clear, can have a very high potential, not only in the status of high-tech and, especially, generics, but also in the status of breakthrough ones. Promoting innovative products as breakthrough products will allow the company to achieve greater success in the market and create sustainable competitive advantage, which is difficult to copy.

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CONDITIONS FOR THE DEVELOPMENT OF ORGANISATIONAL GAMES

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Abstract. The purpose of the article is to show the causes, manifestations and mechanisms of development of selected constructive and dysfunctional organizational games. The text is based on qualitative research carried out in the form of partially structured interviews. This choice of method was a consequence of the aim and object of the study. Learning about organizational games requires very close, sometimes even informal, contact with respondents. It would be very difficult to achieve this by using quantitative methods, which, by definition, narrow the scope of research. Organizational games are a common, although difficult to identify, phenomenon. An organisational game may be initiated for different reasons, and the game itself may have various consequences. Globalization and uncertainty additionally accelerate the creation of games. The article briefly presents the concept and influence of organizational games on the functioning of an organization. The research allowed to identify the most important preconditions for the emergence of organizational games, as well as selected factors and mechanisms that make the games dysfunctional. The study identified some dysfunctional organizational games such as: scapegoating, making a good impression, the illusion of taking charge, forming coalitions, cost shifting, and more. The most important reasons for initiating the games were, among others: seeking formal power or informal influence, the desire to influence change, the improvement of material status, avoiding duty, and defense of one's own position.

Keywords: organizational games, dysfunction, politics

JEL Classification: M12, M20, M29

1. Introduction

Organisational games are an integral part of the functioning of any organisation. The game can also be seen as a core metaphor – in this sense, the organisation is treated as a game. Regardless of the perspective, the game is about limited resources, according to certain rules, both within the organisation and at its interface with the environment. Depending on the objectives, course and consequences, games can have a positive, neutral or negative impact on the organisations in which they take place. If such a game is played for a long time and has a negative impact on the functioning of the organisational system, we can speak of a dysfunctional game. The aim of the article is to show the conditions for the development of organisational games. Particular emphasis will be placed on the factors that determine the constructive or dysfunctional nature of the game. The basis for writing the article was qualitative research conducted in the form of partially structured interviews. Their aim was to identify and learn as much as possible about pathologies and organisational dysfunctions. The issue of games was identified by the respondents as particularly sensitive and important from the point of view of the emergence of later organisational dysfunctions. As a result of the

research, an open catalogue of games and their conditionings was created. Identification of the problems of organisational games in the broad sense, attempting to organize them and identifying the conditions of their development may be extremely important from the point of view of understanding organisational processes. In the case of dysfunctional games, this may be a key condition for reducing or even eliminating their problems.

2. Research methodologies and limitations

The research consisted of two stages. The first was an analysis of literature in the field of games and organisational policies, as well as organisational dysfunctions and pathologies. Concise entries and articles in academic journals were studied. Cases described in the daily press or on Internet news portals were not analysed. The second survey was a partially structured interview. They were carried out with 45 purposefully selected entrepreneurs, managers and specialists of various levels. The interviewees included 12 entrepreneurs, 2 specialists working in international corporations, 1 specialist working in a housing cooperative, and 30 managers of various levels. Among the managers, we can distinguish a subgroup of 10 people who were also entrepreneurs – they were acting as presidents in their own companies. Among the industries represented by the interviewees, the following can be distinguished: health care, construction, retail trade, wholesale trade, property protection, footwear industry, power industry, municipal services and others. The interviewees were a very diverse group, ranging from sole proprietors of startups to top-class managers of corporations operating on global markets, which allowed us to consider the issues from different perspectives. Respondents were asked and requested to give examples of organisational games taking place in organisations, at the meeting point of organisations and their environments, or in close proximity to them. In addition, the sources and consequences of such games were requested to be indicated. The support list for the interview, based on the literature, contained more than 30 examples of games that may be found in the above areas, however, due to the specific nature of the research and the objective pursued, the researcher tried to avoid giving detailed examples and suggestions to the respondents. The length of the interviews ranged from 30 minutes to 6 hours. The interviews were recorded and transcribed.

The choice of the research method was a consequence of the purpose and subject of the research. Getting to know organisational games requires as close, sometimes even informal, contact with respondents as possible. It would be very difficult to achieve this by using quantitative methods, which are by definition narrower than those used in the study. However, the test method used has specific limits. The first group of limitations is the lack of representativeness typical of qualitative research and the limited possibility of generalizations. The second group of restrictions is related to the subject of the study. They are reluctant to address issues that are informal and difficult to define. Investigating pathologies, dysfunctions, errors or malfunctions – and organisational games are usually seen in this context – is particularly difficult. The "we should not speak badly of the company" attitude is deeply established. This may be due to fears of harming the organisation. It may also be motivated by putative sanctions from the organisation. Sometimes, it seems, the interviewees fear that their own attitudes will be assessed negatively or shown in a negative light.

Organisational games are a highly subjective phenomenon and, at the same time, extremely sensitive from the point of view of both researchers and research participants. This term is not even obvious to those representatives of the management sciences who are studying these phenomena. For example, P. Hensel rather writes about policies in the organisation or political

activities in the organisation (Hensel, 2008). Some other authors use similar terminology (March 1962; March, Olsen, 2005; Lewis 2002; Pfeffer 1994). Although the terms 'organisational game' and 'political activities' are used interchangeably, it would seem appropriate to use the former for the purpose of this article. The term "political action" is very closely related to the issue of power in an organisation. Meanwhile, power may or may not be at stake in 'organisational games'. It seems, therefore, that "political actions", "political coalitions" or "organisational policies" should be treated as one of the types of games. The aim of this study was to identify dysfunctional organisational games in the broad sense, including those that extend beyond the area of power in the organisation. Moreover, policies in organisation or policies are often negatively marked (Lubit 2002; Allen et al., 1979; Sussman et al., 2002). These terms most often refer to dysfunctional organisational games.

3. The nature of organisational games

A game can be understood as a social pastime conducted according to certain rules, a game conducted between players or teams according to the rules defined in the rules of a given discipline, competition between two competing persons or groups, or a procedure involving the creation of appearances. Each of these meanings fits partially into organisational games. They are games played according to certain rules, they contain elements of competition, they involve individuals and groups, their important components are organisational roles, and some of the activities are of an apparent nature. Each of these meanings fits even partially into organisational games. They are games played according to certain rules, they contain elements of competition, they involve individuals and groups, their important components are organisational roles, and some of the activities are of an apparent nature. The concept of organisational games stemmed from the economic criticism of the enterprise theory (Piotrowski 1990) and, like other concepts within the neo-institutional trend, questions the realism of using formally (methodologically) rational decision-making processes. Decisions taken at the highest level of an organisation are not the decisions of an individual, but decisions of a coalition of leaders. A company is not a monolith, but a socio-political system of conflict, which is the subject and object of various economic and social constraints (Piotrowski 1990).

4. Constructive and dysfunctional organisational games

4.1 Constructive games

According to Kozminski and Zawislak, management is a non-zero sum game, so one participant winning does not necessarily mean another losing (Kozminski & Zawislak, 1979). Such an assumption is legitimate and even necessary when we take the metaphor of the game as the core metaphor. Organisational games in the light of the neo-institutional approach are a natural and inevitable phenomenon. The game is a market process, an exchange between an organisation and its participants, as well as an internal exchange process. Some authors believe that the roots of the game lie in the environment (Gotsis & Koretzi, 2010). Others draw attention to the special role of personal antagonisms (Vince 2001). The special features of the individual (Znaniacki, 1974; Pfeffer, 1994A; Pfeffer, 1994B) which favour or hinder the efficient running of games also play a significant role. Consistency of arguments and influences, involvement of effort and emotions is usually a condition of social progress. Those interviewees who experienced successful restructuring processes, improvements or major modernisation projects in their companies stressed that these were processes full of social tensions, clashes of views and interests. However, the interviews conducted only partially and indirectly provided an

answer to the question about the features and conditions of constructive games. Answers and examples relating to dysfunctional games were much more frequent. Constructive games are therefore more commonly referred to as 'the opposite of dysfunctional', which means in particular that:

1. To be constructive, you must comply with the general rules of the game. These principles relate to the primacy of the organisation's primary objectives and the subordination of personal interests to those objectives. This attitude is reflected in the statement that "the interest of the company is paramount". However, compliance with the rules must not be a fetish, but it is acceptable to change them as a result of a constructive clash of arguments.

2. Compliance with the rules of the game is more likely when there is a homeostatic balancing mechanism in place within the organisation. It is the flexible rules, vigilant supervision, strong will and the proper authority of its superiors that make it necessary, and the awareness of a common interest – the desire to continue the game.

3. It is important to choose the right people. According to the interlocutors, too many players, "the people playing" (Znaniński 1974), could easily lead to games getting out of control and destabilizing the organisational balance.

4. Proper management of the game. Allowing an opponent to be destroyed entails a zero-sum game, which almost always determines its dysfunctionality.

5. Accepting the dialectic nature of the game. Conflicting views, interests, and points of view can be beneficial for the organisation and should not be suppressed. Even dysfunctional games can have positive consequences in certain cases.

4.2 Dysfunctional games

In addition to constructive games, which lead to the development of the organisation, dysfunctional games can also be observed. A dysfunction is a phenomenon which has a negative impact on a specific social system (Pasioczny & Glinka, 2016). Dysfunctional organisational games are often treated as behaviour designed to protect one's own interests at the expense of others (Cacciattolo, 2014), and this behaviour is often contrary to the organisation's objectives (Ladebo, 2006; Vigoda – Gadot, 2007). According to Beugre and Liverpool, such organisational games are an example of anti-social behaviour (Cacciattolo 2014). As with all other types of games, the key issue is the benefits to players. Participation in the game is itself often a source of pleasure for the player. According to Liu, individuals who benefit from organisational games feel pleasure and excitement, especially when positive results are achieved only in an illegitimate way (Vigoda–Gadot, 2007). According to other researchers, the propensity to play games is a result of evolution and is genetically inherited (Vredenburg & Shea-Van Fossen, 2010). However, the sources of dysfunctional organisational games may differ. These can be cultural backgrounds (Vredenburg & Shea-Van Fossen, 2010), governance failures such as clear violations of human interests or manipulation (Cacciattolo 2014, Gestmann 2001), narcissism (Lubit 2001), or formal or informal power (Crozier & Friedberg, 1982; Shaugnessy et al., 2017; March & Olsen, 2005).

Analysis of the research material allowed us to identify numerous manifestations of games in organisations. Some of them were typically dysfunctional, in some cases such games led to significant problems. A game is a social phenomenon, so the number and intensity of games is related to the size of the organisation. Entrepreneurs most often noticed games outside their organisations, sometimes they claimed that they themselves run such games with the

environment (in such situations they did not perceive them as dysfunctional). The most information about dysfunctional games was provided by middle managers and specialists. Top managers may not notice them or may not want to talk to the researcher about them. The following dysfunctional organisational games were identified in the course of the survey:

1. Lack of cooperation. This was recognised by both top managers and subordinates. Lack of cooperation manifests itself in reluctance to cooperate, bad flow of information, or reticence in sharing knowledge.

2. Externalisation. Externalisation may concern obligations, responsibilities, but also costs in the broadest sense. Almost anything that is unpleasant, burdensome or risky can be externalised. This type of game can be played by both individuals and groups. One of the most common examples of externalisation is the shifting of responsibilities to others. This can be done through interventions with superiors, conscious omissions, suggestions, the method of accomplished facts, and many other ways.

3. Confrontations. This type of game can have different motives: a desire for power, an unwillingness to cooperate, but it can also be based on personal or emotional factors. The sources of confrontation, as in the case of other games, do not have to be and often are not rational.

4. Building coalitions. Coalition building is a classic tool of organisational games and, according to the concept, it does not have to have a negative impact on the organisation. Coalitions are a natural way of pooling resources: power and influence, information, knowledge and skills, relationships, authority, etc. Many interviewees, however, noticed the dysfunctional character of such groups and described them using pejorative terms such as: cliques, mutual adoration societies, cronyism, and so on.

5. Embedding. This type of game is most often aimed at gaining power, influence or other organisational resources and involves finding a sponsor in the organisation and maximizing the benefits of being close to the sponsor. This is a game conducted by an entity and addressed to both the sponsor(s) and other participants of the organisation. Embedding oneself is about gradually relieving the strain on one's superiors and isolating them from their subordinates.

6. Manipulating information. This type of game can be manifested through different behaviours. One of its manifestations is gossiping and spreading of false information. Depending on the objective pursued, the rumour may highlight or mask certain phenomena, weaken or strengthen the position of selected entities. Spreading false information can be used to discredit an opponent, deprive them of support, or build or strengthen a coalition.

7. Legitimation. Theoreticians' reflections on legitimacy are confirmed by the research, although none of the interviewees used this term. The game for legitimacy usually takes place at the highest levels of the hierarchy. It can be manifested by imitating, succumbing to herd effects, following fashion, and other actions that are taken to gain acceptance of an individual's or group's actions.

8. Creating appearances. Both managers and subordinates pointed out the existence of this type of game. Managers noticed the apparent activities of their subordinates aimed at presenting themselves in a positive light, e.g.: consulting on ambitious but unrealistic or unnecessary projects, publicising their own achievements and specific presentation of the performance of standard duties as extraordinary projects and achievements.

5. Conclusion

Organisational games are the subject of numerous publications, but still remain an interesting field of research. The boundaries between constructive and dysfunctional games are not always sharp, and games of one type can evolve into another, with different parameters and consequences for the organisation. According to Buchanan, structural games can take place in organisations when one group of employees can be guided by completely different goals and assessment indicators than the others (Buchanan, 2008). Such conflicts are positive from an organisational point of view, as they lead to improvements in the decision-making process and trigger constructive criticism (Jehn, 1997). However, it is also likely that this constructive game will develop into a dysfunctional one when emotional reactions occur and organisational differences affect the personal sympathies of the participants (Jehn, 1997). Due to the complexity and dynamics of the matter, it is not possible to fully understand the issues of organisational games. It is even difficult to identify individual games taking place in organisations. However, these issues should be further explored as they are an integral part of social functioning and have a significant impact on the functioning of the organisation.

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FACEBOOK – GLOBAL ISSUE WITHOUT (EXISTING) SOLUTION?

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Abstract. Facebook is recognized as a technological giant with possibly unprecedented power. It is assumed that recent large-scale scandals show just a glimpse of what might happen if the company fails to recognize its power. Voices calling for regulation are stronger than ever. Yet, before we move towards proposing a new regulation, a proper analysis should be done in order to establish what kind of socio-economic power Facebook has and whether the existing regulating mechanisms are capable of preventing and solving potential problems. We focus on three regulating mechanisms: data protection, consumer protection and competition law, which are presented as the relevant regulating mechanisms also by the literature. In order to assess the suitability of these mechanisms, we present a brief case study of the recent Facebook redesign. In 2017, Facebook introduced Explore Feed in a few selected countries. As a consequence, posts of pages (including prominent media, politicians, etc.) were shifted from a default wall - News Feed, into a secondary wall - Explore Feed; unless the pages owners decided to pay for sponsored posts shown on the default wall. We assume that such an ad hoc change of service might have had serious consequences. We analyze the existing regulatory mechanisms and their suitability to make Facebook (or other social media platforms) accountable for some of the problems and find that overall there exists a wide regulatory gap in capturing the main problems of platforms, one that may be filled with a new proposal of public supervision over the platforms.

Keywords: Facebook, social media platforms, accountability deficit, regulation of cyberspace

JEL Classification: K12, K22, K23, K24

1. Introduction

Debates on the power of social media over political discourse, healthy functioning of democracy or general social welfare have never been any more actual and vivid as they are now. We have seen the scandal of Cambridge Analytica's misuse of personal data of millions of users of Facebook, proven influencing of the US' and other state's elections through fake news (Hunt & Gentzkow, 2017), fake profiles, army of trolls, often managed from third countries, and deliberate abuse of the platform's algorithms or simply a general exploitation of the inherent features of "neutral" internet service providers for propaganda or escalation of hate speech (Bartlett, 2018). Facebook has also become a means to promote religious and racial hatred against certain communities (Imran, 2014), contributes to political polarization (Lee, et al. 2018) and leads to social amplification of risks (Wirz, et al., 2018). Amid the amounting criticism, social media platforms ("SMP") started to act on their own: Twitter deleted dozens

of millions of fake profiles from its platform; Facebook implemented a tool showing related, fact-checked sources next to disputed ones, or enabled users to see previously undisclosed information about Facebook pages to assess their credibility, genuineness and motives (Lytvynenko & Craig, 2018) (Smith, et al., 2017). The platforms also started to enforce their "community rules" and other content policies more rigorously recently (Romano, 2018). Moreover, some large advertisers started to exert market discipline over platforms (Riley, 2018).

Still, six-seven years ago Facebook, Twitter and other media were seen predominantly as forces of good, enabling democratic revolutions in the Arab world during Arab Spring or in during Hong Kong's Umbrella protests (Sile, 2015) (Tufekci, 2018). The situation started to change as politicians and other actors realized that "*in the 21st century it is the flow of attention, not information (which we already have too much of), that matters*" and that social media could equally be used for their purposes (Ib.). Undoubtedly, Facebook and other SMPs provide useful services to society (Stephenson et al., 2017), yet an issue of regulation has been raised repeatedly in the past years and has intensified recently. (Romano, 2018) The global ramifications of these platforms operated by companies predominantly domiciled in the US complicate matters further.

In reaction to the current discussion on the regulation of Facebook or other SMPs, we cluster the regulatory issues into three parallel and interrelated, yet analytically separate issues: (1) responsibility for users' content; (2) personal data handling; and (3) monopoly power of some of the SMPs in certain relevant markets. Naturally, these clusters of problems do not represent all problematic issues arising in relation to SMPs, leaving aside, for instance, the problem of addiction on SMPs (Ryan et al., 2014). Instead of attempting to review most of the issues related to SMPs, we provide a preliminary assessment of suitability of existing and proposed regulation to tackle these three clusters of issues. The assessment is based on established assumptions, which we briefly describe, and a framework legal analysis. However we do not provide an extensive legal assessment of respective regulations and jurisdictions. We provide an outline of these regulatory issues, built on previously proposed regulatory responses (Stucke, Grunes, 2016) (Kerber, 2016). We discuss suitability of these responses and suggest improvements.

2. Regulating Social Media Platforms – the Why Question

We identify three broad categories of issues with the SMPs, primarily with the most prominent ones, such as Facebook, YouTube or Twitter. First, responsibility for users' content, typically reflects a debate over the nature of platform providers as internet service providers ("ISP"), rather than traditional media. As ISPs, the platform providers are normally not responsible for the content their users publish on their platforms, as that would disproportionately burden them and hamper the dynamic development of vivid internet communities. However, the status of ISP does not provide a complete insulation from every liability, for instance from civil lawsuits (Tsesis, 2017).

On the contrary, understanding SMPs as traditional media would require making them responsible for the users' content, which is not feasible and potentially disproportionate as to the objectives of such measure, and also provide third parties with certain rights, typically provided under media law (right of reply, right of correction etc.). These rights would be difficult to realize on platforms with distributed content creation. Yet, although SMPs typically do not produce the content, their algorithms curate the content on behalf of users, for instance in prioritization and personalization. It is also clearly socially problematic that SMPs deploy

algorithms that favor certain content, often of disputed validity or outright fakes, to the responsible media content. Such use of algorithms is not unlike curation in traditional media, although done automatically.

Moreover, the debate over the nature of SMPs is shaped by the polarization of the internet sphere – as the digital populations of SMPs grew, SMPs became major venues for political debates and marketing. Implications of private ownership of the major political spheres may be severe and the incursions of public law, especially the constitutional rights, may be significant. For instance, in a recent decision by a federal judge of New York the court found that the standing US president, Donald Trump, could not block people from following or viewing his Twitter profile, based on the viewpoint discrimination (Calvert, 2018). The court decision is important in acknowledging that government's accounts (public posts or tweets) on SMPs controlled by the government and used to not only communicate but rather interact with the public represent a public forum with protected access and speech.

Second, the handling of personal data of users requires us to assess the unequal standing of the platforms and their users. It has been acknowledged repeatedly that although SMPs are free of charge for users in monetary terms, the use is clearly paid for by the data and attention of users (Stucke & Grunes, 2016). SMPs benefit greatly from the network effect, inertia of users and great costs of exit for users, rendering meaningful competition unrealistic and unfeasible. Therefore, although the users are theoretically free agents engaged in a mutually beneficial exchange of services for some data and attention, their standing is not equal at all. From this perspective, we can assume, as recently even the German Federal Cartel Office did (Busvine, 2017), the collection of data by certain SMPs may become a competition law issue. The argumentation goes along the line that if an SMP of great market share and power, unrestrained by the competition, such as Facebook, may charge increasing *quality* and *quantity* of data and *attention* of its users without fear that its users will replace the SMP by another one, this represents an unfair increase of price for the consumers and thus decrease their welfare. Such argumentation requires a firm qualification of data, and perhaps even attention, as a currency that consumers dispose of and SMPs can effectively monetize to cover the costs of their services (and profits).

Clearly, in time, the increased knowledge of users and their behavior could potentially increase the power of SMPs to an even greater extent. Deployment of curating AI and machine learning algorithms complicates matters even further (Pasquale, 2016). The third problem is therefore the potential of unchecked platforms, which play an increasingly important role within societies, but do not have to follow socially beneficial purpose or be regulated as a public infrastructure. At times, their role may be decisive of life and death as was exemplified by recent unfortunate cases in India and Myanmar (Goel et al., 2018). While many claim that SMPs are responsible for such and similar acts *only just* as much as gun producers are for murders, it is clear that the way a product or service is designed influences greatly the way it is used. This is even more true for the digital products and services, where multiple methods of behavior influences may come to play, both positively and negatively, as was explained by Lessig (2006). Responsible software design and architecture of platforms appears to be a must and is recognized by numerous voices outside and within the SMPs (Smith et al., 2017) (Forestal, 2017).

3. Regulating Social Media Platforms – the How Question

After presenting the three cluster of problems connected with SMPs, we present the existing regulating mechanisms in order to see whether they are able to deal with the identified issues. After general comments on the particular regulating mechanism, we assess the suitability of the regulating mechanism on an example of recently deployed and subsequently removed Facebook's feature, Explore Feed.

Explore Feed, a feature tested in Slovakia and 5 other countries over a period of 5 months, was a separate feed of posts on Facebook, existing alongside the News Feed, set with the ambition to loosen the mixing of private and public messages within one general feed. The Explore Feed featured professional actors, such as media, brands, NGOs, celebrities or politicians, while personal contacts remained on the regular and default News Feed (Slovak Spectator, 2018). Visibility on the default News Feed could only be procured by paying for advertising the message, which significantly decreased organic interactions; for instance, the average number of interactions on posts of traditional (serious) media pages on Facebook were decreased significantly (by 52%) in comparison with the period prior to the deployment of the Explore Feed (Struharik, 2017). Moreover, the decrease of interactions was less significant on disinformation and conspiracy pages (by 27%). The deployment of the feature was rather sudden and left many unprepared.

The first regulating mechanism is related to a rather broad category of privacy. (Fuchs, 2011) However, we focus mostly on data protection. The protection of data is increasingly strengthening, especially within the EU. As we suggest above, the data of SMPs' users are a valuable commodity. Voices asking to recognize the data as the new currency are currently quite frequent (Newman, 2015) (Stucke & Grunes, 2016) (Kerber, 2016). Therefore, one may assume that if the data protection strengthens, the problems related to SMPs, especially the data handling, would be solved. However, this does not seem to be the case.

Above all, the problem of SMPs is certainly a global one. Therefore, to tackle it correctly, one would need a multinational, if not global solution. Protection of data is certainly not regulated on a global level (sufficiently). In fact, many countries, especially the developing ones, have started to cultivate the privacy protection rules only recently, although they have used the digital space extensively for years now (Arora & Scheiber, 2017). However, since 25 May 2018, GDPR is in force as a supranational regulation of personal data within the EU. As the EU citizens are well-represented users of SMPs, the platforms have to pay attention to GDPR, if they wish to continue providing services within the EU. Yet, GDPR will be insufficient intervention if the data are harvested outside of its scope.

As a core principle of data protection regulation, GDPR requires a consent of persons, unless there is a legal basis that would make the requirement for consent redundant. Once an SMP has a user's consent for particular purpose it wishes to process the data for, it may very well do so. GDPR will not be breached. This is a likely scenario as most of the users are typically not lawyers willing and able to understand elaborate SMPs' terms and conditions and simply accept the default scope of data processing.

Finally, we are quite skeptical about the real possibility of assessment of whether GDPR is observed in practice. If a user denies their consent for a particular purpose, the review of compliance with consented purposes may not be straightforward for the authorities. This will be a question for software developers who implement the data protection safeguards into software, however, it casts doubt on real enforcement of data protection. Clearly, the

deployment of Explore Feed was not a data protection issue, therefore GDPR and other data protection mechanisms are irrelevant.

Second regulating mechanism which can be used to tackle the problems of SMPs is the consumer protection. Consumer protection is represented by a set of rules aimed to protect consumers, i.e. persons who do not act within their professional capacity, hence are more vulnerable in contractual relations. Their informational and professional disadvantage is compensated by non-dispositive legal norms imposing obligations on the part of consumer's counterparties, i.e. businesses.

Users of SMPs usually meet the definition of consumers and therefore consumer law shall be applicable to SMPs. Consumer law can be useful in order to prohibit undisclosed harvesting of consumer's data, vague use of data, non-user-friendly terms and conditions (Kerber, 2016). Nonetheless, these problems may be handled by privacy law as well and a brief overview of typical terms and conditions of SMPs makes it clear that consumer law falls short of properly addressing the complexity, misalignment and disbalance of power in relationships between consumers and SMPs. Consumer protection is also built on premise of strong consumer-protection groups, which are typically active locally or on EU-wide scale, yet not globally.

The consumer protection can be more beneficial from the perspective of the use of SMPs' users data. The key point of this regulating mechanism is to have appropriate conditions for consumers. If a contractual condition causes a severe disbalance to the detriment of a consumer, such *unfair* condition may be invalid even though the consumer has agreed to it. Under this principle, a practice of an SMP, which is to detriment of users can be understood as unfair, in spite of the fact that users agree to it in terms and conditions.

In any case, a significant problem of consumer law is its fragmentation. Consumer law is governed by each state separately, even the EU has only certain harmonization at place. Moreover, in each jurisdiction consumer law is spread around many pieces of legislation. Consumer law is often enforced by national courts which, however, place the burden of litigation on consumers. National authorities, protecting the rights of consumers, are usually not designed to cope with questions related to SMPs.

Returning to our example, as the problem of Explore Feed was structural, not consumer-related, it would be necessary to establish that this practice is to detriment of users qua consumers. It would require a legal analysis of the particular state where the practice is supposed to be unfair and it would be necessary to require a court's decision stating that the practice, i.e. the particular terms, are unfair. This could be a long process, especially taking into account the fact that Explore Feed has surely its advantages to groups of consumers, such as improved personalization of the feeds and decoupling of *professional* and *private* content.

Last but not least, it shall be zoomed in on competition law as a suitable regulating mechanism of some aspects of SMPs. Advantages of competition law are quite straightforward, since it is a supranational law, at least in the EU to a certain level (Scharpf, 2006). The protection of competition outside the EU is quite well established too, which provides for synergic effect around many countries in the world. Competition law has a deterrent effect as the fines for its infringement may go up to millions of euros. Moreover, there are competition authorities with strong enforcing powers which are able to align an undertaking's behavior with competition rules. Plus, there is a possibility to use an action for damages which can be brought by a private party. Nevertheless, there are many issues in need of addressing.

The competition law analysis always starts with the definition of a relevant market. This can be problematic, and, consequently, it is problematic to establish the market power of a particular SMP. Besides, we need to be able to define an SMP as an undertaking. Once again, we face the problem of zero-price markets, since for the competition law purposes, an undertaking needs to be engaged in an economic activity. Even if it is agreed that users pay by their data (Newman, 2015), establishing of an anti-competition practice will not be an easy task to do, not even mentioning the efficiencies, which may arise from many SMPs' practices. SMPs are strong undertakings with predispositions to grow via acquisitions of other applications (Golubov et al., 2015). However, this does not automatically imply that they are dominant undertakings which abuse their position. In any case, such enforcement would take long time to be put into practice.

To be specific, let us analyze the Explore Feed example. To discuss but one problem, we need to define a product market for this practice. Traditional SSNIP test would not be of great use, as we cannot define small but significant non-transitory increase in price, since there is no price per se and data or attention do not seem feasible for this purpose. That brings us to SSNDQ, which focuses on decline in quality instead of increase in price (Stucke & Grunes, 2016). Hence, if we try to define the relevant product market as narrow as making and seeing posts on Facebook's feeds, a small but significant non-transitory decline in quality of Facebook's feeds would need to lead to the majority of its users remaining on the platform instead of leaving for another platform. Provided how difficult such analysis would be and what kind of data would a competition authority need, it seems improbable that many competition authorities would take this path.

The final point of unsuitability of competition law for solving SMPs issues is the difference in goals. Competition law is designed to solve failures of market, thus, its main goal is not to protect the socio-political environment. Although, it may be possible to find certain overlaps, most of the issues described previously are of different kind, hence trying to solve them by a tool developed primarily to tackle economic problems may be far-fetched.

To sum it up, all three regulating mechanism can merely solve partial problems arising in relation to SMPs. Their synergic effect may be more sufficient, yet still the overall regulatory gaps appear to be clear; existing regulatory framework fails to remedy the social-political shortcomings such as fake news proliferation, algorithmic biases or ever-present disputes over freedom of speech of rogue platform (ab-)users.

4. Conclusion

In general, the internet has significant impact on voters and on political situation in any state (Gavazza et al., 2018). SMPs play vivid role in this sense. The understanding the SMPs presented in this paper moves us beyond traditional media, creating a hybrid media and public sphere – (i) privately owned and operated platforms, (ii) with privately set and enforced “community rules” (although set within the legal framework of the public law), (iii) organized by unchecked algorithmic and architectural biases, (iv) based on vast processing of the users' data, (v) with limited access to remedies, (vi) yet of vital importance to our political processes and political discourse (including a certain level of protected speech). Existing regulatory mechanisms are not suitable to address most of the presented issues as they were introduced to address a different set of problems (competition law), are fragmented and insufficient (consumer protection), or limited in scope (data protection). The short-term metrics of the companies operating SMPs, often driven by capital markets' short-termism or simply by

unsustainable company purpose, further exacerbate many of the platforms' problems, although they may represent a partial panacea for some of them (Serafeim, 2018). Nevertheless, we find that there is a substantial accountability deficit in relation to the SMPs, especially in the structural issues of hidden and visible biases of platforms, access to remedies or content regulation. A comprehensive approach towards regulation of platforms should be based on the recognition of platforms as online public fora and could include supervision of the architecture and other structural aspects of the platforms by an independent public body.

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GLOBAL PROBLEMS OF INCREASING COMPETITIVENESS OF TELECOMMUNICATION ORGANIZATIONS, OPPORTUNITIES PROVIDED BY THE DIGITALIZATION OF THE ECONOMY

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Abstract. The problem of maintaining and improving the efficiency of telecommunications companies in the context of global competition is becoming even more difficult due to the emergence of new factors that have a significant impact on the development of individual organizations and national economies, and the global economy as a whole. These factors operate and develop within the framework of the introduction of digitalization trends into economic practice. This phenomenon creates new conditions for telecommunications organizations operating both in global and national markets, which in turn can become factors that change competitiveness. The aim of the study is to study the impact of the introduction and development of the digital economy on the competitiveness of organizations operating in the telecommunications sector. The methodological basis of the study was the comparative analysis of sources; analytical method to identify the positive and negative factors affecting the competitiveness in the digitalization of the economy; synthesis method, which allowed to obtain reasonable conclusions; and inductive method, which was used to identify specific cases in the studied trends of the impact of the digital economy on the competitiveness of organizations. The result of the study is a list of recommendations on the use of opportunities provided by the digital economy to improve the competitiveness of telecommunications organizations. The practical significance of the study is that the proposed recommendations can be applied to create a positive trend in the development of telecommunication companies in the context of digitalization.

Keywords: digital economy, competitiveness, telecommunication organizations.

JEL Classification: O11, M15, L96

1. Introduction

The telecommunications industry includes a set of different types of communication and methods of information transmission, as well as the actual processes of transmission, receipt and processing of information using electronic, electromagnetic, network, computer and information technologies (Lopez-Nicolas & Merono-Cerdan, 2011). At the heart of the

activities carried out in this industry is telecommunications, which is both the telecommunication itself and its provision services. Consequently, the telecommunications market is the market in which communication services are provided. The implementation of these services is carried out by telecommunications companies that have a specific activity. This specificity is primarily associated with close interaction with digital technologies, which currently have a strong impact on the economy as a whole. Therefore, increasing the competitiveness of organizations in this industry can be directly related to the use of opportunities provided by the so-called digital economy. This trend is global, spreading to European, North American, Asian and Russian telecommunications companies (Gomes et al., 2012).

The digital economy is an economy based on new methods of generating, processing, storing, transferring data, as well as digital computer technologies (Ivanova & Machavariani, 2015), (Tremblay, 2015).

Therefore, based on the definition, the increasing influence of the digital economy in society creates additional opportunities for companies in the telecommunications industry to improve competitiveness.

2. Methods

The methodological basis of this study was such General scientific and specific methods as: comparative analysis of sources; analytical method to identify trends in the development of telecommunications companies; synthesis method, which allowed to obtain reasonable conclusions; and the inductive method (Karaboga, 2017), (Amato et al., 2018).

3. Results and Discussion

In order to identify the areas of increasing competitiveness characteristic of telecommunications companies in the digital economy, it is necessary to consider the activities of major representatives of the industry in the world market.

Quite well-known British telecommunications company BT Group, which provides consumers with fixed telephone network and mobile communication services, as well as broadband access to the world wide web, as well as a variety of additional services for individuals and businesses, including voice mail, teleconferencing and web conferences, pays great attention to the development and updating of its competitive strategy (Malakhovskaya & Minabutdinov, 2014), (Kos-Labedowicz, 2016). Since BT Group pays special attention to the development of innovative ways of communication, their competitive strategy, including focused on funding research and development. BT group engineers conduct their developments in the field of new generation communication standards. We are talking about the fifth generation of mobile communication technologies, simply put-5G (Demidenko et al., 2018). And in order to Finance these developments, a competent strategy of focusing or removing cream is used. The company regularly delivers new solutions in the field of mobile communication technologies and IT services to the market, which holds a significant market share and provides a significant share of highly profitable products in the range. The main task of the company is to constantly increase the speed of data transmission through high-speed mobile access, which attracts a lot of consumers.

One of the world's most famous telecommunications companies is the Chinese company Tencent. An important characteristic feature of this company is the possession of quite popular

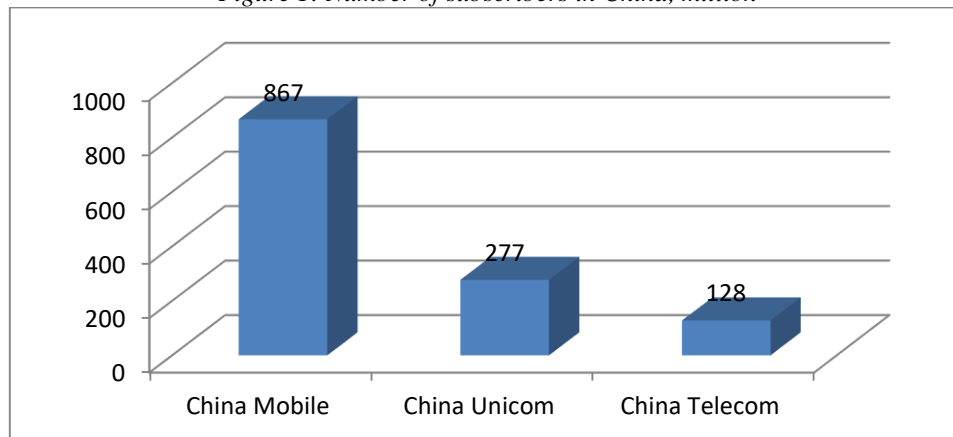
in China text messaging service-QQ, qzone sites (social network), PaiPai.com (custom auction site) and applications WeChat (voice chat) and TenPay (payment system). In addition, Tencent has a number of other well-known web projects, which makes the company's customer base the largest in the world – more than 2 billion active users (Vertakova, 2016).

All these aspects are closely related to the financial strategy of the company, which actively uses its financial resources for the development of the company and the financing of Internet marketing. At the same time, the organization's activities are not limited to Internet business, the group of companies Tencent Holdings Limited includes a number of subsidiaries operating in the fields of media, entertainment, broadband Internet access, telephony and advertising services. That, in turn, requires a differentiated approach to the financial strategy, which performs, including a unifying function. In April 2015, the market value of Tencent exceeded \$ 200 billion. that is quite a high cost of business and indicates the success of their financial strategy. At the same time, the company has 29,692 employees, who create an average annual turnover of about \$ 75-80 billion. (Vertakova, 2016). That shows quite high efficiency of financial decisions of the company's management.

The Lian Xiang company-rather large enterprise providing services of mobile communication, IP-telephony, within the last six years (year of the basis - 2008) (Sokolov & Chulok, 2012). The average annual number of subscribers, by the standards of China, is small, but is more than 140 million people (Sadriev, 2016). Functional strategies detail and translate the corporate strategy of Lian Xiang. When choosing a financial strategy, the company had alternatives: the strategy of "accelerated growth "(formation of financial resources); the strategy of "increasing efficiency" (optimal management of financial resources and cash flows); the strategy of providing financial security (Gohberg & Kuznetsova, 2011). In 2012, the Board of Directors of Lian Xiang approved an accelerated growth strategy, which has been implemented without change since then. However, the external business environment has changed: the growth rate of the industry as a whole has decreased, the number of subscribers began to decline from year to year, as the degree of competition has increased. Under these conditions, the strategy of accelerated growth has become dangerous for the business as a whole, so recently the company's success began to decline.

The current situation in the global telecommunications market is characterized by the mutual penetration of various large companies into the markets of other countries. So the company is "China mobile international (rush)" was released on the Russian market at the end of 2017 (Sadriev et al., 2016). Previously, such major competitors of China Mobile as China Unicom and China Telecom entered the Russian market. They registered Russian divisions of the company in 2017 and 2012 respectively (figure 1) (Kemp, 2018), (Ilyes & Szekeres, 2017).

Figure 1: Number of subscribers in China, million



Source: obtained by authors

All this has a direct impact on their competitiveness, for which it is necessary to take into account the specifics of the Russian telecommunications market. The innovative strategy of China Mobile currently includes large investments that will be used to purchase telecommunications equipment and obtain licenses for telecommunications services, which will allow working with Russian companies (Shehzad et al., 2014).

An important point is that the partner of China Mobile in Russia was the company "MegaFon", which provided the Chinese company with a trunk route with a capacity of 100 Gbit/s for data transmission between Europe and Asia. In the autumn of 2017, a similar project for China Telecom was completed by TransTeleCom (TTK), launching a channel with a capacity of 100 Gbit/s, connecting Europe and China (Plotnikov, 2016). All this requires considerable financial resources and careful financial planning. Like its competitors, China Mobile enters the Russian market to work here with Chinese corporate clients. Competition among Chinese Telecom companies in Russia is increasing, and their expansion is supported by the state within the framework of the "one belt – one road" program (Muhammad, 2016), (Babanova et al., 2018). Against the backdrop of these global changes, the financial strategies of the leaders of the Russian telecommunications market Rostelecom, MegaFon and Orange Business Services are undergoing transformation.

Thus, many world leaders in the telecommunications industry achieve success through the active use of innovative digital technologies. The companies manage to achieve revenue figures in accordance with the forecast, to maintain the profitability of OIBDA at a high level and, despite the high volatility of various currencies, to achieve net profit growth (Sokolov & Chulok, 2012). At the same time, it is necessary to constantly take into account the increasing competition in the telecommunications market. This entails the need to carefully monitor the financial situation and ensure a competitive offer for products and tariffs, as well as for the product and price range of communication tools available to customers in the sales network. Thus, successful financial initiatives, within the framework of an effective financial strategy, allow the considered companies to maintain a leading position in the mobile market and a steady cash flow, while providing affordable services and high quality services to existing and potential customers.

4. Conclusion

Analysis of global trends in the development of telecommunications companies, taking into account the digital economy, shows that the level of coverage of national economies is not the same and there are certain imbalances in almost all the parameters characteristic of the digital economy. This applies both to the use of Internet resources in business and households, and the relationship between business and government (Billon et al., 2018).

Thus, we have formed a generalized list of trends characterizing the level of development of the digital economy in the global world:

1. high growth rate of Internet resources use in business and expansion of their functional purpose for the economy as a whole;
2. the emergence and expansion of the range of virtual enterprises;
3. transition of a significant part of the interaction between business and government agencies in the electronic environment through development;
4. adaptation of enterprise management systems to the requirements of the digital economy.

All the above trends show the need to change the existing technologies of management of telecommunications companies to improve their competitiveness in the digital economy. In particular, it is necessary that the management of modern telecommunications organizations should take into account new management technologies that take into account the specifics of the digital economy.

Within the framework of the program for development and cooperation in the digital economy, a list of new digital technologies that are characteristic of the digital economy was determined (Mau, 2015), (Sutherland & Jarrahi, 2018). These digital technologies are used to collect, store, analyze and share information digitally and transform social interactions. The main positive trend created by the introduction and operation of these technologies is that neither allow modern economic activities to be more flexible, more mobile and more efficient.

The rapid growth of the digital economy, in turn, leads to the accelerated introduction of innovations and their wide application in other sectors of the economy, both individual countries and at the global level. Today, the digital economy is the most important factor of global economic growth and plays a significant role in accelerating economic development, increasing efficiency and productivity in the telecommunications industry, the emergence and formation of new markets for it, as well as in ensuring the comprehensive, sustainable development of the leading companies in the industry (Hackl, 2018).

Let us formulate the main trends of influence of the development of the digital economy for the management systems of telecommunication companies to the relevant use of the virtual business environment.

First, high competence of managers of telecommunication companies in the field of information and communication technologies is necessary. This makes it possible to adequately assess their information needs and, in turn, allows to optimize the management decision-making process. At the same time, the level of knowledge of management personnel in the field of information and communication technologies should be constantly updated.

Secondly, in the process management of telecommunication companies should be applied to modern management technologies, such as engineering, reengineering, benchmarking, etc. the

use of these technologies of management involves the use of information systems and information and communication technologies.

Third, the strategic management of modern telecommunications companies should take into account the strategy of development of information technologies used in management activities and, in particular, the strategy of their implementation and updating.

Thus, it can be concluded that in order to effectively manage telecommunications companies and improve their competitiveness in the global market, it is necessary to take into account both macro trends in the development of the digital economy and the internal information needs of management facilities, which, in turn, not least depend on the level of development of the information and communication business environment.

The analysis of global and Russian trends in the development of telecommunications companies in the digital economy has led to the following conclusions. The digital economy is to some extent a global challenge to the world community, which signals the need for a radical transformation of the economic model of society, the transition to a new technological structure and the restructuring of relations in the global telecommunications market. In addition, at the moment there is a certain technological gap in the development of different countries. In order to bridge the gap in the development of information and communication technologies, it is necessary, within the framework of the principle of inclusion, to ensure the security of critical infrastructure, which operates mainly through information and communication technologies. This, in turn, creates favourable conditions for accelerating the economic development of telecommunications companies.

All the described trends create prerequisites for the fact that it is necessary to control and develop the process of implementation of the digital economy, both at the level of individual telecommunications companies and at the level of the industry.

In addition, attention should be paid to improving the digital literacy of employees of telecommunications companies. A significant point in the implementation of the strategy that increases the competitiveness of telecommunications companies is to attract highly qualified specialists not only to work with innovative digital technologies, but also to improve the digital literacy of employees.

In addition, we noted that for the full and effective implementation of the strategy to improve the competitiveness of telecommunications companies, taking into account the possibilities of the digital economy, it is necessary to constantly monitor the change in the situation in this area. As you know, digital transformation is happening at a high speed and changing the economy as a whole at a high rate. These trends will continue in the future. Therefore, the management of telecommunications companies should develop and adapt to these changes.

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POSSIBILITIES OF SPIN-OFF COMPANIES AS A DRIVER OF INNOVATION IN REGIONS

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Abstract. The innovation potential is the basic assumptions for the development of the digital economy. That economy does not create a new market or new customer; its aim is to offer services in other ways or in a new form with the aim of satisfying as widely as possible the various demands of customers. The development of all dimensions of digitization, in particular of global Internet expansion, its penetration into most business, public or private activities, or modifying expansion, create the conditions for better fulfilment of their expectations. The obstacle in this process is the need to fast develop smart solutions or devices that will meet broad customer requirements. In this process, start-up and spin-off companies, supported by university centres, have a great potential as they directly support the transfer of the latest technology into practice. Summarizing the best practice solutions, we should eliminate barriers to successful spin-offs and start-ups as well as SMEs business doing in competitive practice. We also evaluate the views of 189 managers of Slovak SMEs and 26 managers of IT companies to support much wider use of innovation opportunities and IT potential in practice. Comparing these results with the results of similar researches in the EU, we tried to verify the mutual dependence of selected indicators using statistical methods and validation tools that are part of the SPSS program. Based on the synthesis of research outputs, we summarize the recommendations for managers how to realize the technology transfer into the practice as effectively as possible.

Keywords: globalization, spin-off, innovation, ICT, digital economy

JEL Classification: O00, O30, O32, O34

1. Introduction

People are closer to each other due to professional internet applications. It creates the possibilities that they want to carry out their activities not only in a classical way, but they are looking for opportunities to perform them in a virtual environment as well. The better conditions for sharing technology, the more effective the levels of sharing. The development of intelligent smart solutions, tools and devices can fulfil customer requirements more complexly. New solutions should be available from different environments using unified solutions for different applications. However, their development and application in practice will not succeed without the need, willingness and ability of small producers to offer, develop and exploit their potential in the processes of productions innovated services or products offered as a supplementary service upon request at the point of provision of the main service or consumption of the product. In these processes, start-up and spin-off companies, supported by university

centres, have a great potential as they directly support the transfer of the latest technology into practice. Therefore, nowadays more attention should be paid to research the conditions for setting up and supporting the business of doing spin-off companies in regions, where innovation potential is lower or completely absent (van den Broek et al., 2018). In this paper we will evaluate the conditions for development of the digital economy from the point of view of management IT transfer as a tool for sharing products or services in that ways of doing business.

2. Methods

In these processes, the question is: What is more important: what is the role of the internet and traditional business doing? What is the role of their relationship to innovations?; What the role of spin-off companies is in digital economy? We try to find answers to these questions. As the basis for conclusions, we provide an evaluation of the research results obtained by performing various economic analyses of indicators of digital economy, spin-off functioning, and also by the assessment of attitudes of small and medium enterprises to innovations and IT adaptation. These research activities were carried out in the framework of partial research activities of research institutes of the partner universities (University of Žilina, Institute of Management Systems in Poprad, Matej Bel University, Banská Bystrica) between 2015-2017. We also compared our research results with similar issue, provided in SMEs in EU. To assess the current situation in the attitude of SMEs towards innovation and implementation of new IT as a support of their business activities we will evaluate the opinions of 189 SME managers and 26 representatives of IT companies (data collection by electronic survey and by structured interviews). The data analysis and hypotheses validation will be performed using the statistical methods and validation tools of the SPSS program, as well as methods of deduction and synthesis.

3. Results and Discussion

As we have found out, on the market of products or services providing are major changes occurred. Especially young people prefer the dynamic availability of products and services provided in non-traditional ways, where they will discover something new, to gain new experiences, as an effort to give up traditional models to meet their own needs. They will also change your lifestyle, its value, where prefer to survive something new more than personal forms, which is associated with property ownership, product gathering, etc. They are able to share their own goods and services with each other, either for free or for financial or non-financial remuneration. This fact is confirmed by the results of recent studies (Vaughan & Daverio, 2016), where about two-thirds of respondents said they are heading towards a less materialistic lifestyle, and four fifths of respondents believe that rent has greater advantages than ownership. Nevertheless, there will exist a small part of customers, whose do not prefer sharing something in their own ownership.

3.1 Macroeconomic and microeconomic conditions

We can state that a digital economy does not create a new market, it mainly supports the use of non-traditional ways of products or services. People can switch from being only consumers of classically supplied goods or services to those who drive new services enriched with new experiences or events. For them, it is more acceptable to have access to products or services when they need it (which also brings the moving away from owner-right to user-rights (Zervas et al., 2017). In the key sectors of sharing economy such as finance, accommodation, transport,

small domestic services and professional services, an increase in the number of operations is expected (Eckhardt & Bardhi, 2015). As in (Bartkova et al., 2018) it is shown, new ways of experience gathering give them more realistic information, like marketing-oriented communication of product brand and its ownership. They will also feel better in their decision-making. Different conditions for doing business cause an unequal competitive environment (Veber et al., 2016), which requires regulatory treatments, conditions for sharing or easy disposal with non-traditional means of accessing goods in order to increase the benefits of that economy.

3.2 The basic conditions for digital economy platform development and the role technical intelligence as a driver of competition

The business environment evolves more dynamically, due to continuously expanding markets, globalization, or new technologies that creates the conditions for collective intelligence (Leimeister, 2012). Internet of Everything (IoE) transforms organizations and industries where new business-enabled models are formed (Stalmasekova et al., 2017). Analyzing and summarizing our primary research results (realized through interviews with intermediaries of goods) we found out that it is necessary to make changes in B2B platforms. The new solutions should support the new style of communication with the aim do not to restrict the applicant, and intermediaries will offer the basic as well as additive services. The new technological solutions and related legislative measures are needed. As in (Buño, Nadanyiova, & Hraskova, 2015) it is shown, the level of investment is often not relevant to the structure of industry expansion, where the situation in the Slovak business environment is the worst in comparison with other countries of V4, as in recent years only 0.83% of GDP has been invested in science and research. It is less than half of EU average expenditures. Comparing our research results (realized in 2015-2017 with Slovak SMEs and representatives of IT companies) with the views of managers of SMEs (representatives of 50 SMEs in Lower Silesia, in (Wasinski & Wozniak, 2016), only a small part of SMEs was interested in the new technologies. The lack of financial resources and infrastructure for the comprehensive implementation of the integrated IS was confirmed. Most of SMEs (93.7%) use basic software support for business doing, which creates the conditions for implementing electronic business models. Considering a mutual relationship between awareness of new technologies and innovations and about seeking information about innovation or technologies (using the Wilcoxon Signed Ranks non-parametric tests), we want to state; in SMEs they feel be better informed about technologies than about innovations ($\alpha = 0.127 > 0.05$). They will be also more interested in new information about them – it is their competitive advantage. Here the technical intelligence has its place, because it allows to identify and exploit opportunities arising from technical and scientific changes (Gajanova, 2015), as well as to identify and respond to threats of such changes, and therefore in this area it is necessary to maintain stability. A growing trend of time horizon of technical intelligence is expected (an increase from six to twelve months in the past, to five or more years, in the future (McGonagle & Vella, 2012). These applications can be also used as a service quality regulator, because they can perform back-up control of customer satisfaction. Analyses of negative experiences, record incidents, and so on, allows to identify the cause of dissatisfaction or repeated shortcomings. It allows to find out the "digital market value" as an equivalent to the traditional market value (Virkkunen, 2018).

3.3 Spin-off and the configuration of alliance portfolios as the way of technology and knowledge transfer

The potential of spin-offs lies in owning licensed technology and willingness to apply it to leverage available academic knowledge for commercialization (Rehak, 2009). It helps quickly transform an innovative potential into practice (Degroof & Roberts, 2004, Hamari et al., 2015). Although many universities are collaborating with the practice (Oxford University Innovation - OUI) (Corejova et al., 2017), there is still a problem that prevents commercialization and its transformation. We found out that in the economically less developed regions or those with lower innovation activities, spin-offs help to improve the flow of knowledge within the region. Hypothesis (H1): "The establishment of university spin - off companies is closely linked to the development of the economy and their development is strongly determined by the business environment in the economy", was not confirmed. It means, the crisis has not affected the number of founding spin-offs (e.g., at the University of Žilina) and its establishment is not associated with the economy development. Many spin-offs are oriented towards providing consulting services and help regulate intellectual property protection, where universities can be considered as a catalyst for the business sector (Hayter & Rooksby, 2016). As in (Novak & Zacik, 2016) states, science parks help setting up university and non-university spin-offs providing a basis for suggestions formulating, based on best practices solutions. Newly established spin-offs could help develop a second generation of technologically advanced spin-offs in the future. The fundamentally mentioned categorization can be extended with respect to the industry sector, or company size, etc. according to the area of formation of spin-offs, Hypothesis (H2): "Technically oriented courses have a higher chance to set up university spin -off companies" was confirmed. All technical departments have shown a higher percentage of established companies compared to Social Science courses. It confirms the role of ICT as a driver of economy. The results of the research in (Hagedoorn et al., 2018) indicate that „the partner type variety and partner type relevance, as different dimensions of partner diversity in alliance portfolios, both have an inverted U-shaped association with firm innovation performance”. It means „that broad scope of knowledge distribution allows companies to benefit more from partner type variety in their portfolios”. It is true that, in the case of cooperation of diversified partners in the process of product production, the two sides of the relationship can cover the broad needs of the client on a small scale. It is due to the variety of small, knowledge-intensive or varied business-oriented approaches, which is more optimal according to their more modular industry conditions.

4. Conclusion

Spin-offs gain an advantage over traditional companies as they benefit from providing their own equipment or service. This reduces costs for them and creates opportunities for providing some "on-demand" services. Their own interest is their technical support and online accessibility and also solve the problem of the latest developed technologies that often are not fully functional in their co-operability. In such cases, the creation of alliances with different subjects (with SMEs, spin-offs or start-ups) is more than expected because their different levels of industry modularity and scope of knowledge distribution can help improve their innovation performance. This issue we want to explore in our further research. Next, licensed technology addresses the knowledge transfer from university to the practice and is also a guarantee of their functionality. However, it is well known that companies are not willing to pay for such licenses. The license provides the contractual relationship between the university and the spin-off

company, which enables them to further develop and thus contribute to the maintenance and development of the local or regional innovation ecosystem.

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IMPACT OF GLOBALIZATION ON COMPETITION AND DIVERSITY OF BUSINESS AND TECHNOLOGY DEVELOPMENT

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Abstract. Globalization is increasingly penetrating the economies of countries and regions of the world. This process brings many benefits to the people of individual countries and to the world economy as a whole. These benefits include increased productivity, increased opportunities for self-realization, improved quality of life, increased cultural exchange and other positive effects. Indeed, unification and standardization processes provide the opportunity to produce many products based on standards that are acceptable to virtually all countries, thereby reducing production costs, leading to lower market prices, as well as greater understanding and mutual understanding of cultures and values of different peoples. However, many scholars and practitioners point to the negative consequences of globalization, which are devoted to the relevant research papers and articles. Consolidation of production companies through mergers and acquisitions leads to a narrowing of competitive space, both in individual countries and in the world as a whole. Reduced competition in any market has always been considered a negative factor, as it reduced incentives for companies to develop. At the same time, the proponents of globalization argue that larger companies have greater opportunities for development. The main task of civilization is to prevent such a course of development of globalization processes, which can lead not to increase, but to reduce the quality of life and the emergence of a situation where the voice of the consumer is completely insignificant for those who want to make money on it.

Keywords: globalization, competition, quality of life, development of companies, diversity of forms of development.

JEL Classification: F60, F61, F62

1. Introduction

The processes of development and modernization in the modern world have received a growing influence of globalization - not only economic, but political and cultural, since the early 1980s. The paradox of the process of globalization is that, developing, to a large extent, under the influence of factors to find more effective answers to the growing global challenges, it has itself become a huge challenge for humanity. This was due to the endogenous shortcomings of the neoliberal form of modern globalization, contradiction with the content of cardinal structural changes in the world system - economic, social, political, ideological. The last clearly demonstrates the current protracted global economic instability and especially deep

crisis, which brightly illuminate the phenomena of a significant expansion of the range of global problems and risks, point to the emergence of a number of new global challenges (Pisani, 2009).

The central, strategically important among the new global challenges is the need to implement a radical transformation of the modern global world system, by and large - its transit to a fundamentally different model that, according to superior expectations, is characterized by a post-industrial economy with a predominance of knowledge-based industries, a knowledge-based society, directed, environmentally safe and socially fair economy (Lianget al., 2015). Such cardinal changes are impossible without the context of analysis of deep changes in human consciousness, ideological orientations, systems of dominant identities and values, and ways of understanding the meaning of human existence. And this draws the researchers' attention to such changes and activates attempts to find common answers to key questions that arise in this context.

Global imbalances and asymmetries have not only become quick to acquire the nature of risks and lead to increased uncertainties: they have become factors in the onset of a structural crisis in various areas of socio-economic development, and subsequently of a system-wide crisis of the world order (Ershov & Salatova, 2017).

2. The consequences of globalization

Sources of globalization have not only advantages, but also disadvantages, the advantages of globalization can not be distributed evenly around the world. Some industrial sectors from international trade receive huge benefits, the influx of skilled labor from abroad, financing, and others, on the contrary, lose competitiveness, eventually become unnecessary. Forgotten industries need time and money to rebuild (rebuild), to build up under new conditions of life. Many do not, the owners lose money, and people work. Such changes severely affect the national economy of each individual country, introduce changes in economic structures and increase unemployment (Zeleny, 2012).

The negative effects of globalization processes include:

- instability of development of economies of many countries;
- widening the gap in socio-economic development between countries;
- stratification of society;
- increasing influence of transnational companies;
- increased migration;
- aggravation of global problems;
- the introduction of mass culture, the loss of the identity of countries.

If viewed on a global scale, this leads to deindustrialization of the economy: when the manufacturing industries brought a lot of profit, but then they lose their value and profits do not bring. At the same time, the flourishing sphere of services is gaining momentum. What makes the working population re-qualify to find a place in this global changing system (Danish et al., 2018).

The positive and negative aspects of the globalization of the economy. World experience has shown that from the point of view of the sustainability of the development of national economies and the global economy as a whole, globalization has both positive and negative features (Mueller et al., 2013).

The first of these is the following:

It promotes the expansion of the world market, which allows the participating countries of this process to increase production and marketing, reduce costs, increase profits and, consequently, increase the competitiveness of national economies. In this regard, globalization is certainly a progressive process.

- Globalization creates conditions for optimizing the location of productive forces on a global scale, improving the quality of goods in national markets, promoting knowledge in various areas of society, especially the achievements of science, technology, culture, education, etc.
- Globalization has led to an unprecedented saturation of the market for consumer goods and food. People of the older generation of our country did not know all this in the past.
- Globalization as a whole promotes the equalization of the levels of economic development of the countries of the world. This can be seen in the case of many economically backward countries, such as China, India, Brazil, Indonesia, Pakistan, etc.
- Globalization has also positive humanitarian aspects. It is about easing the communication of peoples, the free movement of people to other countries, the development of democracy and the formation of civil society.

However, to see in the globalization only positive aspects and not to notice its negative manifestations would be a great error. Academician of the Russian Academy of Sciences O.T. Bogomolov outlines the following negative manifestations of globalization:

1. Globalization has led to a sharp increase in competition between TNCs for the spheres of capital application and world domination. The leading positions in the globalizing economy were taken by the TNC of the United States, England, Germany, Italy, Canada, France, Japan (the so-called "Seven").

2. Globalization has contributed to limiting the sovereignty of many countries. Delegating some of the economic and financial powers to international economic organizations, for example, linking national currencies to the dollar weakens the positions of developing countries, increases their financial risks, which, in fact, was confirmed by the 2008 world crisis (Verbeke & Asmussen, 2016).

3. Globalization could not overcome the dangerous gap in the level of economic development of different countries. And it is now quite deep - 20% of the world's rich population consumes 86% of the world's GDP, and 20% of those living in poor countries - only 1%.

4. Globalization has created unregulated migration, which has led to an aggravation of the social and economic situation in several European countries and the United States.

5. Globalization has exacerbated the problem of excessive price fluctuations, exchange rates.

3. The impact of globalization on competition

Competition creates a large gap between qualified and unskilled employees. Salaries of the first significantly increases, while the latter receive a penny or even lose their source of income. This again generates unemployment, which shakes globalization (Bessonova & Gonchar, 2016).

Globalization has a significant impact on the ecosystem of the world. Conflicts over the use of natural resources will not be avoided. The world is already on the verge of great controversy, the cause of which is deforestation, pollution of the oceans and seas, irrational use of the

benefits of the Earth. All this can cause irreparable harm to mankind and all life on the planet as a whole (Bozhkova et al., 2018). Globalization generates conflicts and problems, it is impossible to single out the main disadvantages - they all have an equal negative effect. The main problem is the uneven distribution of benefits. Or in other words, someone from her wins, and someone gets a penny. The second problem is the potential instability (global or regional) due to the interconnection of economies (Broner & Ventura, 2016).

The ongoing globalization, the pros and cons of which are manifested as a result of this relationship, has repeatedly shown this negative side when a crisis in one country or region served as the beginning of the world's negative processes in other countries. The third problem concerns fears that control over the economies of some countries from the hands of the leadership of sovereign states to international organizations, corporations and stronger powers. There are even forecasts about the creation of a world government controlled by transnational corporations (McGowan, 2017).

Globalization increases the unevenness and volatility of national and world economic development. This is due to the division of national economic complexes into export-oriented production chains and to those links that are not able to function effectively in a global market. As a result, previously unified internal national markets are collapsing - they simply disintegrate, which leads to an increase in the proportion of the population employed in inefficient sectors of the economy (Rojicek, 2012). In turn, this generates an increase in the population with low incomes and a sharp property stratification for those who enjoy the material fruits of globalization and those who have not got anything. Until recently, the national state had mechanisms for redistributing benefits from exports to the population, then the emergence of new non-state actors in the world economy that are not under the control of the state (TNCs, Transnational banks and a group of non-governmental organizations) severely limits its redistributive and social opportunities. As a result, the benefits of globalization are concentrated in those economic entities who have managed to integrate into the global economy (Puga & Trefler, 2014). The unevenness of national and world economic development is one of the factors of increasing social tensions in the world, which increases investment and entrepreneurial risks and hinders the sustainable development of the world economy (Tokarova, 2015).

4. The influence of globalization on the diversity of forms of business and technology development

Globalization causes a massive spread of various: negative and positive externalities in the sphere of production and consumption. Thus, the aggravation of competition for access to the global economic market and the benefits of globalization lead to the fact that TNCs often use socially dangerous activities, such as polluting production or creating transgenic products that are harmful to health, to win this struggle. There is a problem of international labor migration at the present time. This seriously exacerbates the developing countries and feeds the developed countries (Turulja & Bajgoric, 2018).

The situation turns out to be somewhat different in the case when it comes to highly skilled workers. Most of them are highly educated young people who, without finding a decent level of payment for their work and career prospects, easily adapt and remain in the country of immigration for good. This kind of migration is usually called a "brain drain", which obviously reduces the country's scientific and cultural potential and increases the host's potential (Ghosh, 2017). The consequence of the implementation of measures initiated in the short term, in the

medium term, should be a serious restructuring of the Russian economy. Such transformations will require large expenditures, can lead to losses in the incomes of the population and a decrease in the standard of living (Gulzar et al., 2018).

It should be noted that recently economic aspects are gaining more and more weight in globalization. Therefore, some researchers, speaking of globalization, mean only its economic side. In principle, this is a one-sided view of a complex phenomenon. At the same time, an analysis of the development of global economic relations makes it possible to identify certain features of globalization as a whole. Globalization has affected the social sphere, although the intensity of these processes largely depends on the economic capabilities of the integrated components (Lee & Huang, 2017).

Social rights, previously available to the population of only developed countries, are gradually being adopted for their citizens and developing countries. In an increasing number of countries, civil societies, the middle class are emerging, and to some extent the social standards of the quality of life are unified (Kyvik, 2018).

The globalization of culture on the basis of the tremendous growth of cultural exchange between countries, the development of the mass culture industry, the leveling of tastes and public preferences (Feenstra & Weinstein, 2017) has become a very notable phenomenon in the last 100 years. As with any complex phenomenon, globalization has both positive and negative sides. Its consequences are associated with obvious successes: the integration of the world economy contributes to the intensification and growth of production, the mastery of technological achievements by backward countries, the improvement of the economic condition of developing countries, and so on. Political integration helps prevent military conflicts, ensure relative stability in the world, and do many other things in the interests of international security. Globalization in the social sphere stimulates huge shifts in people's minds, the spread of democratic principles of human rights and freedoms. The list of achievements of globalization covers various interests from a personal character to the world community (Morgan, 2009).

However, there is a large number of negative consequences. They manifested themselves in the form of the so-called global problems of mankind.

Global problems are understood to be universal, having in scope, strength and intensity a planetary scale of difficulties and contradictions in the relationship between nature and man, society, the state, the world community. These problems implicitly existed in part earlier, but mainly arose at the present stage as a result of the negative course of people's activities, natural processes and, to a large extent, as the consequences of globalization (Razminiene & Tvaronaviciene, 2017). In fact, global problems are not just the consequences of globalization, but the self-expression of this most complex phenomenon, not controlled in its basic aspects.

5. Conclusion

The foregoing allows one to arrive at an important conclusion: neither the unipolar model of the world nor the multipolar scheme of opposing poles provides an adequate idea of the real processes of the modern world, and therefore can not give necessary and sufficient ideas about the real processes and results of the activity under study, the formation of recommendations and decision-making in the sphere of foreign policy and security. The facts most clearly prove that we exist when creating the newest bipolar model with a complex composite structure of each of the poles. In one of them, countries are grouped, which confirm the need to be guided in domestic politics and views with each other by harmonized laws and norms that acquire

certain basic values and the civilizational diversity of the world. The opposite pole is depicted both by state and non-state international networks that profess constructive ideologies, refutes universally recognized norms, powers, moral and moral limitations and assigns the task of the world expansion of their ideologies. It is fair to say that the subject matter in question is an interdisciplinary, interdepartmental, international and weighted formation of exactly the rules and procedures, sanctions and incentives, holders and balances in all areas for diagnosing, assessing and solving the problems caused by globalization.

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IMPLEMENTATION OF INFORMATION SYSTEMS IN MANAGEMENT UNDER CONDITIONS OF GLOBALIZATION

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Abstract. Dynamic and turbulent changes create new challenges for the functioning of economies of different countries and behavior of enterprises. One of the most important signs of this is the progressive transformation of economic processes and globalization in all areas of contemporary life. The functioning of enterprises on a turbulent, hardly predictable and rapidly changing global market requires modern companies to be flexible and adaptable to such changes. In the era of global economy, making changes is often subject to risk and uncertainty. Minimizing risks involves access to fast and accurate information. It becomes necessary to create such information system that will meet the requirements set by managers. That's why it is necessary to have an appropriate information system that can fulfill the functions and tasks of the management system. Access to relevant information is essential for efficient and effective management of an enterprise. Information is the basic element of business management and the decision-making process. Information in the management process is related to planning, organizing and coordinating and allows for making decisions at various levels of management. The aim of the article is to present the role of the information and IT system in the enterprise's management. There are presented the most important features of the information system. Integrated IT systems and their impact on the functioning of the organization in the global economy are also presented in the paper.

Keywords: information system, IT system, globalization, new technologies,

JEL Classification: M10, M15, L20

1. Introduction

The Internet and the development of modern information technologies radically changed the way people function in the social and economic spheres. The enormous development of new forms of communication, such as mobile telephony, e-mails, transmission of different data, photos, films, without geographical limitation, radically reduced the time needed for the same activities as 20-30 years earlier. These changes also apply to business activities of enterprises. Today, talking to a contractor located on another continent is limited only to pulling the phone out of the pocket. With the help of a computer, tablet or phone, you can conduct video relations in real time (Broek & Veenstra, 2018), (Palvia et al., 2018), (Vaujany et al., 2018), (Talon-Ballesterio et al., 2018), (Khatri et al., 2018).

Nowadays, companies focus on the economy in a holistic way, not limited only to current activities. To meet the requirements of being competitive in the current global and constantly changing market, the companies expand their business activity to a virtual environment in the

digital space. The space in which enterprises operate is constantly growing. For this reason, all the time entrepreneurs need to learn new business solutions and implement new solutions to maintain the desired market position (Jelonek, 2004), (Townsend et al., 2018), (Ravichandran, 2018).

2. Business activity under the globalization

In a modern society, the idea of globalization can be a key factor of the development on the global markets. Such phenomenon can connect economies of different countries in order to produce a global product (Salgovicova & Klineckova, 2016). Many researchers deal with the definition of “globalization”. Definition of Peter Drucker (1986) is following: *„A fundamental change in the world economy, with changes cause structural shifts in international markets, product mix and commerce in the developed countries. The way how the production is made has been changed.“*

Nowadays, globalization has become one of the most important determinants in management of the most of contemporary companies. Inclusion of the enterprises into the globalization process requires entirely new approach and attitudes with respect to relations with other people in different countries, with particular focus on economic, political, technological, cultural and other conditions. Very important role as the components of globalization fulfill management systems and integrated management systems implemented by enterprises, often supported by IT systems. Modern enterprises and organizations implement continuously different types of IT systems.

Globalization was at the beginning determined by modern information and communication technologies (ICT) and the Internet. It allowed, for instance, global trading in real time and had an impact at transport price reduction of cargo, people and money. Such new forms of exchange of information simplified business activities (Vanek et al., 2016), (Venkatesh et al., 2018).

Rapid development of ICT technologies, allowed the liberalization of the world market and the opening of borders between countries. It can be observed that at the moment when the Internet network becomes so popular, we are faced with unprecedented acceleration. Both the pace of information transmission and also the amount of information available at any time of the day and in any latitude is impressive. Due to the expansion of the Internet, you can even name the world as a global library.

Internet technologies have caused the lives of many thousands of people today depend on their presence on the web. On the one hand, the Internet is a convenience for users, as it clearly decreases the time and costs of the company’s activity. In addition, there are many people for whom new technologies “create” new workplaces. On the other hand, others may also lose it because of digital development.

Nowadays, socio-economic development is a function of technological progress. ICT infrastructure is a necessary condition, but not enough to form a creative information society.

New information and communication technologies are still generating new opportunities, and the digitization and convergence of media cause easy access to an unlimited stream of information, ideas and views (Łuczak, 2017), (Kroh et al., 2018).

3. Information needs

Measurement of economic phenomena is an important task of the management system. Measuring is one of the most important methods leading to analyzing the essence and character of economic events. By measuring, you learn about the surrounding economic reality. Its analysis allows information recipients to understand the dependencies that occur between individual elements of the system. In recent years, we can observe more and more dynamic changes in the environment of business entities. These changes cause an increase in the demand by managers of business units for the most up-to-date and current information on the economic and financial situation. Managers need quick access to the right information that is necessary for the efficient and effective management of an enterprise. The basis for the functioning of the organization is to have appropriate information that allows the implementation of management processes. Information is a type of enterprise resource that allows increasing economic knowledge in the organization regarding the individual company and its environment. Information is a basic element of business management and decision making process. Information in the management process is related to planning, organizing and coordinating, and allows decision-making at various levels of management (Kisielnicki, 2013).

The information system is an essential element of business management in theory and business practice. In order to meet the required management goals, an enterprise must have an information system that will provide appropriate information to decision-makers in a timely manner (Mesjasz-Lech, 2015).

The information system must be organized in order to ensure that internal users, both managers and employees, have access to individual data and information about the situation within the business unit, as well as changes occurring in the company's environment. The data flow in the information system does not occur only within the unit, but covers its environment, taking into account the suppliers, recipients and intermediaries.

The information system is a multi-level structure that allows its users to transform specific entry information into desired exit information using appropriate models and procedures. Due to the role and importance of the information generated, increasingly high demands are placed on modern information systems. The complexity of organizational relationships and making many decisions in a shorter and shorter time cause that the proper functioning enterprise on the global, more and more demanding market depends on having the proper information system (Nowicki & Chomiak, 2011), (Ding, 2018).

3.1 IT systems in management

An enterprise functioning on global markets must gather a lot of useful information to preserve profitability and competitive advantage. This information, due to the source of their formation, is divided into external and internal. External ones are those that are obtained from the company's environment; internal ones are created inside the enterprise. Information can also be divided due to the method and function of use as:

- decision - that support decision making in the company;
- control - which are helpful in control and supervision;
- coordination - which are related to the cooperation of market participants;
- planning - which are used to forecast and predict various scenarios in the company.

There are following features of information system in management of the enterprise: (Gołemska et al., 2013):

- reliability, defined as the possibility of meeting requirements,
- performance, as the relationship between the value spent on the system and resulting from the system,
- flexibility, which provides the two above features in business environment, and which means the ability to adapt to changing environment and development opportunities,
- openness, enabling interconnection of enterprises' information systems, which ensures the exchange of data between them, and allows for interrelation in the decision-making process - this is essential for supply chain,
- economic efficiency, which takes into account the cost aspect in relation to the fulfillment by the system of the above conditions.

Such features can be only provided by IT systems. Their extension of decision support systems enhances the integration of many decision areas, resulting in different business activities.

Modern companies can't run their business without information technologies. It is a result of numerous advantages of the modern IT solutions. Most important arguments for using IT systems are cost and time optimization (Ciszewski & Nowakowski, 2016).

Nowadays IT systems are used in most enterprises. In these small ones, simple systems are more common, while in larger ones, where many economic processes occur and a large information base is transported, complex systems are most often used. They can more effectively support the running of the enterprise and the process of making decisions important for the company.

In practice, there is a tendency to create integrated systems. This concept is constantly and rapidly growing and developing. Gradually, all these basic management functions are covered by these systems in an enterprise: planning, organizing, motivating and controlling functions. The integrated system is built of various modules intended for data transformation processes supporting the functioning and operation of the unit. The integrated IT system supports all areas of the organization's activity: marketing, planning, procurement, technical preparation of production, distribution of finished products, sales of products, goods and services, running finance and accounting, HR management.

There are many integrated IT systems. An example of such a system is the MRP system. It was developed in the sixties. It supported the design of the production schedule. The operation of this system consisted in developing production tasks from top to bottom through individual stages, levels. On the basis of these schedules, production and purchasing orders were established. It involved the designed schedules with the production plans. At the beginning, the MRP's special task was to control material management, support planning and production scheduling, and the main objective of this system was to minimize the costs associated with storage, while maintaining a continuous production process.

The MRP system is considered not only as an IT management system, but also as a precise, accurate and comprehensive model of company's management.

The abbreviation MRP in the mid-sixties meant Material Requirements Planning. At the end of the eighties, this abbreviation changed its significance to the Manufacturing Resources Planning, and its was changed to MRP II.

The system of MRP II class supports management of inventory, finance and all company resources. The MRP II system does not differ from the MRP only in the title, but also that it

has been supplemented with additional functions, like CRP (Capacity Requirements Planning), as well as components related to sales processes and supporting the decision making process in the strategic area of production management. The MRP II system, apart from materials related to production, includes auxiliary materials, human and financial resources, fixed assets, time and others.

MRP II class systems should implement, among others following functions:

- Business Planning - in this area the company's business plan is set;
- Sales and Operation Planning - it creates a sales and production plan that is related to the company's business plan. These plans affect all other operational plans in the company.
- Demand Management - deals with forecasting and sales planning as well as accepting consumer orders. It determines the future demand and its update.
- Master Production Scheduling - it is about balancing the production capacity, the supply of materials.

Other functions also include: Material Requirements Planning (MRP), material management support, warehouse registration, order management, production, capacity planning, management of workstations, financial planning and control of MRP II system performance efficiency (Banaszak et al., 2016).

Sales and marketing areas are also supported by integrated IT systems. In the nineties, CRM (Customer Relationship Management) system was created. It allows defining a set of techniques and tools that will support the management of relations with consumers using information technology. Currently, this system does not only close to the sales area, but also supports the tasks of marketing department, such as settlement and organization of advertising campaigns, management of marketing events and carrying out strategic analyzes (SWOT, etc.).

Research and development is the most expensive and at the same time the most important area in the company's activity. In the second half of the nineties, the PLM (Product Lifecycle Management) system was introduced, which had to support this area of the enterprise. The PLM system manages the creation and development of the product through all its stages. It supports the creation of a new product concept, the creation of a project, its production, and exploitation and finally the utilization of the product. This system is designed to integrate all participants in the process of creating and developing a new product, i.e. constructors, suppliers, recipients, technologists, etc. The PLM system has an impact on reducing the time of product design creation and implementation on the market, reducing the risk of introducing new products into the markets and improving their quality (Banaszak et al., 2016).

MES systems are used in large enterprises with a mechanized and automated production line. These systems monitor the whole production process. They automatically collect data of this process, analyze the efficiency of the production system. The function of this system is also setting production schedules, assigning orders, controlling of production and analyzing the efficiency of the production process. The IT system supports the maintenance of production, so that the company is not exposed to unnecessary costs and losses.

Supply chain management is also supported by an integrated IT system. Without the suppliers, it is not possible to produce or even simply administrative activity of business unit. The supply chain includes: material suppliers, distributors, manufacturers, transport companies, service providers as well as warehouses and logistics centers. There are dependencies between all participants in the supply chain. The SCM system synchronizes the flow of materials

between selected participants in the delivery process. This synchronization makes it easier for the company to adapt to a given market demand, especially on global markets.

Each integrated IT system is exposed to changes in the close and distant surroundings of the enterprise. The IT system, in order to be effective and properly functioning, should be adapted to the internal and external conditions of the company. The DEM (Dynamic Enterprise Modeler) system, which uses business models for various industries, makes it possible to increase the flexibility of IT systems. These models include, among others: the model of main processes, organizational processes and business functions (Nowicki & Chomiak, 2011).

In every company, many documents are created, delivered and sent. DMS systems (Document Management System) are helpful in managing these documents and maintaining order in their storage. They deal with indexing documents, storing them, in such a way as to be easily accessible to them. DMS systems integrate and cooperate with other IT systems used in the enterprise.

The creation of the ERP (Enterprise Resource Planning) system is the next stage in the development of all production control and planning systems. The ERP system is defined as a group of interconnected solutions (IT methods) supporting the activity of the whole enterprise. Such systems can also be implemented in non-profit organizations and public bodies. Starting from the original form of the company management support system - IC (Inventory Control) - by moving to MRP systems, later MRP II, developed; comprehensive ERP systems were created, which were increasingly combined with the SCM and CRM system (created in about 2000).

ERP systems achieve their goals through analysis, recording, control and improvement of their functioning. In addition to bookkeeping, they started to deal with management accounting, which is part of controlling. The functions, that ERP performs, help in achieving a company's competitive advantage in the market. The entire system is available to users in selected or in all departments of the company. The scope of the system's functionality depends on the decisions made by the managers. Instead of standard systems, a company can purchase a system adapted to the profile, branch of industry of a given company, that meets all its information needs.

Systems of this class are the most developed management support systems that combine the features of transactional systems, management information systems and advisory systems (Drury, 2012).

The most advanced are the ERP II systems, that are, the development of ERP systems with value-added applications for customers and stakeholders through the optimization and sharing of financial and operational processes.

Developing ERP II systems is a natural response to dynamically changing market needs and rapid technological progress. The ERP II system is characterized by enhanced functionality in core domain areas, providing enterprise employees with access to the system base via the Internet, and integrating ERP systems with market partners, both suppliers and recipients.

Integrated IT systems of ERP class more often support large enterprises running their business on global markets, as they have more departments in which a huge amount of data is processed.

4. Conclusion

The use of IT systems in enterprise management enables fast data exchange between individual areas of the company as well as between enterprises being business partners. However, often the use of the basic ERP IT system as the only IT tool that supervises all processes occurring in the enterprise is often insufficient. It is caused by the complexity of management processes and the specificity of a given enterprise. The need for support the processes implemented in the enterprise with additional IT tools and the increase of process specialization causes that the need for dedicated systems supporting ERP systems is still growing.

Global enterprises have often a problem in integration IT systems inside the organization or in their supply chains. This may result from the use of various types and formats of information, various data drives, as well as from the use of various IT systems by users. When each participant of the supply chain realizes the benefits it can have from it, then he/she often leads to full integration of the supply chain. This is not an easy process, because such integration process forces the introduction of a number of organizational, structural and controlling changes, basis of data and documentation flows as well as changes in the functioning of the IT system used by the company.

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ECONOMIC ASPECTS OF CYBERCRIME IN THE GLOBAL DIMENSION

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Abstract. The aim of the paper is to interdisciplinary approach of economics, criminology, globalization to characterize current problems of crime with cybernetic subtext in the global dimension. This is a constantly discussed subject, both in professional circles and the public, as the professionalisation and internationalization of cyber criminals is a daily security threat to all the macroeconomic and microeconomic subjects of the world economy. Cyberspace is not restricted by the natural boundaries of states or continents, so the phenomenon of cybercrime in the current type of society has become a global problem. The starting point of the economic aspects of cyber crime is the analysis of the rational cyber criminal behavior model. It is decided on the basis of the expected costs and benefits of its activity, expressed in units of cash equivalent. The decision-making problem of cybercriminals is an optimization task with regard to its costs. Another discussed issue is the methods of combating cyber crime and a detailed analysis of the method of increased intensity of combat. It is based on reducing the number of cybercrime committed using the mechanism of increasing the cost of criminals. Criminals are forced out of the market for a commercial variant of the crime, and the rest will at least reduce their production. On the contrary, for a specific version of the community variant of crime, this method leads to increased crime. The last topic is the interaction of network effect software makers, consumers and software pirates.

Keywords: Cyber crime, globalization, fighting the cyber crime, software piracy,

JEL Classification: A14, B41, C15, E00, D24

1. Introduction

The history of cyber crime is not long, but its impact on the microeconomic dimension (by sectors of the economy - the most affected by the automotive, infrastructure, banking), macroeconomic and global are significant. The reality is that the statistics (McAfee's antivirus information) suggest that this type of 2017 attacks in the world's economy cost \$ 600 billion, with an average macroeconomic loss of 0.41% of gross domestic product in the European Union. This crime involved 800 million people, about one in ten inhabitants of the planet. In the Czech Republic, the loss is estimated to be between CZK 18 and 19 billion, which corresponds to the percentage of the European Union average. The most common cybercrimes concerned attacks on banks, personal identity theft, encryption of computers for which hackers had been ransomed, or fraud associated with bitcoins and other digital currencies whose emissions had accelerated considerably over the past three years.

Cyber crime has ceased to be the domain of lone hackers, so it is an integral part of the illegal global black economy. Cyber-attacks are most often seen as groups of organized crime. They sell their services to businesses and some national states on thousands of illegal online markets.

They are hiding on the so-called darknet, a part of the internet that allows its users to hide their own identity.

2. Methods

The existence of the economic system, including its microenvironment, both nationally and globally, has been accompanied by the risks of cybercrime since the 1980s. Its trend has accelerated since the beginning of the 21st century, confirming the statistics of cyber attacks and their impacts, quantified by absolute indicators such as the macroeconomic amount of damage or relative indicators as their share of gross domestic product.

For the above reasons, analytical and comparative methods prevail when processing applications. At the same time, the interdisciplinary approach of social sciences and humanities (especially economics, criminology, victimology, sociology, law ...) is being applied to the current development trend of cybercrime in the global economy in connection with the emerging era of Industry Technologies 4.0.

3. Research results

3.1 Criminological, economic, sociological, and cyber crime analysis in time

Criminology as a multidisciplinary social science deals with causes, contexts, conditions of crime and its impact. The subject of her interest is therefore to analyze the area and its surroundings for committing criminal activities. In the case of cyber crime investigations, this is a cyber space. This is a virtual computer world that can be precisely defined as an electronic medium that forms the global, global computer network that is the foundation of online communication. (*Šetek, 2015*) The primary primary feature of cyberspace is its openness to a broad circle of users in interactive and virtual environments. Another feature is anonymity that allows essentially any action without responsibility (*Ozdenoren, Yuan; 2017*). Cyberspace allows users to communicate, share and exchange information and ideas, play games, participate in social forum discussions, conduct business transactions, and more.

At the beginning, the literary work *Neuromancer*, considered to be the most prominent science fiction of the 20th century, was the American prose writer and personality of the cyberpunk movement William Gibson. In 1984, he used the definition of "cyberspace", which represented a suggestive vision of the technological reality of the coming era of the 21st century (*Fu, Wolpin; 2018*). W. Gibson attempted to interpret the context in which human beings develop cybernetic-based technologies. His vision was not optimistic, or just the opposite. This shows the main protagonist of a complicated plot taking place in several places on the planet, on its orbit and, above all, in cyberspace, is a hacker hired by a mysterious man to launch a dangerous virus in cyberspace (*Theodossiou; 2016*).

One of the first was to use the cyberspace term in relation to existing computer networks by the Internet activist and founder of the Electronic Frontier Foundation and author of John Perry Barlow's Cybercrime Independence Declaration. According to him, the concept of cyberspace is referred to as Barlowski, it can be characterized as a space of mediated communication. In the mid-1990s, the initiative of theoretical participation and the interdisciplinarity of social and humanities on the subject of digital and information technology has grown (*Merlo, De Paula; 2017*). Evidence is the socio-anthropological concepts of David Hakken. In connection with John Perry Barlow and his "post-Gibson" definition, cyberspace is characterized as a mediated

social arena, which encompasses all social actors who use advanced information technology to interact with each other. (*Šetek, 2015*)

In spite of many definitions of cyberspace, IT scientists, social scientists, lawyers, governments and international institutions can not agree on its unambiguous definition. A distinctive and characteristic feature of cyberspace is that no single central power controls all the networks that make up this domain, so it does not control cyberspace. Therefore, it is so very specific about the absence of geographical boundaries and the relativization of the distance between the sources of threats and the potential target. Because of its asymmetry, it enables state and non-state actors to harm the strategic and significant interests of all economic subjects without the use of conventional means. It can be said that the above mentioned characteristic is sufficient in terms of the economic and criminological aspects of these modern criminal methods in the global dimension. The number and sophistication of cyber-attacks against the public and private spheres is constantly increasing. These attacks may cause failures in particular for communications, energy and transport networks or transport processes, industrial or financial systems, resulting in material material damage. (*Šetek, Petrách, 2016*) This is fully in line with the theory of the risky society, which was formulated by the German sociologist Ulrich Beck in parallel with the introduction of the theory of cyberspace. According to him, the risks arise to a much greater extent than before, both in the person's personal life and in the macro, social, economic, environmental and military. (*Beck, 2011*) Risks therefore theoretically affect everyone, no one can be sure of leakage before them, from which it is possible to see from the criminological point of view the basic determinants of cybercrime.

3.2 Origin of cybercrime technologies

Cyber crime is a relatively young phenomenon in the history of criminal law, criminology, criminology, and globalism. Its existence is the result of the technological development of the second half of the twentieth century and the confirmation of the already mentioned W. Gibson forecast. The breakthrough moment of the origin of cyber crime is the 1970s in connection with the launch of the first 8-bit personal computers on the market. (*Šetek, Petrách, 2016*) This created two levels for the onset of cybercrime. The first was the use of personal computers in the field of scientific and technical calculations, the management of technological processes and text editors. The second plane was in completely economic factors, when personal computers became an available means for the majority population, which means lower incomes and below average wealth. This was the first turning point in the process of "digging" computers. Another, more important, breakthrough was related to the emergence of computer networks, especially the Internet, that is, the possibility of remote access to computers. From the point of view of criminology, criminology and criminal law, a relatively unique form appeared where the perpetrator and the victim - the victim (and possibly the prey) may be located in completely different places, even in the form of the whole globe. (*Šetek, Petrách; 2016*)

As a result, there were completely new types of internet fraud called phishing to obtain sensitive data (passwords, credit card numbers) and social engineering techniques used to fool users using vulnerabilities in current security technologies, pharming data from attack victims). The virtual world is becoming an increasingly important part of the real world. (*Krč, Al-Madhagi; 2008*)

3.3 Problems of jurisdiction - criminal procedural law and forensics

Cyber-attacks are of a different nature and their economic consequences are disproportionately higher than traditional offenses in the context of economic crime (theft, embezzlement ...). There are a number of problems when detecting and proving them. The fundamental problem lies in the jurisdiction, namely that criminal activity is detected and the offender presented with evidence of criminal offenses. (*Miller, Caplan, 2016*) In the context of classical criminality in any violent physical assault on a person, technical equipment, robbery, theft, it is possible from the point of view of forensic science and other related forensic sciences to clearly identify the basic determinants leading to the detection of a criminal offense, time. In the case of remote access situations and the use of virtual machines and other means of information technology, the server is a major problem. These can be found anywhere in the world, in any computing center of a multinational company. The user, when entering the address in the internet browser, but also into more sophisticated programs, has no knowledge of where the data is currently loaded in the world. He does not know where the crime was, and how to proceed. In this context, there are other forms of fatal civil law impact, such as liability for damage. There may also be situations where deeds occur when they find out what happened, they are evaluated as criminal offenses, but the potential notifier has reasons for confidentiality. This is a very common issue, for example, in the financial sector, because banks are not interested in lowering their credibility (reputation) by admitting that some crime has occurred.

3.4 Typology of cybercrime offenders in the economic context

A more detailed analysis of crime in cyber crime can be divided into four groups. The first group is the most extensive of all persons with access to a computer network or at least to a mobile phone and, from the point of view of human capital theory, possesses the appropriate degree of computer literacy sufficient to commit crimes in this sphere. From the point of view of victimology, these forms of crime serve to aggressive and deliberate harm to the user of these media. Just like traditional bullying, cyberbullying also includes repetitive behavior and disproportion between forces between the aggressor and the victim. The other criteria for identifying cyberbullying include the fact that the victim perceives what is going on as unpleasant and hurtful (*Coyne; 2018*).

From economic and victimological point of view, it is the amortization of human capital as a result of crime. The second large group is the employees of the companies, the financial sector of banking and insurance, the state, the self-government and so on. From the point of view of economic theory, this group of offenders has asymmetric information, and at the same time they usually have sufficient permissions and options to alter, alter, alienate, sell or use foreign data for extortion. In this connection, the theoretical concept of American sociologist Edwin Sutherland can point to the further development of white collar criminality, as the criminal nature of their criminal activity lies in the misuse of their social status or managerial position in the structure of the company, office and other institutions. (*Šetek, Petrách; 2016*) Edwin Sutherland included fraud, bribery, misappropriation of confidential information, and embezzlement. The third group is an organized crime component for all activities attributed to these criminal groups by computer (*Duernecker, Vega-Redondo; 2018*). A particularly serious problem in this context is the risk of controlling the state, especially its control, decision-making and control activities through cyberspace. The fourth group is the activities of extremist and terrorist groups that are able to attack the state very effectively through computer networks within asymmetric conflicts (*Hagedoorn, Lokshin; 2018*). In addition to criminal activities,

they are a serious threat to the activities of foreign states through cyberwar and espionage, combined with hybrid strategies and tactics (*Kumaraswamy, Garud; 2018*).

3.5 Economic analysis of cyber crime determinants

From the economic point of view, each activity carried out by an entity is linked to the cost of its execution and the benefits that flow from it. At the time of decision-making, there is a certain lack of reality that both of its components cost and benefit are only expected, not certain. Given the expected rationality of the subjects, objective objectively determined measures are used to express the uncertainty of the participants (*Caballero, Farhi; 2018*). This approach has a huge advantage in flexibility and usability. In general, every human negotiation and decision making that can be decomposed into basic input components can be analyzed in accordance with this methodological approach. Of course, weaknesses and disadvantages can also be found in this methodology. According to methodological subjectivism, this is certainly a complete loss of subjectivity of decision making. The assessment function can be applied to heterogeneity of subjects in the sense that no two subjects will evaluate one particular input equally but will still be an objective explicitly expressed mathematical formula describing the behavior of the subject. (*Wawrosz, Valenčík, 2014*) The second deficiency is the existence of an evaluation function, especially its construction. Every non-monetary input influencing individual decision-making must be measured by the cash equivalent, which is an obvious problem for completely non-monetary phenomena such as glory, imprisonment, fear, feeling of well-done work, and many others (*Merlo, De Paula; 2017*).

Finding an explicit mathematical formula for evaluating these examples is certainly extremely challenging, even from the point of view of methodological subjectivism, impossible. (*Bertozzi, Johnson; 2016*) This is in line with the theoretical concepts of the world's leading liberal economists, Ludwig Mises and Murray Newton Rothbard who, in accordance with the ideas of the Austrian School of Economics, assume subjective benefits as inseparable and even the very subject in the position of decision maker (*Newbert; 2018*). An example of this issue is the discussion by G. S. Becker in his work on the economic analysis of crime in respect of the monetary assessment of imprisonment. (*Becker, 1968*) In assessing the imprisonment, Becker proposes a discounted amount of potential income for the sentenced person during the sentence period plus a value corresponding to the loss of freedom and unrealized consumption (*Abraham, Laczo; 2018*). This proposal stems from the fact that imprisonment is a greater threat to persons with higher income and at the same time, in substance, the impossibility of objectively assessing this punishment. (*Moore, Recker; 2016*)

G. S. Becker adds that the way individuals value freedom and consumption is unique and no way of calculating. Business cyber crime is, unlike classical crime, with a considerably lower risk that lies in the likelihood of capture. This was characterized by the abovementioned specificities and specificities of cybercrime business. Therefore, according to G. S. Becker's concept of rationality and cost theory, sacrificed opportunities have no cybercriminals any serious obstacles to this business (*Becker, 1968*).

3.6 Economic behavior and targets of cybercriminals

Cybercriminals are looking for ways to combine maximizing their benefits with minimal cost. In this way, cyber crime can be understood and analyzed as any other productive activity where the decision maker moves in the area of costs and benefits (*Egorov, 2017*). Benefits from cyber crime business (these are benefits from the point of view of cyber criminals), can be divided into two large groups. (*Leeson, 2006*)

The first group is traditional money-based benefits, a typical example being the contract price for hacking, stolen money using revealed credit card numbers, pirated software payments, the cost of sending spam messages. The analysis of cash-based benefits corresponds to a standard market supply-demand clash. The cybercriminals must find a specific counterpart of the business willing to pay for the cyber crime. In this way, there is a supply-demand balance ("clean-up" market), which means matching the demand and supply side of the market (Dugast, Foucault; 2018).

The second group presents cyber crimes based on non-monetary forms of reward. A cyber crime is not paid for money in its money, its benefits are purely intangible. These are, in particular, psychological aspects of the status of acquired social status, such as fame in the hacker community, recognition by peers, greater respect and influence on the operation of a group of cyber criminals, or even simple media familiarity, which is typical of cyber crimes by extremist and terrorist groups. (Park, Bali, 2017) The formal capture of the motivation factors of a group of cyber criminals is somewhat more complicated. This is due to the relationship of cyber criminals and his rewards when there is no cash payment. In addition, the benefit of motivating cyber criminals is totally intangible (fame within the group) and it is not necessary to look for the other side of the contractual relationship in advance. The implementation of non-cash cybercrime does not depend on the criminal's agreement with the solicitor, but often only on his decision to achieve the benefit (glory in the group).

4. Conclusion

The cyber threats of the contemporary type of postmodern society are monitored and analyzed not only from an economic and sociological point of view, but also from a substantive, procedural, criminalistic and criminological point of view. They became a subject of priority interest to all the national police, military and intelligence forces concerned. Their political representation seeks to respond adequately to them in the legislative, executive and judicial power.

In the context of procedural criminal proceedings under national law, a number of problems are found in detecting and proving cybercrime. The fundamental problem - jurisdiction, lies in the fact that criminal activities are detected at all, the evidence convicted the perpetrators and clearly proved its criminal activity. Therefore, the only effective way to overcome the conflict of limited jurisdiction and unrestricted cyberspace is a common and coordinated approach within international institutions. They enter the role of world economic actors within its security and are a multinational actor in protecting the major economic interests of all concerned states. (Krč, Al-Madhagi; 2008) These include NATO, the European Union, the United Nations Security Council, the Organization for Economic Cooperation and Development, the Council of Europe, the G7 and the specialized international police bodies of Interpol and Europol.

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ACTIVITY OF THE VIRTUAL BRAND COMMUNITIES MEMBERS ON FANPAGES

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Abstract. Due to globalization, we observe the emergence and rapid development of the social media that have greatly influenced today's communication, both between individuals as well as between individuals and organizations, eliminating the geographic limitations. Virtual brand communities, groups gathered around certain brands and located in social media such as Facebook or Instagram, have become new, extremely important communication channels used for bilateral information exchange between brands and the consumers on the global level. Fanpages, where the virtual brand communities operate, allow brand representatives as well as community members to share content in form of text or graphic posts, comments, use of reaction buttons, etc. Such webpages are accessible regardless of users' location, therefore are useful for global brands, which can communicate with consumers from all around the world. The aim of this article is to present the activity of the consumers on the fanpages, including e.g. reactions to published content ("likes", etc.) or posting positive and negative comments. The author conducted an empirical quantitative research, by indirect data collection with the use of survey technique, carried out among 650 Polish Internet users, of which 277 were members of virtual brand communities. The results show that most consumers are willing to interact with the brand in form of utilizing the reaction buttons, however options demanding more involvement, like publishing comments, are used less frequently. The willingness to use any of the communication possibilities varies among different age groups of respondents.

Keywords: virtual brand communities, social media, fanpages, marketing communication

JEL Classification: M31

1. Introduction

The emergence and rapid development of the Internet have completely revolutionized the way people and organizations communicate. The transfer of information with the use of tools provided by the web is not restricted by any geographical limits, making the communication process easier and faster than ever before. These changes have also influenced marketing activities of brands, creating the need to adjust the methods of reaching consumers via new media. One of the most important inventions of the Internet era are the social media, websites enabling various forms of users' interaction. Social media have provided the marketers with fresh possibilities regarding contact with consumers, the most significant of them being virtual brand communities. Brand communities can be defined as consumer groups connected by common interest in a specific brand, which constitute for a place of members' information exchange with each other as well as with the brand's representatives and at the same time allow the participants to take part in the brand's value co-creation (Cova & Pace, 2006), e.g. by posting content, commenting or using the reaction buttons ("like", "wow", etc.).

The main aim of this article is to present the activity of the consumers on the fanpages, including e.g. reactions to published content (“likes”, etc.) or posting positive and negative comments and participation in competitions organized by the brand representatives. The popularity of various consumers’ actions was investigated. To achieve this goal, the author conducted an empirical quantitative research, by indirect data collection using the survey technique, which was carried out in the 3rd quarter of 2017 among 650 Polish Internet users, of which 277 were members of virtual brand communities.

2. Literature review

The evolution and growing popularity of the Internet have impacted almost every aspect of life. Lack of geographical boundaries and simplicity of online communication became antecedents of globalization progression. Due to features of new media, reaching consumers all over the world has never been easier and less costly. Commonness of social media and their multinational character enabled the deterritorialization of consumer groups, eradiating physical coexistence as a requirement for building the relationship (Kang et al., 2007).

One of the most important milestones of Internet history was the emergence of social media, which influenced social norms and nature of human relationships. Social media can be defined as “a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of User Generated Content” (Kaplan & Haenlein, 2010). Effortless communication possibilities provided by social media have also permanently changed users’ behavior in the aspect of obtaining and generating consumption-related information (Yang et al., 2016). Individuals’ status evolved from “passive consumers of content” into “active co-creators”, enabled to express and exchange their opinions and thoughts with other users (Carvalho & Fernandes, 2018; Gambetti et al., 2015). Another option ensured by such website is building subsites dedicated to the operation of smaller groups, connected by various factors, e.g. attending the same school, working at the same company, common interests, shared lifestyle and opinions. A specific kind of such group is a virtual brand community, which gathers owners, representatives and fans of a given brand.

Brand communities are a type of so called neo-tribe, a construct developed in the end of the 20th century by French sociologist M. Maffesoli (1996). On the basis of this phenomenon, a new marketing theory has been established – tribal marketing, associated with formation of consumers’ groups connected by affiliation with a certain brand. Marketers’ activities in this model include encouraging and accelerating the formation of consumption-based tribes, mainly by creation and propagation of certain symbolic features establishing brand’s linking value, an ability to bring the consumers together (Cova, 1997). An outcome of such strategy is the development of brand communities, collectives of current and potential clients of the brand, connected by shared views and passions, which affect their purchase decisions (Grębosz-Krawczyk & Siuda, 2017) through two-way communication with each other and the brand (Woisetschläger et al., 2008).

While the Internet has become major communication channel for individuals and organizations, the dialogue occurring inside brand communities has also moved to the new media, with Facebook as a major platform of their operation. Virtual brand communities are usually located on fanpages, subdivisions of the main webpage, enabling active dialogue and information exchange (Constantin & Belgiu, 2017; McCorkindale, 2010). Some of the means of such interactions are e.g. posts, comments as well as reaction buttons and sharing content. Various research confirmed that participation in virtual brand communities positively

influences brand loyalty and its antecedents (e.g. Carvalho & Fernandes, 2018; Hsieh & Wei, 2017; Liu & Lopez, 2016), as well as the willingness to take part in brand's value co-creation (Kamboj et al., 2018). The most loyal fans might also act in a manner similar to the marketers, recommending the brand and becoming its advocates in case of negative opinions (Kumar & Nayak, 2018).

3. Research methodology and results

The main aim of the research is to identify the popularity of the activities consumers can take part in on the community website in social media, among them using reaction buttons, posting comments and participating in competitions organized by the brand representatives.

The basis of this paper is an empirical quantitative research, conducted by indirect data collection with the use of survey technique, carried out among a representative group of 650 Polish Internet users in the 3rd quarter of 2017. Due to the nature of the analyzed problem, the number of answers taken into consideration is limited to those interviewees which had declared participation in at least one brand community in the social media (277 respondents).

3.1 Use of the reaction buttons

The first part of the research regarded replying to the content submitted by the brand representatives by means of using the reactin buttons. The results are presented in Tab.1.

Table 1: Percentage of virtual brand communities members which have used the reaction buttons on the fanpage at least once, according to the age group

Have you ever used any reaction button on a fanpage?							
	18-24	25-34	35-44	45-54	55-64	≥65	total
yes	79.73%	78.9%	91.67%	87.5%	92.31%	100%	83.39%
no	20.27%	21.1%	8.33%	12.5%	7.69%	0 %	16.61%

Source: own elaboration based on empirical research

A pronounced majority of the respondents (83%) declared using the reaction button on the fanpage at least once. While all the age groups show visible engagement in such form of interaction with the brand, the highest scores were obtained in case of the oldest social media users – all of the community members aged 65 or older have declared reacting to at least one marketers' post. Results exceeding 90% were observed also in the ranges of 35-44 years and 55-64 years. The least active group are the users aged 25-34, of which less than 79% utilized the reaction button, while the score the youngest group is only one percentage point higher. The differences between age groups were not statistically significant.

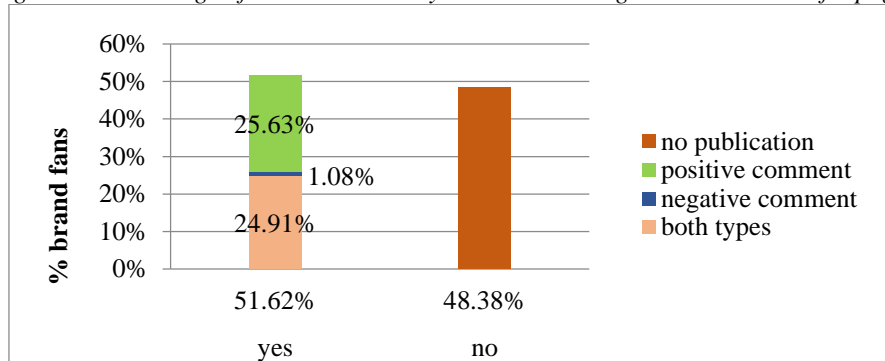
The results might seem surprising as young people are believed to be the most involved in the social media. Such unexpected scores can probably be explained by the fact that the percentage of virtual brand communities' members among the younger age ranges is significant (according to authors' previous research it is 3/4 in the range of 18-24 and over 62% in the range of 25-34) and for many of them the communities constitute only for a small part of their whole Internet activity. Frequently, young users join many communities, sometimes as a way of creating their image, without engaging in the brand-consumer interaction. At the same time, few older respondents enter such groups (16.5% in the 55-64 age range and only 12% in the range of 65 and older), yet those who become members are generally strongly connected to the brand. Moreover, they present better social media usage skills than their peers, therefore they tend to be active on the fanpage.

Taking difference between sexes into consideration, no conspicuous difference was observed – the number of men reacting to posts is 4.9 percentage points higher than in case of women.

3.2 Posting comments

The author have also investigated the members’ involvement in other form of community’s internal dialogue, namely posting comments under the content published by the brand representatives. The results are shown in Fig. 1.

Figure 1: Percentage of brand community members hosting comments on the fanpages



Source: own elaboration based on empirical research.

In the survey’s results it might be observed that slightly more than a half of respondents have posted at least one comment on a brand fanpage. 25.6% of interviewed brand fans published positive comments regarding the brand, 24.9% wrote positive as well as negative comments and 1.1% of the members submitted only negative opinions.

The least active in this aspect are the fans from the two youngest age groups. 41.9% of members aged 18-24 admitted to posting comments on a fanpage. Around half of them published only positive content while the rest published both kind of statements. In the range of 25-34 the percentage of commenting fans is equal to 43.1%, majority of them posting both positive and negative opinions. Other age groups show increased engagement in this kind of actions. The most prominent willingness towards publishing comments under marketers’ posts is observed in the group of community members aged 35-44, among which 71.1% voiced their thoughts on the fanpage (58.1% of them posted only positive opinions, 4.7% only negative and 37.2% submitted both types). Similar results were obtained in the age range of 45-54, where 68.8% of users published their comments (63.6% of which were only positive, the rest wrote both kinds of thoughts). In this case, relation between age and willingness to voice one’s opinion on fanpages is statistically significant.

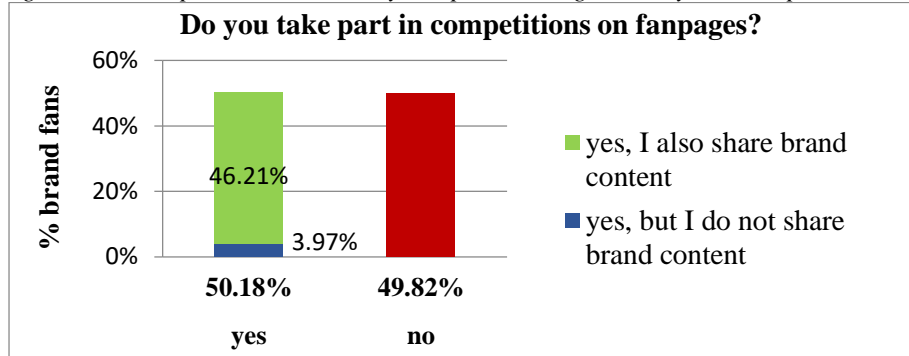
There is close to no disparity between the general scores for both sexes and it shows no statistical significance. 52.8% of female fans commented on fanpage content, while among male fans the result was 2.5 percentage points lower. Similar findings were also obtained in the analysis of comments’ nature. Only positive opinions were published by 50.7% of posting women and 48.5% of such men, only negative views – respectively 1.3% and 2.9%, while both kinds of reaction were used by 48% of women and 48.5% of men.

3.3 Participation in brand-related contests

One of the forms of marketers’ activity on the fanpages, employed to enhance members’ engagement in the community as well as gaining new members, is organizing various competition or lotteries. To take part in such event fans might be obliged to fulfill certain

requirements, e.g. reacting to the marketers' post, posting a comment containing an answer for a marketers' question, publishing a photo or video made by the member or sharing brand content with friends on social media. The next part of the research was aimed at investigating community members' inclination towards participating in the competitions organized by the brand. The results of this section of the survey are presented in Fig. 2.

Figure 2: Participation in community competitions organized by brand representatives



Source: own elaboration based on empirical research.

As can be seen on the chart above, half of the virtual brand communities admit to having taken part in a brand-organized competition on a fanpage. Almost all of them (46,2% of respondents) are willing to share brand-related content on their private profile if it is required to compete. These results indicate usefulness of such actions for the brand owners in engaging consumers in fanpage activity and increasing community's visibility among non-members.

The tendency to take part in competitions and lotteries in social media differs slightly depending on the members age, however no visible trend can be noticed. In the two youngest age ranges the interest in this kind of entertainment is slightly reduced – participation was declared by 48.7% of users aged 18-24 (of which almost all are ready to share marketers' posts) and 45.9% of those aged 25-34 (of which 86% forward brand-related content to their social media friends). The two middle-aged groups present higher willingness to join contests on fanpages. About 2/3 of members aged 35-44 admit to competing in such events, which is the highest score among all age groups, and 95% of the contestants share posts related to the event. In case of age range of 45-54 this percentage equals to 56.3%, of which 77.8% forward brand-related content. The least active group are the fans aged 55-64 – only 30.7% of them have ever taken part in a fanpage competition (3/4 shared information about the event and the brand). Among the oldest fans the interest in contest increases and 60% of respondents declare engaging in at least one of such games. Despite highly positive attitude towards participation in contests, members from this group seem to be the most reluctant to share brand-related content required to compete (only 1/3 would do so). What is interesting, there is no statistically significant relation between age and participation in contest, while at the same time the difference of age groups in terms of readiness to share promotional messages is statistically significant.

Differences between answers of both sexes can also be observed, however here no relation of statistical significance was revealed. In general, women take part in fanpage competitions more frequently – it was declared by 54.9% of them in comparison with 45.2% in case of men. Nevertheless, men show greater willingness to publish marketers' posts regarding these events on their own profiles (96.7% of them admit to reposting in comparison with 88.5% of women). However, these proportions are not reflected in the separate results for each age range.

The author used the Pearson's chi-squared test in order to determine the dependence between the analyzed activities and demographic data (see Tab. 2).

Table 2: Values of chi-squared test for analyzed aspects and demographic data ($p > 0.05$) – statistically significant differences in bold.

Use of reaction buttons		
	chi2	p-value
age	7.055	0.13301012
sex	1.2195	0.269455
Posting comments on fanpages		
	chi2	p-value
age	18.142	0.00115768
sex	0.1659	0.68381
Participation in contests organized on fanpages		
	chi2	p-value
age	8.431	0.07700653
sex	2.6286	0.104957
Sharing brand-related content for competitions		
	chi2	p-value
age	13.324	0.00979653
sex	0.6652	0.414736

Source: own elaboration based on empirical research.

4. Discussion

The research conducted by the author has identified virtual brand community members' willingness to perform certain actions on a fanpage. The study has taken into consideration differences between groups based on demographic factors, i.e. age and sex. The analyzed options of activities on communities' social media included the use of reaction buttons, posting comments under marketers' posts and participation in contests organized by brand representatives. It has to be noted that despite the fact that there are at least slight differences between the attitude of separate age groups and sexes towards these elements, Pearson's chi-squared test shown that they are statistically significant only in cases of relations between age and commenting as well as age and sharing marketers' posts for contests' purposes.

The results indicate that the most popular form of interaction among community members are reactions, e.g. "like", "love" or "angry" – over 83% of respondents admitted to having used this possibility at least once. It has to be noted that this way of presenting one's opinion demands the lowest engagement from all the analyzed options. The user might only briefly skim through published content and the act of pressing the button lasts less than a second. In many cases, the interaction with the brand does not develop further from this point. Still, eliciting fans' reactions bring certain benefits for the brand owners. Gaining many "likes" improves brand awareness (by visibility to friends of the community members) and positively influencing brand trust, making it appear as attractive and satisfactory for many consumers.

Another manner of communicating within the community, namely posting comments, was proven to be much less popular than use of reaction buttons, supposedly due to higher level of engagement this activity requires. Opinions in this form were submitted by slightly over a half of interviewed consumers. Similarly as in the previous case, comments may aid the marketers in reaching their goals concerning interest in offered products as well as brand loyalty. Opinions from the real users are considered more trustworthy than promotional messages, hence they might influence purchase decisions more successfully than advertisements. However, comments can also pose a threat for the company, as negative opinions have stronger impact on the consumers than the positive ones.

The last explored aspect was the participation in contests and lotteries organized on fanpages by brands' representatives. Half of the interviewees admitted that they had take part in such competition at least one. What is important, almost all of them declared their willingness to share brand-related content if required to enter the contest. The information reposted by fans appear on the newsfeeds of fans' friends. In this way, such events not only increase engagement in the community but also are a great mean of increasing brand's visibility and attracting other Internet users and convincing them to visit the brand's fanpage.

5. Conclusion

The emergence of social media and fanpages gave the marketers a powerful tool for promoting the brand and building stable relationships with the consumers. However, even with greatest effort of the brand representatives, in order to create a meaningful dialogue between both parties the activity of brand communities members is indispensable. Therefore the need arises to engage the consumers in the community operation. Some kinds of possible interaction are the reaction buttons, comments or participation in brand-related competitions.

The results of the study implied that reaction buttons are the most commonly utilized tool on fanpages. Author's findings also showed that posting comments and entering website contest along with sharing brand's promotional messages attract similar percentage of fans. It has to be underlined that each of this actions is visible to fans' friends (from their contact list) as mentions of such occurrences appear on friends' newsfeeds. In this way brand's message is spread in non-linear way among the social media users (Matsubara et al., 2017), thus brand awareness may be built outside of the community.

On the managerial level, the conducted study highlights the importance of efficiently executed marketing strategy in the social media. Brand representatives should concentrate their efforts on engaging fans in activities on the community website in order to make the brand well visible in virtual world. Convincing community members to „like“ content, post comments and share information in order to participate in contests strengthens their relationship with the brand and increases brand awareness among their friends. From this point of view, the most beneficial might be focusing on organizing attractive competitions and lotteries, as almost all their participants are willing to forward marketing messages in return for possibility of winning the prize. Moreover, marketers should direct their attention towards younger users, which seem to be less engaged in fanpage activities, as young people generally tend to have broader contact lists, hence providing larger audience for brand-related content.

The conclusions of the research are presented with the caveat as to the limitations of the sample – only Polish brand community members have filled the survey. To gain a more comprehensive view on this issue, the study could be repeated in other countries. What is more, existing results might be supplemented by the study regarding consumers' activity on fanpages of brands operating in different sectors. Another aspect to be determined is connection between active participation in community's life and loyalty towards the brand it is gathered around.

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MODERN ASPECTS OF INTERNET MARKETING DEVELOPMENT IN EDUCATIONAL INSTITUTIONS IN THE CONTEXT OF GLOBALIZATION

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Abstract. The gist of this article boils down to the justification of necessity to use modern online technologies and to develop an Internet education plan for promoting educational services. Nowadays in the context of globalization, Internet marketers do not have a clear understanding of developing an integrated approach to assess the functioning of a company website. The most effective channels of attraction and tools for promoting educational services have not been determined yet. The article analyzes the most effective tools for promoting educational services on the Internet, provides a plan containing main stages in planning marketing activities of educational institutions based on the use of Internet tools. Regarding methodology and scientific approaches, the research work is mainly based on the SOSTAC model. It consists of several stages: situation analysis, objective, strategy, tactics, action plan, control and correction. The article comments on the provisions made to improve the work of educational computer centers in the online system, among which the authors note not only the appearance and usability of the site, but also the interactive and marketing components. The article has a practical focus on the findings and recommendations that can be used to manage the marketing activities of educational institutions, both higher education and additional one. The practical application of the developed plan for promotion on the Internet contributes to attracting the largest number of consumers, developing loyalty to the target audience and increasing competitiveness of the organization in educational services market, which are especially relevant in the context of globalization.

Keywords: Internet marketing, educational services, promotion tools, plan.

JEL Classification: M31

1. Introduction

The market of educational services has long gone beyond national borders, and any institution now operates in a highly competitive international environment.

Russia's accession to the Bologna process provides a new impetus to the modernization of vocational education, opens up additional opportunities for the participation of Russian universities in the global educational system.

In the context of globalization and increasing competition in the market of educational services, higher and additional education institutions should pay great attention to the search for effective methods of promotion on the Internet in order to attract the target audience and improve their efficiency. The development of marketing activities of educational institutions with the use of modern online marketing tools is becoming increasingly important.

The importance of Email marketing is difficult to overestimate – this tool forms loyalty, trust, interest in the company and its products. The development and use of Internet technologies in practice allow the organization to achieve marketing goals and objectives, promote the offered services to the relevant markets by meeting the needs of the subjects of the educational services market. Correctly chosen strategy and tactics of promotion of services on the Internet allows the company to reach a leading position, promotes awareness in General and the formation of interest in the Internet audience. The advantages of the Bologna process, thus, are: increased access to higher education, the subsequent increase in the attractiveness and quality of European higher education, increased mobility of teachers and students, as well as ensuring the successful employment of University graduates through the fact that all academic degrees and other qualifications should focus on the labor market.

Globalization of the educational market is devoted to many scientific articles and monographs, there have been enough attempts to analyze the system of promotion of educational organizations. Currently, some results of theoretical research on the development of marketing activities of educational organizations have been accumulated (Key & Czaplewski, 2017), (Kannan & Hongshuang, 2017), (Sammy & Robinson, 2017), (Mack et al., 2017), (Dong et al., 2017), (Pinho et al., 2018), (İşeri et al., 2017), (Urbano et al., 2017), (Brennan et al., 2018), (Raynard, 2017), (Laczniak & Murphy, 2018), (Shaltoni, 2016), (Castellacci & Tveito, 2018), (Chang & Zhang, 2016), (Cross & Gilly, 2017), (Grossmann et al., 2018), (Pisani et al., 2017).

However, insufficient attention has been paid to the research of educational institutions in this area through the use of Internet technologies. At the present stage the specialists in the field of Internet marketing there is no clear understanding in developing a comprehensive approach to the evaluation of the functioning of the company website, not the most effective acquisition channels and tools of promotion of educational services on the basis of their specific characteristics and objectives of the company in the Internet. Features of the market of educational services are determined by the presence of state regulation of this sphere, a significant share of the public sector, the great influence of the state on the activities of non-governmental educational institutions.

2. Body of paper

The concept of export of educational services of the Russian Federation for the period 2011 - 2020 assumes an innovative type of development, increasing its comparative advantages in the field of education. Since education is one of the most important competitive advantages of Russia. «Not the highest share of our country in the international market of educational services is a missed economic benefit, and not used political opportunities to increase its influence on the world market» [Available: <http://vi.russia.edu.ru>]. The activity of the subjects of the education market is not only commercial, but also has a high social purpose – the preservation and development of the intellectual potential of the nation. Educational services have a socially significant character and social value. All these factors require educational institutions to have

a high level of corporate social responsibility. This specificity of the market of educational services determines the choice of channels and communication technologies of promotion.

Promotion of educational services through the educational portal can include a huge Arsenal of tools, including search engine optimization, contextual advertising, banner advertising, e-mail marketing, affiliate, or affiliate marketing. However, as the main and perhaps the most important tool is the official website of the institution.

The effectiveness of the promotion of educational services through the website is achieved not only by the attendance of all categories of the audience, but also by the attendance of the target audience, if the share of target visitors is small, the effectiveness of the educational institution will be very low. The site should be such as to provide the most optimal array of information to a wide range of customers. It is important for students to have a constant opportunity to quickly find out: class schedule, changes in the schedule of classes, as well as any information that will help them to Orient in the educational and extracurricular activities of the University.

The main advantage of Internet marketing in the educational sphere is the availability and unlimitedness of the consumer to information about educational services. In the promotion of educational services, Internet marketing can include such elements of the system as: display advertising, contextual advertising, search marketing, direct marketing, mobile marketing, social marketing, time marketing, confidential marketing.

Also, in order to effectively promote educational services, search engine marketing in general and SEO (search engine optimization, search optimization) in particular, SMO (social media optimization, promotion of a site in social media networks) and SMM (social media marketing, marketing in social media networks).

The main goal of this study is to develop a plan for promoting the organization's educational services on the Internet.

Research of the strategy of Internet promotion was carried out on the basis of the educational computer center «Arena Center». «Arena Centre» is a training center operating on the basis of the Ural State Economic University (USUE). The center started its work in 2007 and has been successfully implementing its activities for 8 years, which consists in providing educational and consulting services, training the professions in accordance with trends in IT technologies, design and animation.

When choosing the types of marketing communications and promotion tools, the goals of the promotion and the target audience are taken into account. In Table 1 the authors give the main groups of the target audience and the corresponding promotion tools.

Table 1: the Main instruments of promotion of educational services to reach target groups

Task force	Promotion tool
Graduates of schools, technical schools, lyceums	Contextual advertising, SEO, SMM
Students of the courses	Official website, E-mail, SMM
Organizations and enterprises	Contextual advertising, official site, thematic sites

Source: author's compilation

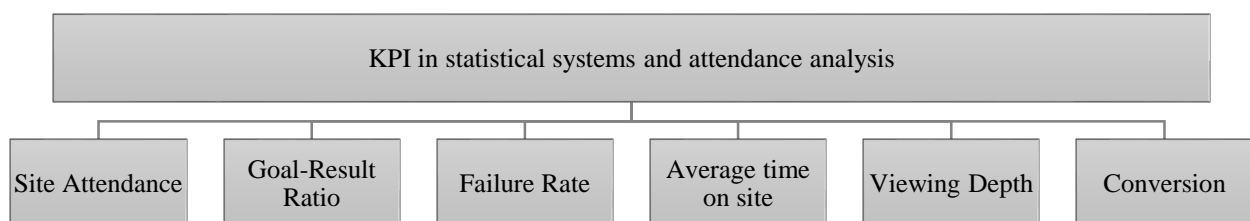
An analysis of the site's traffic showed that 47% of the site's audience «comes» from search engines, 24% from advertising, 17% from direct conversions, 11% from referrals and 1% from social networks. In order to identify the factors influencing the choice of the educational institution, to obtain data on sources of information about the educational institution, the results

of a written interview with the students at the Arena Center were recorded. The results showed that the quality of service provision (47%), the qualifications and experience of the teaching staff (19%) primarily influence the choice of the educational institution. According to the survey, it was revealed that the majority of new clients (90%) in Arena Center, rather than the permanent ones (10%), usually choose no more than 1-2 training directions. In general, the goal of education is to obtain new and modern knowledge for personal self-development (39%), to gain the knowledge and experience necessary for current work (28%), the possibility of additional earnings (31%). The majority of students learned about the activity of the educational institution through Internet sources (59% of respondents), 19% through the recommendations of acquaintances.

The survey also determined the degree of satisfaction of students with the convenience of using the site of the training centre, on the whole, the respondents noted a rather positive result. However, 12% of the respondents noted that they visited the site through mobile phones, and this made it difficult to obtain the necessary information on the site.

It is also important to correlate the purpose of visiting the site with the result of its implementation. In order to distribute the audience by segments depending on the purpose of the visit, it is possible, for example, to divide key phrases into commercial and information requests. Closely related to this is the failure rate, average time on the site, depth of viewing. A high percentage of refusals can mean not only the fact that visitors do not consider the site interesting. It is possible that they get all the necessary information on the page and close it. We consider the same situation to be with viewing depth.

Figure 1: KPI for site analytics



Source: (Evdokimov & Lebedinsky, 2013)

The overall efficiency of the site is tracked by conversion. In statistical systems, this indicator is automatically counted. It shows the ratio of attendance and fulfillment of goals for a certain period of time. The most accurate data can be obtained if the period is from 1 to 6 months, because in this case the deferred conversion will also be included in the final result.

The authors provide a comprehensive assessment of the site of the educational computer center. The results of the analysis of the site allowed us to formulate recommendations for improving its work on the Internet. Among the most important, the authors note the correction of technical parameters (page indexing optimization, download speed), the need to adapt the site for mobile devices.

As the main marketing communications of the educational institution with the subjects of the market of educational services on the Internet, the authors identify direct marketing, PR and advertising, which include a wide range of tools for promotion on the Internet. Based on this, the authors propose to use the following tools to promote educational services of the center «Arena Center»: the official website, e-mail, contextual advertising, and media advertising. The allocated tools allow increasing the level of competitiveness in the market of educational

services and providing communication with external and internal users. In accordance with this, the authors identified the most effective advertising platforms (presented in the media plan table 2), taking into account the analysis of consumers, their preferences and interests.

Table 2: media Plan for the promotion of educational services of the computer center in the Internet

Site/service	Placement format	Unit	Cost per unit according to the price list, RUB.	Cost for the period of placement (including VAT), RUB.	The cost of the RUB/year	Number of shows, PCs.
Service mass Email marketing Unisender.ru	Email newsletters	Email newsletters	once in 2 months package of 35000	0,39	13650	81900
E1.ru	News on the main page (on the cover)	News on the main page (on the cover)	1 time in half a year	38200	38200 rubles / 1 accommodation	76400
Gilmon.ru	Promotion	Promotion	2 times a year	12000	5000 rubles/1 accommodation	24000
Avito.ru	Banner on the main page, under the search cap	Banner on the main page, under the search cap	2 times a year	119,6	23290 for 200x1000 impressions/place ment	46580
vk.com	Teaser ads	Teaser ads	every 3 months	20	18 362 rubles.	73448
MAIL.ru	Banner on the main page	Banner on the main page	800 packages per year, daily	110,2	-	88160
Yandex.ru	Contextual advertising (search advertising and thematic ads)	Contextual advertising (search advertising and thematic ads)	On monthly basis	13,2	10000 RUB/month	120 000
E1.ru	The top padding, the section «News»	The top padding, the section «News»	1 time in half a year	31 200	31 200	62 400
Subtotal:	-	-	-	-	572888	1238563 0

As a result of the work, the effectiveness of the proposed activities was assessed. It was revealed that the most suitable sites in addition to those already used by the Arena Center training center are also Avito.ru, Mail.ru and the already used E1.ru site. These resources are

the most visited and are of the greatest interest to the target audience. Therefore, it was required to assess the volume of crossed audiences and to reveal the share of unique visitors for further economic argumentation of the proposed measures.

Having determined the efficiency of each site, it was possible to establish an approximate number of attracted customers, respectively, to calculate the conversion rate of each resource. The received data allowed drawing a conclusion about the planned increase in the flow of visitors to the site arenaekb.ru and the number of possible customers.

Thus, the availability of data by the possible number of customers and advertising costs allows you to determine the amount of cash flow to evaluate the payback period of investments. Evaluation of the payback period requires special attention, due to the heterogeneity of the types of advertising, the big difference in the terms of attraction, the optimal response time for potential customers, and the reason for granting deferred payment opportunity to the company's customers.

Accounting for the amount of deferred payments should be made on the basis of the debt turnover indicator, the average volume, which will establish the average payment term for the services of the clients of the center.

Based on the above data, for each of the proposed advertising sites, a monthly cash flow matrix was compiled within a certain period of 12 months. The calculations made allowed to establish the average expected payback period of investments, as well as the fact that investments in each of the proposed sites pay off within the established period (Table 3).

Table 3: Summary table of the payback period of investments on various Internet sites

Area	Discounted income, rub.	Costs, rub	Payback period, months.
Unisender.ru	68230,8	60915	7
E1.ru	347977,1	47800	4
Gilmon.ru	149933,5	20000	7
Avito.ru	105635	46580	6
vk.com	283157,8	73448	5
MAIL.ru	133050,1	80160	4
Yandex.ru	433265,6	120000	3

The resulting indicators in the analysis selected conversion rate and profitability of customers. You can see the results of the calculations in Table 4.

Table 4: Analysis of CLTV sensitivity to changes in conversion and profitability

Monthly profitability, p.		Conversion						
		-45%	-30%	-15%	0%	15%	30%	45%
		0,011495	0,01463	0,017765	0,0209	0,024035	0,02717	0,030305
-45%	1906,3	127,6839814	412,8616	698,0392	983,2168	1268,394	1553,572	1838,75
-30%	2426,2	412,8615722	775,8149	1138,768	1501,721	1864,675	2227,628	2590,581
-15%	2946,1	698,039163	1138,768	1579,497	2020,226	2460,955	2901,684	3342,413
0%	3466	983,2167538	1501,721	2020,226	2520,731	3057,236	3575,74	4094,245

15%	3985,9	1268,394345	1864,675	2460,955	3057,236	3653,516	4249,796	4846,077
30%	4505,8	1553,571935	2227,628	2901,684	3575,74	4249,796	4923,853	5597,909
45%	5025,7	1838,749526	2590,581	3342,413	4094,245	4846,077	5597,909	6349,741

Analyzing the given data, it follows that the negative profitability is observed with a decrease in both indicators by 30% or 45%.

The total economic effect of the proposed activities in the billing period will be 1459 thousand rubles, which is 14% more than in the previous year, while revenue will grow by 21% and amount to 16392 thousand rubles. The calculated indicators should be compared with those for the previous period, for this it is necessary to refer to Table 5.

Table 5: Analysis of CLTV sensitivity to change in conversion and profitability

Expenditures for off-budget funds Indicator name	2015	2016	Plan	Dynamics,%	
				Plan /2016	2016/2015
Balance on 01. January current. Of the year	668052,18	1390875,6	-	-	-
Income for the current year -	13665573	13452005,87	16328535	121	98
Income with a transfer. remainder	14 333 625,18	14842881,63	16328535	110	104
Deductions to the center. Fund	6 404 719,31	5852969,519	6747904	115	91
TOTAL actual expenses of the unit, including	6 304 263,07	7 216 810,16	7573791	105	114
Income Taxes	233 767,04	251895,08	285344	113	108
Net profit	1 390 875,76	1521206,871	1721496	112	109

Thus, in the analysis of Table 5, it was revealed that the figures for revenue and net profit after tax paid are positive in the period under review. Relative to the indicators of 2016, the indicators of the planned period have a positive trend: the increase in revenue to 21% (at 2876529.557 rubles); net profit will increase by 12%, which indicates the economic feasibility of the proposed activities. Also, the author considers it necessary to mention the change in the expenditure part in the planning period, the indicator of which increased by 5% from the indicator of 2016. The change in costs was calculated based on the change in the amount of advertising costs in the planning period, while the constant part of the costs remained unchanged. However, the cost of marketing activities using Internet sites increased by 237,702 rubles in relation to the previous period.

3. Conclusion

The conducted research made it possible to establish that the advertising campaign proposed earlier will allow increasing the company's revenue by 21% in the future and the profit margin by 13%.

Evaluation of the economic feasibility of the proposed measures to promote the educational services of the computer center «Arena Center» proves the usefulness of the proposed tools for optimizing the level of sales by using an effective advertising campaign.

The final stage of realization of the program of marketing activity on the Internet is the development of directions for its implementation.

Thus, the set of suggested recommendations for improving the marketing activities of the educational institution on the basis of developing a plan to promote educational services on the Internet, can increase the efficiency of the company as a whole, entering foreign markets, which is an important component of competitiveness in the context of globalization, strengthening of loyal relations.

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TELECOMMUTING AS AN ECHO OF GLOBALISATION

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Abstract. The contemporary concept of labour is based on the development of service-provisioning civilisation, as well as on the development of the ‘information society’. Dominant factors determining such an approach are knowledge, information and the increase of intellectual potential. The root cause of changes taking place in the labour market are mostly globalisation processes and the advancement of modern technology. Due to the variety of IT solutions improving communication, the significance of geographic boundaries and the actual location where the work is conducted is decreasing. As a result the labour market is opening up to flexible forms of employment, one of them being telecommuting. Global market forces, growing competition and the urge to cut the costs on the one hand, cause increased flexibility. On the other hand, it enables adjustment to the requirements of the labour market. Growing demand for labour force skilled in a very narrow speciality leads to global disproportions. Telecommuting is also beneficial for employees. As work-life balance and other personal factors have become more valued, telecommuting appears to be a solution. The aim of this article is to provide evidence that the new form of employment, which does not require physical presence in the office, is the consequence of globalisation. Furthermore, the paper outlines factors essential to the development of telecommuting and presents an analysis of benefits, drawbacks and challenges deriving from such a form of employment. The article was developed mostly on literature review and on the basis of demographic and statistical data acquired from Eurostat and particular economic institutions.

Keywords: globalisation, technology, labour market, remote work

JEL Classification: F66, J40, R23, O14

1. Introduction

Even though globalisation seems to be a modern trend and appears to be especially visible during the last three decades, most experts would agree that the process of globalisation has been ongoing for over 500 years. Some scholars date “big bang” of the phenomenon precisely in the 1492 and 1498 when Christopher Columbus and Vasco da Gama, through their geographical discoveries, commenced a new, global era. Such a view was also supported by Adam Smith, who perceived those two events as the most essential in the world’s recorded history (O’Rourke & Williamson, 2000). Nevertheless, since 1990s transnational interactions have been intensifying, due to the end of the Cold War and the development of informational technology.

Globalisation is a multidimensional phenomenon visible in all areas of life: from economic, political and legal through social and cultural, to the religious area. We are experiencing it on

a daily basis through the media, access to the Internet and modern technology, financial transfers, globalisation of production or mass movement of people - tourists, economic migrants and refugees. Anthony Giddens (1990) defined globalisation as “the intensification of worldwide social relations which link distant localities in such a way that local happenings are shaped by events occurring many miles away and vice versa”. Indeed, the borders between domestic matters and global affairs have blurred and even distant events play an important role in everyman’s life.

Globalisation, on the one hand eliminates national borders, promotes universality and leads to reduction in global disparities in wealth between the “North” and “South” (Stahl & Tung, 2015). On the other hand, it acclaims local diversity and ethnic identity, but is also criticised for unequal distribution of benefits. It is hard to clearly state whether the process of globalisation has made the world “smaller” or if it has deepened disparities between economies. What is easier to acknowledge though, is the impact of globalisation on the labour market.

The process of globalisation, development of innovation and technological change play a key role in shaping today’s labour market. They have an impact on automation of particular tasks and reduction of the transaction costs of global communication. Moreover, they enable vertical fragmentation of industrial production, which helps to benefit from expertise and comparative advantages of particular countries at every stage of production (OECD, 2017). These forces are also key factors influencing the transformation of the labour market in terms of de-industrialisation, that is a shift from employment in manufacturing towards an increase in employment in the sector of services (Gonchar & Kuznetzov, 2018). Current economy is referred to as “knowledge-driven” due to increased importance of information and knowledge workers. As a result there are significant shifts in employment, the number of middle-pay, middle-skill jobs is decreasing in comparison to low-pay and high-pay jobs (Spreitzer, Cameron & Garrett, 2017).

The labour market reacts to the abovementioned changes with the increased flexibility. On the one hand, employees face the need of transition to a job in a different occupation or industry and upskilling. On the other hand, the market creates more flexible work arrangements allowing to meet the employees’ needs, such as work-life balance, better working conditions and quality of life. One of the solutions is “working anytime, anywhere” in the form of telecommuting. The aim of this article is to prove that such work arrangement, which does not require physical presence in the office is the consequence of globalisation. The paper consists of the analysis of the factors playing a key role in the development of telework and evaluates benefits, drawbacks and challenges of this flexible form of conducting work. The article has been developed mostly on literature review and on the basis of demographic and statistical data acquired from Eurostat, OECD and particular economic institutions.

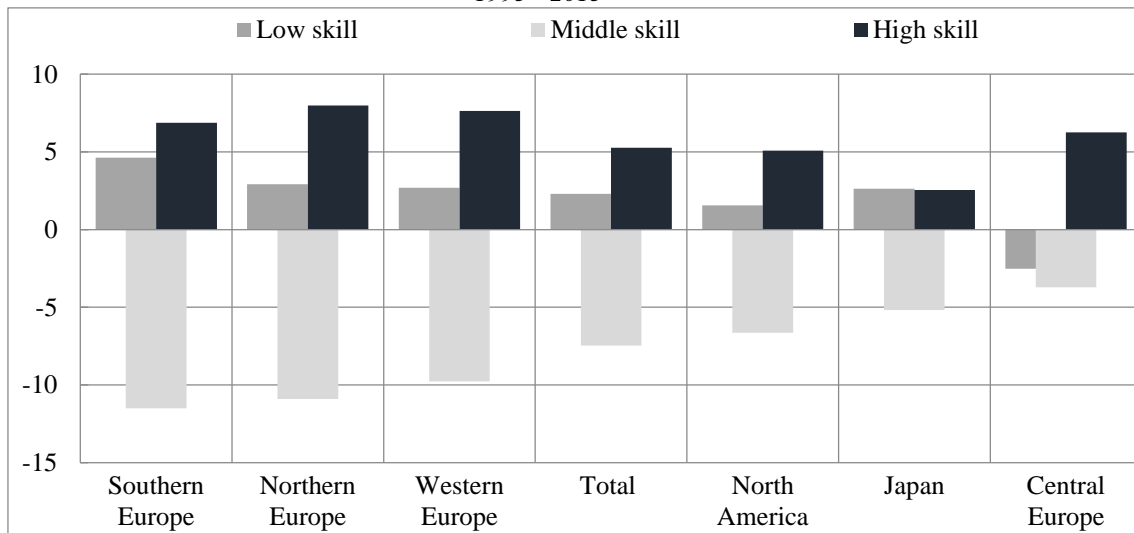
2. Impact of globalisation on labour market

Globalisation remodels interactions between nations. It involves dismantling of trade barriers, enables easier movement of labour and expands the flow of goods and capital (Herod, 2000). Moreover, the firms are globalizing the production by international dissolution of their operations. They benefit from locating each stage of production in the most cost-saving area (Fort, 2017). There may be summarized five drivers of globalization which lead to closer global integration, namely lower trade barriers, transportation and communication costs, development of information and communication technology and also spread of technology. As an effect, the world has become a global, single market - diverse but closely linked. On the one hand, the

number of potential clients has increased, but on the other hand, the number of competitors has also grown and the competition became more severe. Businesses need to fight the pressure coming from lower visibility in global market, adjust to customer preferences and what is more, implement innovative solutions in order to get competitive advantage.

Technology has enabled deeper economic and social integration in the world by enabling communication and plays also an essential role in shaping labour market (Schubert, Baier & Rammer, 2017). Firstly, development of technology affects deindustrialisation, that is a relocation of employment from manufacturing to services. Information and communication technology is perceived as a complementing force for creation of high-skilled positions based on cognitive tasks, while it influences decrease in the number of middle-skill jobs through automation of routine tasks (Crino, 2010). OECD study (2017) depicted on Figure 1 shows polarisation of labour market in Europe, North America and Japan.

Figure 8: Polarisation of labour market - percentage point change in share of total employment in years 1995 - 2015



Source: https://doi.org/10.1787/empl_outlook-2017-en (accessed 27th August 2018)

Shift from manufacturing to professional services, supported by the 90s boom in development of ICT and increase in use of home computers, laptops, mobile phones and all sorts of communicators, opened the possibility for working without the need to commute to the office. Businesses invest in software and technological tools in order to enable employees to work from home. It is common to use means such as virtual private network (VPN), telephone systems, instant messaging such as Sametime or Skype and cloud-based collaboration software like WebEx or Zoom.

However, firms not only need to invest in the state-of-art technology, but also attract the best talents. The world has become a global marketplace and thus, one of the consequences is a global skill shortage (Morris, Snell & Bjorkman, 2016). It is predicted that in the future, competition between countries with regards to the skilled professionals will escalate. For that reason, picking up skilled workers in a global approach is one of the most challenging tasks for competitive, innovative businesses (Antras, Garicano & Rossi-Hansberg, 2006).

Hays 2017 Global Skills Index analyses the gap between the skills searched for by the businesses and skills available in the labour market. The higher the score of talent mismatch indicator the more difficult it is for the businesses to find suitably skilled workforce. Lower

score implies more ease of finding workers with needed skills. Talent mismatch indicator and key skills in demand in particular countries are presented in Table 1.

Table 2: Comparison of talent mismatch and key skills in demand in 33 countries

Country	Talent Mismatch Indicator	Key skills in demand
Australia	5.2	Digital experts (DevOps engineers and solutions architects), engineers, senior accountants, financial planners, residential estimators
Austria	4.9	Software developers, system engineers, risk managers, validation/qualification engineers, firmware developers
Belgium	0.4	Engineers (industrial and civil), technicians R&D/sciences, accountants, IT developers/analysts, multilingual sales support
Brazil	8.9	Application security specialists, demand planning, plant managers/industrial managers, Latam accountant and tax coordinators/managers, sales executives
Canada	5.5	Software developers, cyber security professionals, construction estimators, skilled tradespeople, construction project managers
Chile	1.9	Sales professionals, senior controllers, developers, site managers, logistics & operations professionals
China	3.8	Internet, eCommerce and digital professionals, R&D professionals in high-tech industries, PE/VC and M&A experts, business development and account management professionals, audit, risk compliance and legal professionals
Colombia	6.7	Business unit managers, product managers, supply chain managers, financial controllers, HR managers with labour relations experience
Czech Republic	5.3	Sales representatives, IT developers, QA engineers, HR specialists, English-speaking accountants
Denmark	9.1	Software developers, sales managers, business controllers, project managers, medical advisors
France	7.6	Tax specialists, cost estimation engineers, service technicians, developers, biostatisticians
Germany	3.5	Software developers, hardware developers, IT consultants, project managers, business analysts
Hong Kong	4.9	Cyber security experts, compliance professionals, digital marketing professionals, developers, sales professionals
Hungary	9.5	Quality engineers, automation engineers, java developers, data scientists, native mobile app developers
India	5.0	Management professionals, chartered accountants, business analysts, software engineers, software application developers
Ireland	8.1	Software developers, bilingual sales roles (esp. German), engineers, architects, auditors
Italy	8.3	Export managers, CFO/finance managers, operation managers/plant managers, customer service managers, purchasing managers
Japan	9.9	Mobile application engineers, data scientists, medical doctors, junior HR bilingual candidates, senior digital marketing managers
Luxembourg	10.0	Java developers, cost estimation engineers, trilingual sales, controllers and assistants (FR/ENG/GER)

Malaysia	n/a	Cyber security experts, compliance professionals, digital marketing professionals, developers, general managers
Mexico	4.6	Quality managers, engineering plant managers, sales managers/directors, solution sales, HR generalists/senior management
New Zealand	4.6	Structural, civil and building services design engineers, professional practice auditors, quantity surveyors, software and digital technology specialists, project managers (construction and infrastructure)
Poland	6.1	Developers, cyber security professionals, engineers (quality, process, R&D), project managers, HR business partners
Portugal	9.0	Full stack developers, DevOps engineers, maintenance engineers, certified accountants, field market access managers
Russia	4.2	Big data specialists, heads of international sanctions in compliance departments, regulatory managers, design engineers, sales and product managers
Singapore	5.9	Cyber security experts, change & transformation management experts, analyst and AVP level AML/KYC experts, accountants (commercially minded), internal auditors (technology background)
Spain	10.0	Data analysts, .net programmers, sales people with language skills, property portfolio managers, industrial engineers with language skills
Sweden	9.8	Accounting, payrolling, QA specialists, business/financial controllers, project management
Switzerland	3.6	Quality specialists (life sciences), hardware development engineers, clinical trial managers, software developers, relationship managers (banking)
The Netherlands	5.3	Account managers, software engineers, project leaders, sales managers, online developers
United Arab Emirates	n/a	Senior sales managers, security specialists (information and cyber), mobile development specialists (Android and IOS), turnaround specialists FD/COO level, immediately available PAs - with past C-suite experience
United Kingdom	8.4	IT security architects, data analysts, risk analysts, part-qualified accountants, civil engineers
United States	9.3	Software developers, cyber security professionals, construction estimators, clinical research associates, Big Data professionals (data analysts/scientists)

Source: www.hays-index.com (accessed 26th August 2018)

The conclusion that can be drawn from the data depicted in Table 1. is that all of the skills in demand are knowledge based. It is visible that knowledge has become a key resource and the field of demanded professions is very narrow (Acemoglu et al., 2007). Already in 1959 Peter Drucker predicted such a scenario concluding that "it is information that enables knowledge workers to do their job" and pointed out that knowledge will become a key resource that knows no geography. The actual location where the work is performed does not play a key role in majority of cases - most high-skilled, knowledge-based jobs can be performed remotely.

Moreover, Hays results show that the average GSI score measured across 33 countries has dropped from 5.4 in 2016 to 5.3 in 2017 (The Hays Global Skills Index, 2017). One of the reasons for the decline is growing openness for innovative working patterns. Businesses become more open towards hiring freelancers, contractors or on-call workers and more often adopt flexible working arrangements such as telework. In the last decade the number of freelance, contract and on-call jobs in US has grown from 10 to 15 per cent of all workers. According to Freelancers Union's report 63 per cent of freelancers in United States chooses to work from

home over traditional job (Upwork, 2017). The highest amount of telecommuters is observed within industries such as computers, informations systems, mathematics, art. design, media, finance, insurance and real-estate (Gallup, 2016).

What is more, as already mentioned, due to globalization the competition between companies became more severe. In order to obtain competitive advantage businesses need to reduce the costs connected with production. From the employer's perspective telecommuting is very beneficial, as it allows to cut the costs of relocation of potential employees and diminishes real estate expenses. Businesses may keep smaller office premises and thus cut the costs without impacting the organizational performance and number of employees. As revealed by Global Workplace Analytics report (Flexjobs, 2017), employers may save up to \$11,000 per half-time employer per year by decreasing the office space.

3. Telecommuting - pros and cons

The term "telecommuting" has appeared in the 1970s as a solution to the oil crisis in the US. Since then the phenomenon has been increasing worldwide and had a boost especially in the 90s due to rapid development of technology. Popularity of remote work keeps an ascending trend, for instance, in Europe percentage of adults working from home grew from 11,8% in 2006 to 14,5% in 2015 (Eurostat, 2016). In the US the number of people working from a remote location is even higher - in 2015 it was equal to 35% (Gallup, 2016).

Even though the definitions of "telework" and "telecommuting" differ slightly in meaning, they are very often used interchangeably. "Telework" is a technology assisted work performed outside of an office, while "telecommuting" refers to work conducted on a regular basis from an alternative workplace, such as home, or another remote location, using information technology, but still maintaining a traditional office (Nilles et al., 2007).

The interest in remote work is increasing due to a number of advantages provided by such forms of organising work. First of all, it is cost-saving for both employer and the employee. From the worker's perspective, telework saves costs of eating out for instance, travel expenses (e.g. public transportation, gas, parking, insurance) or time spent on commuting to work. Therefore it also helps balance work and family time and leaves more space for hobbies (Leung & Zhang, 2017). Telecommuters are able to gain back even up to 11 days per year just by cutting the travel time. They also tend to eat more healthy, homemade meals and are less exposed to common illnesses or stress. As concluded in Flexjobs (2017) research, full time telecommuters are able to save over \$4,000 each year and half time remote workers on average \$2,677 on expenses connected with work, such as travel, meals, clothing etc. Remote work is also an opportunity for disabled people, who are not able to travel to the office.

From the employer's point of view, telework impacts the real estate expenses through reduction of leased office space. Companies are able to keep the same number of employees and organizational performance while cutting the premises area (Nurmi & Hinds, 2016). Moreover, as mentioned in the previous part of the article, telecommuting helps avoid market saturation and the recruitment of talented people from the whole world. Another important benefit is productivity. Results of ConnectSolutions report indicate that 77% of employees are more productive while working away from office, 30% reported that they accomplish more within shorter time and 24% achieve more in the same amount of time (Nevogt, 2016). Furthermore, remote workers appear to log more hours at home and take sick leave less often than traditional workers (Gallup, 2016).

However, there are also disadvantages arising from such work arrangements. Employees often complain about the isolation and may have psychosocial issues due to lack of human interactions on a daily basis. There is also an essential drawback caused by the gap in legal regulations - teleworkers are exposed to risk due to lack of labour protections and inspections. Another issue is connected to the mentality of workers. Employees very often admit that through the fact that they are not present in the office, they feel as if they are perceived as working less. They complain about feeling guilt and feel obliged to overcompensate for working away from the office premises. It leads to another issue, connected with supervision and control of remote workers, as well as measuring working time and overhours (Morganson et al., 2010).

4. Conclusions

Globalisation is a phenomenon, which plays an important role in the daily life of individuals and whole societies. It impacts all areas of life: from economic, political and legal through social and cultural, to the religious area. It eliminates national borders and intensifies social relations, which is apparent in common access to the media, modern technology, financial transfers, globalisation of production or mass movement of people. Globalisation is also a key force shaping the labour market.

Impact of global processes on labour market is visible for instance in automation of tasks and the reduction of the transaction costs of global communication (Xia & Liu, 2017). The consequence is vertical fragmentation of industrial production and de-industrialisation. The current economy is “knowledge-driven” and the importance of information and demand for knowledge workers is increasing. There is a shift from employment in the industry sector towards growing employment in services.

As a result, the market turns towards greater flexibility. One of the solutions to changes taking place on labour market are flexible work arrangements, such as telecommuting. Such form of working may be defined as a technology assisted work performed outside of an office. Concept of telework draws from the development of technology and common usage of tools such as Skype or WebEx etc, which make remote work possible.

Telecommuting is beneficial both for employers and workers, as it enables to cut the costs of transportation, real estate, increases productivity and leaves for space for employees’ hobbies and work-life balance.

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GEOCACHING: GLOBAL GAME IN THE LIGHT OF FREEDOM INDICES

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Abstract. The contribution focuses on a global outdoor game called geocaching in the light of human rights indices. The aim of the worldwide game is to find geocaches - boxes hidden in different places, sign the logbook inside and log the found on the internet. Everyone can join the community for free. Regarding the equipment, players usually do not need anything else than a smartphone or a handheld GPS. However, playing the game may be time-consuming, so only people with secured basic needs may join it and play for longer time. Geocaching relates to the free movement closely, players are often travelling around their own country or visiting interesting places abroad. There are some requirements on the environment as well – placing and finding small containers must be tolerated by people in the community/society and cannot be restricted by administrative or other rules. The contribution asks and answers a question, whether there is a significant correlation between the relative number of geocaches and geocaches (in a state) on one hand and the Index of Economic Freedom and the Human Freedom Index on the other hand. The text explains briefly both indices (created by the Cato Institute and the Heritage Foundation) and input data about geocaching (provided by Project-GC) and further studies and interprets the relation between them based on statistical analysis.

Keywords: geocaching, human rights, Index of Economic Freedom, Human Freedom Index

JEL Classification: K38, F69, C19

1. Introduction

Geocaching is a global outdoor game and the aim of it is to find geocaches – tiny or bigger containers - hidden in different places, sign the logbook inside and log the “found” on the internet website. There are more than 3 million geocaches placed worldwide. Geocaching is a typical leisure time activity; playing geocaching assumes that players’ fundamental needs (physiological and safety needs as defined by Maslow) (Sirgy, 1986) are satisfied and the player has enough spare time, money and energy to satisfy his/her need of belonging and love, esteem and self-actualization and self-transcendence.

Unofficial motto of geocachers is “The World is Our Playground”. Since 2001, more than 7 million people decided to register for the game and more than 1 million of geocachers are still active nowadays. Although the game comes from the United States, it became very popular in Europe and most of active players live and play in Europe by now. The number of geocachers, as published on the website project-gc.com (which is powered by Geocaching Headquarters) (Overview, 2018) shows the highest absolute numbers of geocachers in United States (363 095 active players in the last year), Germany (208 910), France (124 883), the United Kingdom (92 395) and the Czech Republic (67 871). On the other hand, there are no active players in Burundi,

Central African Republic, Ghana, Lesotho, Mauritania, Pakistan, Sierra Leone, Tajikistan and several other African and Asian States.

Tab. 1 illustrates the distribution of geocaches and geocachers in six world regions (as defined by the United Nations Demographic Yearbook) (Department of Economic and Social Affairs, 2017).

Table 1: Distribution of geocaches and geocachers in world regions

Region	Enabled and disabled geocaches	Active geocachers (5. 9. 2017 – 4. 9. 2018)
Asia	17 844	4 952
Africa	48 386	5 783
Europe	1 643 276	813 181
North America	1 308 859	424 253
Oceania	109 934	41 623
South America	7 269	1 594

Source: Author. Data extracted from <https://project-gc.com/Statistics/Overview>

How should we understand this unequal distribution and how to explain such gaps? There are many factors that influence the accessibility and attraction of the game: at least the economic background and disposable income (in the State and personal), degree of satisfaction of basic needs, cultural values of particular society, official State’s support of sport activities or tourism, relation of people to the environment, climate conditions, internal motivation and particular situation of each particular player. As well the state of human rights in a State may play an important role. Freedom of movement is the crucial condition for playing the game. Also, other human rights are touched by the geocaching game. Geocaches are hidden in public and private places usually with the consent of the owner of the property. In States, where the right to property is not sufficiently granted and protected, it may be difficult to identify or contact the owner before hiding the container. Freedom of expression can be mentioned in relation to publishing logs on the internet.

The following text focuses on three of the above-mentioned factors: on the wealth of a State where the player lives and play, on so called economic freedom in this State and third, on the overall human freedom in the State. Regarding the “nationality” of geocachers, it has nothing to do with citizenship (as regulated by national law) or State nationality (as known in international law). Link between a geocacher and a State is decided by the geocacher only and it depends on the “home coordinates” as they are set by the player on his/her profile page. From practical reason, this home coordinates usually correspond to place where the player factually lives and spends most of his/her time.

This contribution presumes and further examines the linear correlation between geocaching activity (number of geocachers and number of geocaches) in a State and three other different variables. First of them represents the wealth of a State (GDP per capita), second the economic freedom of the State and third the human freedom in the State. Aim of the contribution is to compare and discuss the correlation strength expressed by Pearson correlation coefficient.

Regarding the state of the art, geocaching as a topic appears in scientific debates quite rarely. In the “Web of Science All Databases Search”, there are 36 entries responding the key word “geocaching”, including 15 conference proceedings and 14 articles. Most of them are presenting the topic from the point of view of tourism and sport (e. g. Boys, 2017; Robinson, 2016), other authors are studying motivation of players to join the game and their behaviour (e. g. Boilaire \

Cova, 2013 Boilaire & Cova, 2008; Garney et al, 2016; Hawley, 2010) or discussing the possibility to use geocaching in educational process (e. g. Spencer, 2015).

2. Methods

This contribution studies the linear correlation between geocaching activity on one side and the wealth, economic and human freedom on the other. The relation between various socio-economic characteristics of a State and geocaching activity is studied quantitatively using simple statistical method. The Pearson correlation coefficient is calculated to express the relation in six different relations. All studied relations are illustrated also in scatter diagrams.

The geocaching activity is represented by two quantities - number of geocaches relative to the size of population and number of active geocachers in last 365 days - again relative to population size. The number of geocaches (including enabled and disabled, excluding archived caches) as well as the number of active geocachers are extracted from project-gc.com website (as it was available on September 4, 2018). Because of the fact, that the number of geocaches as well as the number of geocachers varies in order of magnitude among States logarithms of these numbers are used. In 22 States there are no geocachers; these States were excluded from the dataset before calculating the correlations. There is at least one geocache in every State included in this study.

Wealth of a State is in this study represented by nominal GDP per capita and the data are taken from the World Economic Outlook Database, October 2017, as published by the International Monetary Fund (GDP per capita (current US\$), 2018).

Economic freedom is expressed by Economic Freedom Index (2018 Index of Economic Freedom, 2018; Maier & Miller, 2017). The index is published annually by The Heritage Foundation, Washington since 1995. The index evaluates and quantifies 12 freedoms and criteria related to labour, economics, trade, government spending, business and investment and covers 186 countries. The Economic Freedom Score for each observed State is between 0 and 100. In 2018, the highest score was reached by Hong Kong (90.2), Singapore (88.8) and New Zealand (84.2). Cuba (31.9), Venezuela (25.2) and North Korea (5.8) close the list as most economically repressed States.

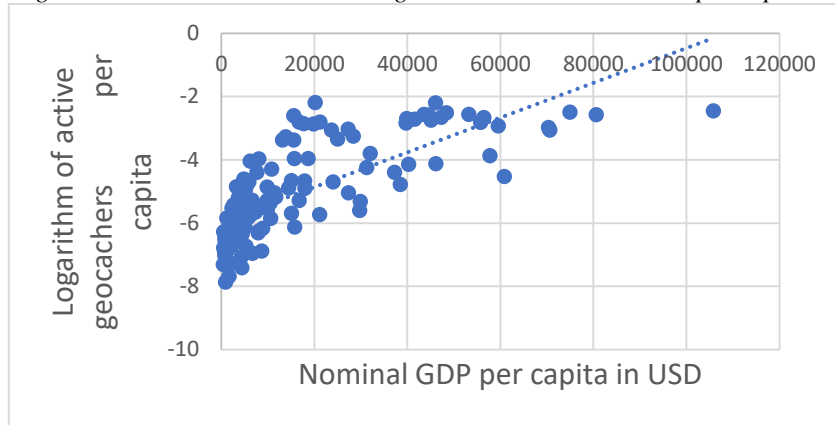
There are several methods how to measure and evaluate the state of human rights and human freedom (e.g. Freedom in the World by Freedom House, the Cingranelli-Richards Human Rights Data Project - maintained from 2004 to 2014, the Democracy index by Economist Intelligence Unit in United Kingdom). This study uses the probably most comprehensive freedom index working with 79 indicators – The Human Freedom Index, published by the Cato Institute, the Fraser Institute, and the Liberales Institut at the Friedrich Naumann Foundation for Freedom (Vásquez & Porčnik 2017). The 2017 edition of the index covers 159 countries. Each country gets a rating between 0 and 10 for economic freedom, personal freedom and overall human freedom. Higher score means the higher freedom in observed State. At the top of the list of States organized by their ratings of human freedom can be found Switzerland (8.89), Hong Kong (8.88) and New Zealand (8.86), at the tail are situated republic Libya (4.37), Venezuela (4.34) and Syria (4.04).

Following study covers 155 States, for which both the Index of Economic Freedom and Human Freedom Index are available.

3. Results and Discussion

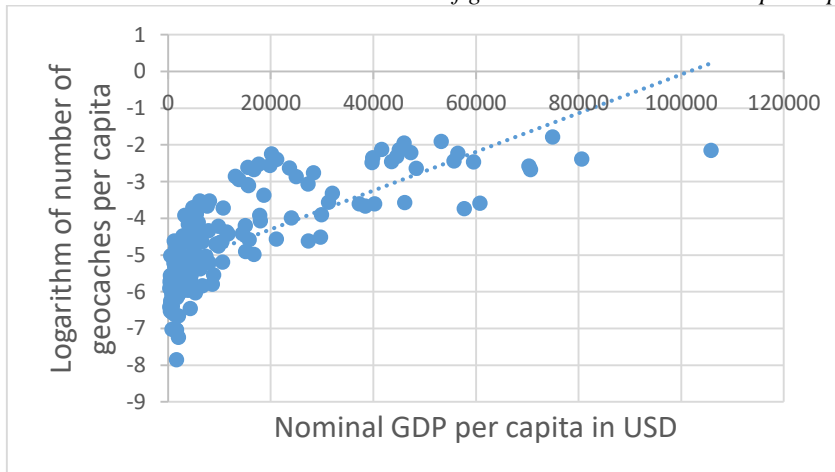
The dataset used for calculation of correlation coefficients and graphs is available online at <https://drive.google.com/file/d/18mlS5nKUxIsrKj4J-uEzx7aFqL7Z7Z61/view?usp=sharing>.

Figure 1: Corellation Plot – Active geocachers / Nominal GDP per capita



Source: Author

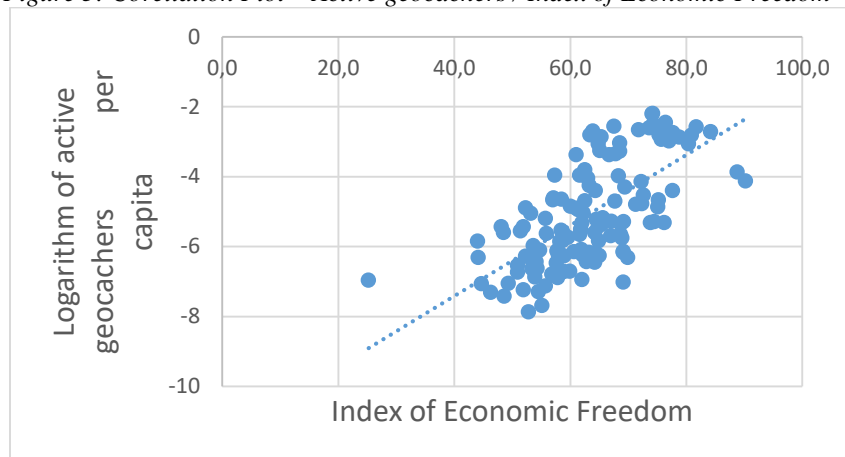
Figure 2: Corellation Plot – Relative number of geocaches / Nominal GDP per capita



Source: Author

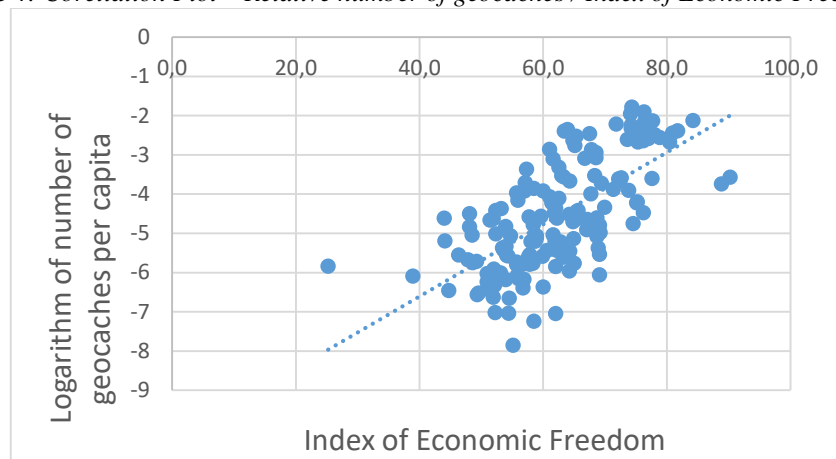
The Pearson correlation coefficient (PCC) for the relation between logarithm of active geocachers per capita and nominal GDP per capita is 0,7432. PCC for the relation between logarithm of geocaches per capita and nominal GDP per capita is 0,7460. With increasing number of geocaches or with increasing number of players normalized to the size of population the spread of nominal GDP per capita substantially increases.

Figure 3: Corellation Plot – Active geocachers / Index of Economic Freedom



Source: Author

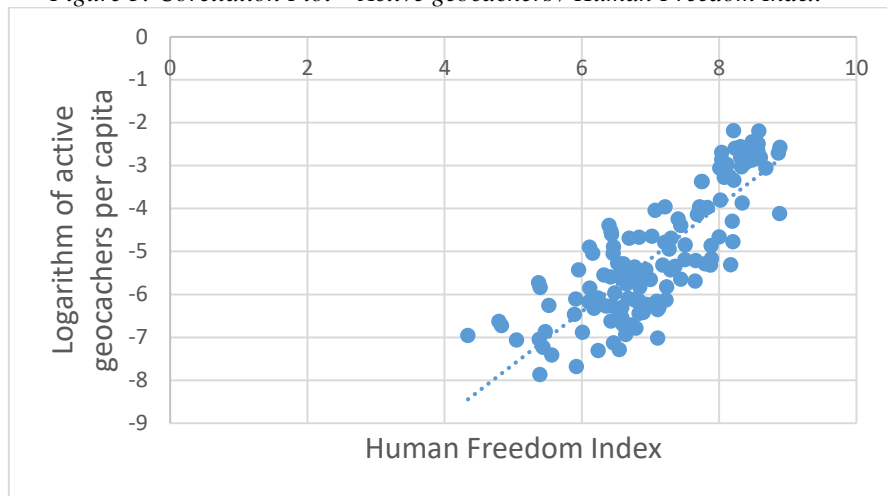
Figure 4: Corellation Plot – Relative number of geocaches / Index of Economic Freedom



Source: Author

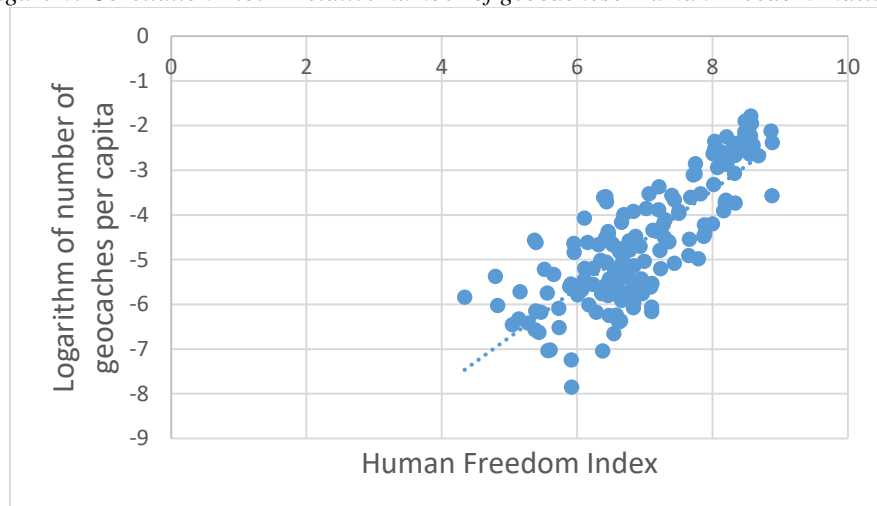
PCC for the relation between logarithm of active geocachers per capita and Index of Economic Freedom (IEF) is 0,6747. PCC for the relation between logarithm of geocaches per capita and IEF is 0,6711. Hence PCC is somewhat smaller than in the previous case, however the spread of the points in Figs. 3 and 4 with respect to central line is almost constant (with the increasing number of geocaches or with increasing number of players normalized to the size of population the spread of Index of Economic Freedom is constant).

Figure 5: Corellation Plot – Active geocachers / Human Freedom Index



Source: Author

Figure 6: Corellation Plot – Relative number of geocaches / Human Freedom Index



Source: Author

PCC for the relation between logarithm of active geocachers per capita and Human Freedom Index (HFI) is 0,8261. PCC for the relation between logarithm of geocaches per capita and HFI is 0,8070. As well as in case of Index of Economic Freedom, also here the central line on Fig. 5 characterizes the relation of the two quantities equally well in the whole range of Human Freedom index and active geocachers per capita. In Fig. 6, the points are more compactly distributed with respect to central line for the higher HFI.

In both figures, the corresponding Pearson correlation coefficient is above 0,8; according to the rule of thumb - as defined by Evans (1996) – this correlation can be marked as very strong.

4. Conclusion

The simple statistical analysis presented in this paper shows, that possibly interesting relations between seemingly unrelated characteristics of a State such as wealth, economic and human freedom on one side and popularity of the global outdoor game called geocaching on the other side can be identified. To quantify these relations the Pearson correlation coefficients were calculated and all the studied relations were also displayed in scatter plots.

The highest PCC – 0.8261 – was obtained in the case of the relation between logarithm of active geocachers per capita and Human Freedom Index. High positive PCC were obtained for all studied relations:

- 0,807 for the relation between logarithm of geocaches per capita and Human Freedom Index;
- 0.7432 for the relation between logarithm of active geocachers per capita and nominal GDP per capita;
- 0.7460 for the relation between logarithm of geocaches per capita and nominal GDP per capita;
- 0.6747 for the relation between logarithm of active geocachers per capita and Index of Economic Freedom;
- 0.6711 for the relation between logarithm of geocaches per capita and Index of Economic Freedom.

These findings suggest, that the level of economic strength and freedom of a country, and even more the human freedom in particular State define relevant preconditions for playing geocaching.

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LOGISTICS SYSTEMS IN CONDITIONS OF GLOBALIZATION

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Abstract. Since the end of the twentieth century, logistics has become one of the decisive drivers of the global economy. The main reasons were globalization of the world and the globalization of the world trade; the imbalance between resources, production and consumption and their allocation across the world; the development of new management technologies in mathematics, cybernetics and informatics; cost and cost reduction factor. In this article, we deal with logistics systems in the conditions of globalization. The logistics system includes all enterprise logistics chains created for each individual products or customers (supply, production, distribution and business articles are subsystems), works with logistic resources (goods, people, information) that optimally deploys, focusing on customer needs, and pursues the main goal and partial goals of enterprise logistics. In logistics systems, the use of methods, approaches and management procedures is increasingly being promoted to optimize all activities. The essence is to satisfy the needs of customers at the lowest cost and acceptable quality. With the development of modern logistics, a number of logistics technologies are gradually being developed and evolving around the world. Each company creates its own "logistics enterprise systems, concepts" looking for its own way. The aim of the article is to define the concept of logistic system, to describe its individual subsystems within the concept of logistics, to define the difference between macro-logistic and micro-logistic systems.

Keywords: logistics, logistic systems, concept of logistics, globalization.

JEL Classification: D23, D24, F6, M11, M16

1. Introduction

Logistics is increasingly the motor of success of industrial organizations on global markets. Globalization brought not only the potential of global market, disturbance of market barriers and free movement of capital, but also global competition and so far unknown speed by which market turbulences appear. The current effort of modern logistics systems planners is, when designing these systems, to build into their features the ability of fast adaptation to changing market conditions. These systems are, at present, called adaptive logistics systems which use, for the ensuring of adaptability, new types of technologies also on the basis of computer emulation. (Furmann et al., 2017)

Worldwide globalization, constant technology development, increasing competition and growing demands from customers, all of this creates constant pressure on businesses today.

Flexible businesses, therefore, build reliable networks of customers, business partners and vendors with a view to creating long-term relationships. At the same time, they are aware of the necessary need for changes to the logistics system, which is a key weapon and one of the prerequisites for achieving resource efficiency, productivity and market performance. (Cibulka, 2015)

The world is growing closer and closer together. Political and ideological borders are disappearing. Trade barriers are being dismantled and customs duties are being eliminated. At the same time, innovative information and communication technologies are creating new, far-reaching possibilities. As a result of this dynamic development, the demand for logistics services is climbing enormously. Logistics has become a critical factor in the success of modern companies because customer and supply networks can be extended around the world. At the same time, though, intensifying global competition is developing. The result: Globalization is creating new challenges to go along with its sweeping opportunities. (Ceniga & Sukalova, 2015)

More and more companies are expanding their reach to areas of the international sector. When businesses enter markets in different countries, they have to build the appropriate logistics systems to be able to provide the products and services that customers demand. Individual components of a global logistics system may resemble the components that an enterprise uses in its home environment, but the management of the international network may be very different. The manager responsible for international logistics must manage various logistical components in an environment characterized by a number of uncontrollable elements: political, legal, economic, competitive, social and cultural. Within this uncontrollable environment, the manager tries to optimize the relative composition of costs and services. (Lambert, 2000)

Global supply chains play a critical role in many of the most pressing environmental stresses and social struggles identified by the United Nations' Sustainable Development Goals (SDGs). Responding to calls from the global community, companies are adopting a variety of voluntary practices to improve the environmental and/or social management of their suppliers' activities. Supply chains tied to multinational corporations represent over 80% of global trade and engage over one in five workers. Supply-chain management therefore has a significant impact on key social and environmental challenges. (Thorlakson et al., 2018)

2. System approach in logistics

For logistics and the application of its basic principles is a typical system approach. System approach means that all logistical problems are solved in essential internal and external contexts, the main tool being the co-operation of individual components of the system. The system approach interconnects the strategic level of management with the operational level, it interconnects the supply with production and distribution. Within the system approach, the phenomena are explored in contexts. At the same time, cause-effect relationships are investigated. (Oudova, 2016)

The system can be understood as a set of individual elements and interrelationships between them. Elements of the logistics system are processes, departments, workplaces, businesses, and more. (Oudova, 2016)

Two types of tasks - both analytical and synthetic - can be dealt with by system approach in logistics. Analytical tasks have a given system structure and examine the behavior of the

system's elements. Synthetic tasks deal with situations where the behavior of the system is predetermined and look for the structure of the system that will be appropriate for this behavior. (Oudova, 2016)

The consequences of any decision on the operational level of logistics management need to be addressed in the context of the system approach in the light of the implications of this decision for higher levels of management. So what happens at the level of activities and processes in an enterprise, affects the related processes or entire departments in the enterprise. This relationship also works the opposite, t. j. if it strives to increase production performance, it is important to focus on the processes that directly affect it. (Oudova, 2016)

3. Definition of the logistics system

From the traditional viewpoint of business administration, logistics is viewed as a function in service of company strategy that aims to provide the right products at the right time in the right place as consistently as possible. (Niine & Koppel, 2015)

The notion of logistics is not clearly defined in the literature. There are many features and definitions from different authors. For the purposes of the article, we will build on the definitions that talk about logistics systems.

Novak (1985) defines logistics as "the technical and economic discipline, whose task is to ensure that the object - raw material, semi-finished product, workpiece, product - has been transported at the specified time, quantity and quality to a designated place, while preserving the required characteristics and optimally spent costs" and on the logistical side, it includes the activities of the following subsystems:

- the material handling complex, including its own handling, transport and storage,
- public transport as the scheme of transport systems and roads,
- internal trade, sales and supply organizations,
- material flow management, including the documentary evidence and the transmission of information.

According to Kubat (1989), logistics is a "purpose discipline" which consists of three pieces:

- material system,
- information system,
- control system.

The *material system* includes all shifting and storage processes from obtaining raw material to delivering it to the user – it represents the realization of material flow. Logistics flows represent a link between the elements of the system. These flows may be physical, informational or economic. The main two flows in logistics are material flow and flow of information. Between them, there is a clear and relevant bond - it's just an information flow that moves the flow of material. (Krizova et al., 1994) (Oudova, 2016)

The *information system* collects, stores, processes and transmits data of course of the previous development, current and predicted state of material flow. Data may include, for example, movement of material or means of transport. The information system is further subdivided into a planning system, dispositional system and processing system. The planning

system deals with the preparation, creation and optimization of logistic chain links. The dispositional system ensures the smooth operation of logistics systems. The processing system supports management of information flow. (Krizova et al., 1994) (Oudova, 2016)

The *control system* plans, manages and controls the material flow with a view to achieving logistics performance and economic goals. It deals with the processing of information at the place of its origin or realization, in real time. The effectiveness of such management is influenced by the quality of information, availability, usability and timeliness. There are two types of control systems: *computerized* (use of technology; lower error rate; lower administration costs) and *non-computerized* (data processing by human; extensive administration; slow and inefficient management). (Krizova et al., 1994) (Oudova, 2016)

The logistics system consists of several components, i.e. subsystems. Each component is dedicated to realize physical and information flows, and each subsystem is related to others. Changes of any of the components have a greater or lesser impact on other components. It can be characterized as a system that connects the nodes. Nodes are fixed devices such as factories, warehouses, terminals and inventories. An important logistical problem is the layout of these nodes. (Krajcovic, et al., 2004)

From the dynamical point of view, the activity of the logistics system is ensured by the whole of universal practical measures, which helps to investigate, determine and control the consistent patterns of organization and movement of economic flows in the process of production, distribution, exchange and consumption of. Economic decisions concerning achievement of the set aims are made on the basis of the results of application of the measures of such nature. In this way, rational use of resources is ensured in this system and this emphasizes prevalence of economic principles in logistic activity. (Navickas et al., 2011)

Logistics systems activity is very sensitive for the change of demand factors, services of logistics systems are elastic and depend on consumers' experience or wishes to get this experience. Moreover, the activity of logistics systems is very dependent on intensity of consumption, variety of its needs. However, the scientists note, that the sector of services, also logistics services, is less sensitive for cycle changes, i.e. for expansion and recession, and it ensure the stability of this sector. (Navickas et al., 2011)

There are more and more modern logistics systems on the market that, as part of control systems, must guarantee production flexibility, required delivery dates, market readiness and liability for binding capital into inventory. (Milic & Zoric, 2017)

Modern logistic systems and supply chains development requires new models designing that allow describing the similar systems and the occurring processes, as well as forming management mechanisms with the use of the logistic integration potential. Specifically, at the modern stage of logistic theory evolution, and also as a result of researches on the functioning practice of various branch belonging, it is expedient to consider the modern logistic systems as multilevel ones. (Lukinskiy & Lukinskiy, 2017)

There exists new notion, like a *discrete event logistics systems* (DELS), which are a class of dynamic systems that are defined by the transformation of discrete flows through a network of interconnected subsystems. The DELS domain includes systems such as supply chains, manufacturing systems, transportation networks, warehouses, health care delivery systems, etc. DELS are inherently complex systems due to the large scale of the networks, the dynamic nature of interactions between actors, and the randomness of both the external and internal environments. This makes any decision making process difficult and implies the need for a

wide range of modeling and analysis methodologies and tools to guide decision making. (Sprock & McGinnis, 2015)

The logistics system's strategy of enterprise fits within the enterprise strategy and the logistics goals support the main (hierarchical superior) goal or set of business goals. The logistics strategy can be characterized as a set of decisions focused on the functioning of the enterprise logistics system in order to achieve logistic goals, increasing logistics performance, added value for the customer, accelerating flows in logistics chains, reducing logistics costs, and ultimately ensuring customer satisfaction, stakeholders, and business competitiveness. (Lambert, 2000)

The external objective of the enterprise's logistics system is to meet the needs and requirements of customers. This external target can be quantified e.g. in the form of a percentage of consistent deliveries of the products delivered, their reliability, flexibility, quality or environmental suitability for deliveries of products to be achieved over a given period. The external objective of the logistics system is directly embedded in the set of enterprise goals and it reflects the knowledge of the correlation between customer satisfaction and volume of revenues. (Cibulka, 2015)

In order to achieve external goals, internal goals must first be met in areas:

- performance (sometimes technical or even operational), which means delivering the right product in the right amount, in the right quality, at the right time in the right place - infrastructure and other assumptions are needed at the appropriate level;
- economic, which means with the right (optimal) costs. (Pernica, 2004)

In order to ensure the planned performance and cost objectives of logistics, the logistics system must have a certain potential. (Cibulka, 2015; Regiani de campos, 2017)

The potential of the logistics system (permeability, throughput or capacity) is actually the ability of the logistics system to deliver outputs in terms of volume, structure, level of supply and consumed resources at a given time, space and in boundary conditions. The potential of logistics is given by the structure of the logistics system (the properties of its elements and the links between the elements). It is influenced e.g. the size and specialization of workplaces, the balance of capacities in the logistics chain, the location of the customer order disconnection point, the demand forecasting methods used, production planning, inventory management, workers' substitutability, applied information systems in logistics, and other factors. (Cibulka, 2015)

4. Organization of logistics

Logistics systems can be categorized from the perspective of different professionals, but also from different economic interests. For the purposes of the article, we use the following segmentation:

- macrologistics systems - solve the problem of motion of matter from the point of view of the national economy,
- micrologistics systems - their aim is to solve the movement of matter at the level of the enterprise in the sphere of production and circulation. (Krajcovic et al., 2004)

The term *macrologistics* is not new in the literature and some perspectives have already been documented, although limited and without a trade-off measurement dimension (which is at the heart of logistics). (Havenga, 2018; Liljestrand, 2017)

Gleissner and Femerling (2013) described macrologistics based on its components, namely the traffic system and infrastructure required to provide transport and warehousing. They expanded the view to what they call ‘societal logistics’, where the human element is included. Banomyong, Cook and Kent (2008) defined four components, i.e. infrastructure, institutional framework, service providers and shippers of goods.

Macrologistics management defines the term "Macrologistics" as a means for designing a catalyst for change in any organization. The "macro" approach means seeing the big picture-to use time and place strategies for competitive advantage. It is a "breakthrough" strategy because it prioritizes "logistics" selection as a key factor in developing customer satisfaction and market penetration. Traditional management approaches the product and cost savings as key factors in their strategy. (Stein & Voehl, 1997)

Most decisions in macrologistics systems affect decisions in the enterprise sphere, i.e. in micrologistics systems. For example, investments in the field of macrologistics are important for the development of micrologistics systems and their functions throughout the reproduction process. They affect logistics costs, and thus the profits of businesses, as well as a number of factors, especially the time factor. (Krajcovic et al., 2004)

An important extension in the logistics discipline could be the solidification of the theory and instrumentation of macrologistics to assist society on a macroeconomic level to make better choices for improved economic, environmental and social outcomes. (Havenga, 2018; Li & Li, 2017)

The role of macrologistics in macroeconomic management is defined as the estimation of sustainable freight logistics configurations on national and industry levels to enable macroeconomic trade-offs against other production factors. The development of the tools to enable this role is what is referred to as the instrumentation of macrologistics, as Havenga described in 2018.

Logistics and supply chain management are typically defined from microeconomic perspectives, optimising firm-level logistics and other supply chain costs. However, the implications for the national economy are that firms and logistics service providers drive optimal logistics solutions within their specific contexts, without cognisance of the broader economic, environmental or social impact. (Havenga, 2018; Kunz et al., 2017)

Micrologistics systems include material flow issues, energy flow, and information in terms of space and time, storage, and other activities within enterprise. The subject of logistical research is the pre-production process (purchase of material from suppliers), its own production process (enterprise warehouses; handling equipment; transport technology; information and decision making system) and post-production processes (sales and supply of products to suppliers). Thus, the micrologistics system can be divided into a purchasing, in-plant and sales logistics subsystems. (Krizova et al., 1994)

In many publications, the term *metallogistics* is included at the same level as macrologistics and micrologistics. We can define it as logistics operates in the area of supply chains, so the term is replaced by the logistics company. (Sixta & Macat, 2005)

5. Conclusion

Customer requirements are ever-increasing, which leads to the demand to deliver high-quality customized products in short time, while simultaneously global competition is becoming more and more intense. Companies are confronted with increasing demand for a wide variety of products, which in turn gives rise to a high-level complexity of their logistics systems. (Chankov et al., 2014; Ali et al., 2017)

In global economy the activity of logistics systems, its infrastructure usage for the purpose to achieve the growth of economy become a necessity, whereas the scope and aims of logistics systems and its infrastructure use become specific in a reason of the impact of country's economic policy, focused on long-term competitiveness. (Navickas et al., 2011)

The opportunities to allocate and distribute processes and activities within the logistics systems, also the stability of relations of subjects of logistics systems, allow for sustainable development of country's economy, relevant distribution of synergy effect of logistics systems activity. It affects the increase of effective use of resources and other economic values and relevant its distribution, i.e. it ensures the movement of material, finance and information flows. In this instance, movements of these flows inside logistics systems multiply the value of flows, and thus, it positively influences the indicators of country's economy. So, for the aim to generate country's competitive advantages it is necessary to improve indicators of effectiveness of logistics systems activity. (Navickas et al., 2011)

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GLOBALIZATION AND INNOVATION: INNOVATION ACTIVITIES OF MULTINATIONALS IN THE CZECH REPUBLIC 2008-2014

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Abstract. This paper analyses location-specific endowments of the markets and the ownership-specific endowments of multinational enterprises (MNEs) in the Czech economy. The analysis aims at MNEs innovation activities between 2008 and 2014 in the Czech Republic. A panel of four Czech Community Innovation Survey waves is analyzed. The results suggest that there are ownership-specific endowments like the company size, market orientation. The location-specific endowments of the markets played an important role. The probability to innovate depended positively on the technological level of industry. The MNEs were consistently stressing throughout the whole period the existence of a variety of hampering factors of innovation. MNEs competing in national and world markets are more likely to spend more money on R&D activities than firms competing in European and small local markets. The European markets are home markets for most of the MNEs located in the Czech economy and it is a default market for them. The lack of credit and other external sources was an issue for MNEs because of the lower incomes from sales in times of economic crisis of 2008.

Keywords: multinational, innovation, imitation, localization, strategy

JEL Classification: O33, F23, L20, F63

1. Introduction

This paper deals with multinational enterprises (MNEs) and it is a follow up of a previous study (Vokoun, 2016a). It was concluded that there are both location-specific endowments of the markets and the ownership-specific endowments of multinational enterprises (MNEs) in the Czech economy between 1998 and 2010. To do this a panel of 6 Czech Community Innovation Survey waves was analyzed. MNE's size and market orientation was a positive factor of innovation activities of MNEs. Multinationals spent more on research and development (R&D) if they were pushed by the governmental support, or by the need to upgrade production capacity, and pulled to innovate by the information and knowledge of their suppliers. There were location-specific endowments in the decision to innovate model. The "U-shaped" Herfindahl index relationship was observed. Also, the technological level of industry played a dominant role in the MNE's probability to innovate.

This paper continues this debate by analyzing the Czech economy using newer dataset covering the year span of 2008-2014. The Czech market is heavily influenced by MNE presence, especially in the service industry. This paper aims to compare the new results with previous ones and it focuses again at the *location-specific endowments of markets* and the *ownership-specific endowments of enterprises*.

a. Theoretical background

The integrated approach to MNEs is based on the *ownership-specific endowments of enterprises* (Dunning, 1977). The general theory of the firm that fits the needs of a good MNEs empirical analysis is the transaction cost theory of Coase (1937). This theory of the firm is based on factors such as company growth dynamics, markets, institutional rules, externalities, and microeconomic transaction cost analysis.

Nowadays, the economic agents are located in the market economies with *location-specific endowments of markets*. The understanding of institutions is very complex in the national and regional markets. The rules can be formal (regulation) and informal (networks, culture, and tradition). The relationship between rules and the innovation activities of enterprises is endogenous. Institutions (market mechanism, regulation, and tradition) are enhancing the technological growth and globalization. New technologies are introduced by supra-national enterprises regardless the formal and informal institutions which are outdated and deprecated (shared economy, UBER, and Airbnb), and state regulation is naturally pushed by new technologies to adapt and change. The analysis of supra-national networks, regional and local networks is necessary to understand MNEs (Loof, 2008).

The Coasian theory of firm led to the formation of new entrepreneurship theories which are tailored to the market mechanism economies with the protection of private property, and free market entry (Acs et al., 2009; Manzano & Monaldi, 2009). The analysis of MNEs goes beyond a national state which is “just a market” for them. It is just an opportunity to invest in the market where there are different institutions, i.e. better or worse business environment, protection of private property and also investment incentives (Gome et al., 2016). These theories are based on the evidence that MNEs are on average agents of prosperous change for host-country (Kwok & Tadesse, 2006).

One of the location-specific endowments of the host country is the country-specific assets (invested capital, labor force, land structure, and borders), level of knowledge (patent and utility model base) and the ability to absorb external knowledge (learning and education system). In other words, the actions of MNEs are tailored to local opportunities (Phene and Almeida, 2008). Some authors pointed out that countries can be rated and we can observe portfolio-like investments (high-risk, exploit strategy) in low to medium income countries and more long-term investments in countries with certain country’s income level (Mayer-Foulkes & Nunnenkamp, 2009).

Mixed strategies (portfolio-like and long-term) were observed in the Czech Republic between 1991 and 2003. There were many suspicious “unsuccessful” foreign investments of MNEs. After a year or two, the business plan of an MNE did not work out even with generous state support (not limited by regulation of the EU Commission). The joining of European Union in 2004 was the income-level threshold signal that Czech market economy is suitable for long-term foreign investments (Vokoun, 2016b) with tertiary educated and skilled employees.

The results of this study will be interpreted in the terms of Czech market as an opportunity for MNEs. We assume that ex-ante strategies of MNEs will be on average rather long-term oriented than short-term. The activities of MNEs are reflecting the Czech market. This market is a stable economy that is considered to be developed country; however, behind the so-called older European member countries.

The latest research is oriented at the importance of factors such as knowledge acquisition, spill-overs and sustainability and continuousness of R&D, and networks. These factors are

studied since first innovation surveys in the 1990s and they are broadening the understanding of these factors. There is an issue in some of the case studies usually in low-level journals. They are blindly generalizing their results with no regard to the *location-specific endowments of markets*. The importance of qualitative approach with respect to the national and global context is necessary (Cohen & Fjeld, 2016). The qualitative results for the Czech market suggest that older senior managers and enterprise owners obtained economic degrees at economic schools where Marxism-Leninism economic concepts were taught (Stellner & Szobi, 2013), but they were able to adapt with help of new generation of business analysts who were trained in MNEs, and thanks to the implementation of talent management (Kmecova, 2017).

The Czech currency is Koruna (CZK), i.e. not the euro, and the Czech economy has a specific position in the international trade. It belongs to the most open exporting economies in the world. More open markets, new trade treaties, and less import and export taxes are a great opportunity for the Czech economy even though there are risks in terms of higher currency fluctuations (Vanickova & Bilek, 2016). The Czech economy is one of the biggest exporters of the electricity in the world (7th in 2015). The mining industry and energy industry is under pressure of political interests which has a regional and global impact (Caha, 2017). Logistics industry and transport industry is of great importance because the Czech economy is in the middle of the EU.

Recent results from the papers dealing with globalization and multinational issues stress the importance of network interconnectedness (Golini & Gualandris, 2018; Baily, 2014), deterritorialized view of MNEs (Phelps, 2014), sustainable practices (Marcon, et al. 2017), open innovation, and platformization in the form of programming interfaces, software development kits (Nambisan et al., 2018). Berry's (2014) results show that American MNEs are more likely to do collaborative patenting when host country doesn't have many patents and that there is no significant difference across parent-subsidiary and subsidiary-subsidiary collaborations. Taxes have big part of impact of location of production and jobs. American and foreign multinational companies are discouraged by high taxes to invest more (Baily, 2014).

This paper has two hypotheses: (1) Location-specific endowments of markets: The innovation activities of MNEs are in a relationship with the technological level (or knowledge-level) of the industry in the Czech Republic. (2) Ownership-specific endowments of enterprises: There different innovation pull and innovation push factors of MNEs.

2. Data and method

The 4 datasets (2008, 2010, 2012, and 2014) of the Czech Community Innovation Surveys (CISs) are analyzed. Financial variables are in thousands of CZK, per one full-time employee, and are logarithmically transformed. An expanded version (Andersson et al., 2012) of a Crepon, Duguet, and Mairesse (CDM) innovation model (Crepon et al., 1998) is used for testing innovation hypotheses. Technology push, demand-pull variables have a value of one at high and medium importance level, zero otherwise. So-called "hampering factors" are barriers, which prevents a firm to innovate more. Demand-pull factors refer to information sources, technology push variables refer to a pressure of new technologies. Innovator firm is rather narrowly described as a firm which is identified as "*having non-zero R&D expenditures in the last three years and introduced a new-to-the-market innovation*". Firms with abandoned innovation projects are added to the sample of innovator firms. There is a bias in the estimation of CDM (Andersson et al., 2012), which will be taken into account in form of cautious interpretation.

Table 1: Summary statistics of the MNEs data sample of 4 CIS waves

Variable	Obs.	Mean	Std. Dev.	Min	Max
Innovator	6943	0.24	0.43	0	1
MNEs	6943	1.00	0.00	1	1
Sales	6943	2.01E+06	8937151.00	3	2.97E+08
Employees	6943	338.02	854.22	10	24509
R&D expenditures	3487	6.32E+04	439553.70	0.00E+00	1.51E+07

Source: Czech Statistical Office questionnaires

In the MNEs data sample, there are 24 % innovators (Table 1) which are less (54 %) than in the previous study (1998-2010). The dataset has no observations of micro (less than 10 employees) enterprises. This analysis thus describes rather the activities of small, medium and large MNEs. The industry technology classification follows the Eurostat classification (Eurostat, 2016) and there are 4 degrees of technological and 2 degrees of knowledge intensity.

Estimation strategy (Table 2) follows a process definition of innovation (the decision about innovation, the intensity of R&D expenditures, the innovation output, and the productivity stage). The innovation-decision and the intensity of innovation are estimated using the Heckman procedure, which controls for selection bias using a non-selection hazard variable (Mill's ratio) in the second equation. It is a random effect Probit estimation and general linear panel regression with Mill's ratio in the second equation in the terms of panel estimation.

Table 2: The first step of the CDM model

1st step	$r_{it}^* \begin{cases} 1 \text{ if } r_{it} = (X_{1it}\beta_1 + \varepsilon_{it_1}) > 0 \\ 0 \text{ otherwise } (r_{it} \leq 0) \end{cases}$
	$k_{it}^* = \ln(k_{it}) (r_{it} > 0) = X_{2it}\beta_2 + a_i + \varepsilon_{it_2} \text{ with } Df(k_{it}) = (0, \infty)$

Source: Based on Andersson et al. (2012)

Where $X_{nit}\beta_n$'s (with $n = 1$, and 2) are vectors of explanatory variables and ε_{itn} 's (with $n = 1$, and 2) are random-error terms. The vector of parameters to be estimated is denoted β_n (with $n = 1$, and 2). The first equation (r_{it}^*) accounts for selection into R&D activities. The r_{it}^* equals 1 if the firm (i) is an innovator (see method) in the selected period (t). The second linear equation (k_{it}^*) describes innovation input, which relates the log of internal and external R&D expenditures to the number of employees in a firm I , conditional of being an innovator, the a_i represents fixed effects component. The full CDM model is not analyzed because it would exceed the scope of this paper.

3. Results

The decision of MNEs to engage in innovation depended positively on firm size, being part of a group, technological level, knowledge level, and market orientation in the Czech economy in the period of 2008-2014. Same results were observed in the previous period (1998-2010). The only difference is the recognition of factors which hampers innovation activities (Table 3).

Table 3: Factors of innovation intensity of MNEs in the Czech Republic 2008-2014

Innovation intensity	Decision to innovate Random Probit	R&D Exp. per emp. (LN) Fixed effects
Number of employees (LN)	0.241*** (0.03)	0.327 (0.37)
Being part of a group	0.319*** (0.07)	-0.138 (0.45)
Technological level:	0.230**	-3.222

Low-Medium Tech	(0.10)	(0.41)
Technological level: Medium Tech	0.394*** (0.09)	-2.878 (0.62)
Technological level: High Tech	0.383** (0.15)	-2.781 (0.75)
Knowledge level: High	0.165* (0.09)	-1.427 (0.38)
Market orientation: National	0.486*** (0.10)	0.835* (0.44)
Market orientation: Europe	0.344*** (0.10)	0.517 (0.54)
Market orientation: World	0.686*** (0.13)	1.118* (0.60)
Year / Hampering factors	Yes/Yes	Yes/No
Constant; ln(σ^2)	-3.371***; 0.036 (0.18); (0.10)	3.098 (2.09)
Observations	6933	1577
R ² within		4.40 %

Source: Czech Statistical Office questionnaires, robust standard errors, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
 Hampering factors not included in the table but used in estimation

The only two factors which were in a relationship with R&D expenditures per employee were information from suppliers and the need to upgrade the production capacity of the firm. Newer CISs do not have information about innovation strategies and we cannot compare the results. The situation is quite similar. A number of employees, technological and knowledge level are not important for R&D expenditures intensity. This is expected result because MNEs are more likely to obtain knowledge and technologies from the headquarters located usually in the more developed country (Germany, Netherlands, Austria, France etc.), where the R&D activities are conducted. There are weak indices that there are changes in the period 2008-2014. MNEs that are competing in national and world markets are more likely to spend more money on R&D activities than firms competing in European and local small markets. The European markets are home markets for most of the MNEs located in the Czech economy so this is kind of default market for MNEs. Almost all the factors that hampered innovation activities were statistically significant and the high importance of these factors positively related to the decision to innovate in the previous period (1998-2010). The negative coefficient is also observed for the decision to innovate and the no-need-to-innovate-in-the-market variable in both periods (Table 3). In this period, the lack of credit (external resources) was an issue that hampered innovation activities. This can be explained in terms of the economic crisis that impacted the internal resources of MNEs. They had to apply for credit to maintain high wages of their employees and other project costs. Cooperation partners were not a problem or they were not required. The highest coefficient was the importance of information sources about markets (marketing research, acquisition of relevant market information, etc.) which are considered to be the source of competitiveness.

4. Conclusion

There are location-specific endowments of the markets in the Czech Republic and the ownership-specific endowments of multinational enterprises (MNEs) in the Czech economy between 1998 and 2010, and also 2008-2014 which was proved by this analysis. A panel of 4 Czech Community Innovation Survey waves is analyzed and the results suggest that MNE's size and market orientation is a positive factor of innovation activities of MNE. The location-specific endowments of the markets played an important role as well. The higher the

technological level of industry is the higher is the MNE's probability to innovate. MNEs in the markets with low-tech products or less knowledge-intensive services have a lower probability to innovate. The MNEs were consistently stressing the existence of a variety of hampering factors of innovation apart from technology and existence of prior innovation in both periods. There was a new factor that hampers innovation activities of MNEs. It was the lack of credit and other external sources. MNEs had issues to get resources because of the lower incomes from sales after the economic crisis hit the Czech markets.

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DIGITAL TECHNOLOGIES OF MANAGEMENT IN A GLOBALIZED ECONOMY

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Abstract. At present, due to the large-scale growth in the level of informatization of all spheres of public life, business processes are re-evaluated in order to maximize the effect of production and economic activities. Regardless of the company field of activity, industry, trade, construction, services, etc., there is a need to improve the efficiency of business processes through engineering or reengineering. Of all business processes, the most manageable ones are the functional processes at the subdivision level, as well as the processes at the lower level of decomposition; those that are performed by one person at the workplace. Research data shows that when dealing with unstructured processes, initially people organize themselves. Further, in the course of systematic self-organization, the risk of a complete loss of controllability of the organization increases, which makes it impossible to achieve the desired goals within a single structural unit or the whole company. This activity is traditionally accompanied by a surplus of resources (highly paid managers and specialists), which affects the cost of solving the problem, and the issue of information support of interfunctional processes becomes an especially pressing one. The rapid development of information technology in recent decades has resulted in need to manage consciously the process of developing a software product. In this regard, the issue of choosing the means, methods and approaches to software development is relevant as never before.

Keywords: resources, management, economy, organization

JEL Classification: O32, M11, F66

1. Introduction

The world today is developing under the influence of the tendency for globalization (Fama & French, 1998; Broner & Ventura, 2011; Hitt et al., 2006; Neto & Veiga, 2013; Palich, et al., 1995; Verbeke & Ciravega, 2018). One of its prerequisites is the rapid development of information and communication technologies. The level of digitization and informisation of a Business is one of its main distinctive features determining its competitiveness (Alcácer et al., 2016; Chen & Kamal, 2016; Ciborra, 2006). It results in the need for efficient management of the various software employed by the company. Currently, the need to manage the development of software products is caused by the increasing complexity of software. As a result, the number of development teams grows, new roles emerge in them, which leads to the need to accurately coordinate the actions of team members (Selyavka, 2015).

This trend is also observed in business, where the financial success of the company is increasingly dependent on the automation of information flows, and where, with the right

approach, software and related infrastructure can become a cost-cutting factor and contribute to forming a valuable offer for the client (Berzakova, 2015; Bodrunov et al., 2017). At the same time, the involvement of IT technologies can be traced literally in all processes and is strongly related to the size of the business unit itself. The efficiency of a business as a whole depends on how well the product or service picked for the client matches their expectations, how quickly the development and release are performed, how well the delivery is organized, how efficient the transaction analysis is (Volkova and Plotnikov, 2016).

This article deals with the specificity of using digital technologies in company management, the Russian business sphere serving as an example. This approach is determined by the fact that institutional conditions in various countries have a great deal of influence on the methods of application and distribution of IT technologies. Additionally, the use of digital technologies in management is affected by the level of socioeconomic development. All of that points to the significance of taking regional specifics into account.

2. Digital Technologies in Management

2.1 Development Tendencies of Business and Services Sector in the Circumstances of New Developments in Software and Programmatic Management Systems

Currently, the Russian market has a large number of software products designed to simplify the processes typically run by organizations. Among the most noteworthy Russian software products are the following: INTALEV: Corporate navigator (INTALEV), Business Engineer (BITEC), ORG-Master Pro (Business Engineering Group). The most popular foreign software products include: CA ERWin Process Modeler, formerly BPWin (CA), ARIS Business Performance Edition (IDS Scheer AG), Hyperion Performance Scorecard (Oracle), SAP Strategic Enterprise Management (SAP), IBM WebSphere Business Modeler (IBM).

It is necessary to take into account the fact that the purpose of Russian software developments is primarily to describe/engineer a company's activities. As a rule they provide capabilities necessary to describe almost any process in various subject areas. Foreign producers are more oriented toward the execution process. For the most part, their products present one or more modules in the software product line, which is provided by the developer. Duplication and geographical distribution of successful business projects pose new challenges for developers, such as coordination and consolidation of IT technologies of individual projects. A new opportunity has emerged to use Internet technology in managing information flows. These technologies are now becoming an indispensable basic part of typical software solutions, even for small businesses.

When choosing a software product model, one should try to take into account the complexity and variability of not only internal, but also external environmental factors of the company that are not dependent on its activities, but have an indirect effect on the use of software within the company. In other words, it is recommended to take into account all that relates to the company's business environment – a set of political, social, economic and technological reasons, the analysis of which does not always take place (Volkova, 2015). For example, the choice of a methodology with a high product quality but at the same time lengthy cycles and high development costs, is subject to the risk of underfunding due to high costs if the external economic conditions deteriorate, or the risk of early termination due to changes in the customer's objectives.

The process of choosing a software product for optimizing business processes should be preceded by the formulation of the company's main goals and objectives and formalizing the strategy. For clarity, one can place it on the strategic map chart. Each indicator is given a target value and a date by which it should be achieved, as well as a plan to achieve it in the distribution in the selected measurement period. Employees can be appointed who can have the right to control the values of specific indicators, as well as identify the people responsible for tracking these values.

Having a formalized strategy, you can start designing the company's business processes, that is, identifying the activities that the company's employees must perform in order to implement the company's strategy and achieve its goals. In today's market environment, the competitiveness of an enterprise is greatly influenced by the quality of its products or services provided and the availability of opportunities to meet the needs of consumers. A primary tool to manage and ensure the quality of products or services and the timely identification of customers' needs is a quality management system that operates in accordance with ISO 9000 standards. According to the requirements of ISO 9001:2008, a quality management system needs to be documented and all documentation must be maintained up-to-date.

One of the principles of the ISO quality standards is the continuous improvement of the management system. To do this, it is necessary to conduct a systematic analysis of inconsistencies, their consequences, as well as the causes of their occurrence. This will quickly identify shortcomings, their causes, opportunities for improvement, and plan changes and monitor their effectiveness. All this can be done through the software used. If one refers to the scope of literature devoted to the analysis of cross-functional business processes, the information it provides is not comprehensive. A number of researchers, among them V.G. Eliferov, V.V. Repin (Repin, 2011), M. Hammer, D. Ciampi, and J. Harrington, offered a variety of ways to manage cross-functional business processes, which, however, have a number of shortcomings.

First, the "no change" approach is only one of the steps in organizing the management of business processes in the company and is not limited to the framework of the basic approach. Secondly, the principle of "organization of the group around the process" in practice is only locally applicable, i. e. only part of the company's activities are used. Thirdly, in the system of "matrix management" the structure is very sensitive to the availability of resources. A lack of project managers in the operational management system can easily transform the matrix system into a linear-functional one. Fourthly, the system of "supervision by the top management", which suggests entering the process and seeking to study all problems in a short period of time, reduces the effectiveness of these decisions to zero due to a lack of understanding of the main causes of these problems. It should be noted that none of the currently developed approaches to managing end-to-end processes for use in companies that are oriented and engaged in the development and implementation of innovative technologies can be called effective.

One can conclude that one of the problems in the organization of end-to-end business processes is the chaotic nature of the distribution of "key" information between the group of executors and higher-level managers (this is especially true for small and medium-sized organizations). That is explained by the fact that modern methods of working with information suggest the use of various ways of conducting administrative and economic activity, and binding information to one carrier causes a delay in the targeted receipt of information necessary for making a swift and timely decision or performing specific tasks within the specified timeframe.

The solution to this problem is to use the technology of the "cloud field". This is an area in which the activities of all employees of the company or of a separate unit involved in the implementation of cross-functional business processes are united into a single information field. This field contains constantly updated information about the progress of the business process. This allows managers to monitor progress and make adjustments in real time, and for each specialist involved in the process, there is an opportunity to contribute their share to the collective work and the end result by performing their specific sub-tasks (Begashev, 2014). "Cloud storages" provide opportunities to keep information related to ongoing business processes up-to-date, which allows specialists to track the progress of tasks, while providing each of them with all relevant data on the project to ensure the best possible work productivity (Volkova & Plotnikov, 2016).

Structurally organizing work through "cloud" services allows building team processes in an optimal way. This leads to: (1) autonomizing the activities of teams; once duly empowered, they have the opportunity to independently make decisions and coordinate activities horizontally; (2) the replacement of rigid bureaucratic administrative ties with more flexible ones; (3) involving employees from various divisions, regardless of their physical distance from the main office (subsidiaries, branches, etc.) in the development and dealing with day-to-day of tasks.

In conclusion, it should be noted that a significant systemic effect in the management and optimization of end-to-end business processes within teams can probably be achieved only in the situation where company executives actively participate in all stages of process work (Begashev, 2014).

2.2 Business Sphere Experience of Introduction of Distributed Management Systems

Ideas of using distributed systems based on microprocessor devices have attracted developers since as early as the 1970-80-s. Devices of the analog type used before the era of microprocessors were basically a distributed (at least, functionally) system that allowed to achieve high rates of overall survivability, as the failure of one of the devices led to the loss of a certain number of functions, and the available redundant or parallel channels ensured that monitoring and control systems were ready and able to perform the most important tasks. At the same time, these devices were characterized by low reliability. The use of systems of this type resulted in an increased risk of loss of control and a decrease in system availability.

For any kind of management or control, the essential basic characteristic is the presence of an object, measuring elements and a governing body. The objects of management are extremely diverse: they include technological processes at various enterprises, branches of the national economy, energy, etc. Since the control loop in complex automated systems necessarily implies the presence of a person, a portion of the functions is assigned to them, and often those are the most responsible ones. Several types of management can be distinguished: centralized, distributed and hierarchical.

In centralized management all processes of management are implemented through a single central control body (controller). This body collects information on the status of all managed objects, processes that information, and then assigns its own management team to each of the managed objects. Commands also present a kind of information that is described as administrative. In systems of this type, the control body is perceptive of the behavior of its controlled objects and always retrieves feedback about the state of these objects. Decentralized (distributed) management suggests the distribution of management functions among individual

elements of complex systems. In order to effect an impact on each object, only data on the state of that object is required. In fact, such systems are collections of several independent systems that have their own databases of information, as well as technical, algorithmic and other databases. An illustration of the advantages and disadvantages of centralized and distributed control systems as a whole is shown in Tables 1 and 2.

Table 1: Centralized Management: Pros and Cons

PROS	CONS
Since every controlling impact is calculated based on the aggregate data about the system, there is potential to implement a wholistic optimum approach to managing the system	It is necessary to collect and process huge volumes of data
The implementation of systemic informational interactions is simplified	It is necessary to possess storage capabilities of very large volumes
Adjusting the ever-changing system-wide data is easy	It is necessary to use computing devices of great performance capacity
There is capacity to achieve maximum efficiency with a minimal use of redundant technical means	Reliability standards are extremely high (regarding both the software and the hardware used) since a critical error encountered by one element may partially or fully incapacitate the whole system
	If there are objects in the system that are located at a significant distance, the aggregate length and load of communication lines becomes go beyond normal values

Source: (Denisenko, 2009)

Table 2: Decentralized Management: Pros and Cons

PROS	CONS
It is not necessary to collect and process huge volumes of data	It is possible to encounter multiple control methods with the same kind of object
It is not necessary to possess storage capabilities of very large volumes	A management system of this kind of very expensive
It is sufficient to use computing devices of average performance capacity as long as they operate fast	The volume of the information processed decreases, which ultimately leads to a lower quality of management
Reliability is high because a critical error encountered by one element does not result in a system-wide failure	
Communication lines do not experience overload	

Source: (Denisenko, 2009)

As already mentioned, an important role in any automated systems belongs to the organization of data exchange, and distributed systems are no exception. Fuelled by the proliferation of new information technologies, which are based on the advanced ideas of microelectronics that emerged in the last quarter of the 20th century, significant changes have occurred in a wide range of areas of production activity. These achievements are based on the use of a wide range of digital algorithms and a variety of data processing tools. The use of new technologies leads to a significant simplification and acceleration of the processes of data transfer and exchange. As of now, significant experience has been accumulated on the introduction of distributed systems of various kinds, as well as on the integration of disconnected systems into a single distributed system.

Shifts in the direction of functional distribution in management systems are combined with the centralization of the architecture of the information systems themselves. They are expressed in users' refusal to use complex individual information systems in favor of simplified options, from the point of view of these users, and the transition to centralized architectures that use

interfaces based on browsers; such systems are called Web-centric. These systems are more intelligent, they have more opportunities for self-organization, and their operation does not often require the interference of specialists.

3. Conclusion

The rapid development of information technology in recent decades has necessitated developing a conscious approach to managing the process of software product development (Grechenyuk et al., 2016). In this regard, the issue of choosing the means, methods and approaches to software development is relevant as never before. This trend is also observed in business, where the financial success of the company is increasingly dependent on the automation of information flows. The involvement of IT technologies can be traced literally in all processes, and efficient IT solutions more often than not mean efficient business operations and therefore significantly contribute to the ultimate commercial success of a business. That means that a well-chosen software product matching the specifics and goals of the company is of great importance to business. In choosing a software product model many factors descriptive of the company's business environment must be taken into account, including a set of political, social, economic and technological reasons.

One of the challenges in the organization of end-to-end business processes is the distribution of information between the group of executives and higher-level managers. The solution of this task is cloud technology. This technology facilitates uniting all business processes in a single information field. As already mentioned, an important role in any automated systems belongs to the organization of data exchange, and distributed systems are no exception. New information technologies have triggered significant changes in many areas of business operations. These achievements are based on the use of a wide range of digital algorithms and a variety of data processing tools. Using the latest technologies leads to a significant simplification and acceleration of the processes of data transmission and exchange. At present significant experience has been accumulated on the introduction of distributed systems of various kinds, as well as on the integration of disconnected systems in a single distributed system.

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OPPORTUNITIES FOR STUDY OF UNIVERSITY GRADUATES PROFESSIONAL REALISATION USING WEB BASED TOOLS

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Abstract. Dramatic demographical changes in parallel with changes in behaviour of young people following difference in values due to generation specifics and worldwide open labour market due globalization lead to necessity of reconsidering the type of education that young people must receive in Bulgaria. Main challenges standing in front of high schools and universities identified in regional aspects are related with huge discrepancies between demand and supply on the labour market. For boosting the solution of that problem, the government introduced new legislative framework, which bounds the governmental subsidies for tertiary education with level of professional realisation of graduates. This sets lot of challenges before educational institutions related with issues how to measure the level of employment under obtained specialty and how to keep in touch with graduated students in globalized environment. The paper objective is to provide description of a solution for study of university graduates professional realisation via web-based tools. After an analysis of literature, Bulgarian national policy for development of higher education and national legislation as well as best practices in University of Ruse a structure of web based database, including e-CV is developed. The proposed solution includes insertion of specific IT tools in existing systems for study of professional realization of graduates, which will motivate young people to provide necessary information to university in a long period after graduation at low price for the institution. The mechanisms for motivation of young people following generation specifics, element of the IT solution and compliance with GDPR are discussed.

Keywords: study of professional realisation, web based database, tertiary education, labour market, youth employment

JEL Classification: F66, F68, I23, I28

1. Introduction

Fast transition from employment to first job corresponding to achieve education is a challenge for every young person. Nowadays the main problems that arise before graduates are

serious discrepancies between supply and demand on the labour market, who operates in world of changes in work values and expectations of new generation towards the job, workplace, salary, social benefits and work- life balance. Environment in which young people search their job is characterized by trends as globalization of labour market, increased workforce mobility, gig economy, flexible worktime, raising self-employment, overqualification, overeducation (Acosta-Ballesteros et. al, 2018), new technologies, long life learning, gender equality issues, raising requirements for equity of work. The labour market was shaped by educational expansion (Gangl, 2002), which increased the number of people obtained education and expecting economic benefits from it. The challenges in the labour market in Bulgaria follow the main European trends and have some national specifics. Last 30 years of political, economic and societal changes brought nowadays labour market to critical situation. Last three decades huge demographical changes took place in Bulgaria. The official statistics claims that from 8,5 million people the population dropped below 7 million for 30 years due to emigration processes and decline in birth-rates (Bogdanov, 2018). The prognosis for next decades are even worst – it is expected that until year 2060 according realistic scenario the population will be about 5,4 million people. The emigration process leads to huge brain drain as a vast part of educated young people left the country. Migration processes foster movement of young people from small settlement to Bulgarian capital. The demographic crisis due to dropped level of births during 90's lead to insufficient number of specialists with high education and increased demand of labour force in many sectors. These discrepancies follow the changes in educational choices of young people and the values formed by their families. White collar specialties in the fields of Economics, Business administration and Law became more and more attractive, while technical knowledge and engineering specialties and STEM are underrated and rejected as non-prestigious and difficult. As a result many young people graduated without opportunity to start work, related with obtained specialty.

In addition to local trends young people who are entering to the labour market carry new values and perceptions for the required job. Those one, representing Generation Y (18 to 29 years old), born between 1989 and 2000 are the most demanded employees by employers, (Othman et. al, 2017) from the other hand they are overconfident, have predominantly high expectations of their employment (Twenge, 2013, Deloitte, 2018), opportunity and progression (Maxwell & Broadbridge, 2017). They are team-oriented, able to multitask, technologically savvy and driven to learn (Radulescu et al., 2018), needful empowerment (Kim et. al, 2018), “digital natives”, because internet was available when they were children, they are born with technologies (Twenge & Campbell, 2012). From other side they are lower in creativity, report higher narcissism, possess weaker work ethics than previous generation, are less inclined to read long passages of text and are more extravert and leisure-values oriented than earlier generations (Twenge & Campbell, 2010). Employers face difficulties to respond to all requirements of potential employees, which leads to delay in first job, preferences for emigration, often work migration and short periods of employment followed by search of better work place. Those trends of lack of qualified people in some sectors, overeducation and youth unemployment provoked in 2015 changes in Bulgarian legislation, concerning funding of state higher education institutions (HEIs) bonding 40% of the subsidies with realisation of graduates with application of obtained education and level of incomes.

In 2016 National evaluation and accreditation agency of Bulgaria (NEAA) introduced new Criteria system for institutional accreditation of HEIs, which poses new approach for evaluation (NEAA, 2016) based on Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG) of ENQA (European association for quality assurance of higher

education) (Thune, 2005). Following the European standards for the responsibility of higher schools to improve the quality of training as a result of interaction between teachers, students and institutional environment, the criteria focus on the education institution (higher school) policy on the "life cycle" of students (admission, progression, graduation and realization). The best indicator for measurement of quality of education appears to be employability of graduates and duration of the period of university to work transition. Tomlinson (2017) proposes conceptualisation of employability as composition a range of dynamic, interactive forms of capital which are acquired through graduates' lived experiences. The five main types of capital include human, social, cultural, identity and psychological capital. During the transition to employment individual internal factors, formed by gained diverse forms of capital play crucial role and together with external factors (Boudreau and Boswell, 2001), resulting from current state of environment influences on the duration of transition and quality of obtained job (Yordanova, 2018). In this environment the partnership between university and employers and existing labour market policies are the main preconditions for encouragement of employability of graduates. Pursuing the vision for necessity of HEIs active role for encouragement of employability, within a framework of legislative requirements and major changes in environment set a lot of challenges before educational institutions related with issues how to measure the level of employment under obtained specialty and how to keep in touch with graduated students in globalized environment.

The paper aims to present an interactive solution for permanent study of professional realisation of graduates of University of Ruse via web-based tools. The proposed idea corresponds to some of main behavioural characteristics of Generation Y and claims for sustainability potential.

2. Concept for web-based tool for study of professional realisation of graduates

2.1 Purpose of proposed solution - IT tools for study of professional realization of graduates

University of Ruse (UR) is one of the largest universities outside the capital of Bulgaria with up to 10 000 students. In UR there is a strict policy for assurance of quality of education, career orientation and study of professional realisation of graduated student. In 2005 University Center for Career Development (UCCD) was established aiming to "provide high quality services for professional orientation and development of students and graduates". UCCD introduced web based information system (Pencheva et al., 2015) assuring services for students, employers and allowing collection of information for administrators from university and UCCD. The systems have following functions:

1. For students - information about job and internship positions announced in the system and sends automatically e-mails with news and new position announcements. Students can join the virtual faculty Alumni club. Students receive also invitations for events organized by UCCD-fairs, in company visits, presentation of companies in university and many more. The information is available also in the website of UCCD. Current system provides graduated students with same information if they prefer to keep their account. After graduation students can provide personal e-mail.

2. For companies – posting and if necessary editing information about company and opened positions. Employers can add their employees in virtual faculty Alumni clubs.

3. Administrators can manage content and profiles and provide help of system's customers and to generate reports about number of system's visits and activities performed.

The system must allow collection of information and analysis of realisation of graduates and their professional development, which complies with requirements of NEAA and national legislation.

Administrators from UCCD encounter one main problem while using the system - graduated students are not very active and use the system rare after completion of their education. The proposed solution includes insertion of specific IT tools in existing systems for study of professional realization of graduates, which will motivate young people to provide necessary information to university in a long period after graduation at low price for the institution. It includes virtual CV self-instructor, several CV forms, variety of CV templates, option for online CV filling-in and function for online CV modification including summarization of information about work experience and / or training suitable for different job position purposes.

The idea is evaluated as valuable for few reasons - (1) young people face difficulties while preparing their first documents for job application and interactive CV self-instructor will allow them to prepare documents easy and to learn while doing it. (2) They prefer to receive information in accessible, convenient, and interactive way, which will encourage the system's use. (3) Young people increasingly use mobile technologies to access information and support in day-to-day life (Waite-Jones et al., 2018; Panova & Carbonell, 2018). There is a raising share of young people use and even tend to overuse Internet every day, (Szymanski et al., 2017; Kuss & Griffiths, 2011) preliminary by their smartphones (Demirci et al., 2015). The web-based system will reply to this trends by friendly interface, based on responsive web template for better access via mobile appliances. From the other side existing work places for high skilled employees are presumably accepting computer capital as routine (Deming, 2017) and should have appropriate information culture to perform successfully their designated functions and information management tasks (Nedyalkov, 2014) and the system is an opportunity for demonstration of computer literacy. (4) Young people tend to change often their jobs, which requires often update and preparation of targeted documents for every job announcement. The flexibility of the system is useful due to the function for choice which part of CV to be included and with what extend of details.

2.2 Functions of the system and data base

The goals of the proposed solution are (1) to train students how to prepare CV on interactive way, (2) to establish flexible IT based solution which is interesting and useful enough to gain loyal users, thus (3) to provide relevant data about gradates employment and long life learning at low price by analysis of filled in information and regular enquiries; (4) to ensure reliable and secure connection between students, graduates and employers by sending information about internship and job offers to students and facilitate employers with option for filtering the database by characteristics of potential employees for sending targeted job announcements; (5) to collect information about employer's opinion referring to quality of education and realisation of graduates.

Functions for students are divided to few elements: 1) self-education for preparation of documents necessary for job application, 2) filling in online CV which is interactive, allows use of different formats and is easy to update and 3) obtaining information for recent announcements form firms.

Every student after accession in university receives students' account, used for log in internal university e-network, which includes e-mail. The account can be used for registration in UCCD

database for receiving information about available internships and jobs, invitations for events organized by UCCD - fairs, in company visits, presentation of companies in university and many more. The information is available also in the website of UCCD. Graduates can keep the account and thus they have permanent lifetime access to informational resources of UCCD. They can change the e-mail for registration in UCCD with personal one. Self-education module includes instructions for filling in CV. Each CV contains obligatory elements like personal information, work experience, education and trainings, languages, and personal skills - communication, organisational, job-related, digital and other skills and hobbies. Information about drivers 'licence, awards, memberships, publications and references can be added is applicable too. For each element of every CV part user can add personal description, which facilitates further selection of information if the document is targeted for specific position application – i.e. work, education and trainings related with chosen knowledge or skills – i.e. financial management, mechanical engineering, etc. Young people face difficulties in defining their skills and are not able to present themselves in best way in the CV. This is why the proposed tool provides detailed description of each skill, that the user might choose and gives an option for description of the way each skill is achieved. There are several tests for self-evaluation and career orientation included, aiming to provoke additional users' interest toward the module. Once prepared, the CV can be modified with regard to size of content and template of the document. Individual CVs for different purposes can be created and saved. Each created file can be downloaded in doc or pdf format. The system allows user to sign in to a cloud service and to place all files there and to edit them. Friendly interface, based on responsive web template guarantees better access via mobile appliances, which are the main tool for communication of young people. In addition the module proposes the option for document uploading – user picture, diplomas, certificates, references, awards etc. Students can use the system for checking available job opportunities divided by sector, location of the company, and requirements for work experience, knowledge and skills. They can apply online for every position by submitting letter of interest or motivation letter and CV by e-mail. The system contains trainings (video and power point presentations from real trainings that took place in university) including topics “How to prepare CV”, “How to prepare motivation letter”, “How to behave during interview”. Proposed functions fit to the needs and specifics of Generation Y and Bulgarian students. As students will fill in their first CV during study the flexibility and attractiveness of the system might motivate them for further use. Young people tend to develop “boundaryless career”, described by Sullyvan (Sullyvan, 1999) as Employability for performance and flexibility, in multiple firms, requiring transferable skills. Young people measure success by psychologically meaningful work, including On-the-job training and learning related. All aspects of the proposed solution might reflect these characteristics and motivate young professionals to keep up-to day their CV.

Functions for employers include posting of announcements in the system through the website of UCCD, search by filters among registered users due different criteria (education, graduated specialty, level of education, years of work experience, languages, skills and desired work position), option to send announcement to selected number of specialists through the system. Protection of data is assured because personal data – names, address, phone, e-mail, etc. are hidden and the only possible interaction is e-mail exchange. Company's contact data are hidden too in sent announcement, which also requires interaction between stakeholders through the system. Employers get primary registration after UCCD approval and fill in information about company, free positions, requirements toward employees, benefits coming from work in the company and any other relevant information, which might attract candidates. Every received announcement is checked by the UCCD officer before posting approval. The

advantages of proposed solution lie not only in protection of data. Students are able to apply with their CV and motivation letter, prepared purposively for every job announcement online, which saves time. Employers save time for first phase of selection process. System's effect and use can be measured, e.g. number of students visited single job offer, number of sent applications etc. All personal data shall be preserved according new legislation – GDPR. Each user will be able to choose if his personal data will be used and in which way. The system will provide option for account erasing. Additional functions for administrators not mentioned above include generation of different analyses about system use and from enquiries. Two types of enquiries are proposed. First are random short enquiries, which appear during the user login and collects answers about users' evaluation of the system. Second group of enquiries shall provide administrators with information of user's current employment status, type of employment, relationship with graduated specialty, size of salary etc. This information can be obtained once a year and gives a picture about employment state of graduates with option for dividing respondents by specialty, year of graduation, age, location and other important factors. Employers receive also once per year questionnaires aiming to evaluate use of the system, satisfaction from employed graduates, requirements toward students' education and plans for hiring new specialists. The system is able to send questionnaires to all registered users or to clusters of them and to process obtained data similarly to Google enquiry form. The system is able to provide visualization of results - charts, graphs and tables and have function for downloading in most common file formats - spreadsheets and documents (doc and pdf). Administrators and university will be able to collect information about professional realization of students, opinions of the business and graduates concerning quality of education. Proposed solution can serve as a tool for prognoses for future need of work force in the region.

2.3 Stakeholders using web-based tools

Stakeholders in this process are students, graduates, business and university.

The benefits for students and graduates are improved skills for preparation of documents for job application, ready flexible and time saving CV in different languages, suitable for every job position and constant access to information about free places in labour market and news in UR. Employers benefiting from access to information about graduated students. The practice in UR shows that business is interested in specialists, graduated last 2-3 years. The reason is that after labour market entrance young people manage to acquire habits to work – discipline, practical experience, team work, time management orientation in organisation's goals and obtained professional orientation which prevent fluctuation between jobs. University receives information about realization of students, real demand in the labour market and get evaluated about the quality of provided education. The contacts of graduates are up to date, which declines the expenses of information collection. Graduates stay up to date with news in the university and thus their relationship is maintained. Students are able to join the alumni club groups of UCCD system and this way to communicate with their fellow-students and to exchange information with them.

3. Conclusion

HEIs in the globalized world are challenged in providing high quality of education with correspondence to business needs, and referring to accreditation criteria and international ranking systems. Employability of graduates and short transition period from education to work is the best testimonial for curricula and work of professors. The feedback from graduates and employers can be very useful for adaptation of education to future needs on the labour market.

If the study of professional realisation of graduates is implemented in accordance with generation characteristics – use of internet, mobile appliances, presentation of information in interactive way with more visual stimulus and less reading young people can get motivated to maintain closer connection with educational institution.

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SIMULATION AS A MODERN AND EFFECTIVE METHOD FOR MEASURING HEALTH QUALITY THROUGH THE ASSUMPTIONS OF BENEFITS AND INVESTMENTS WITHIN THE GLOBAL ENVIRONMENT

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Abstract. Predictive technology and simulation methods attract more widely attention of experts in many areas. Maintaining competitiveness and increasing the level of service requires organizations to change constantly. This research paper is devoted to the simulations and their significant place while creating possible combinations and various alternatives scenarios, which were included within the model and can occur in reality. The first part is focused on core description of simulation as a measuring method of the health quality at the level of enterprise, region or globally. Specifically, there is outlined simulation as a dynamic model in which phenomena occur in the same sequence as in the model system. The essence of the simulation benefits methods for the field of operational research can be observed mainly in facilitating work with dynamics and complicated probable links. If it is possible to create an analytically solvable model that reflects the essential aspects of reality, it is necessary to prioritize it because it is usually more general, and its construction and solutions are less costly. The second part is concerned with initiatives and disadvantages outgoing from the utilizing simulation models. When performing simulation or creating a model, certain limitations must be recognized. Actual systems are very complex, and the details must be determined to be captured in the model. The last part is tackling by model example of simulation handled in Excel program.

Keywords: simulation, prediction, health quality, model, global

JEL Classification: C15, C53, E17, F01

1. Introduction

Simulation as a method of business process analysis is a modern tool for analysing complicated service, supply and production processes. Simulation as a measuring method has significant value for measuring health quality at the level of enterprise, region or globally. (Antonelli, 2018; Burton, 2018) It allows to anticipate future development and point out on potential threats. It is a method that allows a manager to predict the behaviour of the system while changing internal or external conditions, optimizing business processes according to specified criteria, using the PC model of the business process. (Vagner & Bartosova, 2017; Bisceglia, 2018)

Shannon defines simulation as a real-system model design process and conducting experiments with this model to understand the behaviour of the studied system and to evaluate

different system variants, examining the results of changes in the system or in the work procedure (Shannon, 1998). The key terms in this definition are the model and system. A model means a representation of a group of objects or ideas, and under the system we understand a group of mutually connected elements cooperating to achieve a goal (Peralta-Alva & Santos, 2010). If the examined system is simple, its model can be solved by analytical methods. However, most systems are too complex that it is not possible to construct a simple mathematical model that would faithfully represent it. (Bhat & Sidharthan, 2011; Bhargava, 2017)

1.1 Significant reasons for utilizing simulation methods and their limitations

Methods related to simulation have several *benefits* over analytical and mathematical methods. This is a good way to justify a strategy for company management and customers, because simulation models are more comprehensible than mathematical models of linear programming. (Dlouhy, 2007; Heathcote et al., 2017) In addition, simulation models tend to be more trustworthy because their behaviour can be directly compared to real system behaviour, even in the case of simulating history or verifying the correctness of the model using accurate historical data, and requiring less simplistic steps, so they can capture more realistic features studied system. Experimenting with a real system can be very expensive, lengthy, even impossible in certain situations (Kliestik & Majerova, 2015). Computer simulations are repeatable, and the data obtained from them facilitate for interpretation and reduce the amount of unpredictable statistical summaries. Recently, there has been an increase in the utilizing of simulation programs in education, for example in the study of medicine, where there is an obvious advantage, for example, in the possibility of testing the correct dosing of medicine on computer models instead of testing in patients (Challet, 2018).

The utility of simulation experiments depends on model quality and model maker quality. Simulation models are so-called "input-output models, according to the quality of the input data, the system behaves at the output (Falat, 2011). An important consideration in the relationship between the real world and the model is the validity of the model (in the example with medicines it would mean that it must accurately mimic human responses to a particular dosage). The validity of the model, i.e. exactly how the model represents the real world, is judged by the degree of matched match between the data generated by the model and the data obtained from the real system (the program must therefore be considered). (Durana, 2017; Mukuria et al., 2017)

Although the use of simulations is very positive, there are some *disadvantages* that come with it. Simulation modelling is a craft unconditionally requiring study or even specialized training and a lot of experience. (Constantini & Kunst, 2011; Lim & Meer, 2017) The collection of reliable input data itself can be time consuming and outputs are sometimes controversial, with inadequate data being highly misleading (Upper, 2011). In addition, the correct data cannot guarantee that the simulation result will be good. Generally, the result of the simulation depends on both the quality input data and the perfect model. In other cases, simulation results are often irrelevant. (Tverdokhlib, 2010; Grieco & Mcdevitt, 2017) Therefore, simulations are used "only" as a support tool for decision-making that can analyse system behaviour and perform experiments with settings of its properties and surrounding conditions. (Fanelli & Palomba, 2011; Kawano & LaLumia, 2017; Beaudry et al., 2018)

2. Model example of simulation for waiting order fulfilment handled in Excel program

The process of building this model example is based on the study of author *Erdem* (2017). First, it is necessary to create tables of the order arrival time (table 1) and ordering time (table 2), in which we determine the frequency, cumulative frequency in percentages and time. Values are assigned subjectively. (Atkin et al., 2017) We are based on an operating sequence with 2000 data, then in Excel, in Table 3 in the second column, we assign random numbers of incoming orders ranging from 0 to 100. In the third column of table 3, the arrival of the order requires the VLOOKUP function with the values in Table 1, namely the cumulative frequency in percentages and time together with the relevant retention values. In the next column, we define the range of random numbers for the order fulfilment of the range from 0 to 100. In the third column in the second row, the value is credited to the first value and the column is restored. In the fifth column, time for order fulfilment we will use the VLOOKUP function once again and we will use this data from the ordering time table 2. In the following column, starting with order fulfilment is based on the arrival of orders. The end of the order fulfilment is determined by the IF function, which is the condition to leave before get order, to start order fulfilment and to the time for fulfilment order. The waiting time for the response in the eighth column will depend on starting with the order, and it is important to set the maximum starting order value. In the ninth column leave before get order values are determined by the IF condition, considering the waiting time for the response. The waiting time for order fulfilment in the 10th column is determined by using the IF function in the second line, using the order arrival and end of order fulfilment. The number of orders in the row in the last column is calculated by using the COUNTIF function from the data of order arrival, the end of the order fulfilment, and the operating sequence. (Heidheus, 2017)

Table 1: Time interval of orders arrival

Time interval of orders arrival		
frequency	cumulative frequency in percent	time
9	0	1
20	9	2
28	29	3
17	57	4
8	74	5
2	82	6

Source: Own processing

Table 2: Ordering time

Ordering time		
frequency	cumulative frequency in percent	time
3	0	1
27	3	2
30	30	3
13	60	4
7	73	5
3	80	6

Source: Own Processing

Table 3: Order fulfilment database

Operating sequence	Random number of order arrival	Order arrival	Random number for order fulfilment	Time for order fulfilment	Start with fulfilment	End with fulfilment	Waiting time for response	leave before get order	waiting for order	Number of orders in queue
1	56	3	39	3	3	6	0	0	0	0
2	64	7	64	4	7	11	0	0	1	0
3	62	11	0	1	11	12	0	0	0	0
4	76	16	100	6	16	22	0	0	4	1
5	31	19	71	4	22	26	3	0	0	1
6	45	22	18	2	26	28	4	0	0	0
7	98	28	64	4	28	32	0	0	0	1
8	49	31	3	2	32	34	1	0	0	0
9	41	34	37	3	34	37	0	0	0	1
10	1	35	52	3	37	40	2	0	0	1
11	63	39	56	3	40	43	1	0	0	1
12	54	42	63	4	43	47	1	0	0	1
13	59	46	31	3	47	50	1	0	0	1
...
1992	38	7006	23	2	7021	7023	15	0	0	3
1993	57	7010	97	6	7023	7029	13	0	0	3
1994	96	7016	93	6	7029	7035	13	0	0	5
1995	95	7022	29	2	7035	7037	13	0	0	4
1996	87	7028	83	6	7037	7043	9	0	0	5
1997	4	7029	80	6	7043	7049	14	0	0	5
1998	21	7031	49	3	7049	7049	18	1	0	4
1999	11	7033	99	6	7049	7049	16	1	0	3
2000	97	7039	94	6	7049	7055	10	0	0	3

Source: Own processing

From the data obtained, it is possible to determine the average waiting time, ratio of leaving, average order waiting time, average number of orders in queue (Table 4).

Table 4: Possible results from processing simulation for waiting order fulfilment through Excel

average waiting time	ratio of leaving	average order waiting time	average number of orders in queue
8,524926686	0,056640625	0,099706745	2,841642229

Source: Own processing

3. Conclusion

Managerial problem solving with dynamic simulation tools is a modern and efficient method that allows to simulate large-scale enterprise changes within a PC model environment. (Bian & Liu, 2018; Robinson, 2018)

Simulations belongs to quantitative tools that can be utilized to support decision-making. We cannot imagine their application in practice at present without computer equipment and specialized software products (Upper, 2011). There are currently a lot of commercial software on the market, but they are not free. Less common to medium scale simulations can be used with a common spreadsheet, such as Microsoft Excel, we have demonstrated the example (Esteves & Ploeckel, 2018).

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GLOBAL VIEW OF THE CONSUMER DECISION JOURNEY ON THE MOBILE HEALTH MARKET

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Abstract. Thanks to innovations and the expansion of the Internet, the behavior of current globalized consumers is different from the past. Consumers' involvement is extremely high, they have a huge amount of information, that they have flexibly at their disposal and they can use them right for their benefit at any time. The ability to use digital innovations, social networks, high-performance mobile devices, and cloud solutions contributes to consumer excellence throughout the purchasing decision process. These global changes bring about changes in the consumer decision journey, where the current consumer comes between the incentive to buy and the purchase itself to so called „the zero moment of truth“, which greatly affects consumer decision-making. This means that the consumer is currently influenced by the amount of information to which they have constant online access and which they are actively searching for before the actual act of purchase. Contributors apply mentioned knowledge to the area of mobile health, which is currently an intensively evolving industry in which modern digital technologies play an essential role. The authors pay particular attention to mobile health devices, which integrated mobile technologies with sensors that can record human life data. The aim of this scientific contribution is to define the consumer decision journey process, to identify the factors influencing the consumers zero moment of truth when purchasing mobile health devices and to create the mHealth consumer typology, based on the comparison of knowledge from the results of the global research studies and the research study processed by authors.

Keywords: consumer behavior, mobile health, zero moment of truth, consumer decision journey

JEL Classification: F01, I12, M31, P46

1. Introduction

The changes brought about by innovation and the constant development of the Internet, information and communication technologies, affect all areas of human life. These changes are visible in the everyday lives of today's populations, and at the same time they can be considered extremely progressive. Today's highly competitive environment puts ahead of marketing the challenges arising from the current gradual saturation of marketing activities. Continuous shifts in consumer behavior and the rapid development of technological change create new markets and this leads to a change in consumer decision-making. These changes are a major factor influencing consumers' preferences when choosing products or services.

Technology has changed rapidly over the last 30 years, and even changes can be made in a much shorter horizon - for example over the last three years. Technological progress is the

driving force that acts on all the elements of the market. Consumers can be considered as the basic element of marketing and all their activities are concentrated on consumers. Today's consumer is connected online more than ever before (Ruzicka, 2016). At the same time, the range of activities that consumers perform online is significantly expanded. Changes in consumer behavior are closely related to technological change (Miklosik & Dano, 2016). Consumer behavior is the way in which products, services or resources are consumed. The trend is a significant increase in consumption, not only in terms of volume but also in terms of quality and structure. These changes are clearly visible in the field of mobile health. Mobile health or mHealth is an emerging concept referring to the use of mobile devices and wireless technology for healthcare purposes (Onodera & Sengoku 2018). The term mHealth broadly refers to “medical and public health practice supported by mobile devices such as mobile phones, patient-monitoring devices, personal digital assistants (PDAs), and other wireless devices” (WHO, 2011).

2. Methodology

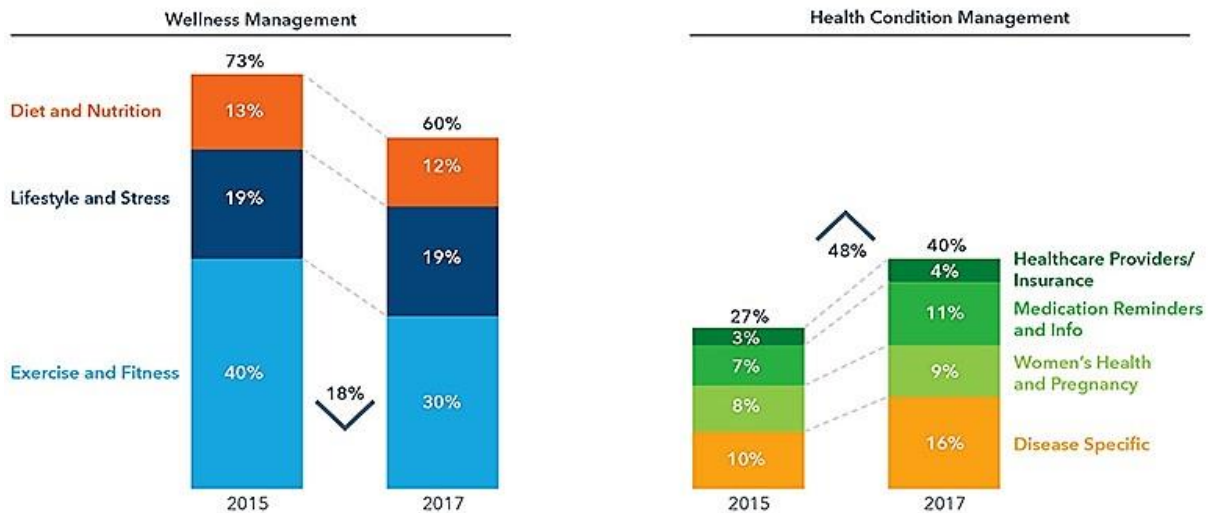
The aim of this scientific contribution is to define the consumer decision journey process, identify the factors influencing the consumers zero moment of truth when purchasing mobile health devices and create the mHealth consumer typology, based on the comparison of knowledge from the results of global research studies and the research study processed by authors. Based on an empirical analysis of the current state of the problems examined, they predict changes that affect the development and direction of consumer behavior in the mobile health sector. To achieve this goal, we used the basic methods of scientific research - abstraction, synthesis, induction, deduction, comparison and description. Through abstraction, we have been monitoring substantial and consistent information published in various literary sources so that we can define the basic concepts and categories of the problem under consideration. We realized the analysis as a step-by-step collection, sorting, evaluation and subsequent interpretation and used the synthesis to find out the links between the delineated elements, signs and their connections.

3. The position of software applications on the mHealth market

mHealth applications make it possible to improve life in different ways. According to the *Effective Behavioral Changes through a Digital mHealth App* study „*perceived psychological empowerment and enhanced hedonic well-being from the mHealth application may be a more impactful way to support the effectiveness of mobile cognitive behavioral therapy for smoking cessation than eliciting strong inspiration*“ (Lin et al., 2018). Possible use of mHealth application in urology ranges from educational, clinical or surgical purposes, and may include such diverse tools as health promoting applications, electronic diaries that aid in treatment monitoring or augmented reality application (Pereira-Azevedo & Venderbos, 2018). In the low and middle-income countries „*credible, evidence-based, affordable mobile applications are needed to provide a platform for continuing health education to health professionals and patients*“ (Garner et al., 2018). Worldwide, a large number of mHealth applications are available to the consumers. According to the *mHealth App Developer Economics 2017* study, nearly 325 000 mHealth applications were available in 2017 from 84 000 application developers who were downloaded 3.7 billion times in total. The majority of mHealth applications publishers are the technology companies or app developers. The digital intruders (mHealth app companies) constitute the biggest group within the global digital healthcare market,

representing 26% of the market. The market of traditional healthcare is being penetrated by the rather new breed of digital intruders, bringing mostly “digital-only” business models to the table. 28% of the digital health market is occupied by purely digital market players; mHealth app companies and accelerators / incubators. (Research2guidance, 2017). The majority of mHealth applications are general wellness related and the numbers of condition management applications are increasing rapidly, now representing 40% of all health-related applications as shown on Figure 1.

Figure 1: mHealth applications by category in 2017 and 2015 - comparison



Source: IQVIA. (November 2017). *The Growing Value of Digital Health: Evidence and Impact on Human Health and the Healthcare System*. Available: <https://www.iqvia.com/institute/reports/the-growing-value-of-digital-health>

There are many types of mHealth applications that can be mentioned in particular: symptom checkers, healthcare professional finders, managing clinical and financial records, condition education and management, self-monitoring, remote patient monitoring, rehabilitation programs, prescription filling and compliance.

4. The consumer decision journey on the mHealth market

Many studies on consumer behaviour prove that time spent online is increasing considerably every year. It has been proven that Internet has become an important tool to provide information during consumer purchase decision journey (Gaitniece et al., 2017). And it is not otherwise in the field of mHealth consumers. According to *Accenture 2018 Consumer Survey on Digital Health* study, healthcare consumers continue to show strong use of digital technology. Almost 75% of US consumers surveyed said technology is important to managing their health. This study also showed increases across the board in the use of mobile, electronic health records, social media, wearables and online communities. Nearly half (48%) of healthcare consumers are using mHealth applications, compared to just 16% in 2014 (Accenture, 2018).

Consumer decision journey begins with a phase of *awareness of need*, while mHealth consumer at this stage gets a sense of need especially in the context of internet usage, web browsing, and social networks. A common phenomenon is awareness of the need for interactions with other mHealth consumers. Marketing is aimed at targeting this segment by means of digital marketing tools or direct digital advertising. The *information search phase* follows, where the most used source of information is the Internet nowadays. Specifically, these

are search engines, blogs and retailers' websites. An important role is played by interaction with other consumers through social media. An interesting category is video that can provide consumers with audio-visual information. The digital consumer is constantly online connected and the fastest way to find information is through the smartphone. In particular, Internet comparators play a key role in the **decision-making process**, where consumers compare properties, reliability or product specifications, as well as price comparisons with similar products. Interacting with other digital consumers or friends, discovering their experiences, preferences of attitudes or attitudes is one of the key factors influencing this process for many consumers. Another factor that often influences decision making is the review of other consumers who already have experience with the product. The results of authors survey, compared to the findings of several global studies, have highlighted the fact that the current consumer experiences a so-called „zero moment of truth“, which greatly affects consumer decision-making process. This was noticed by Lecinski in 2011 to emphasize that the consumer is currently influenced by the amount of information to which he has constant online access and which he is actively searching for.

Figure 2: Zero moment of truth



Source: Lecinski, J. (2011). *Winning the Zero Moment of Truth (ZMOT)*. Available: <https://www.thinkwithgoogle.com/marketing-resources/2012-zmot-handbook>

The Zero Moment of Truth (ZMOT) comes immediately after a whistle that has prompted the consumer to buy the product. After getting enough product information, First Moment of Truth (FMOT) and then a Second Moment of Truth (SMOT) experience when the product has been physically acquired and tested for its functionality. The second moment of truth (SMOT) is the consumer's influence on the ZMOT of another consumer who is considering buying the product, and reads product reference (positive or negative).

From the point of view of the mHealth **purchase** itself, the consumer prefers to purchase via the internet, and the most preferred payment option is card payment. The final phase is **post-purchase behavior**. The starting point of this phase is customer satisfaction with the purchase made. At this stage for the digital consumer is characteristic of sharing information about satisfaction or buying experience. The most common channel for this information is social networks or reviews. Another phenomenon is the post-purchase dissonance resulting from the availability of a large amount of information after the purchase, which can create a feeling of uncertainty for the consumer.

4. Discussion

In addition to consumer decision journey, we have attempted to create a mHealth consumer typology based on the digital consumer typology. According to several authors (Boban, 2017), (Perez-Fabara et al., 2017), (Stephen, 2016), the basis for typology is the fact that within the digital consumer there are internal differences in perceptions of innovation and their adaptability, especially from the point of view of purchase behavior.

The proposed typology distinguishes the three main types of mHealth consumer. The key factors in the given typology are confidence in a new product, technological innovation, or the willingness of the consumer to accept a change in the way their purchasing behavior is. Many products that are technological innovations and innovations require users some degree of technology and skills adaptation, the level of trust that can be provided by the provision of different data or access to a consumer credit card.

The consumer group, which responds in a very short time to news in a positive way, represents *enthusiasts*. They are mostly enthusiasts who welcome technology news, new products and services, and they are quick to buy and use them, and are willing to buy products at the beginning of their life cycle, often over a higher price, a typical enthusiast in their smartphone downloaded many applications, has an overview of world technology news before the majority of the population, is willing to undergo a certain degree of risk at the price of trying out the news and wants to always have the latest products among the firsts.

The second group represents the so-called *rationalists*. This group includes sophisticated consumers, who prefer comfort and try to eliminate the risk, and the rationalists verify information about new products, compare and consider alternatives, and then choose to buy the product for the best price. The decision process before making the purchase takes a long time. If a firm gains their trust on a long-term basis, they are willing to accept news from their portfolio in a relatively fast time. After the confidence-building phase, they often share their feelings and share information with their surroundings.

The last group is *skeptics*, who are characterized by a high degree of mistrust of novelty. They are skeptical and cautious. In particular, they are in possession of authenticated products, reacting suspiciously to changes and accepting them only when they become a tradition. The decision-making process of innovation is tedious for them, the news does not follow the news, and the news is never tested without it being verified by anyone else. It is a group of conservative consumers, not representatives of opinion leadership.

5. Conclusion

The consumer is the most important part of the mHealth market and to him are oriented all the activities of sellers, manufacturers and developers of new mHealth devices and applications. It is the consumer who have these products to enhance and simplify life and to help improve health care and fitness. Understanding the consumer decision journey and the factors that affect it, can support the process of developing, manufacturing and selling mHealth products. At the same time, it is desirable to understand differences in the typology of mHealth consumers. We believe that the findings in the contribution helped to clarify these basic concepts.

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IMPACT OF SOCIAL MEDIA ON RAISING AWARENESS OF ECO-INNOVATIONS IN A GLOBAL ENVIRONMENT

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Abstract. Due to globalization, the world is changing significantly. The question remains, whether these changes can be considered as an opportunity or a threat. On the one hand, globalization brings innumerable opportunities for businesses to develop areas where they excel, but on the other hand, in areas where they are lagging, they may become more vulnerable. We can also point to the continuing trend of digitization and the use of digital technologies, even in changing business model, providing new and value-producing opportunities. In the presented contribution, authors deal with the topic of globalization in connection with the implementation of social media into the business environment in order to increase interest in eco-products. For businesses, social media represent an information channel by providing them valuable information about consumers and their habits. Authors present results of their own research focused on the use of social media within eco-innovation processes. They also focus on the way of implementing communication strategy at a corporate and an external business communication level to support the introduction of eco-innovations in Slovakia, and compare them with foreign businesses at global level. The contribution consists of two parts – in the first part, authors deal with the aspects of social media use within marketing communication of businesses in order to raise awareness of eco-innovations at the global level. The second part presents partial results of a quantitative marketing survey conducted in Slovakia in comparison to selected foreign studies, in which authors investigated the level of utilization of social media in presentation of eco-innovations.

Keywords: globalization, marketing communication, digital marketing, social media, eco-innovations.

JEL Classification: M21, M31, Q50, Q56

1. Introduction

Globalisation of science as well as technologies is closely connected to a number of changes happening in the field of economy. It poses higher requirements on the environment but, on the other hand, may also offer new solutions. Higher economic pressure is inevitably modifying the whole planet (Bezakova, 2016). We may already assume that the future of businesses will be highly dependent, more than any time before, on their preparability to face ordinary as well as new threats and crisis in order to ensure socially, economically, politically or ecologically sustainable future (Bednarik & Capkovicova, 2016). A global approach to marketing and

business combined with high competitiveness make corporations not only target their customers but also retain them (Kusa & Greskova, 2016). Businesses through all the industry fields are able to benefit from higher environmental and social effectiveness as a competitive advantage (Jurisova, 2016). The present paper deals with the topic of globalisation in relation to implementation of social media into the business environment in order to enhance awareness of eco-products. Social media may be defined as a specific set of internet or network communication platforms using a business model of a database which is created by users themselves and enables connection of public and personal communication (Fuchs, 2017). The second part of the paper presents the results of the selected foreign studies and some partial results of the quantitative research defining the rate of usage of social media in promotion of eco-innovations.

2. Social media marketing

Nowadays it has become natural for businesses to communicate through digital world. It can be referred to as a switch from the offline to the online world with a certain impact on individual's thinking, feeling or behaviour. Furthermore, it may also influence other processes, such as formation of an economic value or a public opinion. The main aim of social media is not only a change but also production of content and verbal messages. The most popular examples are social networking websites, services providing sharing of picture and videos or instant message services. These services may be adapted, modified or interpreted by users themselves. Social media – along with smartphones and wireless Internet – enable permanent access to online content and communication while creating the network of friends and communities and thus helping to interconnect users one to another or to a specific brand (Vorderer et al., 2018).

The modern information age may be defined by a switch from one-way mass communication having targeted the wide public to personalised communication through social media. „*We live in a time where brands are people and people are brands*“ (Lipschulz, 2018). Social media differ from other online media by a high level of interaction, creation of a user's identity as well as openness to sharing the content within communities. It is one of the globalisation trends which helps us to overcome cultural or other clashes. They may also be referred to as a certain technical infrastructure or an interactive and mobile social movement. Social media are mainly defined by development of new websites. The most sophisticated ones focus primarily on mobile communication and target smartphone and tablet users. A dynamic and continuously developing feature of technologies has enabled social media to become worldwide popular. Such communication has turned into a primary source of information for the people – social media are providing new opportunities for sharing news, information as well as events (Lipschulz, 2018).

The globalisation trend is especially influenced by continuously growing coverage of digital technologies, variable behaviour of customers and economic development. In spite of this, some businesses are able to find great opportunities in this transformed global economy. In the majority of cases, these opportunities arise out of innovative business models using digital connectivity and eco-systems in order to expand beyond the borders. Social media represent a certain platform for interaction – a medium by means of which individuals and brands are trying to communicate with masses. Thanks to connectivity with the environment, customers can perceive brands much more attractive. It is essential to create interactive content as a basis

for conversation. Based upon the research, the company BannerOwl has defined seven current and basic trends in digital marketing:

1. Video marketing – businesses are advised to implement this tool into all the aspects of customer experience. It also includes a live video streamed through various platforms;
2. Chatbots (AI-powered live chat tools) – the main purpose is to improve online customer service as the feedback is provided instantly;
3. Storytelling – it is crucial to create a story of a brand and to implement it into the digital strategy and simultaneously, provide a customer with true information about the objectives and purpose of the brand itself;
4. Rise in the cost of social advertising – businesses should increase costs of social advertising since the reachability of organic content has dropped considerably;
5. Growth hacking – this method combines various marketing approaches with the purpose of a faster growth of both the company and its sales as SEO and video marketing are expected to be the most successful strategies in 2018;
6. User generated content – the fact is that users tend to favour their own opinions rather than advertising or celebrity endorsement; therefore it is much simpler to incorporate such content into the business marketing strategy through testimonials or customer reviews;
7. Interactive content – the use of interactive content via quizzes, questionnaires or video (Ditrichova, 2018).

The higher the environmental awareness, the higher the demand for environmentally friendly business practices. It is essential to implement the principles of corporate social responsibility management into day-to-day activities of all the corporations (Grib & Zauskova, 2014). Social media create and promote customer loyalty and trust towards a business, accelerate searching for information about the company and provide contact in a real time and, at the same time, help to differentiate, i.e. differentiation from identical businesses thanks to unique content. By Zauskova (2016) individuals – consumers as well as businesses shall understand a need for ecological behaviour and changes within the business environment in order to ensure sustainable development.

3. Social media on a global scale

Nowadays consumers are much more educated, informed and demanding than ever before. Apart from comparing and verifying products and services they are interested in, they also care about the businesses offering these products and services (Malikova & Rybansky, 2016).

On a global scale, green marketing has become one of the most essential marketing strategies of businesses (Miklencicova, 2016). A correctly selected marketing strategy is set to be a key to a successful eco-innovation. Businesses have launched new online communication channels and new approaches to communication via various digital technologies (Zauskova & Grib, 2016). And the social media are a power controlling today's digital world. The study to have been conducted by the American Agency Pew Research Center in 2016 revealed that the developed countries such as Sweden, the Netherlands or Australia favour the usage of social networking sites and the Internet rather than the Internet without social media. For example, in

Sweden 71 % of respondents use social networking sites as well as the Internet compared to 22 % using only the Internet without social media and 7 % using neither the Internet nor social media. The situation seems to be identical in the Netherlands with 70 % of respondents using social networking sites and the Internet, 25 % using only the Internet and 5 % using none. If we come to measure the results of eco-innovation performance across the EU member states, which are evaluated on a yearly basis by the Eco-innovation Observatory on behalf of the European Commission – Sweden was ranked the first in 2017 while the country has been in Top 5 since 2010. Eco-innovations are an essential part of the Swedish national strategy of environmental policy and the country has long been a leader in development of new technologies in the fields of bioenergy, intelligent resources, green buildings, waste treatment technologies and recycling, e-vehicles, water resource management, ocean energy and solar energy. Sweden has proved that the economic growth may be closely linked to a low carbon footprint (European Commission, 2017).

The phenomenon of social networking sites has completely and rapidly changed the way of interaction among the people with regard to personal and professional relations. As mentioned in the study by the Pew Research Center in 2015, Facebook has been one of the most popular media for both the adults and teenagers. Twitter ranked after Instagram and Pinterest (among the adults) and after Instagram and Snapchat (among the teenagers). Such results indicate the change in communication. Businesses have to understand and be a part of these platforms as millions of people with common interests meet on one place at one time. There is a set of certain rules based upon which businessmen should consider their activity on social networking sites and media. For instance – What time is suitable for sharing a post? By Bilsing (2015) Facebook reports a 20 % higher interaction out of working time, so sharing posts in working time seems to be rather inefficient. Bilsing also states that Facebook activity is the highest in early hours in the morning (around 7 AM), after work (around 5 AM) and late at night (around 11 PM). As for the days of the week, Thursdays and Fridays report much higher interactivity than other days – an 18 % increase. The message content to be spread through social media has to be good enough to generate adequate feedback and interaction. Successful use of social media involves regular creation and content sharing. Consumers expect continuous communication through valid messages in order to become loyal. Social networking sites may be understood as a certain entry point for the Internet – i.e. consumers tend to follow the recommended content on social networking sites and consequently, they click further on other websites.

4. Methods and partial results of the pilot study

The authors conducted their own quantitative pilot study from May to June 2018 which partially focused on the use of social media in eco-innovation processes. As for the method, the authors selected a written questionnaire. The respondents represented small and medium-sized enterprises operating in Slovakia and promoting the implementation of eco-innovations. The data were processed by statistic methods by means of which the authors obtained particular results and drew specific conclusions. The pilot study focused on four basic fields of business – wood industry, energy industry, textile and clothing industry and food processing industry. There were 104 respondents the majority of which (60) operate in the wood industry (26.9 %) with 10 businesses operating in the textile and clothing industry (9.6 %) and 6 businesses in the energy industry (5.8 %).

On the basis of the study, the authors were trying to find out in what manner the businesses ensure the implementation of their communication strategy into internal as well as external

business environment (i.e. communication with the employees, the public, product promotion). They also focused on specificities of the use of social media in the framework of the company innovation processes. The given results were collected and presented in the table in relation to particular types of social media and corresponding business fields.

Table 1: Use of specific types of social media in business innovation practices

		Social networking sites		Blog, vlog		Video and audio content websites		Photo sharing websites	
		áno	nie	áno	nie	áno	nie	áno	nie
Field of business	Wood industry	16 (21.6 %)	2 (2.7 %)	2 (2.7%)	16 (21.6 %)	10 (13.5 %)	8 (10.8 %)	8 (10.8%)	10 (13.5 %)
	Energy industry	4 (5.4%)	0 (0.0 %)	2 (2.7 %)	2 (2.7%)	2 (2.7 %)	2 (2.7 %)	0 (0.0 %)	4 (5.4 %)
	Textile and clothing industry	8 (10.8 %)	0 (0.0 %)	0 (0.0 %)	8 (10.8 %)	2 (2.7 %)	6 (8.1 %)	6 (8.1 %)	2 (2.7 %)
	Food processing industry	40 (54.1 %)	4 (5.4 %)	10 (13.5%)	34 (45.9 %)	18 (24.3 %)	26 (35.1 %)	28 (37.8 %)	16 (21.6 %)
Total		68 (91.9 %)	6 (8.1 %)	14 (18.9 %)	60 (81.1 %)	32 (43.2 %)	42 (56.8 %)	42 (56.8 %)	32 (43.2 %)

Source: Own processing, 2018

As for the particular types of social media, the authors included – *social networking sites* (e.g. Facebook, Twitter, LinkedIn ...); *blogs and vlogs*; *video and content sharing websites* (e.g. YouTube, Vimeo, Flickr ...); *photo sharing websites* (e.g. Instagram, Pinterest ...). The results show that 74 businesses (71.2 %) out of 104 use social media for their innovation processes and in order to ensure their internal or external business communication strategy.

The respondents tend to favour *social networking websites* – up to 68 businesses (91.9 %) answered „yes“ in all the fields of business. Businesses need to be faster and more reactive due to a large number of data and growing power of consumers. Easier Internet connection has made users require as well as share information mutually, permanently, at any place and any time through a number of devices (Hofacker & Belanche, 2016). Social networking sites enable businesses to engage the target audience and develop interactive relations with their customers. Ottmanová’s paper (2017) states 20 new rules for green marketing. In her opinion, the brands with long-term and loyal customers are required to educate and engage them into a meaningful conversation via social networking sites. Appealing to a customer through traditional media and paid advertising can not build consumer loyalty in the smart world of today.

Moreover, the authors assumed that other types of social media are not so widely popular in the selected business fields. *Blogs and vlogs* are used by the majority of respondents (10) mainly in the food processing industry (13.5 %). Blogs and vlogs are complemented with social media – their use is recommended to enrich other social media through longer posts and on the other hand, social media can be used for promotion of our own blogs. Influencing marketing through social media has become a key digital marketing strategy in the majority of commercial business fields thanks to its usefulness for green marketing strategies (Arshad, 2018).

Video and audio content websites are mostly used in the wood industry and food processing industry, especially the platforms YouTube or Vimeo, while the use of this type of social media is predetermined by specific product or business features. Video is currently the most popular type of content sharing platform among users – short, interesting, accurate yet with a lot of

unexplored potential. More than a half (42) of respondents (56.8 %) stated they did not use any video or audio content sharing websites. *Photo sharing websites* (Instagram, Pinterest) are used by 42 respondents (56.8 %) especially in the food processing industry.

Social media provide a great opportunity for sharing information about the company throughout the world by way of internally generated content, limited posts and interactions with other users. When properly using social media, one may improve the benefits of word-of-mouth marketing or target larger audience even in the implementation of eco-innovations (Mohanraj & Karthikeyan, 2016). The main advantages of social media are as follows: lower marketing costs; higher visit rate of the website; better positioning in web search engines; higher engagement and interaction of customers and better feedback; the room for marketing research on customers; higher chance of building networks with customers and other businesses; microtargeting; larger access to international markets (Botts, 2018). Social media, however, do not have to be suitable for each and every business. It is highly important to create a clear marketing and social media strategy – failure to do so may result in insufficient competitive advantage for a particular business. What is more, social media have to be regularly managed and permanently controlled.

5. Conclusion

Implementing specific social media tools into digital marketing seems to be a suitable solution how to increase interest in innovative eco-products of business entities and simultaneously enhance customers' environmental awareness. Personalised content of a message helps to overcome the ignorance of the public towards environmental education and promotes effectivity of the accepted environmental policy. Social media provide a countless number of opportunities for developing creativity and ideas in each environmentally friendly society (Zauskova et al., 2015). The use of social media within the company communication campaign can represent a great competitive advantage (Kusa & Zazikova, 2015). The authors have analysed the implementation of social media into the business environment and their role in increasing interest in eco-products. The second part of the paper presents partial results of the selected foreign studies as well as their own pilot study to have been conducted within the specific industry. The rate of usage of social media in promotion of eco-innovations varies from country to country. The authors can see unexplored potential in the use of social media in Slovak businesses as the majority of them are still not implementing digital marketing at required level. It is worth analysing when businesses are able to understand the potential of these modern marketing communication tools.

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GLOBAL TRENDS IN THE CYBERSECURITY OF TRANSPORT COMPANIES AND METHODS OF BUSINESS PROTECTION

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Abstract. This paper is devoted to the results of a study on the global trends of cyber security in the digitalization of transport systems. The main digital technologies that are generating the risks of cyberattacks are considered, including: artificial intelligence, "Internet of Things", augmented reality, unmanned devices, virtual reality, blockchains and robotization. It has been shown that the increasing dependence on the Big Data and internet work is putting the business activities of transport companies at risk of losing their resistance to cyber-shocks. Cyber-threats are described as large-scale events with destructive consequences for the transportation business, which develops according to the cascade principle. In the paper, the classification of cyber-threats is given, and the predicted consequences of cyberattacks on automation and robotics systems are presented. The inequality in the matters of readiness and the provision of cyber security between the transport companies in different countries of the world is established, while the main factors for this are considered. They include the economic, ecological, public or cybernetic stability of states towards cyber-attacks, and in particular, their investments in an infrastructure, knowledge and relationships that are resistant to cyber-shocks. It is proved that cyber-resistance should be considered as an integral method of providing benefits to the transport company, and not just as a way to prevent risks. The benefits of investments in the digital transformation of transport services, as well as the key directions for cost reductions in the formation of a new business model based on digital products, are described.

Keywords: global risk of cyber-threats, cyber security, digital transformation of transport systems, blockchain, stress tests.

JEL Classification: R41, R42, R48

1. Introduction

The field of scientific research in global trends of switching of the world economy to the new technological structure is significantly changing under the effect of the digital landscape, which becomes endless, and every asset owned or used by an organization represents only a link in an endless chain of interconnected elements. The society can already assess the benefits of investment in the transformation of production, in particular, the reduction of maintenance costs, the increase in the index of operational efficiency, the reduction in the cost of production and the increase in the duration of the uninterrupted operation of equipment. However, losses and threats caused global digitalization are already apparent.

New threats are threats to information security with "cyber" prefix. The object of this study is cyberspace, including transport systems. It is a complex environment that does not exist in any physical form and comes out upon interaction of people, software, Internet services, technological devices and network connections. Moreover, cyberspace is not only information and telecommunication technologies, but their continuous interaction, determined by the activities of people who use these technologies. The latter not only generates threats of destruction of strategic and operational models of the transport business, but also creates risks of its existence.

The subject of the study is cyber-threats, associated with new technologies, as well as the motivation of people who organize cyber-attacks.

The research methodology is considered as a set of knowledge about the structure, logical organization, methods and means of activity used in describing the behavior of all subjects in a new technological order.

The purpose of the study is to identify the correlation between cyber security and the increase in business efficiency and the operating model of transport companies.

2. Research results and discussion

The functioning and transformation of transport systems in cyberspace is becoming an active subject of the study of the transport economy. The main rhetoric about cyberspace is based on endless and unlimited influence of digital technologies. So, American researcher Kaplan C. studies the transformation of transport in cyberspace under the influence of the Internet, while focusing on information component of this transformation (Kaplan, 2002). In his work, Sandvik K. studies communications that turn cyberspace into a humanitarian system, analyzes the trends of this transformation associated with a huge flow of data (Sandvik, 2016). Considerable part of research relates to regional problems of the formation and protection of cyberspace, namely, the work of Sergio Sechel (Sechel, 2016) is devoted to the study of e-commerce and e-business in Romania as a country with increasing rates of cyberspace development. The author evaluates the risks of cyberspace in the management of commercial activities, the internal environment of households and internal business processes of companies. I. Bernik's (Bernik, 2016) work studies the problem of city cyberspace in Slovenia and proves that the current level of threats and security of cyberspace in European countries is approximately at the same level. The global consequences of change in cyberspace and the impact of these changes on the infrastructure of China, the EU, India, the United Kingdom and the United States have been studied in work of Shackelford, S.J., Craig, A.N. (Shackelford & Craig, 2014). The authors compare the cyber security policies of these countries with the goal of formalizing the best practices for regulating cyberspace and justify the proposals for enshrining them in international law. In view of these and other studies, we believe that cyberspace should be considered as a complex and worldwide supported system for the dissemination of physical information and communication technologies (ICT), devices and network connections that virtually reflects the physical, social, spiritual, financial, political, emotional, professional, psychological, educational or other types of behavior. In this case, it is apparent that cyberspace is exposed to all kinds of threats associated with such behavior. Moreover, there are a number of other circumstances that complicate the safe functioning of this system, in particular, the lack of communication between operating subjects and objects in cyberspace and suppliers of new technologies. Devices and connected networks that support cyberspace have multiple owners with multidirectional interests and behavior.

The process of the formation of cyberspace is in an active phase and its future state is determined by a number of global trends that change the world in a new technological order. At the same time, as shown by our study, the influence of global trends on the cyberspace of transport systems in the next 10 years has different significance, Table 1. This fact can be explained by slow development of transport infrastructure, the long payback periods of transport projects and significant changes in the geography of transport.

Table 1: The effect of global trends of new technological order on cyberspace

	Trends of new technological order				
	Digital technologies	Change in global balance of economic forces	Demographic changes	Lack of resources and climatic changes	Urbanization
General effect on cyberspace, long-term trends	67%	63%	47%	36%	26%
The effect on cyber security of transport systems, period from 2018 to 2028	5.4%	5.4%	3.76%	2.88%	2.08%

Source: It is prepared by the authors based on the following sources: (Popova, 2018); (Chaplygin); (Data of the Report of World Economic Forum, 2018).

Moreover, in cyberspace, or the global inter-network interaction, ‘anything’ and ‘anyone’ may be constantly subject to global risk of cyber-threats (Global Cybersecurity Index report, 2017). Table 2 shows the possible consequences of cyberattacks, which can be evaluated in the world and, in particular, in Russia.

Table 2: Predicted consequences of cyberattacks on robotic and automation systems

	Predicted consequences of cyberattacks, %				
	Disturbance of operating (production) activity	Loss or damage of confidential data	Negative effect on quality of manufactured goods	Damage of material property	Infliction of harm to human health
In the world	40	39	32	29	22
In the Russian Federation	47	48	27	30	21

Source: It is prepared by the authors based on the following sources: (Healey, 2017); (The World Street Journal, The Morning Download, 2017); (Is digital Infrastructure a challenge or possibilities?2018).

Existing global cyber-threats are described by ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. International cyber security standards are focused on bridging the gap between domains. As such, the first area of focus of this International Standard is to address Cyberspace security or Cyber security issues which concentrate on bridging the gaps between the different security domains in the Cyberspace. In particular this International Standard provides technical

guidance for addressing common Cyber security risks, including: social engineering attacks; hacking; the proliferation of malicious software (“malware”); spyware; and other potentially unwanted software.)

Work of Finnemore, Martha and Hollis, Duncan B. (Finnemore & Hollis, 2016) gives more detailed studies of processes and procedures of creation of international cyber security standards. In policy article devoted to cyber security, UK experts define this concept as any activity in digital form, including information content and actions implemented through digital networks. (Klimburg, 2012; Caldwell, 2017)

Thus, the cyber security environment reduces to the conditions under which digital technologies, namely communication channels of the Internet and other telecommunications networks, the technological infrastructure, communication management processes and intellectual systems are protected from the greatest possible number of threats and impacts that have undesirable consequences during functioning of systems above. (Risi & Wickert, 2017)

Cyber security can be defined as a dynamic process or drive of cyberspace for stable security against physical, financial, political, occupational, psychological or other types of destructions. In terms of transport systems being an infrastructure component of cyberspace, cyber security can be characterized as the maintenance of a favorable state of transport and movement processes that prevent consequences of damage, errors, accidents or any other events in cyberspace that may be considered undesirable or that could destroy the operational and business models of transport activity. This definition implies that the system should be protected from the event or negative effects on human health and economic losses, which is ensured by maintenance of confidentiality, integrity and accessibility of information in cyberspace. (Suddaby & Foster, 2017)

It should be understood that cyber security cannot be aimed at protecting against the maximum number of threats. The intensity of cyberattacks is explained by incredible rate of growth of cyberspace, its virtual nature and almost complete lack of understanding of its organization and management. Levesque, R., Walsh, D., Whyte, D. (Levesque et al., 2015) note that the task of securing cyberspace is beyond the capabilities of any one entity and requires radical shift in decision, in particular at the level of research and development, education and effective cyberattack prevention systems. The multiplicity and cascade nature of elements that make up cyberspace, the abundance of interrelations between them, the possibility of applying special procedures for controlling the actions of these elements, form a multiplicity of threats, logical description of which can be found in quantum mechanics. We believe that understanding of quantum as a finite indivisible element is the best mathematical basis for modeling cyber-threats, where malicious behavior depends on an infinite number of factors and that the individual or business has no idea of any threats until the event occurs. (Kim & Rhee, 2017)

Basing on works of Ivanova, Y.A. (Ivanova, 2017); Hill, R. (Hill, 2015); Lu, Tianbo; Guo, Xiaobo; Xu, Bing; Zhao, Lingling; Peng, Yong; Yang, Hongyu (Lu, et al. 2013) and some own studies, we have assessed the effect of basic digital technologies on cyber security of transport. The results of such assessment are shown in table 3.

Table 3: The effect of digital technologies on security of cyberspace

Technologies	Percentage of the effect on cyber security, %
Data storage on cloud platforms	18
Artificial intelligence	17
Unmanned control	15
Digital payment systems	14
Internet of things, computer-aided learning, delivery by remotely piloted aircraft and chat bots	13
Quantum computers, virtual reality	12
Large data arrays, portable devices	10
Augmented reality	7

Source: author's compilation

3. Creation of new models of transport systems in cyberspace

Mankind has never checked the objects of the critical infrastructure, to which the transport belongs, for a real cyberattacks. There are still no unified standards for cyber security in global transport networks. The society promotes computer crime, which is part of business and politics. The legislation of countries changes slowly and without synchronization with international legislation, which does not make sense in global networks. The operational and business models of transport organizations are becoming digital and today it is more difficult for companies to identify the boundaries of the digital environment in which they operate. Such conditions create a fertile ground for hacker attacks.

In our study of cyber-threats, the concept of cyberspace transport systems is based on the study of three models:

- *Operating model of the transport business.* It is primarily influenced by the Big data and the "Internet of things", which are a network of objects (devices, etc.) and data exchange method. As to transport systems, these technologies allow tracking traffic, monitoring devices and infrastructure and managing connected devices. These technologies turn cargo and passenger traffic flows into a dynamic network that forms a two-way flow of values that makes the transport system efficient. The destruction of this network reduces the effectiveness of the *operating models of the transport business*.
- *Business model of a global or national transport system.* The main destruction after cyber-threats to the information environment of transport systems, such as the "Internet of things" technologies and blockchain, covering all activities of users or participants of cyberspace carried out using information resources, data flows and storages of which are located on the technical infrastructure, has negative effect primarily on the *business model of global or national transport systems*. This lead to destruction of values obtained by users of transport services, relationships with partners and the capital that is necessary for obtaining sustainable income. Threats to the business model of transport companies can be assessed in view of the following probability of the following events: malicious software 64%; fishing 64%; cyberattacks to steal of intellectual property 32% or data; cyberattacks to steal financial information 30%; internal attacks of 25%. Moreover, it is possible to state that the purpose of cybercrime like any other crime is not focused on information, but on the monetization of their actions.

- *Process model of cyber security* should be focused on eliminating threats to human life. To a greater extent, it is represented by infrastructure, IT, software, unmanned devices, robots used for the management of the transport system. One of such solutions is post-quantum cryptography (a new generation of mathematical algorithms), offering new encryption algorithms that are complex and can't be easily hacked by both classical and quantum computers. Today, Russia deals with researches in the field of post-quantum cryptography to develop such algorithms and transport companies should be the first interested parties.

In order to ensure protection against new attacks, it is necessary to assume that the origin of threats will be unknown in some cases. Despite all the uncertainty, transport organizations must outline possible future threats and develop an approach that will allow them to take prompt action at the right time, based on the principles of "projected security". (Vives, 2017)

4. Conclusion

The most sustainable transport companies will be those who are best prepared to maintain business continuity. The creation of a cyber security strategy is based on advance approach, i.e. special checks "background checks", penetration testing, threat assessment, active monitoring of information security, as well as cyber intelligence and vulnerability assessment. Strong efforts are needed to ensure exchange of information, coordinate actions between stakeholders and participants in mixed global transport systems and ensure data integrity during recovery from disruptive events.

Globalization of transport systems requires consideration of cyber-resistance as an integral component of gaining benefits but not just as method of risk prevention. In other words, achieving a higher level of resistance to risks is the way to higher long-term economic efficiency.

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CLUSTER ANALYSIS OF DIGITAL ECONOMY IN THE EUROPEAN UNION

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Abstract. In the reality of globalised economy, high competitive potential of developed countries is mostly dependent on their abilities to take advantage of digital economy. Last two decades confirmed that also relatively developed economies could be characterised with important disparities in this field, which can indicate that also developed countries can suffer from so called digital trap. Therefore, improving conditions for digital economy development and reducing disparities in this regard has been considered as an important objective for the European Union. This aim was stressed in the most important strategic documents of the EU such as the Europe 2020 plan. Building effective digital economy can be also a source of great potential for Central and Eastern European economies that face the problem of reducing their development gap to the old EU countries. The main objective of this article is to verify disparities concerning the digital economy development between new and old EU member states. As a result, the similarities between the European economies in digital economy development were analysed with application of the Ward's clustering method. The current research showed not only expected disparities between new and old EU members, but also significant differences in the group of old EU countries. From the policy perspective the article confirms structural development problems of the European Union economy, which can influence its future growth potential under global completion.

Keywords: cluster analysis, digital economy, Ward's method, European Union

JEL Classification: C38, O33, O38

1. Introduction

In the reality of global intensive competition stable economic growth of every economy is dependent on its ability to use potential of a digital economy (Dima et al., 2018). Last decades show that it is a serious challenge not only for developing but also developed economies. As a result, building conditions for the digital economy has been considered as an objective for the European Union, which was stressed in the Europe 2020 plan. However, improving conditions for digital economy development can be a source of special potential especially for Central European countries, which aim at obtaining high level of convergence with developed economies as quick as possible.

Therefore, the objective of the article is to verify disparities in regard to the digital economy development between the “new” and “old” EU member states. To reach that objective the similarities between the European economies in regard to the digital economy development

were analysed with application of the Ward's clustering method, which was applied for comparison of the results in two years 2011 and 2017.

2. Methodology

Most scientific problems, which are the subject of research for social sciences, should be considered as complex and multiple-criteria phenomena. They are often difficult to measure not only due to its complex nature, but also as a result of unavailability of high quality comparable data (Ahmed et al., 2017; Meluzin et al., 2018a, 2018b, 2017; Balcerzak et al., 2017). As a result, multiple-criteria comparative analysis and taxonomic methods are often applied in business sciences and economics (Hadad, 2015; Keshavarz Ghorabae et al., 2016; Mardani et al., 2016; Balcerzak, 2016a, 2016b, Zygmunt, 2017; Cheba & Szopik-Depczynska, 2017; Melecky, 2018; Hajduk, 2018; Maknickiene et al. 2018). In this regard, in the case of economics method of linear ordering and cluster analysis are commonly used (Zavadskas et al., 2016; Novak & Pahor, 2017; Vavrek et al., 2017; Moni et al., 2017; Tatarczak & Boichuk, 2018).

Cluster analysis is a classification method, which enables to distinguish homogeneous groups of economic objects within a given economic subject of the research. Economic objects, which are found in a particular cluster, are characterized by a high level of similarity to each other. The similarity is determined with application of a given metric, where Euclidean distance is the one most often used. The classification of objects is obtained after application of an agglomeration method. In the case of current research the Ward's agglomeration method is applied. The selection of the method is based on its popularity in economic research. Its main advantage is related to its properties of generating many clusters with a small number of objects (Ward, 1963). In that method clusters are separated on the basis of the criterion of minimizing the sum of squares of distances between objects (Trąpczynski et al, 2016; Rollnik-Sadowska & Dąbrowska, 2018; Nowak, 2018).

3. Results

In the article cluster analysis was applied to assess the similarities between the EU countries in regard to the digital economy development level. In the article diagnostic variables provided by Eurostat were used, which are given in table 1. The diagnostic variables were selected based on previous literature review and suggestions of the Eurostat (Balcerzak & Pietrzak, 2017; Wierzbicka, 2018).

Table 1: Diagnostic variables

No	Name	Character	Description	Unit
x1	Households - level of internet access	stimulant	Household internet connection: all type	Percentage of households
x2	Households - type of connection to the internet	stimulant	Household internet connection type: broadband	Percentage of households
x3	Households - availability of computers	stimulant	Households having access to, via one of its members, a computer	Percentage of households
x4	Individuals - mobile internet access	stimulant	Individuals used a laptop, notebook, netbook or tablet computer to access the internet away from home or work	Percentage of individuals
x5	Individuals - frequency of computer use	stimulant	Frequency of computer use: daily	Percentage of individuals
x6	Individuals - computer use	stimulant	Last computer use: within last 12 months	Percentage of individuals
x7	Individuals - frequency of internet use	stimulant	Frequency of internet access: once a week (including every day)	Percentage of individuals
x8	Internet purchases by individuals	stimulant	Last online purchase: in the last 3 months	Percentage of individuals
x9	E-government activities of individuals via websites	stimulant	Internet use: interaction with public authorities (last 12 months)	Percentage of individuals
x10	E-commerce purchases	stimulant	Enterprises having purchased via computer mediated networks	Percentage of individuals

Source: own work based on Eurostat data.

In order to assess the clusters the diagnostic variables were standardised and the distance matrix were assessed. The standardisation was based on the average and standard deviation, whereas distance matrix was obtained with application of the Euclidean distance. The clusters were obtained after application of Ward's procedure, where five clustered were assessed. The research results for the years 2011 and 2017 are given in table 2.

Table 2: The clusters for the EU countries in the years 2011 and 2017

Country	Cluster		Change of cluster	Country	Cluster		Change of cluster
	2011	2017			2011	2017	
Ireland	1	1	no	Estonia	4	1	yes
Austria	1	1	no	Slovenia	4	5	yes
Belgium	1	1	no	Slovakia	4	5	yes
Malta	1	5	yes	Lithuania	5	5	no
France	1	1	no	Czech Republic	5	4	yes
Germany	2	2	no	Hungary	5	5	no
UK	2	2	no	Italy	5	4	yes
Denmark	2	2	no	Cyprus	5	4	yes
Finland	2	2	no	Portugal	5	4	yes
Sweden	2	2	no	Latvia	5	1	yes
Luxembourg	2	2	no	Spain	5	5	no
Netherlands	2	2	no	Poland	5	4	yes
Romania	3	3	no	-	-	-	-
Bulgaria	3	3	no	-	-	-	-
Greece	3	4	yes	-	-	-	-

Source: own work based on Eurostat data.

In the clusters 1 and 2 the countries with the highest level of digital economy development in 2011 were found (see average values for the variables for given clusters in table 3). In the cluster 1 there were Ireland, Austria, Belgium, Malta, France, and cluster 2: Germany, UK, Denmark, Finland, Sweden, Luxembourg i Netherlands. In the cluster 3 the countries with the lowest level of digital economy development were placed: Romania, Bulgaria, Greece. In the cluster 4: Estonia, Slovakia and Slovenia were grouped. In the cluster 5 Central European countries and remaining Southern countries were found: Lithuania, Czech Republic, Hungary, Italy, Cyprus, Portugal, Latvia, Spain, Poland. In the year 2017 quite a similar clusters were obtained, whereas the changes in grouping of the countries were found in regard to clusters 4 and 4 (see table 2).

For the given clusters the average values of diagnostic variables were assessed, which were presented in table 3. The obtained values provided information on the level of development of the digital economy for the clusters. As it has been already mentioned the highest average values were obtained for clusters 1 and 2 and the lowest for cluster 3. Finally, the Kruskal test was used in order to check whether the determined mean values of variables differ significantly between each other for the obtained clusters (Table 3). All the p-values are lower than 0,05, which indicates that in the case of all assessed clusters there are significant differences in obtained average values of diagnostic variables.

Table 3: Average values of the variables for the clusters and Kruskal test results for the year 2011

Cluster	Variables				
	X1	X2	X3	X4	X5
1	76.2	71.2	78.4	9.4	61.8
2	88,0	80,0	89.2	26.7	76.5
3	47.3	38.6	51.6	13.6	35,0
4	71,0	62.3	73,0	34.6	58.6
5	62.3	58.2	66.3	18.3	49.2
Kruskal test					
p-value	~0,00	~0,00	~0,00	~0,00	~0,00
Cluster	Variables				
	X6	X7	X8	X9	X10
1	78.6	73.0	35.0	47.2	39.4
2	90.4	85.4	54.0	62.1	50.8
3	52.0	43.3	7.3	19.7	10.6
4	76.3	69.6	19.7	49.0	18.6
5	66.4	58.9	13.7	33.8	27.0
Kruskal test					
p-value	~0,00	~0,00	~0,00	~0,00	~0,00

Source: own work based on Eurostat data.

Table 4: Average values of the variables for the clusters and Kruskal test results for the year 2017

Cluster	Variables				
	X1	X2	X3	X4	X5
1	85.6	83.6	83.4	26.1	66.7
2	95.4	94.0	93.9	40.3	79.3
3	77.4	75.8	74.6	23.4	57.0
4	81.3	81.0	79.5	44.2	62.2
5	71.5	70.5	68.0	31.0	48.5
Kruskal test					
p-value	~0,00	~0,00	~0,00	~0,00	~0,00
Cluster	Variables				
	X6	X7	X8	X9	X10
1	84.6	82.6	44.7	61.9	45.6
2	94.1	93.1	67.9	73.1	53.9
3	70.4	71.2	25.8	38.0	30.6
4	78.5	77.7	36.5	48.2	28.5
5	66.0	61.5	11.0	15.0	12.5
Kruskal test					
p-value	~0,00	~0,00	~0,00	~0,00	~0,00

Source: own work based on Eurostat data.

4. Conclusion

The main objective of the article was to assess similarities and disparities between the “new” and “old” EU countries in regard to digital economy development in the years 2011 and 2017. In order to fulfil that aim the Ward’s clustering method was used.

The obtained empirical contribution can be summarised with two main facts:

a) it confirms that the countries with the lowest level of digital economy development were not able to change their relative positions in the analysed years. This can confirm a threat of staying in digital trap for such countries as Bulgaria, Romania and especially Greece.

b) The research confirmed not only some expected disparities between the new and old EU members, but also significant differences in the group of old EU countries.

Form the policy perspective the results confirm structural development problems of the European Union economy, which can influence its future growth potential under global completion.

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