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Grażyna Paliwoda-Pękosz (Ed.)  
Piotr Soja (Ed.)  
Ralph Sonntag (Ed.)

## **ICT Management for Global Competitiveness and Economic Growth in Emerging Economies (ICTM)**

**International Conference on ICT Management for Global  
Competitiveness and Economic Growth in Emerging Economies  
Wrocław, Poland, October 23-24, 2017  
Proceedings**

University of Wrocław, Poland

Polish Chapter of Association for Information Systems (PLAIS), USA - Poland

The College of Management "Edukacja", Poland

University of Applied Sciences Emden / Leer, Germany

University of Zielona Góra, Poland

Polish Association for Analytical Psychology (PTPA), Poland

Hochschule für Technik und Wirtschaft Dresden, Germany

AIS Special Interest Group on ICT and Global Development (SIG GlobDev), USA

# ICT Management for Global Competitiveness and Economic Growth in Emerging Economies (ICTM)

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# ICTM 2017

## Proceedings of the International Conference on ICT Management for Global Competitiveness and Economic Growth in Emerging Economies

Conference Theme:  
Innovations for Human Development in Transition Economies

Wrocław, Poland, October 23-24, 2017

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University of Wrocław, Poland  
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The College of Management "Edukacja", Poland  
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## 1. From the Conference Co-Chair

New information and communication technologies have imposed a dynamic on the contemporary world that is inducing transformational change within economic, social and cultural realms, resulting in synergy and convergence effects that are difficult to predict. To put it simply, within the growing complexity and unpredictability of the ambient conditions, there is no defined, closed repertoire, strategy, or solution, whether business oriented or institutional, that provides both effective and innovative approaches to the increasing structural problems of the global stage. The only existing solution to maintain a sustainable competitive advantage within today's world of permanent and endogenous change is the involvement of human capital (potential): its creativity and innovative approaches which alone can become a source of Schumpeter's creative destruction.

This implies even more, in the case of emerging economies, which still lag behind the more mature, developed countries both in economic, social and cultural standards of living. To truly close this gap, an interdisciplinary approach to human capital (human resources) is more than required, especially in reference to the transformational potential of information and communication technologies (ICTs) and any associated new management techniques, new business models, and new regulatory policies. Thus, the objective of this conference is to provide a forum for interested researchers and practitioners to exchange their experiences and creative ideas related to ICT management for global competitiveness and economic, social and cultural growth in emerging economies. Possible topics may include but are not limited to the following aspects of innovation:

- Economical, psycho-social and legal frameworks as they relate to ICT and ICT Management
- Unique ICT management techniques for emerging and transition economies
- Methods for measuring the benefits and costs of projects involving the adoption of ICT
- The role of human and social capital
- Gender and other socio-demographic factors in human and social capital and in innovations processes
- Innovative ways for generating revenues and creating commercial knowledge products
- Educational systems and training as they relate to ICT and ICT Management
- Tradition and contemporaneity of pedagogical thought
- ICT innovations to support small and medium enterprises
- ICT innovations as a path to economic growth
- ICT productivity with specific reference to the prevalent social and business conditions
- Global supply chain management in emerging and transition economies
- Country specific case studies, with specific reference to the prevalent psychosocial and business conditions
- ICT off-shoring/outsourcing into emerging and transition economies
- ICT project management, with specific reference to the prevalent social and business conditions
- Digital divide in emerging and transition economies
- E-commerce impact in emerging and transition economies
- E-government in emerging and transition economies

- Healthcare and ICT Management
- Psychological, social, and economic aspects of Internet use in emerging and transition economies
- Virtual reality in psychological treatment and psychotherapy
- Analytical psychology and psychotherapy in the era of new technology
- Information and communication technologies in personnel recruitment, assessment and development
- Leadership and new technologies
- Psychological aspects of working in a virtual team
- Information and communication technologies in an ageing society
- Quantitative methods and information technology in management

Note:

*Proceedings of the ICTM* are indexed in Web of Science, ISI REUTERS, JCR since 2012.

Contributions to any of the directions within the spectrum of the *ICTM2017* paradigm are welcome.

The four categories for proposals are (1) abstracts, (2) individual papers, (3) posters and (4) e-posters.

Three kinds of publications are planned, the first one - a monograph, in which the papers with up to 20000 characters in English will be included; the second one, in which the articles in a smaller volume will be published. The monographs will be submitted for inclusion in the Citation Index by Thomson Reuters. The paper should also be accompanied by a summary in English. Those papers which are top rated by reviewers when submitted to the ICTM 2017 conference will be published in a special sections of the journal of international scope: *Information Systems Management, ICT Management for Global Competitiveness and Economic Growth in Emerging Economies (ICTM), as also Economy Market Education and Polish Journal of Applied Psychology*.

### **Track 1**

#### **Communication in Management and Psychology**

*Track Chairs:*

**Jolanta Kowal**, *University of Wroclaw, College of Management "Edukacja", Poland*

**Piotr Soja**, *Cracow University of Economics, Poland*

**Grażyna Paliwoda-Pękosz**, *Cracow University of Economics, Poland*

Emerging economies with their dynamic development and rapid growth are often considered the engines of the global marketplace. Unfortunately, despite vigorous economic growth, most emerging economies still lag behind the mature, developed countries in economic output and standards of living. To truly close this gap, new management techniques, new business models, and new regulatory policies, among other factors may be needed. Moreover, information and communication technologies (ICTs) will likely play a vital role in this development process. Thus, the objective of this section is to provide a forum for interested researchers and practitioners to exchange their experiences and creative ideas related to ICT

management for global competitiveness and economic growth in emerging economies. Possible topics may include but are not limited to the following:

- Social, political and legal frameworks as they relate to ICT and ICT Management
- Unique ICT management techniques for emerging and transition economies
- Methods for measuring the benefits and costs of projects involving the adoption of ICT
- The role of human and social capital
- Innovative ways for generating revenues and creating commercial knowledge products
- Educational systems and training as they relate to ICT and ICT Management
- ICT to support small and medium enterprises
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- Digital divide in emerging and transition economies
- E-commerce impact in emerging and transition economies
- E-government in emerging and transition economies
- Psychological, social, and economic aspects of Internet use in emerging and transition economies
- Quantitative methods and information technology in management

## **Track 2**

### **Tradition and Contemporaneity of Pedagogical Thought**

*Track Chairs:*

***Marek Lewandowski**, Wyższa Szkoła Zarządzania "Edukacja", Poland*

***Janusz Czerny**, Wyższa Szkoła Zarządzania "Edukacja", Poland*

***Piotr Jarco**, Wyższa Szkoła Zarządzania "Edukacja", Poland*

We offer the following thematic blocks:

- Problems of education and training in a reformed school
- Innovation in education - between tradition and modernity
- Pre-school and early-school education - looking for alternative solutions
- A child with special educational needs - theory and practice
- Teacher as a guide between nature and culture
- Communication in education

### **Track 3**

#### Communication in Education

*Track Chairs:*

**Ralph Sonntag**, *Hochschule für Technik und Wirtschaft Dresden, Germany*

**Jolanta Kędzior**, *University of Wrocław, Poland*

Possible topics may include but are not limited to the following:

- New technologies and trends in education and social communications
- New Technologies in education in the global educational space, e-learning platforms, exchanging of ideas, experiences, creating joint study programs, e-publications, virtual libraries, virtual campuses, the use of e-learning and communication mediated by modern media in scientific research and teaching (conference rooms, voice chat, diagnosis, skills, problems with the use of new means of communication), e-learning in Professional development, creating and popularising the use of knowledge
- Educational function of computer games
- Edutainment (entertainment education)- knowledge, competences, attitudes, entertainment, social change
- Media competences of different social groups (diagnosis, developing of key competences), new technologies and child development
- New forms of communications in social communications
- New technologies in interpersonal communications in different social groups (family, education, labour market institutions, NGOs, civic movements, social environment in the internet, social conflicts)
- Wiki technology- wikinomy (openness, partnership, cooperation, global collaboration, expert communities), E-inclusion

### **Track 4**

#### Analytical Psychology and Psychotherapy in an Era of New Technology

*Track Chairs:*

**Krystyna Węglowska-Rzepa**, *University of Wrocław, PTPA, Poland*

**Aleksandra Szczepaniak**, *PTPA, Poland*

**Joanna Kasza**, *Jagiellonian University, PTPA, Poland*

Reflection upon analytical psychology and psychotherapy conducted within an era of new technology refers to different aspects: technological enablers/conduits of psychoanalytical or psycho-therapeutical relations re-mediated via new media/internet, social aspects of new technology (new ways of creating identity: both individual and collective) and last, but not least, the cultural aspects of new technology (excess of symbolic and cultural content – the permeation of psyche and cultural content: symbols, meanings, narratives, experiences, modalities).

Such change often evokes ambivalent feelings and reflections on both sides, thus creating a more pressing need for an in-depth analysis, including among others: indications of benefits and difficulties, the impact of new technologies on the classic process of psychotherapy or psychoanalysis (along with phenomena like transference and countertransference), the

emergence of new phenomena specific to therapy via internet/new media, as well as the implications of conducting counselling, psychotherapy and psychoanalysis by internet for the long-term development of an individual.

## **Track 5** Language in Communication

*Track Chairs:*

***Anna Kuzio, University of Zielona Góra, Poland***

Language is essential to everyday human interaction. We use language to inform other people of what we feel or desire, and how we understand the world. We communicate effectively using words, gestures, and tone of voice in a multitude of situations, and for a variety of purposes. The capacity for articulate discourse is what makes us distinct from other living species. The objective of this section is to provide a forum for interested researchers and practitioners to exchange their experiences and creative ideas related to linguistics in its broadest sense. We especially welcome papers which re-examine existing frameworks for critical discourse research and/or which highlight and apply new methodologies sourced from anywhere across the humanities, social and cognitive sciences. Possible topics include but are not limited to the following:

- Discourse analysis
- Political and media discourse
- Advertising
- Discourses about war and terrorism
- Discourses about discrimination and inequality
- Power, ideology and dominance in institutional discourse
- Identity in discourse
- Education discourse
- Environmental discourse
- Health communication
- Language and the law
- Translation
- Applied linguistics
- Language teaching
- Lexicography
- Corpus linguistics
- Intercultural communication

## **Track 6**

### Cultural Heritage and Creativity in the Economy of Tourism

*Track Chairs:*

*Lesław Koćwin, College of Management "Edukacja", Poland*

Culture, including communication, plays a significant role in analyzes of potential for development, as well as programs and plans for tourist areas. In terms of the economy of tourism, it is expressed in defining the role of historical and contemporary cultural content as a leading motive of various tourism products.

The creators of these products are local communities that wish to improve their quality of life, as well as being motivated by economic interests.

In this perspective, it can be observed that within the tourism environment there exists the occurrence of "creative regions", "creative cities" and "creative villages" inhabited by "creative communities", governed by the "creative class". Of great significance for these locations and communities are "creative industries", identified also as the "cultural industries". They are a variety of activities related to the protection of historical content and the evolution of new content and its dissemination. These are areas of cultural life such as, the conservation of historical monuments, museology, archeology, architecture, music, visual arts, industrial design, crafts, media and publishing.

The aim of the panel is to consider the nature of the relationship between creativity and the economy of tourism. In particular, it concerns the activity of the creative and business environment in the form of local government units, schools and universities, cultural institutions and non-governmental organizations. They are the involuntary or intentional creators of cultural tourism products which enter the market. Their activity is the answer to the needs and trends in tourism, as well as an inspiration for the organizers and entrepreneurs who operate in the sphere of tourism.

Range of topics: In research reports and reflections from personal experiences which are the basis for discussion and an exchange of views, references to the following issues are sought:

- Specifics of the creative sector in tourism
- Art as a response to new needs and trends in the contemporary tourism
- Trends and needs of the creative sector
- Management of the creative sector in tourism
- Institutional support for the arts for the purposes of tourism
- Linking science and business in the area of creative industries
- Originality of "cultural" tourist products in the light of ethics and law
- Economics of the production of "creative products" for the purposes of tourism

## **Track 7**

### **Gender in ICT Management in the Context of Social and Digital Inclusion**

*Track Chairs:*

*Ewa Soja, Cracow University of Economics, Poland*

*Jolanta Kędzior, University of Wrocław, Poland*

*Anna Mitrega, University of Wrocław, Poland*

The goal of this panel is to develop discussion on the present and future position of gender issues in management, in the context of social and digital inclusion. The topics of the panel may include among others:

- International, interdisciplinary and cross cultural research
- Developing an international focus for research ideas and dialogue
- Issues in the area of gender, work and organization
- Gender and e-management
- Gender and ICT communication
- Gender in a virtual society
- Gender and innovative capabilities
- Gender and social and digital inclusion
- Ageing and social and digital inclusion

## 2. Biographies

### Jolanta Kowal



Jolanta Kowal, PhD. of economic sciences, certified Jungian analyst, a tutor and researcher at the Institute of Psychology of Wrocław University. She is a President of PLAIS (Polish Chapter of Association for Information Systems) and President of PTPA (Polish Association of Analytical Psychology), Individual member of IAAP, a member of scientific associations AIS, PTS and PTPA accredited by IAAP. A researcher and lecturer, Jolanta is the author of over 100 scientific publications and delivers lectures and seminars on methodology of management, applied statistics in socio-economic, psychological and multicultural research. Her interests and research specializations are: organization and management, information technology in organization, methodology, quantitative and qualitative research, analytical psychology, cross-cultural research. Jolanta acted as the conference co-chair and track-chair for many international conferences ([ECMLG](#), [CMEP](#), [ICTM AMCIS](#)). She is also a member of editorial board of scientific journals: [GRE](#) and [PJAP](#).

### Helena Lindskog



Adjunct professor in industrial marketing and industrial economy with a special focus on public procurement at Department of Management and Engineering, Linköping University, Sweden.

Engineer on electronics from Technical University in Warsaw, Bachelor of Arts in languages, comparative religion, history and literature from Stockholm University; long experience from both private (responsible for market introductions and training at Ericsson, as adviser, expert and consultant at HelDag AB) and public sectors (technical director and secretary in governmental commissions), PhD in Technology at Linköping Technical University.

Author of several scientific articles, reports, technical specifications, debates and columns in the Swedish press. Fluent in Polish, Swedish, English, Spanish, Russian and French.

### Yasmeen Ahmed



I have completed by Masters in Business Administration and currently a Phd Candidate in the field of Organization and Management in the faculty of Economics and Business Administration, Erciyes University. I am a six sigma certified professional, ITIL (Information Technology and Infrastructure Library) certified professional and Microsoft Certified professional (MCP). Member of Strategic management Commission at the faculty. I have also presented studies on employee psychology at organizations. My Scientific interests are focused on Organizational Behaviour, Strategic planning at Organizations, Human Resource Management.

**Bartłomiej Gawin**

Bartłomiej Gawin, PhD, provides a synergy between business activity as an IT Director and academic research. He has actively participated for over 17 years in numerous projects regarding the development, implementation and use of business applications, workflow tools as well as analytical techniques – including Business Intelligence (BI) and process mining. Aside from IT, he has the professional experience in telecommunications and Facility Management. He deals primarily with research regarding applications of modern techniques and tools for analysis, design and simulation of business processes and IT solutions as well as BI in service of energy efficiency.

**Tanya Gibbs**

Tanya Gibbs is a former instructor of Finance at the American University of Sharjah's School of Business Administration, where she also developed and taught a course on financial crime. In May 2017 she successfully defended her doctoral dissertation in advanced legal studies at the University of London. Her PhD research focused on assessing the effectiveness of Anti Money Laundering/Counter Financing of Terrorism efforts in the United Arab Emirates. Gibbs has multidisciplinary research interests, focusing on Russia and the United Arab Emirates.

**Saikat Gochhait**

11 years of experience with 5 years of teaching experience and 6 years of industrial experience with Tata Group(TRL Krosaki Ref Ltd) and Bajoria Group(IFGL Ref Ltd). Bsc(Physics), PGDCA, MSc-IT, MBA with specialization in Marketing and Ph.d-International Business from Sambalpur University. He has been awarded Doctorial Bursary Award 2010 from Coventry University, UK for the doctoral thesis-Refractory Industries. He has been awarded with Diamond of Belpahar-2013 sponsored by Tata Krosaki Refractories community for excellence as an individual and contribution to the society. He has been awarded with MTC Global award for Best Faculty in Rural Area. Mr.Saikat has contributed extensively in National and International Journals and Conferences and has chaired session in different International and National conference such as IIM-K,IIM-L,IMS-Noida, IMT, XIM-B and Amity University-Jaipur. Phd Thesis has been published in Book printed form by LAP Lambert Academic Publishing, AG & Co KG, 2012 available on ([www.ebay.com](http://www.ebay.com) › Books › Nonfiction).  
 Blog:[www.saikatgochhait.blogspot.com](http://www.saikatgochhait.blogspot.com)

**Piotr Jarco**

dr Piotr Jarco – Worker of Higher School of Management „Edukacja” in Wrocław. Doctor of Economics specialized in social policy (graduated in Sociology and Economics). His scientific interests are focused on psychological and socio-economic determinants of activity (inactivity) in society. Lecturer of Sociology, Management of Human Resources as well as Work and Organizational Psychology. Author of more than 30 publications, coordinator of research and implementing projects in scope of social policy and sociology.

**Olga A. Kalchenko**

Olga A. Kalchenko is currently an associate professor and researcher at Peter the Great Saint-Petersburg Polytechnic University, Russia. She holds a Ph.D. in Economics. Olga has also studied in Lappeenranta University of Technology, Finland and Northern Institute of Technology Management, Germany. Her research interests are: human capital, innovative projects effectiveness and efficiency evaluation, sustainable development, economic safety. As a researcher and lecturer, Olga is the author of over 12 refereed scientific journal articles, 2 scientific books (monographs) and tutorials. She chaired a session at the 2014 International Congress on Economy, Finance and Business, Japan.

**Joanna Kasza**

Joanna Kasza – absolwentka SGH na kierunkach: MBA (Master of Business Administration) i Zarządzania i Marketingu, oraz Podyplomowych Studiów: „Zarządzania w kulturze” Instytutu Kultury przy Uniwersytecie A. Mickiewicza w Poznaniu; „Dyplomacji kulturalnej” Collegium Civitas we współpracy z Instytutem Adama Mickiewicza, oraz Interdyscyplinarnych Studiów „Sztuka, przestrzeń publiczna, demokracja” SWPS we współpracy z Muzeum Sztuki Nowoczesnej. Aktualnie doktorantka Instytutu Kultury UJ w trakcie pracy doktorskiej na temat przemian w obiegach kultury w ponowoczesnej gospodarce w związku dokonująca się obecnie rewolucji ICT

Zainteresowania: relacje między kulturą i sztuką a gospodarką, czy w szerszym ujęciu między ekonomią, polityką a społecznym i technologicznym wymiarem i rezultatem tych relacji (podejście konstruktywistyczne przy założeniach: anty-redukcjonizmu i artykulacji relacji między kulturą a ekonomią polityczną - w kontekście współczesnych pytań o relacje między kulturą a ideologią, hegemonią i władzą oraz polityką/ politycznością

**Alicja Keplinger**

Dr Alicja Keplinger is a researcher and lecturer at the Institute of Psychology of Wrocław University. She is a member of Polish Association of Organizational Psychology and a board member of Lower Silesian Branch of the "National Forum for Lifelong Guidance" Association. Between 2008 and 2012 she held position of Vice Director of the Institute of Psychology of the University of Wrocław.

Alicja is the author of over 50 scientific publications (published among others in University of Wrocław and ENETEIA) and delivers lectures and seminars on psychology of management, psychology of motivation and psychology of individual differences. She reviewed papers for ECMLG PROCEEDINGS 2010-2012 (ACI, Reading, UK) and Developmental Psychology 2012 (Poland) among many others.

Her interests and research specializations are: organization and management, psychology of motivation, psychology of individual differences and ethos of behavioural problems in organization.

Alicja acted as the conference chair for the 3rd, 4th and 5th Interdisciplinary Scientific Conferences "Man against mass social phenomena" hosted at the University of Wrocław, Poland. The topics included: "Faces of passivity" 11-12 June 2007, "Femininity and masculinity - contexts (not) daily," 19-20 May 2008, "Transgressions, innovation and creativity" 18-19 May 2009.

**Jarosław Klebaniuk**

Assistant Professor at the Institute of Psychology of the University of Wrocław, a journalist, novelist, editor of the quarterly "Social Psychology". He conducts research in the field of political psychology. He advocates greater social equality. He writes about psychology, politics, books, films and theater productions. He published several scientific articles, authored five books, among others: "The phenomenon of social inequality" and "Faces of inequality." He is the editor of the journal "Social Psychology" and Lewica.pl portal. His pieces of writing appeared in such magazines as "Accent", "Frazier", "Borderland" and "Lamp".

**Aleksandr Kozlov**

Aleksandr Kozlov, date of birth: 1955.07.25, Doctor of Science (Ec.), Professor Professor of International Graduate School of Management, Peter the Great Saint Petersburg Polytechnic University (since 2016). Professor of University of Economy in Bydgoszcz (since 2009)

Career:

2012-2016 Head of Department "World and Regional Economy" of Peter the Great Saint Petersburg Polytechnic University,

2006–2012 Professor of Peter the Great Saint Petersburg Polytechnic University,

1989–2006 Director for Training and Research Programs of Center for Management and Marketing "Progress" under Government of Russian Federation,

1980–1989 Assistant, Associate professor, St. Petersburg State Polytechnical University

**Anna Kuzio**

M.A.: studied English at Wrocław University, Ph.D. studied English at Adam Mickiewicz University in Poznań. Research interests: intercultural communication, critical discourse analysis, pragmatics, rhetoric, persuasion and manipulation. Assistant Professor at WSZ EDUKACJA in Wrocław (Poland).

**Bianka Lewandowska**

Bianka Lewandowska - PhD with a specialization in psychology. She graduated from the Institute of Psychology at the University of Wrocław. In the years: 1993 - 2003 Bianka worked at the Institute of Economic and Social Sciences University of Technology, and since October 2003, in the Department of Clinical and Health Psychology, Institute of Psychology at the University of Wrocław. Her professional activities outside the university: to design and conduct workshops and individual counseling psychology in supporting personal development and communication. Current area of her research interest is psychology of the body - the experience of corporeality, identity processes and emotions and somatic health, the possibility of psychological support prevention and treatment of diseases. Research: Determinants of psychological adaptation to chronic illness for example endometriosis.

**Marek Lewandowski**

A graduate of the Academy of Physical Education in Wrocław, specializing in teaching.

In the 1986-2012 academic teacher at the Academy of Physical Education in Wrocław. The College of Management in Wrocław industry since 2012, author of over 70 scientific peer-reviewed publications, including two books, editor of nine monographs. He has research and teaching internships at the Hochschule für Musik und Darstellende Kunst "Mozarteum" Abteilung Orff Institute in Salzburg, Austria, Deutsche Sporthochschule - Institut für Sportdidaktik in Cologne, Germany, the University of Olomouc - Czech Republic, Academy of Physical Education in Warsaw Academy of Physical Education in Gdansk. Work experience: developing a theory of physical education in the context of the culture of health behavior, recreational and aesthetic man. Research activity is focused on the study of the role of the environment: the school and the family in the child's acquisition of cultural competence and psychomotor. Interests: listening to music, collecting records, drawing and painting, hiking.

**Zbigniew Łoś**

Zbigniew Łoś – psychologist, PhD in human sciences, works in Institute of Psychology, Faculty of Historical and Pedagogical Sciences at the University of Wrocław.

He has developed his own theory assuming that the psychological organisation of human beings consists of four evolutionarily shaped functional layers which may be subject to progressive development throughout four periods of human life. He is engaged in research aiming to falsify this theory. His main publication is “Rozwój psychiczny człowieka w ciągu całego życia” [Life-long psychological development of human beings] (2010, a monograph). He developed (with Alicja Senejko) theoretical model of attitudes to globalization (MAG). She is a coauthor (with A. Senejko) The World and I Questionnaire (WIQ), which is a measure of this attitudes.

**Maria Mach-Król**

Maria Mach-Król is the associate professor in the Dept. of Business Informatics at the University of Economics in Katowice, Poland. She received her MS degree in cybernetics from the University of Lodz, Poland in 1993, and her PhD degree in information systems for management from the same University in 1998.

Since 2008 she has been working at the position of associate professor at the University of Economics in Wrocław, Poland, and then at the University of Economics in Katowice, Poland.

She is the author and co-author of more than 50 journal and peer-reviewed papers, three books, and has written several book chapters. Her current research interests include artificial intelligence, big data and knowledge-based systems. She is the member of the Polish Artificial Intelligence Society and of the Business Informatics Scientific Society – NTIE (Naukowe Towarzystwo Informatyki Ekonomicznej).

**Juho Maekioe**

Prof. Dr. Juho Mäkiö joined the Department of Electrical Engineering and Industrial Informatics at the University of Applied Sciences Emden-Leer and became Full Professor of programming in 2013. He received the Doctor degree in Economics from the University of Karlsruhe, Germany, in 2006. From 2006 to 2010 he was first project manager (till 2007) and then department director (2007-2010) in the department of Software Engineering at the research centre of information technology at the University of Karlsruhe (FZI). From 2010 to 2012 he was deputy professor for software engineering and programming in the University Heilbronn at the department of e-Business. From fall 2012 to summer 2013 he was lecturer at the Technical Teacher Collage (TTC), Riyadh, KSA. Besides the current position at the University of Applied Sciences Emden-Leer, he is visiting professor at the Polytechnic University of St. Petersburg, Russia. Prof. Mäkiö has participated in leading position in German research projects, e.g. as coordinator of the project "OUTSHORE".

**Bartosz  
Marcinkowski**



Bartosz Marcinkowski, PhD, is an Assistant Professor at the University of Gdansk, currently engaged in research regarding IT solutions development within globalizing enterprises. The author of several best-seller Systems Analysis and Design (SAND) books published on Polish market. He is also an expert in computer networks administration domain and an instructor at numerous professional training ventures dedicated to the development of IT competences. His professional skills are confirmed by international certificates, inter alia: OMG Certified UML Professional, OMG Certified Expert in BPM, Cisco Certified Network Associate Instructor Trainer, and ITIL V3.

**Janusz Martan**



Janusz Martan was born 1 April 1950. in Wroclaw. In 1973 he completed a degree in electronics at the Technical University of Wroclaw. In 1977 he received his PhD ("Investigation of ion extraction conditions on the parameters of ion beam."). In 1997, obtained post-doctoral degree ("Modeling of the concentration distribution of implanted ions in solid-state"). In 2004, transfers from the Faculty of Microsystem Electronics and Photonics to the Department of Computer Science and Management. Since 2005, he exercises the function of the vice-dean. His research covers the field of the production of molding and applications of ion beams, ion implantation and fractal calculus applications in various fields of science and knowledge.

**Anna Oleszkowicz**



Anna Oleszkowicz (born in 1956), psychologist, professor at the Institute of Psychology at the University of Wroclaw. Her research interests focus on developmental issues of adolescence, adolescent rebellion, criteria and forms of adulthood. The author of numerous scientific and popular works in this field, including the monograph crisis youthful - the essence and process (1995), youthful rebellion. Conditions, forms, effects (2006), How to truancy (2010) co-author, psychology of adolescence. Developmental changes in the age of globalization (2013), co-author. Since 2008 he has been the Director of the Institute of Psychology. PhD 1989, habilitation in 2007.

**Celina M. Olszak**



Prof. Celina M. Olszak, Ph.D., D.Sc. is a professor of Management Information Systems at the University of Economics in Katowice, Poland. She is a dean of Faculty of Economics, a chair of the Department of Business Informatics as well as Deutsche Akademische Austausch Dienst (DAAD) and Swiss Government scholarship holder. She visited and took different courses at the universities in Europe, USA, and Australian. She has authored 15 books and over 300 academic journal articles. Her research focuses on decision support systems, knowledge management, management information systems, business intelligence, big data, enterprise resource planning, innovations and IT-based organizational creativity. She is a member of Informing Science Institute in USA, the Pays du Groupe Vysegrad (PGV) Network, and the Polish Academy of Sciences.

**Krystyna  
Ostapiuk**

Krystyna Ostapiuk Ph. D., is an associate professor at the Pedagogy Department of Wrocław University of Management 'Edukacja', Krakowska 54-42. She is a pedagogue, educationist, therapist, and a licensed coach of 2nd rank of Polskie Towarzystwo Psychologiczne (Polish Psychology Association) in Warsaw, as well as a business coach.

**Grażyna  
Paliwoda-Pękosz**

Grażyna Paliwoda-Pękosz is assistant professor in the Department of Computer Science at the Cracow University of Economics (CUE), Poland. She holds a postdoctoral degree (habilitation) and Ph.D. in economics from CUE and M.Sc. in Computer Science and Mathematics from the Jagiellonian University of Krakow, Poland. Her research interests include enterprise system adoption, application of ICT in education, and Semantic Web technologies. Grażyna has published in *Industrial Management & Data Systems*, *Information Technology for Development*, *Information Systems Management*, *The Electronic Journal of Information Systems in Developing Countries*, and in conference proceedings such as AMCIS, ICTM, ICEEE, EMCIS, and ICEL. She has been involved in the organization of mini-tracks in AMCIS and the workshop in SIGMOD/SBD. Grażyna has reviewed for ECRA, ISM, and ITD journals.

**Wojciech  
Piotrowicz**



Research: Information Systems, Supply Chain Management,  
Interests: Information Communication Technology, Performance Management,  
Sustainable Supply Chain, Management, and 11 more

About:

Wojciech Piotrowicz is a member of the Faculty of Management, University of Oxford, and a member of the Oxford Institute of Retail Management (OXIRM) at Saïd Business School. Wojciech is an expert on supply chain management, information technology and performance measurement, including sustainability-related indicators.

Wojciech is currently working on a major 18 month research project led by Richard Cuthbertson of OXIRM, on the evolution of multi-channel retailing. The project is examining how emerging information technologies can be utilised to encourage shoppers back to the high street against the backdrop of increasing online sales, decreasing footfall in store and increasing costs. Instead of treating online and in-store purchases as two competing channels, the project is exploring how online solutions could be brought into stores to combine the advantages of both. Wojciech is examining the ways in which the physical shopping experience could be enhanced by the benefits generated by emerging technology, such as self-service kiosks and mobile applications used in-store. Such a radical reconfiguring of retail will present challenges to retailers, who must simultaneously address back office support and supply-chain issues to service these innovations and exploit the opportunities of developing technology.

**Ivana Poledňová**

PhDr. Ivana Poledňová, CSc.

Research methods in psychology, Methodology of Psychology, Psychodiagnostics, Theories of Personality, Psychology of Motivation. In the past eight years the project proposer is working on the Institute for Research on Children, Youth and Family. This institute is part of Psychology Department on the Faculty of Social Studies at Masaryk University in Brno and its main interest is long-term research on children, youth and their families. Research institute is taking part on unique European project (coordinated by the Institute of Child Health University of Bristol, Great Britain) called ELSPAC (The European Longitudinal Study of Pregnancy and Childhood).

The project proposer research activities within the Institute are focused on these areas: vocational plans in adolescence in relation to the self-concept and achievement motivation, career development, cognitive development and professional training. In the year 2009 she was the editor of monograph *Sebepojetí dětí a dospívajících v kontextu školy* (Self-concept of children and adolescents in the school context), Brno, MU. Several years she cooperates in the research activities of the Institute of Psychology of the University of Wrocław, Poland. One of the results of this cooperation is her contribution to the polish monograph on aggression *Zachowania agresywne dzieci i młodzieży* (Aggressive behavior in children and youth), Warsaw, Difin 2013. As the author of several psychodiagnostic methods she cooperates long term with the Psychodiagnostika Brno publishing.

**Kamil Romani**

Kamil Roman: PhD student at the Maria Curie-Skłodowska University in Lublin.

In my research work, I'm interested in issues related to logistics problem and urban development according to the Smart City concept.

**Narczyz Roztocki**

Narczyz Roztocki is Professor of Management Information Systems at the State University of New York at New Paltz. His research interests include IS/IT investment evaluation, IS/IT productivity, IS/IT investments in emerging economies, technology project management, and e-commerce. He has published in numerous journals and conferences including: the European Journal of Information Systems, the Journal of Computer Information Systems, the Electronic Journal of Information Systems in Developing Countries, Electronic Journal of Information Systems Evaluation, International Journal of Service Technology and Management, Journal of Global Information Technology Management, Journal of Information Science & Technology, and proceedings of the AMCIS, DSI, ECIS, ECITE and HICSS.

### **Ariane-Tabea Schueller**



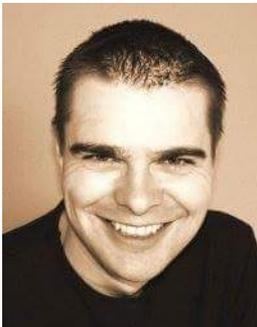
Ariane-Tabea Schueller is a scientific employee at the Ernst-Moritz-Arndt-University of Greifswald (Germany), where she teaches classes of economics and marketing. After pursuing a bachelor of science of business administration at the University of Marburg (Germany) she focuses as a researcher on topics of consumer behavior and social media.

### **Alicja Senejko**



Alicja Senejko, dr hab. from Institute of Psychology, Wrocław University. Her scientific interests is focus on the two topics.1/Psychological defence and development. She is an author of the Function-action approach to defence activity. Her questionnaire PSPDQ (Psychic and Psychosocial Defences Questionnaire) diagnoses threats and defences among adolescents and adults; 2/ Psychology of globalization. She is a coauthor (with Zbigniew Łoś) The Model of Attitudes toward globalization (Mag) and The World and I Questionnaire (WIQ), which is created to diagnose attitudes toward globalization. Dr hab Alicja Senejko is an author of 3 monographs, and 50st articles. She is a member of PTP (Polish Psychological Association), European Association for Research on Adolescence (EARA), and International Society for the Study of Behavioral Development (ISSBD).

### **Richard Sharp**



Richard Sharp is a full-time teacher at the university of Zielona Góra, Poland. At the moment he is in the process of doing a PhD. His research interests include computer-assisted language learning (CALL), mobile-assisted language learning (MALL) and the impact of new technologies on the classroom and language acquisition process.

### **Piotr Soja**



Professor Piotr Soja is assistant professor in the Department of Computer Science at the Cracow University of Economics (CUE), Poland. He holds a postdoctoral degree (habilitation) and Ph.D. in economics from CUE. He also holds an M.B.A. from the School of Entrepreneurship and Management at CUE in association with the University of Teeside, UK. He has over eight years of industry experience as an ERP consultant, system analyst and software developer. His research interests include enterprise systems adoption, ICT for development, and inter-organizational integration. Piotr has published in Enterprise Information Systems, Industrial Management & Data Systems, Information Systems Management, and Production Planning & Control, among many other journals, as well as in numerous conference proceedings such as AMCIS, HICCS, ICEIS, and ISD.

**Ralph Sonntag**

Ralph Sonntag is since 2004 Professor of Marketing, in particular multimedia marketing, at the University of Applied Sciences Dresden. In addition, he is scientific director of an incubator for start-ups at the HTW Dresden. After studying business administration in Würzburg, he worked as a researcher and project manager of the Steinbeis Transfer Center for Business Information Management and the Technical University of Dresden. Subsequently followed by positions at the consulting company Diebold (now Detecon) in the digital business as well as in communication and advertising agencies. His work and research interests are in the study of Word of Mouth, E- and Social commerce, models of Digital Business, methods of media planning and advertising success research.

**Janusz Stal**

Janusz Stal is a senior lecturer in the Department of Computer Science at the Cracow University of Economics (Poland). He holds a Ph.D. in economics from the Cracow University of Economics. His areas of research include mobile technology, mobile knowledge management, applications of ICT in education, and cloud computing. Dr. Janusz Stal has published articles in Information Technology for Development, International Journal of Strategic Management and Decision Support Systems in Strategic Management, and numerous conference proceedings of EMCIS, ECIME, SIGCSE/SIGCUE, IIS, ICEEE, and ICEL.

**Zdenka Stránská**

PhDr. Zdenka STRÁNSKÁ, Ph.D. works as an assistant professor at the Department of Psychology of the Faculty of Arts, Masaryk University in Brno. He teaches educational psychology, school psychology, didactics of psychology, psychology for teachers and general psychology. Her research has focused on the issue of motivation for learning, boredom, fear, anxiety and stage fright at school, learning styles of students, school success of pupils, students' creativity, teacher's personality, etc.

**Evgeniia Surkova**

MSc of Agriculture (Saint Petersburg, Russia), currently student in the third year of Computer Sciences (BSc) and student of the Media Informatics in the first year (MSc) at the University of Applied Sciences Emden/Leer (Germany). At the same time she is a local project manager at the STIMEY-Project which is funded by the European Financing Program Horizon 2020. The project aims to educate, engage and increase the youth's interest in STEM education and careers by using E-Learning Platform.

**Jan Trąbka**

Jan Trąbka is an assistant professor at the Cracow University of Economics and he holds a Ph.D. in Management from the same university. He works at the Department of Computer Science. His research interests include analysis and design of information systems (especially in the content management area), business process modeling, accounting systems and ERP systems. He is the author of several articles and conference papers (presented at: PoEM, SIGSAND/PLAIS EuroSymposium, KKIO, SWO, Computerworld Requirements Engineering). In his business life he has been involved in business analysis and pre-implementation requirement analysis (ERP, Workflow, ECM) projects. He has also managed several implementation projects. In the past he worked as a project manager for Asseco Group and for several years he managed projects in the sectors of logistics, medicine and IT. He is a member of the Association for Information and Image Management International and Polish Society for Information Systems Research (Naukowe Towarzystwa Informatyki Ekonomicznej).

**Paweł Topol**

Paweł Topol, Ph.D., associate professor, Adam Mickiewicz University in Poznań, Poland, Faculty of Educational Studies – M.A. in English, Ph.D. in pedagogy, educator and researcher. Research interests: educational technology, teacher training, IT in education, CALL (Computer-Assisted Language Learning), e-learning and u-learning, 3D virtual worlds for education. Author: 2 books, 50+ articles, 11 reviews. Research and teaching experience: EFL (30+ years), IT and CALL (25+ years), e-learning (15+ years), 3D virtual worlds (6 years), online teacher at Appalachian State University, NC, USA (8 years).

**Mirosława Wawrzak-Chodaczek**

prof., Dr Hab. at the Institute of Pedagogy, Wrocław University in Wrocław, (professor). Member of scientific associations Wrocław Scientific Society. Researcher and lecturer, the author of over 60 scientific publications. Research specialisation: social communications, mass media and education, public relations, social security. She is an organiser of many conferences. In 2006-2008 she participated in the research on the educational-professional mobility of incomplete-legal persons in the Lower Silesia. Diagnosis of the Support Instruments - project financed by the European Social Funds and in a research project Czech-German-Polish "Equal opportunities for women and men in the Euro-region Neisse-Nisa-Nysa" coordinated by the Internationales Begegnungszentrum St. Marienthal, PONTES-Agentur, St. Marienthal 10, 02899 Ostritz, funded by the government of Germany- Bundestag.

**Jarosław Wąsiński**

Jarosław Wąsiński – Lecturer in the College of Management Edukacja; Doctor of economics; Alumnus of The Warsaw School of Economics, Auditor/ Lead Auditor ISO 9000 series QMS and ISO 27 001 (about 500 audits and expert opinions in UE); Trainer; Eleven years of experience in the implementation of management systems such as ISO 9001, ISO 27 001, ISO 22 000, HACCP, BRC, IFS; Originator of technology projects in companies and industrial restructuring.

**Heinz Roland Weistroffer**

Heinz Roland Weistroffer is an Associate Professor of Information Systems in the School of Business at Virginia Commonwealth University in Richmond, Virginia, USA. His research interests include computer assisted decision-making, systems analysis and design, and information technology for development. He has published in Journal of Strategic Information Systems, IEEE Transactions on Software Engineering, Journal of Multi-Criteria Decision Analysis, Socio-Economic Planning Sciences, Information Technology for Development, and Computational and Mathematical Organization Theory, among many other journals, as well as in numerous conference proceedings such as AMCIS, HICCS, and ECIS. He is an associate editor of the journal Information Technology for Development.

## Krystyna Węglowska-Rzepa



Krystyna Węglowska-Rzepa, PhD in psychology, an employee of the Institute of Psychology at the University of Wrocław, a member of the Polish Association of Analytical Psychology and the trainee on Jungian analyst at the International Association for Analytical Psychology. Beyond scientific and didactic work at the Institute of Psychology UWr, runs a private psychotherapy practice. She participates in many national and international conferences and training related to psychology and the social sciences. Her interests and research focus on personality psychology, the influence of significant events and experiences for the development of individuals in the course of life, psychoanalysis and neuroscience. She has numerous publications, the last of them are (see Publications by University of Wrocław):

- The "Symob" projective method and its possible applications in the labour market: the basis for the method's construction / Krystyna Węglowska-Rzepa, Jolanta Kowal // W: *Functioning in the workplace: quantitative and qualitative psychological research* / ed. by Barbara Mróz. - Warszawa: SCHOLAR Publishing House, 2012;

- *Femininity and masculinity in the course of social and mental changes* / Krystyna Węglowska-Rzepa, Jolanta Kowal, Aleksandra Szczepaniak // W: *Ona w XXI wieku: interdyscyplinarny obraz kobiety* / red. nauk. Magdalena Baranowska-Szczepańska. - Poznań: Instytut Naukowo-Wydawniczy MAIUSCULA, 2011;

- *W poszukiwaniu swojego miejsca w życiu: spojrzenie z perspektywy narracyjnej i analitycznej* / Krystyna Węglowska-Rzepa // W: *Psychologia narracyjna: tożsamość, dialogowość, pogranicza* / red. nauk. Elżbieta Dryll, Anna Cierpka. - Warszawa: Eneteia - Wydaw. Psychologii i Kultury, 2011. - (Seria Akademicka).

## Stanisław Wrycza



Professor Stanisław Wrycza, University of Gdansk

Founding member of AIS – 1995;

He has been the organizer of the following AIS events:

- Xth European Conference on Information Systems – ECIS 2002
- SIGSAND/PLAIS EuroSymposia - 2007, 2011, 2012, 2013, 2014, 2015

Professor Wrycza is together with the former AIS President

Professor Claudia Loebbecke co-founder of PLAIS in 2006;

Head of Department of Business Informatics at University of Gdansk;

Senior Editor of *Information Systems Management Journal* (IF=0.35);

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**Aleksander Wolski**

Doktor nauk społecznych w zakresie socjologii, długoletni wykładowca, promotor. Autor artykułów z zakresu socjologii (społeczności lokalnych, komunikacji społecznej i konsultacji społecznych). W obszarze działalności akademickiej zajmował stanowiska: kierownika ośrodka zamiejscowego, pełnomocnika dziekana, pełnomocnika rektora. Aktualnie Dziekan Wydziału Zamiejscowego GWSH w Żorach. Wykonuje analizy społeczne dla przemysłu energetycznego i wydobywczego. Praktyk z zakresu rozwoju osobistego. Zaangażowany w pracę z osobami uzależnionymi od alkoholu. W charakterze eksperta uczestnik audycji radiowych i telewizyjnych. Swoje zainteresowania zawodowe w zakresie socjologii łączy z osiągnięciami filozofii taoistycznej, rozwojem duchowym oraz fizyką kwantową.

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In the current research work focuses on contemporary requirements and expectations of the IT sector, lead the way to transform the IT industry, the critical success factors of projects and the competencies and efficiency of PM. The author of numerous articles and monographs domestic and foreign, as well as expert, consultant, trainer in the area of innovation in project management. She is passionate about teamwork preferring an interdisciplinary approach, combining knowledge from different fields with industry practice and personalized approach based tutoring.

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## 4. Papers

## **Keynote address**

# Social and Economic Aspects of Internet of Things

by

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## ABSTRACT

Changes, any kind, tend to influence the environment in which they take place. Some of the changes are desired and some are undesired, some of them are foreseen some are unforeseen. During the last two centuries, the industrial development has passed four “revolutions”. They all took place after technical innovations, which made them possible. Each of them has dramatically changed the world of their time. The last of them, the 4th industrial revolution, is going on in our days. The technical enabler for that is the Internet. The current novel technical innovation, the Internet of Things (IoT), is based on the Internet and is rapidly changing our social and economic environment – how we communicate, how we work or how we spend our free time. The speed of the changes forces us to face with questions about their positive and negative consequences. Do the other from this change affected areas change in the same tempo? Is the novel technology with all its consequences, manageable and are the consequences of its application desired from the social and from the economic points of view? These and similar questions are needed to be ready to meet the challenges of the future dealing with the novel technical possibilities. In my talk, I want to highlight some social and economic aspects of IoT.

**Keywords:** changes, Internet things, kind, influence the environment, economy, social and economic aspects

# Attitudes towards ICT solutions for independent living among older adults in Sweden and Poland: A preliminary study

by

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## ABSTRACT

Since the growing amount of elderly people in the population is a challenge for most of the European countries, it would be favorable to develop common models and processes for elderly care and healthcare based on the new digital solutions. However the social, economic and cultural environment differ between countries in Europe and it is important to acknowledge and understand the country-specific context when new digital solutions are implemented. The aim of this paper is to investigate older adults' needs and attitudes towards ICT solutions for independent living in two European countries: Sweden and Poland. The study was conducted with the help of a questionnaire distributed to older adults in two comparative regions in Sweden and in Poland. The results show that attitudes towards ICT solutions and the factors that are considered as most important for a meaningful everyday life for seniors differ between Swedish and Polish older adults. Older adults in Poland have lower requirements than Swedes regarding aspects important for satisfying and independent ageing, but Poles reveal more positive attitudes towards development of various kinds of technologies supporting independent living.

**Keywords:** ICT solutions, older adults, independent living, comparison study, acceptance.

## INTRODUCTION

Growing numbers of elderly in the population increases the burden on health and care systems and families. This creates an urgent need for solutions that could contribute to sustainable health, social care, better value creation, and a more effective use of resources (Carretero et al., 2015; Rigby et al., 2013). Designing new models for social care and

healthcare that would take advantage of new digital solutions is a prioritized area in Europe (e.g. European Commission, 2015). Generally ICT is seen as a powerful means to maintain cost efficiency and high quality health and social care, as well as a possibility to empower people of every age to better manage their health and quality of life. The large variation of ICT solutions and potentially reduced cost and increased efficiency by use of ICT create many new opportunities. ICT can for instance remind a user about taking medicine, help to structure the day for a person with cognitive decline, send medical data to a responsible physician who can immediately react on undesirable changes in the elderly's health status. By aiding communication with relatives, healthcare and homecare, ICT can increase the sense of safety and security as well as reduce loneliness and social exclusion.

Since the growing amount of elderly people in the population is a challenge for most of the European countries, it would be favorable to develop country-adaptable models and processes for elderly care and healthcare based on the new digital technology. But even though technology is universal, the social, economic, and cultural environment differ between countries (Malinowsky et al., 2017). For instance Patomella et al. (2017) studied everyday technology use among older adults in Sweden and Portugal and found that there were significant differences between the two countries regarding the kind and the number of everyday technologies considered as relevant. The authors argue that studying technology use in general is important for understanding how older adults engage in everyday occupations and ageing in place. Previous research shows that consideration of both social and technical aspects is essential for successful implementation of ICT solutions for independent living in real life settings (Kolkowska et al., 2016). We argue that to be able to take advantage of other countries' experiences and attain user acceptance that is necessary to achieve the benefits of modern ICT solutions, it is important to acknowledge and understand country-specific differences especially between western European countries and eastern European countries (Soja P. and Cunha, 2015). The aim of this paper is to investigate older adults' needs and attitudes towards ICT solutions for independent living in two European countries: Sweden and Poland. These two countries are very different regarding demographic and socioeconomic aspects (Klimczuk, 2016). This study seeks to answer the following research questions: 1) *What factors are important for the older adults in Sweden and Poland to have a meaningful everyday life in the future?*, 2) *What kind of digital technology needs to be developed to support independent and healthy ageing according to older adults in Sweden and in Poland?*

The rest of the paper is structured as follows. In the next section we describe the background for this study. After that we present our research method followed by the presentation of the results. The paper ends with a discussion and conclusions.

## **BACKGROUND**

On the basis of Eurostat database (Eurostat, 2017) Sweden has a higher life expectancy age (83.7 years for women and 80.1 for men) than Poland (81.9 years for women and 73.9 for men). 19.6% of Swedes and 15.6% of Poles are older than 65. In both countries most of the people within this age group live together with their partners or families (60% in Sweden and 70% in Poland). In the Swedish population and age group of 65–74 years, 88% are frequently using the Internet (Davidsson and Findahl, 2016), compared to the Polish population, where only 23.1% in the same age group are frequently using the Internet (Eurostat, 2017). Economic level between the two countries also differs: Poland's GDP per capita in PPS (Purchasing Power Standards) for 2016 was 69 while Sweden's was almost twice as high: 124 in the same year (Eurostat, 2017). These figures show clear differences in economic levels and Internet use between the countries, which we assume will influence the older adults' attitudes towards ICT solution supporting independent living. Furthermore, Swedish Government actively investigates how innovative technologies can enhance quality and increase the efficiency of elderly care (Dir 2015:72. Nationell kvalitetsplan för äldreomsorgen) and puts significant resources on digitalization of health care and social care. In Poland innovative digital solutions used in elderly care are still very rare (Soja, E. 2017). However, it should be noted that the use of ICT solutions for healthy and active ageing (e.g. market products, integration and centralization of health services, consolidation of data) were also mentioned as important for public health and population policy in the context of demographic changes in Poland (Szyborski, 2016).

Swedish and Polish elderly care systems are organized differently (Klimczuk, 2016). Most of elderly care in Sweden is provided by public care providers and funded by municipal taxes and government grants. In Poland only some of the care needs are satisfied by the government, while other services are rendered by private service organizations. The Swedish model is defined as the state responsibility model, in which public services are dominating. The underlying objective of this model is to promote a high level of regular employment in the care sector to be able to meet the care needs of those who are not self-sufficient (e.g. European Commission 2010; Klimczuk, 2016). The aim is to help elderly people and hose

with disabilities to live normal, independent lives, which includes living in their own homes as long as possible. To be able to cope with everyday life at home, elderly people can obtain various kinds of support from municipalities services. For example, ready-cooked meals that can be home-delivered, help with cleaning, shopping, eating etc. Elderly people with disabilities can receive assistance around the clock, which means that many are able to remain at home throughout their lives.

Elderly care system in Poland is difficult to attribute to a particular model, as changes in social policy are in progress and the model is still being created. The currently existing solution can be described as a hybrid system where some social needs are met by the state (like in Sweden), while other needs are met by private service providers, following the more liberal regime (like in the UK). In the case of the long-term care sector, informal care is widespread. This situation, on the one hand, is a result of the Polish traditions, in which the care of family members is seen as a moral obligation. On the other hand, this is related with a limited state budget resulting in a low availability of public care services. At the same time, seniors' incomes are relatively low not allowing them to use more expensive private services (Perek-Białas and Raław, 2014).

## **RESEARCH METHOD**

The study was conducted with the help of a questionnaire distributed to older adults in two comparative regions in Sweden (Örebro County) and in Poland (Cracow and its surroundings). Questions were asked in two categories: 1) factors that are important for the older adults to have a meaningful everyday life in the future / as people age and 2) kind of digital technology that needs to be developed to support independent and healthy ageing.

The factors that the respondents could select within the first category were:

- 1) ability to choose where they will live (e.g. independently at home, at home with family, nursing home, at home with help coming). This factor was named “type of residence”,
- 2) ability to choose what they will eat. This option may be limited by for instance the type of residence or income (“kind of food”),
- 3) ability to choose when they will eat. This option may be limited by type of residence (“time of meals”),
- 4) ability to be outside when and as much as they want (“time in outdoors”),

- 5) ability to participate in cultural activities (e.g. theater, cinema, concerts – “cultural activity”),
- 6) ability to perform physical activity (“physical activity”),
- 7) ability to decide what kind of help they will receive (e.g. personal care, cleaning, shopping – “kind of aid”),
- 8) ability to choose the time of assistance (“time of aid”),
- 9) ability to choose the assisting person (“assisting person”).

Examples of digital technologies that the respondents could select within the second category were:

- 1) robots assisting independent eating (this device named as “eating”),
- 2) technologies facilitating communication (e.g. with family, health care, care – “communication”),
- 3) memory-supporting technology (“memory”),
- 4) health monitoring technologies (e.g. remote transmission of blood pressure measurement, sugar level – “health monitoring”),
- 5) technology that help with personal hygiene (“hygiene”),
- 6) cleaning robots (“cleaning”),
- 7) monitoring and alarming technologies (e.g. fall – “alarming”).

All items were measured on three-point Likert-type scale. Questions included in both areas were answered by: 1 - not important, 2 - important, and 3 - very important.

People aged 50 to 79, aggregated in 10-year age groups (50-59, 60-69, 70-79), were selected for the comparison. The Swedish sample consisted of 2318 people, and the Polish pilot sample counted 60 people.

The oldest age group in the Swedish sample and the middle group in the Polish sample were overrepresented. Therefore, in the final analysis, we used appropriate weights for the two samples. The adopted weights took into account the proportions in the age structure of the analyzed populations in 2016.

## RESULTS

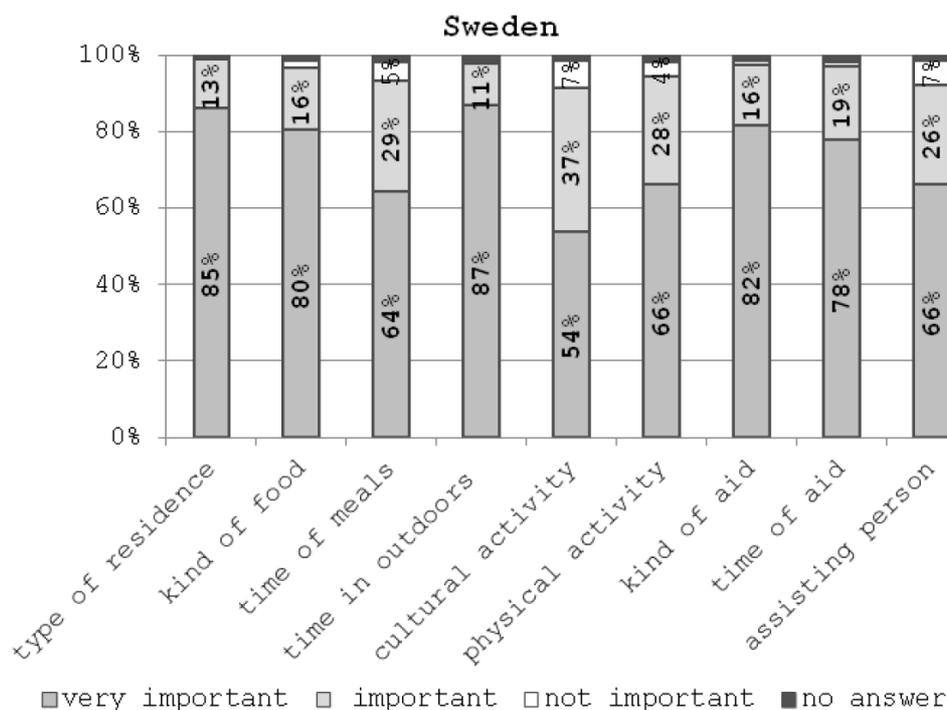
Regarding the first question, the results show that for both Polish and Swedish older adults all of the indicated factors are important for having a meaningful everyday life in the future (as seniors) (Fig.1, 2). However, the perception of the importance of the different

factors varies from country to country. In general, older adults in Sweden consider them more important than older people in Poland.

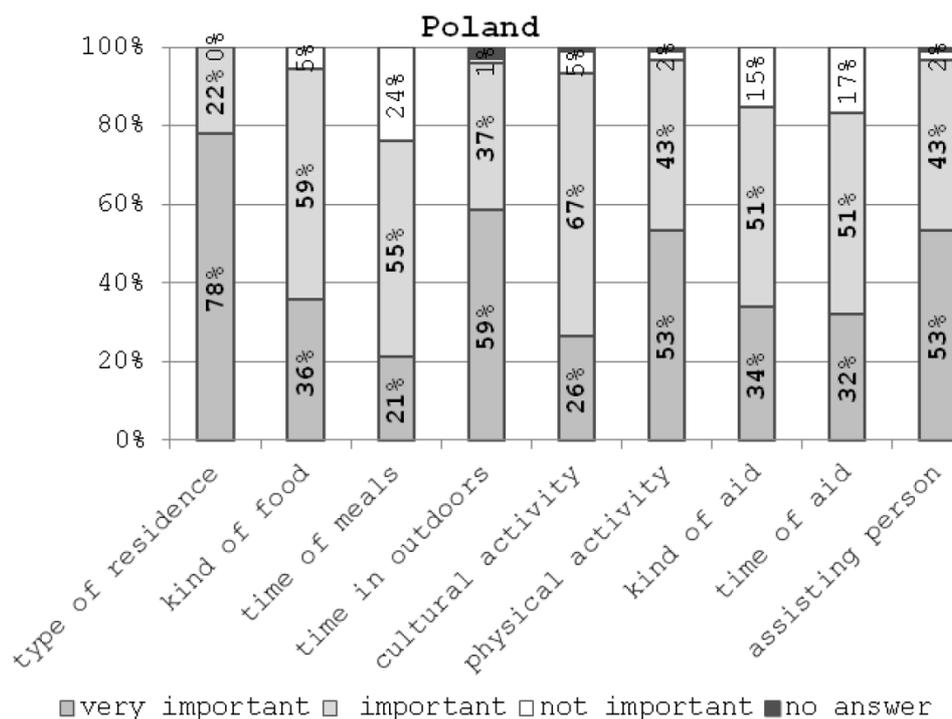
All nine factors were very important for most respondents in Sweden, while in Poland only four of them were perceived as very important. Only the importance of type of residence was almost identical in both counties. This factor was identified as the most important (very important) by the largest percentage of Polish and Swedish respondents, while no one identified this factor as not important.

In the case of Sweden, other factors such as: choosing what kind of assistance is needed (kind of aid), an ability to be outside when and as much as they want (time in outdoors), an ability to choose what they will eat (kind of food) as well as when to get help (time of aid), were also very important for over 3/4 of respondents. Participation in cultural and recreational activities was less important in overall assessment for all Swedish respondents, but still more than half of older adults considered it as very important.

In Poland, the most important factors after "type of residence" were: "time in outdoors", "physical activity" and "assisting person". They were identified as very important by most respondents. The results also exhibit that "time of meal", "time of aid" and "cultural activity" were the least important factors for Polish older adults: from 15% to 25% respondents rated these factors as not important, and from 20% to 35% as important.



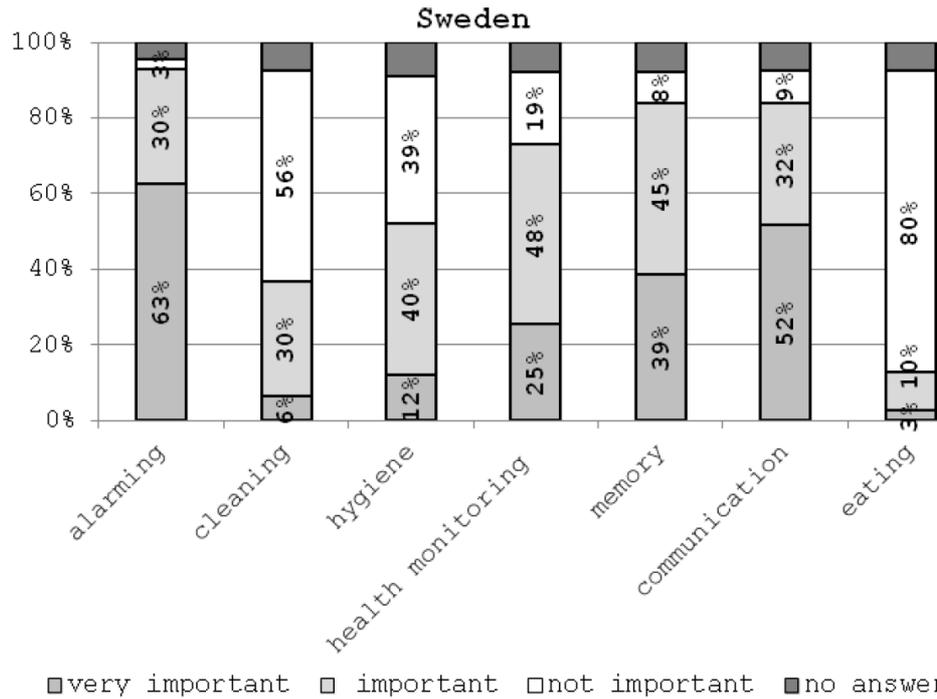
**Figure 1.** Factors identified as important for meaningful life by Swedish respondents



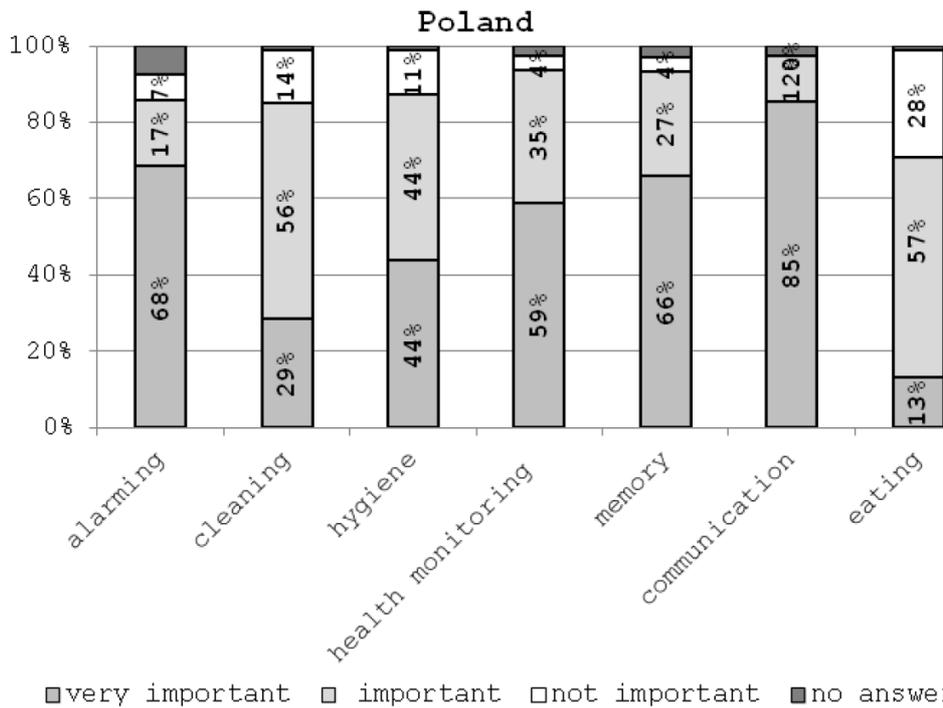
**Figure 2.** Factors identified as important for meaningful life by Polish respondents

Regarding older adults' attitudes to development of technology supporting independent ageing, we found both similarities and differences between the two studied countries (Fig. 3, 4). The least important for Polish and Swedish respondents was development of technology that facilitates food, cleaning and personal hygiene. Swedes expressed a clear negative attitude toward robots for cleaning and food and mostly considered development of these technologies as not important. In Poland such negative opinions were expressed only by less than 30% of respondents.

Generally, Poles have recognized that all kinds of digital technologies supporting independent and healthy ageing should be developed. For communication, alarming, health monitoring and memory technologies, i.e. 4 out of 7 proposed technologies, the need for development has been recognized as very important by over half of Polish respondents. On the other hand, most Swedish older adults considered only development of technologies related to alarming and communication as very important.



**Figure 3.** Important digital technologies according to Swedish older adults



**Figure 4.** Important digital technologies according to Polish older adults

## DISCUSSION AND CONCLUSION

Although the results from the Polish study are based on a pilot trial, some clear patterns can be noted in relation to the results from the Swedish study. It seems that older adults in

Poland have lower requirements than Swedes regarding the factors needed for a satisfying and independent ageing. These differences can depend on the different models for elderly care and, in particular, long-term care, which in Poland is primarily based on family care. Trust for the family, and hence lower requirements or anxiety about the quality of support, is linked to the Polish tradition of family responsibility towards the elderly. However it should be emphasized that both Polish and Swedish older adults considered the ability to choose the type of residence as a very important factor for independent and successful ageing.

In the case of ICT solutions for independent and healthy ageing, it appears that older adults in Poland are more interested in their development than older Swedes. On the one hand, this may be due to the generally less developed ICT sector in Poland and hence the need for its development. On the other hand, Poles are aware that because of the existing care system they will need to rely on themselves or on their families when they get older. Therefore they hope that modern technologies will help them to be able to cope with everyday life at home when they get older.

The present study contributes to research by providing an increased understanding of how attitudes towards ICT solutions supporting independent living may differ in different settings. The findings contribute to development of sustainable solutions that are more relevant to local contexts.

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# Experiences and acceptance of immersive learning arrangements in higher education

by

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## ABSTRACT

Immersive learning arrangements, e.g. virtual reality simulations, have a great potential for new settings in teaching and learning. The paper describes the procedure, first experiences and a model for evaluation.

**Keywords:** immersive learning, technology acceptance

## INTRODUCTION AND MOTIVATION

The use of immersive visualization systems, such as virtual reality (VR), augmented reality (AR) or mixed reality (MR) systems seem like an obvious choice for a wide range of teaching applications. The recollection of a personal interactive experience will probably always be superior to merely receptive observations of new facts or surroundings. Nevertheless, today's teaching relies heavily on passive ex-cathedra methods. It is often just too expensive to provide laboratories for each student for practical exercises like operating a machine or synthesizing a chemical compound. The simulation of said experiences by VR-means (e.g. using a "Cave" system) was also too costly, at least up to recently. The VR headsets have been available since 2016 are a true game changer in this regard– not only in terms of price but also reliability, latency and precision. It is therefore important to evaluate the newly available possibilities of this technology for teaching purposes.

For this reason, the University of Applied Sciences Dresden has been using immersive systems, specifically VR systems in "room-scale" mode, since autumn 2016, in regular teaching situations. All students enrolled at the Faculty of Mechanical Engineering use these

systems within the curriculum. This paper describes the process of the development as well as the experiences after over a year of use.

## **LEARNING WITH IMMERSIVE MEDIA: PRIORITIZATION OF APPLICATIONS**

The question, which actual learning effect can be achieved, is a central question when new media are introduced into teaching. This also applies to immersive learning, as the benefit should surpass conventional "non-VR" methods. As a starting point, university teachers, current VR-developers and students were interviewed to visualize possible general learning situations and restrictions. The input was structured in regard to "useful" and "not useful" situations within typical technical learning scenarios. The following catalogue sums up relevant findings:

**"Visualization only" not useful (enough):** only in rare cases (e.g. for very complex threedimensional structures) is a pure visualization via immersion actually beneficial over standard 2D-monitor projections. Hands-on experience at the University of Applied Sciences shows that, while an immersive view does indeed help to understand the structure, the inconvenience of current VR or AR equipment outweighs this benefit. Mounting any VRgear is a significant disturbance in work-flow and users will thus not adopt it in a working environment in the long run. This may change when the equipment becomes more userfriendly.

**Manual interaction:** tasks that involve frequent manual interaction are suitable for VRapplications, as such hands-on experience cannot be conveyed by other non-physical teaching means.

**Scale dependent tasks:** Tasks that involve placing, moving or evaluating objects in specific spaces or distances are usually easier to solve and learn within an immersive system as a continuous comparison with artificial scales is becoming unnecessary.

**Hand-eye coordination:** Tasks that not only involve manual interaction in general but rather precise spatial manipulations are hard to learn just on two-dimensional projections like a computer screen. However, in VR they can be learned directly.

**Social interaction:** The use of projected physical representations like avatars to visualize or simulate co-students, co-workers or other relevant persons for a certain task is undoubtedly a strong suit for VR-applications. This can be used to support a learning situation or even create it. In the current project the focus was placed on more technical interactions. However, such

social interaction elements could be used as an “intuitive” communication way for technical learning tasks in the future.

## **APPLICATION EXAMPLE WELDING SIMULATOR**

Based on the criteria catalogue above, several possible applications for relevant university scenarios were prioritized. Possible candidates during evaluation were a general visualization for factory planning or metrology, an interactive metal-physics or chemistry simulator and a learning environment for welders. Both aforementioned applications were chosen and implemented. Based on a software development by the principal author, simulation environments were created for both scenarios that are suitable for university teaching. As a hardware basis the HTC Vive was chosen, as it not only supports very precise manual interaction via laser-tracked controllers but also allows large room-scale environments. Several VR-rooms were furnished with the relevant hardware for optimal use. Besides three dedicated VR-labs (area: up to 25m<sup>2</sup>) also conventional labs in the “joining technology” department were equipped with the necessary laser tracking systems to allow direct integration of VR-content into teaching. Thus, since 2016 practical courses with typical student group sizes of up to 10 persons can be enhanced using VR-teaching methods.

The goal of the welding simulator is to enable students to gain personal experience in welding. The learning effect was intended to be similar to a beginners training under a one-to-one supervision. It is placed as a “warm-up” between theoretical explanations and real welding. Here, immersive learning is especially suitable, as safety precautions against beginners errors are strongly reduced as well as material costs (steel, welding wire, shield gases) are nonexistent in VR. To achieve this goal, a typical welding lab including weld tables, parts, torches etc. was recreated in VR.

The general idea of a welding simulator has been known for several years, e.g. Hester et al. describes in 2008 commercially available welding simulators at that time already. [1] A short development history as well as their proven effect is discussed in [2]. Newer developments e.g. solving problems with weld bead representation, see [3]. However, a general drawback of available solutions is their very limited working volume and flexibility in terms of welding shape. As a result, many teaching situations are not possible to setup. Another serious limitation of available welding simulators is also the quality of immersion. Most simulators use optical systems that do not incorporate real stereo vision within a head-set. Instead, the user has the impression that he is seeing his hands on a two-dimensional

screen in a certain distance. As a result, intuitive hand-eye coordination training is not possible.

The solution presented in this paper aims to overcome these limitation. Due to the inclusion of modern off-the-shelf room-scale laser tracking as well as wide-angle field-of-view VRglasses, a much higher immersion can be reached. Arbitrary welding shapes in a large working area of several square meters are also directly possible and the system works independently of special reference parts.

Additional work has been done to increase simulation realism further: Here 3D-printed adapters were developed for the manual VR-controllers to allow the connection to standard weld-torch cables. In real welding, the weight and pull effect of the torch cable is significant, therefore it was vital to address this challenge within the simulation for more advanced users. Also, the amount and behavior of weld spatter was analyzed in off-standard torch positions. A welding robot was used to generate weld beads with defined torch-angle errors and speed deviations. The results were filmed and analyzed and visible trends were incorporated into the visualization within VR. The goal was to achieve similar optical input for the welder when welding with erroneous torch parameters. Due to the large laser-tracked working area of the VR-system, parts up to several meters size (e.g. a train chassis section) can be imported as CAD files into the simulation. Users can then walk around and train welding steps directly without the need of immersion-breaking movements like VR-teleportation.

Figure 1 shows one of the systems used for teaching within the University of Applied Sciences practical courses for all mechanical engineering students. The controller with a 3dprinted adapter for cable connection and torch-nozzle fixation is also visible, the latter is used for realistic collisions when welding on dummy parts.

The control panel in the foreground shows (besides a live view from the welder's eyeposition) all available analysis results of the current and previous welds. Individual results can be chosen in real time by a supervising person to increase the learning effect, e.g. by giving additional hints based on the current performance during welding. The welder does not need to leave VR to see the resulting performance charts himself, as they are presented in form of a virtual flip-chart within the virtual welding lab.

This "asynchronous" use of VR, where only one person is actually within the immersive system while another person is using a second 2D screen, is an effective way to reduce costs but still involve several students in the learning situation. Seen from the current application,

the learning effect for supervising persons is also notable, as they can directly see movement patterns and subsequent problems during the process. This leads to an increased awareness of certain challenging aspects. As a result, supervising students are generally faster in mastering the simulation when they in turn weld in VR.



**Figure 1.** above: learning environment for manual welding (mixed reality view, control panel, head-set, controllers), below: live-impression during application

To be able to visualize the current process to larger groups, a mixed reality system was integrated in to the system. It can be seen in the top view of the screens in figure 1. Here an additional web-cam is used to acquire a live view of the welder. By applying a special shader his or her image is separated from the (real) background and then mixed with position-corrected live images from the virtual scenes: fore- and background. This gives the impression of a view into the VR-world, helping others to understand the interactions of the VR-user. Such systems are generally favorable for immersive learning environments, as others can observe a VR-user (and participate with him) much more intuitively.

As the University of Applied Sciences Dresden only offers presence courses in Dresden for mechanical engineers, there was no need to include the ability to virtually connect distant learning environments. However, such virtual connections are technically possible, allowing radically new ways of joint learning experiences.

## **ACCEPTANCE**

### **Concept development and preview**

The individual supervision of students is supported by a computer-based real-time feedback system for analysing the performance of the welder, which shows auxiliary variables and symbols on the welding torch. An important aspect for an effective learning outcome is the analysis of the acceptance of the system and an improvement of the presentation and processes.

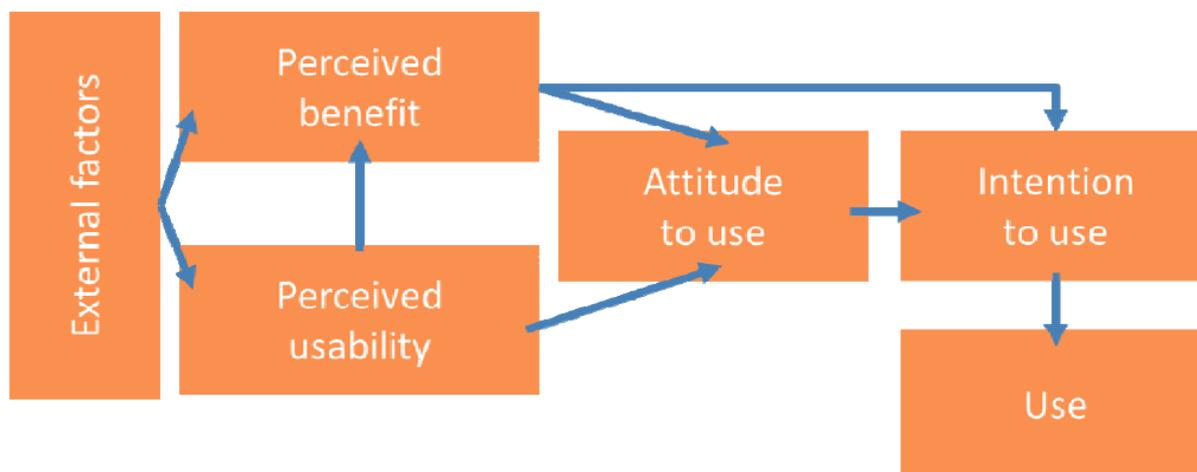
The virtual space and the tasks represent a new scenario for the user, for the student. The technical possibilities of VR and AR allow this new kind of use on the one hand, and on the other hand, due to its novelty, uncertainty or reluctance of the users can be expected.

One basic model for acceptance research is the diffusion theory of Rogers. This was extended with regard to the integration of dynamic aspects by Kollmann. In addition to these general acceptance models, there are special models for explaining the acceptance of technologies. The Technology Acceptance Model (TAM) is considered to be a standard here. [5][6] The TAM has already been used in the area of digital teaching/learning scenarios. [7]

For example, a link between the cessation of use, the intention to use and the actual use of the technology is evaluated. The determinants are the simplicity of use and the perceived

benefits of the new technology. [8] The perception of benefits is based on the subjective assessment of how far technical innovation can increase individual performance. Simplicity of use describes how the person views the use of the technology. [9]

The model focuses on these determinants. This is also viewed critically, since the context, framework conditions and social environment are not directly examined.



**Figure 2.** Technology Acceptance Model [10]

In this scenario of virtual teaching/learning environments, not only is the technology important, but also the consideration of the social environment and the situation in the learning context. The authors propose an extended model for using the technology acceptance of mixed and virtual reality in the teaching context by combining the technology acceptance model and an evaluation of the analysis of the learning situation.

The teaching/learning situation is analysed specifically with questions on the acquisition of competence and questions on the setting of the learning situation with the help of the semantic differentials.

The learner will give a subjective assessment of the effectiveness and efficiency of the learning and adoption of competences within a framework of questions on competence acquisition. Based on the nature of a semantic differential, the user is asked questions with a scale and pairs of contrasting assessments, e.g. "how do you feel in the learning situation? pleasant – non pleasant".

The following areas of question are planned for evaluation.

## I. TAM

- evaluation of mixed / VR technology in general
- evaluation of technology simplicity
- evaluation of the use for the concrete adaption of welding technology
- meaning of VR as a gamification element



**Figure 3.** Enhanced and combined model of TAM, skills acquisition and learning situation

## II. Skills acquisition

- effectiveness for learning welding technique
- efficiency of the technology used
- specific technical questions on the adoption of competence
- questions on the acquisition of competence in the area of key qualifications (e. g. working in a team)

## III. Learning situation

- evaluation of the learning situation by using polarity profiles
- survey of the emotional situation (valence dimension)
- evaluation of the importance (potency dimension)
- survey of the degree of dynamics and activity of the learning situation (activation dimension)

This paper presents a concept for evaluation of acceptance and learning outcome. The first qualitative indications of acceptance have already been collected in the past semesters.

The implementation of a systematic analysis based on this combined technology acceptance model with consideration of the learning situation will take place in the coming semesters.

The presented approach will be the basis for the actions within a double loop approach to illustrate a continuous improvement process.

### **User-Acceptance and -Immersion (Qualitative Indications)**

The following insights on system usability are a compilation from observations during its application in practical courses during the past two semesters. It focuses on general indications where immersion and learning success were affected and can be optimized.

**Use of optical indications/signs:** The use of head-up displays within VR to permanently show certain information was tested and rejected as impractical. This method was identified as detrimental to immersion and usually narrows down the (already quite small) field of view. Instead, classical information presenters like screens or flip-charts can be simulated within VR, as they will be intuitively used.

Relevant local information was always visualized where action needed to be taken, e.g. semitransparent guiding arrows showed where torch-angle corrections were needed during manual arc welding. Here it was noted that fine-tuning of the visibility of such information is vital: If additional performance information is too obvious, users start focusing primarily on this information as regulatory input for their actions, neglecting their actual hand-eye feedback loop. This results in short-term high performance scores in VR but they will eventually fail in reality where such “aiming guides” are not available. On the other hand, if performance indication is too marginal, users may overlook it and fail to optimize their performance. Thus, shape, place, timing and visibility of indications was adapted in several iterations during development. Furthermore the supervising student has full control over which type of helper information is shown or not to further optimize the learning effect.

**Realization of acoustical indications:** it was often communicated by VR-users that spoken words from persons “outside” VR feel somewhat strange, as they cannot attach this voice to anything visible. As a result, reactions to spoken suggestions were significantly lower in comparison to normal course interactions. From a teachers perspective it may therefore be beneficial to consider using avatars within VR to reduce this immersion error.

**VR-sickness:** So far, no problems were encountered with this issue. It is probably helpful that the systems in use (HTC Vive) have a very low latency and high room-scale accuracy for their head tracking. Furthermore, all simulations employed at the university avoid “unrealistic” movement schemes where discrepancies between real body movement and VRworld movement occur. Indications for VR-related indispositions were noted only in very few cases. Thus, new insights to already known effects (e.g. see [11], p. 344f) cannot be given.

**General Acceptance of VR-based Learning:** Based on general observations, it can be noted that acceptance of this new teaching form was high. However, emotional responses were more differentiated: One learning environment uses a setting in an elevated working position (simulated welding on a thin scaffold in 20m above ground). Here about one third of the users showed typical signs of acrophobia, the other two thirds were only very little affected by this. This indicates that a majority of the users are able to distance themselves easily from the obviously computer generated environment.

### **Conclusion Applicability Immersive Learning System**

The immersive learning systems were setup in autumn 2016 and used for two semesters with over 200 students since. Based on this experience, it can be stated that the intended learning effect was successfully reached. Even beginners in welding were, after 30-45 minutes in VR, able to master a subsequent real welding task using a Short-Arc Gas-Metal-Arc Welding process without larger errors. By means of a virtual warm-up, students gained a sufficient understanding of hand position, movement, angle and general challenges of manual welding. As a result, disruptions or work hazards due to insufficient skills were reduced to zero so far. As also staff manpower and time requirements for such beginner courses are low, this new combination of VR warm-up + real welding allowed for the first time the integration of real welder training into the tight fitted practical course schedule.

### **CONCLUSION AND OUTLOOK**

Since the installation of several virtual-reality laboratories in the University of Applied Sciences Dresden, immersive learning was used successfully as a new method within obligatory practical courses for students in all mechanical engineering study directions. Based on the described experiences, it can be safely predicted that immersive learning systems can

possibly have a significantly higher learning effect than conventional teaching methods. A more detailed quantitative analysis of this prediction will be done in the near future. In the given example of the newly developed welding simulator, a more in-depth teaching experience was made available to students, while safety and time requirements were even better met than before.

Further activities at the University of Applied Sciences Dresden in immersive learning include contributions from faculties for Mathematics/Computer Science, Spatial Information, and Agriculture/ Environment/Chemistry. Since beginning of 2017, these activities are coordinated in the internal initiative “Immersive University”. It is a mutual consensus of the contributing professors that immersive technologies will become an established method for teaching in the not-too-distant future. Therefore, the intention of this platform is the reduction of technical obstacles for interested teachers in regard to the implementation of immersive learning and teaching methods.

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# Big data driven strategy in organizations

by

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## ABSTRACT

This study concerns the issue of Big Data. It investigates different approaches to developing Big Data driven strategies in organizations. Based on the above, the paper then presents a survey among twenty-five organizations as a case to demonstrate a development of a Big Data driven strategy. The research makes useful contributions to our understanding of the essence of Big Data. The outcomes will hopefully help organizations to better understand the consequences of Big Data use, as well as to identify factors on which they should pay particular attention while creating their Big Data driven strategy.

**Keywords:** Big Data, strategy, organizations

## GOAL

The topic of Big Data (BD) is one of the most rapidly developing research areas in recent years (Chen, Chiang, & Storey, 2012; Davenport, Barth, & Bean, 2012; George, Haas, & Pentland, 2014; Lavalle et. al., 2011). The importance of BD's potential has been highlighted by both academics (Chen & Zhang, 2014; Iafrate, 2014; Kaisler et. al., 2013) as well as practitioners (IBM, 2012; Manyika et. al., 2011; Microsoft, 2016). They stress that a challenge for the years to come and simultaneously one of the most significant needs of contemporary organizations is intelligent analytics that allows them to discover business value from BD (Goes, 2014; Ularu et. al., 2012). It is claimed that BD is helpful in effective decision making, building innovative business models, and monitoring various socio-economic phenomena (Erickson & Rothberg, 2013; George, Haas, & Pentland, 2014; Kountroumpis & Leiponed, 2013; Olszak, 2016; Schmarzo, 2013; Wamba et. al., 2014).

However, when we look at the number of organizations that actually use BD, it is relatively limited for the moment. There is a lack of appropriate strategies, approaches, and

tools targeted at the use of BD (Olszak, Bartuś, & Lorek, 2017), but above all, there is a low level of knowledge in organizations about the importance of BD in making decisions. In others words, there are no recommendations and strategies that would be a beacon for organizations on how to use BD in management.

In this research we are motivated to investigate: (1) the substance of BD and the added-value of BD to organizations (2), different approaches of building BD-driven strategies in organizations and (3) the development of a BD-driven strategy in selected organizations.

The remainder of this paper is organized as follows. In the next section, the research methods are presented. Then, the concept of BD is discussed. Afterwards, the different approaches to building BD-driven strategies are described. Finally, a survey about BD-based strategy development in selected organizations is presented.

## **RESEARCH METHODS**

A qualitative approach is used in this study. A qualitative approach is suggested when: (1) there is little known in a particular research area, (2) existing research is confusing, contradictory, or not moving forward, and (3) the topic is highly complex (Yin, 1994). BD is a new research topic and still poorly investigated. This justifies using a qualitative approach to explore and better know the BD issue.

Two research steps are distinguished in this study. The first step refers to a review of the subject literature. Webster and Watson's (2002) approach for systematic literature reviews on BD was followed. Specialized journals and the latest proceedings of various conferences were explored and different bibliographic databases were searched, such as EBESCO Host, Emerald Management 75, ISI Web of Knowledge, ProQuest, and Scopus.

The second step in this research involved in-depth interviews that were conducted among twenty-five Polish organizations. The collected data was used to better understand the issue of BD and BD-driven strategies, as well as to investigate the factors that determine their development.

## **BIG DATA CONCEPT**

The term '*Big Data*' has gained significant popularity in recent years. Unfortunately, there is still no consensus among scholars on how to interpret it. Chen, Chiang and Storey (2012) state that BD represents a wide spectrum of applications as well as a huge potential to

improve and create new business opportunities. BD is often associated with the increase of the number of real-time data collected from social media (Facebook, Twitter, Instagram) and applications for the Internet of Things (Himmi et al., 2017). Manyika et al. (2011) claim that BD refers to databases whose size is beyond the ability of typical databases to acquire, store, process, and analyze.

According to many authors (Manyika et al., 2011; Erl et al., 2015), five main specific attributes (5V) are assigned to BD: (1) Volume – the number of data is measured in peta- and zettabytes, (2) Velocity – the meteoric speed of data emergence, (3) Variety - the heterogenic nature of data, data can have different form and come from various devices and applications, (4) Veracity – data can be inconsistent, incomplete, and inaccurate, (5) Value - significant value hidden in data.

Parise et al. (2012) stress that BD is a capability that allows organizations to extract value from large volumes of data. Through BD, organizations could better follow the acceptance of services in the market place. According to many authors (Davenport & Harris, 2007; Schmarzo, 2013), BD is not about technology but first of all about business transformation. BD means transforming the organizations from a retrospective environment into a predictive and real-time business environment.

## **BIG DATA DRIVEN STRATEGIES**

Many authors claim (Halaweh & Massry, 2015; Manyika et al., 2011; O’Driscoll 2014; Das & Kumar, 2013) that thanks to BD, organizations can create unique value for business. This value may be manifested in improving decision making and business processes as well as developing new business models. However, it is stressed that without an appropriate strategy driven by BD, achieving the benefits of BD may be difficult and questionable. In this section, different approaches to the development of BD-driven strategies in organizations are presented.

Himmi et al. (2017) proposed four BD strategies that illustrate the link between operational and decision dynamics and Big Data capability. They are named: routine, integration, strategic, and excellence. The first strategy takes place when the operational activity in organizations is stable and lack dynamics. These organizations have a limited capability to gain access or to analyze data of large volumes. Data requesting is at a very low level and data processing is routine as a result. An integration strategy means that an

organization has limited data capabilities while still facing a large number of operational dynamics and decision making requests. In turn, when the organization has a high level Big Data capability in order to handle a large number of dynamics decisions, Big Data becomes strategic.

In turn, Parise, Iyer and Vesset (2012) developed four BD strategies based on two dimensions: business objectives and data types. These strategies include: performance management, data exploration, social analytics, and decision science. Performance management involves understanding the meaning of BD in company databases using predetermined queries and multidimensional analysis. The data used for this analysis are mainly transactional. The second strategy, data exploration, makes heavy use of statistics to experiment and get answers to questions that managers might not have thought of previously. This strategy leverages predictive modeling techniques to predict use behavior based on their previous business transactions and preferences. The last proposed strategy, called decision science, involves experiments and analysis of non-transactional data, such as consumer generated product ideas and product reviews, to improve decision-making process. Decision scientists, unlike social analyzers who focus on social analytics to measure known objectives, explore social Big Data as a way to conduct field research and to test hypotheses.

According to LaValle et al. (2011), organizations that plan to go on the big data path, should build their analytical capabilities. There are three stages of analytical adoption: aspirational, experienced, and transformed. The first stage means that organizations are the furthest from achieving their desired analytical goals. Often they are focused on the efficiency or automation of existing processes and searching for ways to cut costs. These organizations currently have few of the necessary building blocks: people, process or tools. The second stage refers to organizations that have gained some analytical experience. These organizations are looking to go beyond cost management. They are trying to develop better ways to collect, incorporate and act on analytics effectively so they can begin to optimize their decisions. The last stage concerns those organizations that have substantial experience using analytics across a broad range of functions. They use analytics as a competitive differentiator and are already adept at organizing people, processes and tools to optimize and differentiate.

The model created by Davenport and Harris (2007) describes the map to becoming an analytical competitor. The model includes five stages that refer to: “analytically impaired, localized analytics, analytical aspirations, analytical companies, and analytical competitors”. At the first stage, organizations lack the prerequisites for analytics. They face substantial

obstacles, both human and technical, to analytical competition and are still focused on putting basic, integrated transaction functionality and high-quality data in place. The localized analytics approach is manifested in organizations that do analytical work, but they have no intention of computing it. The organizations at stage 3 do grasp the value and the promise of analytical competition, but they face major capability hurdles and are a long way from overcoming them. In turn, stage 4 organizations, analytical companies, are on the verge of analytical competition but still face a few minor hurdles to get there in full measure. They have e.g., the skill but lack the out-and-out will to compete on this basis. The last stage of the proposed model refers to organizations where analytics are the primary driver of performance and value.

McAfee and Brynjolfsson (2012) carried out an interesting debate on the role of Big Data in management revolution. The authors identified five management components referring to Big Data strategies. These components include: leadership, talent management, technology, decision making, and company structure. Organizations which succeed with big data have leadership teams that establish clear business goals and strategies. Business leaders should spot e.g., a great opportunity, know how a market is developing, think creatively as well as propose truly novel offerings. Talent management pays attention to the increasing role of data scientists and others members of organizations skilled at working with huge quantities of information. The authors also indicate a significant role of technology in BD processing. Hadoop is the most commonly used platform. It combines commodity hardware with open-source software. The last components of BD strategies refer to decision making and company culture. According to McAfee and Brynjolfsson (2012), “people who understand the problem need to be brought together with the right data, but also with people who have problem-solving techniques that can effectively exploit them”.

When investigating different approaches to the development of BD-driven strategies in organizations, it was assumed that such a strategy is a process activity based on: (1) organizational culture - enabling the transformation of business from a retrospective environment into a predictive environment, (2) applying different kinds of information to creating new business opportunities, (3) the ability to discover new knowledge, and (4) using different tools from the field of advanced analytics and ICT. These activities have become a subject of the analysis presented below.

## **FINDINGS AND DISCUSSION**

### **BIG DATA DRIVEN STRATEGY IN THE LIGHT OF A SURVEY**

A survey was conducted among twenty-five selected Polish organizations in 2015. They comprised companies from the service sector (10), the manufacturing sector (9), and the retail sector (6). The respondents were mainly decision-makers and ICT professionals. The interviews were based on semi-structured questions and focused on the four topics mentioned above. It should be emphasized that the results of the analysis of the collected empirical material presented in this paper show only a small portion of the study that concerned the topic of organizational creativity support (Olszak & Kisielnicki, 2017). These results list answers that directly correspond to the objectives formulated for the needs of this paper.

The conducted survey shows that managers are increasingly interested in BD as new way of taking a competitive advantage and surviving in a global market. Information and knowledge are seen as significant resources that help organizations to reach business success. Evidence is found in the feedback and comments received from the interviews: (1) Thanks to Big Data, we can create new and valuable resources based on customers, suppliers, and other stakeholders; (2) Information and knowledge are key strategic resources that enable us to solve different economic problems resulting from, for example, various crises as well as economic breakdowns; (3) Information resources play a greater role in our business than effective production systems; (4) Big Data is a driver of the efficiency of our organization, trying to achieve a competitive advantage and maintain it a changeable environment; (5) Big Data is a valuable organizational capacity in our business - it enables us to build innovative business models and new knowledge from existing information resources; (6) Our business is based on Big Data, we use the Internet and social media; (7) Advanced analytics and ICT are helping us to discover a new business value from Big Data.

Interesting remarks arise from a couple of questions that concerned the need to use BD in the surveyed organizations. Most respondents (17) agreed that their colleagues were required to use BD. The others articulated a neutral position on the issue. When asked whether they were motivated to use BD, however, fifteen respondents answered, uncertainly and the rest answered “probably not” or “they are absolutely not motivated to use BD”. All respondents pointed out the need to develop the needs to use BD among their organization’s employees. In their opinions, such needs and behaviors are primarily expected from managers (18 responses), CEOs (Chief Executive Officers) (14 responses), employee groups (12

responses), ICT specialists (11 responses), individuals (10 responses), analysts (10 responses), and project teams (7 responses).

The organizations define their preparedness (knowledge) to use BD as rather average. The respondents from nine organizations claimed that they are sufficiently educated to create, new business models and e-services based on BD. In six organizations, the level of knowledge and the skills of managers was far too insufficient to build original business models based on BD. In other organizations, this level of knowledge was defined as average and as probably not providing grounds for new activities. This study shows, however, that there is a lack of comprehensive strategies and management practices aimed at encouraging BD, as well as identifying and developing BD needs, in the surveyed organizations, for both individuals and groups. The surveyed organizations did not conduct research on BD needs and their link with the organization's strategy and ICT. The responders were not able to indicate who, in their organizations, is (or should be) responsible for the development of a BD strategy. Most often there is an individual department which formulates such strategies. The investigation of BD needs, professionally, is sometimes accidental. The survey suggests there may be issues where organizations are not fully aware of the significance of the investigation and development of their BD needs. A rather negative picture of strategy (policy) for the development and identification of BD needs emerges from the responses in these organizations. A coherent and clear BD-driven strategy was noticed only in two of the surveyed organizations. In seven organizations such a policy was run in some departments, In other organizations, such a strategy simply does not exist.

This study suggests that the development of a BD-driven strategy requires an appropriate organizational culture. The respondents pointed out that organizations should continually diagnose and predict their information needs. The organizations all emphasized that without support from senior management the development of a BD-driven strategy is questionable. The responders agreed that an important role is played by a system of training and motivation to undertake activities based on BD. The surveyed organizations suffered from limited and insufficient knowledge about how to manage analytical people, how to share knowledge, and poor motivation for change and activity based on BD. This study has shown, unfortunately, that, for now, an overall BD-driven strategy has not been developed in organizations.

Most of the organizations surveyed confirmed that ICT allows them to better use and analyze BD. However, the study suggests that these organizations apply rather basic ICT

tools. The most commonly used ICT tools are e-mails (24), search engines (22 responses), spreadsheets (18 responses), databases (18), intranets (15 responses), and data visualization (13 responses). The tools that were used less frequently, include: business intelligence (10 responses), extranet (10 responses), CRM (9 responses), groupware systems (8 responses), expert systems (6 responses), discussion forums (6 responses), computer simulations (5 responses), Big Data (5 responses), DSS (4 responses), and CAD/CAM (4 responses). Some reasons for the use of rather basic ICT tools were a lack of appropriate knowledge and skills to apply more advanced ICT tools (11 responses), a lack of time to know new ICTs (11 responses), a lack of appropriate tools (11 responses), and a lack of motivation to use ICT. Unfortunately, most of the managers in the surveyed organizations do not think strategically about the potential of BD and ICT tools.

## **CONCLUSION**

The results of the surveys led us to conclude that there are three main categories of factors that are crucial for the building of BD-driven strategies in organizations. They include: organizational culture based on analytical capabilities, information resources and knowledge, and advanced ICT. BD-driven strategies should be a part of an organization's business strategy. It should correspond to the real needs of organizations and support key processes and business decisions. Organizations should continually explore their close and more remote environments. Adequate data resources provide organizations with a detailed view of the business environment, which is needed when they want to create new products, services, and new managerial practices, and to win in this rapidly changing global market. Organizations should seek innovative ways and ICT tools for the acquisition of new sources, the exploitation and exploration of data resources to enable the creation of new business models. They should know how BD can be used in the transformation of business processes and relationships with customers, and suppliers.

## **CONTRIBUTION**

Our study makes several theoretical contributions to the relevant literature. First, BD is generally an unexplored field of research. Therefore, the current study contributes to the emerging literature on BD by investigating the issue of BD-driven strategies in organizations. Second, the current study is one of the rare studies that illustrates how organizations can develop their BD-driven strategies. Third, this study demonstrates that there are three main

categories of factors that are crucial for the building of BD-driven strategies in organizations. They include: (1) organizational culture based on analytical capabilities; (2) information resources and knowledge, and (3) advanced ICT. Finally, the current findings provide empirical significance that a BD-driven strategy may play an important role in management and in decision making. These contributions are significant because the void in the literature regarding these types of conclusions is remarkable.

## LIMITATIONS AND FUTURE RESEARCH

There are limitations associated with this research, which may narrow the scope of the findings and point to potential directions for future studies. The described survey is a kind of initial validation of BD-driven strategies in organizations. It needs further validation and testing. This should lead to the development of best practices and contingency guidelines for managers and researchers concerned with the development of Big Data driven strategies. By understanding the factors that determine BD use, management should be better able to manipulate such factors. It seems that the next step(s) in exploring the phenomenon of BD-driven strategies should be quantitative tests that would cover a much greater number of organizations.

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# **Session:**

## **Innovative ICT Economies**

Session Co-Chairs:

**Ralph Sonntag**, Dresden University of Applied Sciences, Germany

**Ella Kolkowska**, Örebro University School of Business, Sweden

# The effectiveness of product placement in traditional media and feasible transfers onto social media

by

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## ABSTRACT

The impact of advertisements in television has been declining in recent years (Avery & Ferraro, 2000). In order to increase the effectiveness of their commercial efforts, nowadays many corporations use additional promotion strategies (to the traditional communication mix methods alternative), such as sponsoring or product placement (Schumacher, 2007). Therefore many scientific studies on product placements in TV and printed media have been conducted (Glaeser, 2014). However, the embedment of products into the content of internet- based entertainment sequences, especially YouTube tutorials, has received little to no consideration (Hardy, 2010).

Often, the recipient of amusement presentations is not aware of the commercial intent of the production because of the subtle product-incorporation into the editorial section of the entertainment story (Schueller, 2017). This hindrance of consumption withdrawal is said to be one of the major advantages of product placements for the broadcasting- and printed media (Cowley & Barron, 2008). Additionally cost reduction, the avoidance of legal restrictions on air-time, a higher credibility and other factors are scientifically proven benefits of product placements for traditional media (Balakrishnan et al., 2012). Because of these gains the advertising industry also uses YouTube tutorials as a carrier of their commercial messages (Heinemann, 2014). YouTube stars, also known as influencers or opinion leaders, directly appeal to potential buyers via their tutorials (Chaffey & Ellis-Chadwick, 2012). Due to their reputation and credibility they are supposed to maximize the efficacy of the product advertisement (Reichwald & Piller, 2009). But yet a comprehensive survey of the effectiveness of product placements in YouTube tutorials is missing.

The research approach aims to fill the gap of scientific knowledge of the potencies of product placements in YouTube tutorials regarding the advertised product and also product-category

by conducting an empirical survey on part of the main target group of YouTube, specifically students. Since the integration of ICTs, especially social media such as YouTube, is known to be a crucial element of the consumer's value creation process and also identified to increase firms' competitiveness and productivity (Vilaseca-Requena et al., 2007), the topic reveals its great importance to any operating business. This research in progress gives an overview of different methods and approaches of various scientific studies to determine the effectiveness of product placements in traditional media and how these may be transferred to social media, such as YouTube tutorials.

**Keywords:** Product placement, YouTube, effectiveness, tutorials, commercial, consumer behavior, ICT, social media

## **BACKGROUND**

### **Definition**

Both in science as well as in the general linguistic usage, product placement has been variously defined (Rathmann, 2014): "it places commercial messages in a nonpromotional context that is less likely to evoke critical responses on the part of consumer audiences" (Friedman, 1985, p. 936) or "a paid product message aimed at influencing movie (or television) audiences via the planned and unobtrusive entry of a branded product into a movie (or television program)" (Balasubramanian, 1994, p. 31) or "the inclusion of a product, a brand name or the name of a firm in a movie or in a television program by different means and for promotional purpose" (d'Astous & Chartier, 2000, p. 31) or "a promotion placed in a non-promotional entertainment context, where the promotional intent is not made explicit" (Tiwsakul et al., 2005, p. 98). The comparison of these four and 82 other definitions reveal that even though all are slightly different, they also possess three mutual elements: a placed object, a chosen media type and a money consideration. The first classification attribute, the placed object, has changed over the time. Starting with the integration of a branded product the definition was enhanced by services, to companies and whole product category groups. The most extensive development can be seen in the transformation of the second category, the

chosen media type. While the first placements have been inserted in the traditional media of cinema and television, the rapid progress of technological innovations has led to the fragmentation of the entertainment media (McDonnell & Drennan, 2010). Therefore the range of media species was expanded by computer games, music videos, books, audio books and most important by the internet. But instead of listing all of the various media types, researchers prefer to concentrate on the generic term of mass media or program input.

**Table 1.** Definitions of product placement

Author (year)	Product placement definition
Friedman (1985)	"(...) it places commercial messages in a nonpromotional context that is less likely to evoke critical responses on the part of consumer audiences."
Nebenzhal / Secunda (1993)	"Product Placement (PPL) is defined as the inclusion of consumer products or services in motion pictures distributed to theatres by major Hollywood studios in return for cash fees or reciprocal promotional exposure for the films in marketers' advertising programs."
Baker / Crawford (1995)	"The inclusion of commercial products and services in any form in television or film productions in return for some sort of payment from the advertiser."
Babin/ Carder (1996)	"Product Placement involves film characters presenting branded products, visually or verbally, as part of the script or to simply have branded products used as set pieces or pops."
Fuller (1997)	"A more insidious form of advertising: products and ideas that are more subtly introduced at a subconscious level."
Gupta / Gould (1997)	"It involves incorporating brands in movies in return for money or for some promotional or other consideration and actually is one of many types of placement which include TV, radio, music video, video games, novels, plays and songs, as well as movies."
Karrh (1998)	"The paid inclusion of branded products or brand identifiers, through audio and/or visual means, with mass media programming."
d'Astous / Seguin (1999)	"The placement of a brand or a firm in a movie or in a television program by different means and for promotional purpose."
Avery/ Ferraro (2000)	"This term refers to attempts to influence viewing audiences via the planned placement of branded products in movies or television programs, either for a contractual fee or by donation."
Gibson / Maurer (2000)	"Actors use products on screen to promote those products."
Schultze (2001)	"Insertion of product names, logos, advertising billboards and so on in the middle of movie scenes."
Russell (2002)	"The practice of placing branded products in the content of mass media programming."
ICC (2003)	"The inclusion of a product so that it is featured within a program, normally in return for payment or other valuable consideration to the program producer or licensee."
Kuhn et al. (2004)	"Product Placement is a hybrid message classified along visual, auditory and plot dimensions. Its use is intended to influence brand attitudes, increase brand awareness, increase sales, and overcome the problems of clutter, zipping and zapping inherent in traditional advertising."
Roehm et al. (2004)	"(...) a marketer negotiates representation for a brand in one or more scenes of a show's story."
FTC (2005)	"Product Placement is a form of promotion in which advertisers insert branded products into programming in exchange for fees or other consideration."
Tiwsakul et al. (2005)	"A promotion placed in a non-promotional entertainment context, where the promotional intent is not made explicit."
Balasubramanian et al. (2006)	"Brand appearances that represent deliberate promotional efforts that are reinforced by formal agreements between marketers and the creators/managers of editorial content."
Hardy (2010)	"Product placement is the placing of a product in media content in return for payment or other valuable consideration." "Such placements ranges from the visual inclusion of brands, to verbal endorsement and sophisticated brand integration".

Chin et al. (2013)	“(…) any incorporation of product and/or brand placement, both visual and/or audio, in a range of media contexts for commercial purposes.”
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Finally, many scientific articles explicitly refer to the money consideration. Pro rata temporis a parabolic shape has evolved: as opposed to early publications, where no mention of a monetary reward can be found, over the years references of recompenses, trade-offs, tie-ins and gratuitous placements appear. However more recent articles shift away from the emphasis of money considerations. Some scientists argue that this fact is due to the difficulty of the acquisition of information relating to the payment for product placements (Chan, 2012). Summing up: product placement is characterized by the integration of a commercially capable object in an editorial input of mass media.

### **Placement categorization**

The combination of various scientific articles leads to five differentiation criterions, namely: placed object type, used media, degree of integration, type of information exchange and degree of connection to the leading actor. According to the eleven types of placed objects, a product placement does not need to be a product, but can also be the integration of a company, service, place and many others (Schumacher, 2007). However the integration of a branded article represents the most frequently used type (Fuchs & Unger, 2014).

As already mentioned in the definition discussion there has been an evolution of the media, which affects the second category “used media” directly. The first product placements can be found in the cinemas, followed by radio- and TV-inputs, computer- and online-games, books, songs and many more (Chan 2012).

The third category is determined by the dramaturgy integration intensity, which predominantly affects the advertising impact and success. One does not differentiate as to the product peculiarity but with reference to the extent and poignancy of the creative product integration into the course of the plot of action (Blaue, 2010). The prime example of a creative placement is the integration of the Reese’s Pieces candies into the movie “E.T.”. But also recent cinema movies do use this degree of integration, for example the black 1970 Dodge Charger R/T in “Fast and Furious”. Instead of distinguishing between the degree of integration and the category of the type of information exchange some scientists compress these two into the category of prominence – opposing subtle placements to prominent ones (Lehu & Bressoud, 2009).

The type of information exchange, which represents the fourth category, focuses on the formal design parameters and is also known as modality (Schumacher, 2007). While a pure

optical placement is called visual placement, the mere linguistic integration goes by the name of verbal placement. The highest level of attention is generated by the combination of a visual and verbal information exchange about the placed object (Griesebner, 2002).

Finally, if the leading actor accentuates the placed object, this is called a placement with endorsement, whereas the antipode does not hold any connection between the actor and the product and is therefore known as a placement without endorsement. These two poles are object to the fifth and last placement category, the degree of connection to the leading actor (Burmam & Wegener, 2013).

**Table 2.** product placement categorization

<b>differentiator</b>	<b>product placement profile</b>	<b>explanation</b>
<b>placed object type</b>	product placement	integration of an branded article
	brand placement	integration of a brand
	corporate placement	integration of a company
	service placement	integration of a service delivery
	generic placement	integration of no-name products
	innovation placement	integration of a new product
	location- / country placement	integration of a place
	historic placement	epoch appropriate integration
	message placement	integration of a slogan or a preventative communication content
	music placements	integration of a soundtrack
personality placement	integration of a personage	
<b>used media</b>	movie placement	embedment in the plot of films (TV, cinema)
	game placement	embedment in the plot of video- and computer-games
	music placement	embedment in the plot of music videos or lyrics
	book placement	embedment in a book
	print placement	embedment in a print product
	radio placement	embedment in an audio transmission
	internet placement	embedment in the WWW
	advertising placement	embedment in external advertising spot
<b>degree of integration</b>	on set placement	no direct connection between placement and plot
	creative placement	integration of the placement into the plot
	image placement	film topic is aligned with the placement
	requisite placement	plot determines the integrated products
<b>type of information exchange</b>	visual placement	
	verbal placement	verbal information exchange
	audiovisual placement	combination of visual and verbal information exchange
<b>degree of connection to leading actor</b>	placement with endorsement	leading actor corroborates the placement
	placement without endorsement	no direct connection between leading actor and the product

Due to the huge amount of publications on the topic of product placements different categorization forms are available. Russell (2002) classifies product placements with regards

to content. Another alternative is to distinguish by the sort of reward or to oppose this communication instrument to other commercial types as surreptitious advertising, sponsoring and recommendation marketing.

Audio-visual, creative and the classical product placement are said to be the most effective placement forms regarding the impact on the recipient. On the other hand, generic-, on-set- and visual placements evoke the smallest recall impact (Frank & Rennhak, 2010).

### **Empirical Studies**

Over the last few decades, there has been a gradual development of research activities in the field of product placement (Burmam & Wegener, 2013). Of 96 found scientific studies, six were conducted in the years of 1991 to 1995, followed by eleven in 1996 to 2000, 14 from 2001 to 2005, 29 in 2006-2010 and 36 in 2011 to 2015. Because of the enhancements of mass media forms there is going to be an onward increase of the numbers of scientific research on product placement.

A content literature analysis illustrates that many scientists have undertaken studies regarding the effectiveness of product placements on TV and cinema (Chan, 2012; Chin et al., 2013). For example: in 1996 Babin and Carder prove that over 25% of the 39 brands placed within the movie Rocky III were significantly more salient among a treatment group than among a control group. Also Glass 2007 verifies that placed brands were rated good significantly faster than normal advertised brands. Therefore, these and other scientific studies have proven that prominent placements in TV productions elicit the highest recall values, followed by advertisements and subtle placements (Gupta & Lord, 1998; Jin & Villegas, 2007). However, on the other hand, the repetition of prominent placements decreases brand attitudes, whereas the repetition of subtle placements has little impact on the consumers' attitudes. Therefore, Homer (2009) draws the conclusion that repeated prominent placements motivate viewers to consider the inappropriateness of this promotional tool.

In reference to various research papers, a framework for an empirical study on the effectiveness of product placement in YouTube-tutorials was developed.

### **RESEARCH APPROACH**

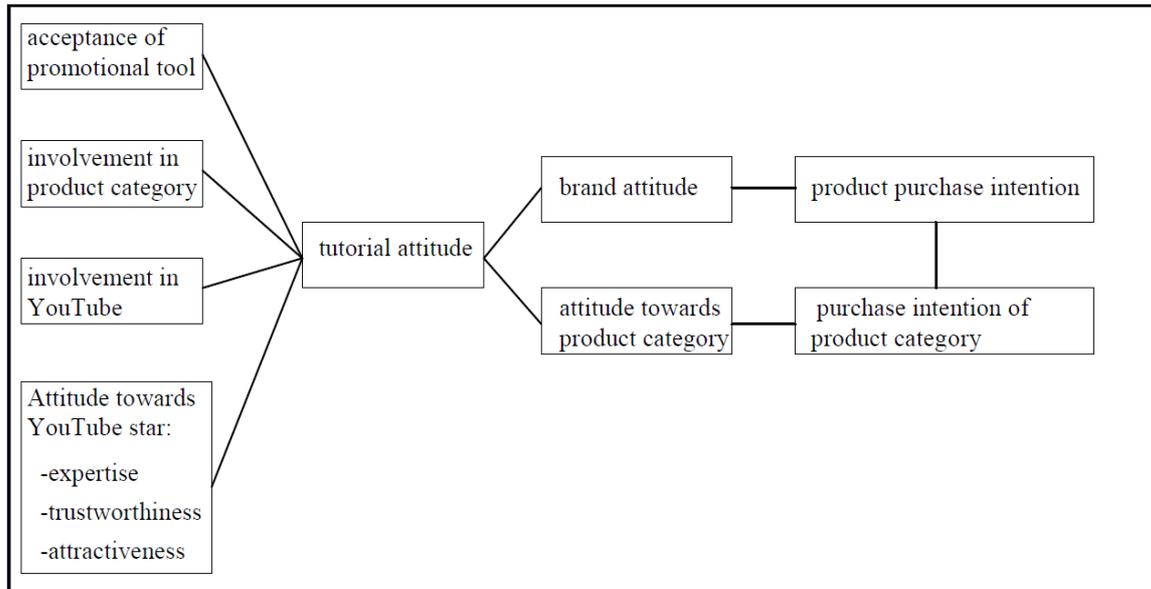
Many scientists argue that there is a need for research in the field of product placement in social media (Chin et al., 2013). The general objective of the research approach is to fill the

gap in the literature of understanding the impact of product placement in YouTube-tutorials on the cognitive and behavioral response of university students. An analyses of the exemplary twenty scientific studies on product placement reveals that out of the 14 experimental studies only two focused on children, three studies have surveyed adults and nine, which account for 64.28 percent of the studies, have examined the behavioral impact on students. Also Burmann and Wegener (2013) point out that the majority of scientific studies are undertaken with students, because of the high affinity towards the medium and because of the special impact of commercials on students. Last but not least university students represent the main part of the target group of companies campaigning on YouTube (Angermann, 2005). Therefore, it is assumed that the research object of students also constitutes a representative sampling for this research approach.

**Table 5.** Survey respondents

<b>Selection of exemplary studies on product placement (20)</b>			
<b>Experimental studies (14)</b>			<b>Content analysis (6)</b>
<b>Students (9):</b>	<b>Children (2):</b>	<b>Adults (3):</b>	
-Babin/ Carder (1996) -Gupta/ Lord (1998) -d' Astous/ Seguin (1999) -Glass (2007) -Jin/ Villegas (2007) -Cowley/Barron (2008) -Homer (2009) -Allan (2010) -Balakrishnan et al. (2012)	-Auty/ Lewis (2004) -Hudson/ Elliott (2013)	-Bressoud et al. (2010) -Gregorio/ Sung (2010) -Bigne et al. (2011)	-Bullen (2009) -Frank/ Rennhak (2010) -Araujo-Vila/ Franz-Brea (2011) -Chan (2012) -Burmann/ Wegener (2013) -Chin et al. (2013)

The specific objective is to analyze the placement of a beauty product in a tutorial, which was solely created to campaign for the product as a customer product test and how this affects the buying choice of the product or a substitute of the product category. Also, influences of attitudes towards the YouTuber, acceptance of the promotional tool, product-category- and YouTube-Involvement shall be considered. Since a prior brand evaluation is proven to be closely related to consumer attitudes towards the marketing strategy and purchase intention (Jin & Villegas, 2007), it should be of interest to investigate a previous involvement of the product category- and how this affects the attitude towards the tutorial and any related buying decisions.

**Table 6.** experimental framework

Research generally suggests that the marketing tool of product placement positively influences consumer attitudes, recall and recognition towards the brand (Jin & Villegas 2007). However, the scientific results vary depending on the product types and the degree of integration. For example: product placements in popular music, meaning in lyrics of pop-music, have been tested to be mostly ineffective. While a traditional 60 seconds commercial generates a recall rate of 84%, the brand recall of popular music is 28% (Allen, 2010). Concluding that first of all it has to be tested, if there are any recall effects of product placements in YouTube-tutorials.

Bressoud et al. 2010 state that a large screen and previous exposure represent the most important characteristics for a good placement recall. Therefore a large screen was used in the university setting of the research approach and the previous exposure is to be measured with the items of product category involvement and YouTube-involvement.

A very important study is that of Balakrishnan et al 2012. According to this study, there is a significant relationship between the acceptance of placements, based on the consumer's perception, and the brand recall towards preferences, loyalty and the intention to purchase. These findings are seized by the construct of acceptance of the promotional tool, the involvement in the product category and the attitude towards the YouTuber.

The fact that by the act of buying the integrated products, the recipient tries to transfer the displayed lifestyle onto themselves and to signal a social affiliation (Frankf & Rennhak, 2010) is kept in mind and shall be considered when analyzing the attitudes towards the YouTuber and their buying intentions.

The measurement method of the effectiveness of product placements has been subject of much discussion. Some academics suggest a quantitation by recall, persuasion and behavioral levels (Balasubramanian, 1994). The most popular means of assessing product placements are unaided recall and brand recognition (Hudson & Elliott, 2013) or the sales tracking (Karrh et al., 2003). The unaided recall method has been chosen for the research approach.

## DISCUSSION AND IMPLICATIONS

As demonstrated, many studies on the effectiveness of product placements in traditional media have been conducted, while comprehensive research on social media is missing. Some of the findings of scientific studies are applied to this research approach. Of course there are many more interesting scientific findings, such as: peer communication, which is a strong predictor of product placement attitudes and behavior (Gregorio & Sung, 2010) or the repetition factor (Homer, 2009). But before these can be tested, the impact of product placements in YouTube-tutorials has to be analyzed. Therefore this research approach aims to be the first step of this topic, which has to be followed by other assembling studies.

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# **Session:**

## **ICT Innovation in Management**

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# Big Data analytics in Polish companies – selected research results

by

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## ABSTRACT

The main aim of this paper is to present the state of preparedness of Polish enterprises to adopt Big Data advanced analytics to gain the sustainable competitive advantage. The main research questions are: How do managers understand the “Big Data” term, are they aware of Big Data analytical potential and its possible advantages, how are companies prepared to make use of Big Data analytics?

The results presented in the paper are based on the survey conducted in 2016 using the case - study approach involving multiple cases.

The main conclusions from research reveal managers need a roadmap which would help them to adopt advanced BD analytics. Also the temporal nature of Big Data, and the dominating role of time factor in BD characteristics and analytics is strongly present in respondents’ opinions.

**Keywords:** Big Data, advanced business analytics, time.

## INTRODUCTION

Some years ago the role of analytics in gaining a sustainable competitive advantage was recognised – see e.g. (Davenport & Harris, 2007). There are numerous examples of companies from various industries, which gained a competitive advantage through properly conducted advanced analytics, and data-driven decision making (Phillips-Wren, Iyer, Kulkarni & Ariyachandra, 2015). Research has also proven, that data-driven companies perform significantly better on both financial and operational measures (McAfee & Brynjolfsson, 2012).

For a few years, a new, potentially valuable source of data has come into play. So-called Big Data gives new insight opportunities, but due to its nature it is not possible to analyze it with existing human and IT infrastructure (Phillips-Wren, et al., 2015). Big Data is generally characterized by 5V, which stands for Volume, Velocity, Variety, Veracity, and Value – see e.g. (Erl, Khattak & Buhler, 2016). In contemporary fast-paced economies, the velocity dimension of Big Data is extremely important, as the speed of action is critical to gaining a competitive advantage. Enterprises have to respond almost in real time to rise to emergent challenges and opportunities (Yang & Meyer, 2015). For this reason, Big Data analytics is gaining importance. Syncsort (2016) predicted that in 2017 Big Data insights would become a mainstay in the boardroom.

The main aim of this paper is to present the state of preparedness of Polish enterprises to adopt Big Data advanced analytics to gain a sustainable competitive advantage. Hence, the main research questions are: How do managers understand the term “Big Data”, are they aware of Big Data analytical potential and its possible advantages, how are companies prepared to make use of Big Data analytics?

## **BACKGROUND**

Many authors have already recognized the importance of Big Data usage/analytics in various areas.

Wang, Kung & Byrd (2016) paid attention to the healthcare sector, and analyzed 26 Big Data implementation cases, identifying five BD analytics capabilities: analytical capability for patterns of care, unstructured data analytical capability, decision support capability, predictive capability, and traceability. The same sector has been addressed in e.g. (Raghupathi & Raghupathi, 2014) or (Batko, 2016), but from a more theoretical point of view, presenting, inter alia, benefits and challenges of BD analytics in healthcare.

Some other pieces of research concerning Big Data analytics implementation, encompass e.g. logistics and supply chain management (Wang, et al., 2016a), government sectors (Kim, et al., 2014), but an overwhelming amount of research is focused on business and management- related issues. Examples include: the impact of Big Data on processes, technologies, organizations, and industries (Abbasi, et al., 2016), organization design (Galbraith, 2014), Big Data in society administration (Chen & Zhang, 2014), organization

management (George, et al., 2014) or possible BD applications in business in general (Fosso Wamba, et al., 2015).

Possible uses of Big Data for business success are addressed also in the context of Polish organizations. Wiczorkowski (2014) focuses on the area of public administration. Weinert (2016) reports results of research conducted in 269 Polish companies with the aid of questionnaires, and uses a comparative approach to indicate differences in the exploit of Big Data solutions against various characteristics of these companies.

The main difference of the research presented in this paper, in relation to approach in (Weinert, 2016), lies in the methodology – case-study approach involving multiple cases – and in the main focus of research questions. In the research presented in this paper, questions were strongly focused on managers' understanding of the term "Big Data" and their knowledge about possible IT solutions and functionalities which (in their opinion) may be useful for BD analytics.

## **METHODOLOGY**

The research is based on both qualitative and quantitative paradigms, and carried out by personal CAPI semi-structured interviews. In the research, employees from 15 various companies (cf. the subsequent section) were interviewed. Thus, the research used the case-study approach involving multiple cases.

The interview questionnaire was developed in March 2016, and consisted of 15 questions, both closed- and open-ended, followed by 7 questions concerning respondent's particulars.

The sample was selected by purposive sampling. Independent variables which were taken into account during sample verification, include: the company's business activity, number of employees, average annual turnover for the last three years, capital structure, a respondent's position in the organization, the company's sector, and for how long has the company existed on the market.

The author is aware of the fact, that the sample is small, due to the relative novelty of the Big Data concept in Polish companies, however, due to the same reason, it is worth publishing the results obtained.

## STRUCTURE OF THE RESEARCH SAMPLE

Among the companies being researched, the largest group (46.7%) is the service one. 13.3% of companies are manufacturing ones, and 40% of respondents selected the answer “other”, for example banking, R&D, or software development. The details are given in Table I.

Table I. Companies' business activity

<b>Business activity</b>	<b>Number of responses</b>	<b>%</b>
Manufacturing	2	13.3
Services	7	46.7
Other	6	40
Total	15	100

These are mostly medium and big companies, because 53.3% of them belong to one of these two categories. The category of small companies may be assigned to 46.7% of firms being researched. No micro-companies were selected for the study.

The majority of firms are these with domestic capital (66.7%). The interviewed respondents were mostly owners or management board members (53.3%), they were also ICT managers/specialists (13.3%), or performed other functions in their organizations, as e.g. technology department managers, advanced analytics managers, SEO specialists or model validation specialists.

As for the sector in which the researched companies operate, the ICT sector is the most numerous (26.7%, with production of ICT, and ICT service/support treated collectively), the second position is occupied by professional, scientific and technical sectors (20%), and the third by financial sector (13.3%).

Obviously, these are not all respondents' particulars, however, they illustrate sufficiently the heterogeneity of the research sample.

## RESEARCH FINDINGS

The first research question was: How do managers understand the term “Big Data”?

For almost all managers (N=14), regardless of industry or size of enterprise, the first association of the term “Big Data” is with the flow and processing of changing, scattered, loosely coupled data, coming in vast amounts. About 1/3 of respondents pointed out difficulties with processing such an amount of data, with applying standard analytical methods to it, with revealing interesting hidden patterns. Other descriptions of Big Data notions concerned big datasets, not suitable for classical storage and processing methods. Also 1/3 of respondents described Big Data as dynamic and volatile. Five managers associated the term Big Data with their sources, such as the internet, social media, cookies, web usage mining results, IoT and Google.

Two respondents pointed out the lack of structure and irregular inflow of Big Data.

The second research area concerned managers’ awareness of Big Data analytical potential and its possible advantages. Respondents have been asked to give their opinions on issues such as:

- a) Types of business analytics, which are especially important for organizations, and should be performed;
- b) Types of data and/or knowledge useful for advanced business analytics;
- c) ICT solutions which should be used for advanced business analytics.

In the above questions, the notion of Big Data is not explicitly present. This was intentional, not to suggest the use of this term, to check whether respondents would use it spontaneously.

The types of business analytics considered particularly important for an organization are as follows:

- Dynamic analytics and reporting – 12 and 11 answers, respectively;
- Multi-criteria analytics, predictive analytics, forecasting, real-time analytics – 9 answers.

None of the managers pointed out Big Data explicitly, however, looking at the responses, it may be noted, that Big Data analytics is the one encompassing dynamic aspects (e.g. time, pace of change, etc.), predictions, forecasting, and real time analytics in one. Obviously, this is not given per se, but needs appropriate understanding, approach, and IT support for Big Data. For this reason the next question concerned data/knowledge which should be used for advanced business analytics. Managers were presented a closed set of examples, accompanied with the five-level Likert scale with the following format:

1. Definitely not;
2. Probably not;
3. Neither yes nor no;
4. Rather yes;
5. Definitely yes.

Having in mind that not every respondent is an IT-specialist, and some of the notions may be new, the response table contained an additional column entitled “I am not familiar with such a concept”. Respondents could also add their own comments during the interview.

The summarized responses on this topic are given in Fig. 1.

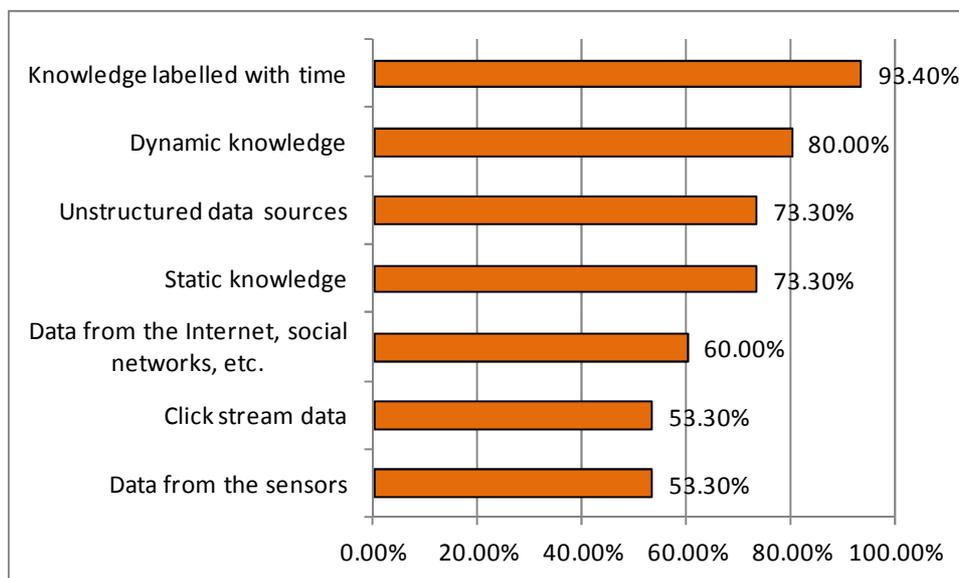


Fig. 1. Data/knowledge the most essential in business analytics

Respondents explained, that by static (unchanging) knowledge they understood e.g. managerial knowledge, models, expert rules, etc.

Subsequently, the respondents were asked about IT solutions an organization should use while preparing advanced business analytics. Again, they were presented a closed set of examples, similarly as in the previous question. The summarized results are presented in Fig. 2.

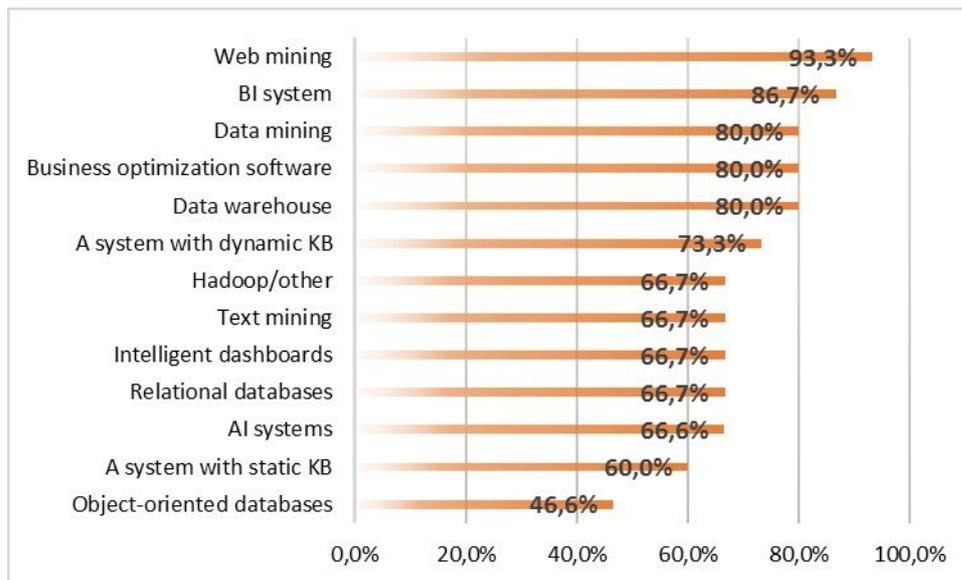


Fig. 2. The most suitable IT solutions for business analytics

The next interview topic concerned functionalities which should be offered by IT systems if they are to be useful in advanced business analyses. Again, the respondents were presented a list of examples accompanied by Likert scale with the same format as in the case of two previous areas. The most necessary functionalities are as follows:

- multidimensional analytics/BI reporting;
- data mining and advanced data mining;
- analysis of Big Data;
- inferences taking time factor into account.

It should be explained here that by “advanced data mining” the respondents meant all data mining activities which go beyond traditional DM tasks (clustering, classification, associations etc.), e.g. temporal data mining.

The summary of responses is given in Fig. 3.

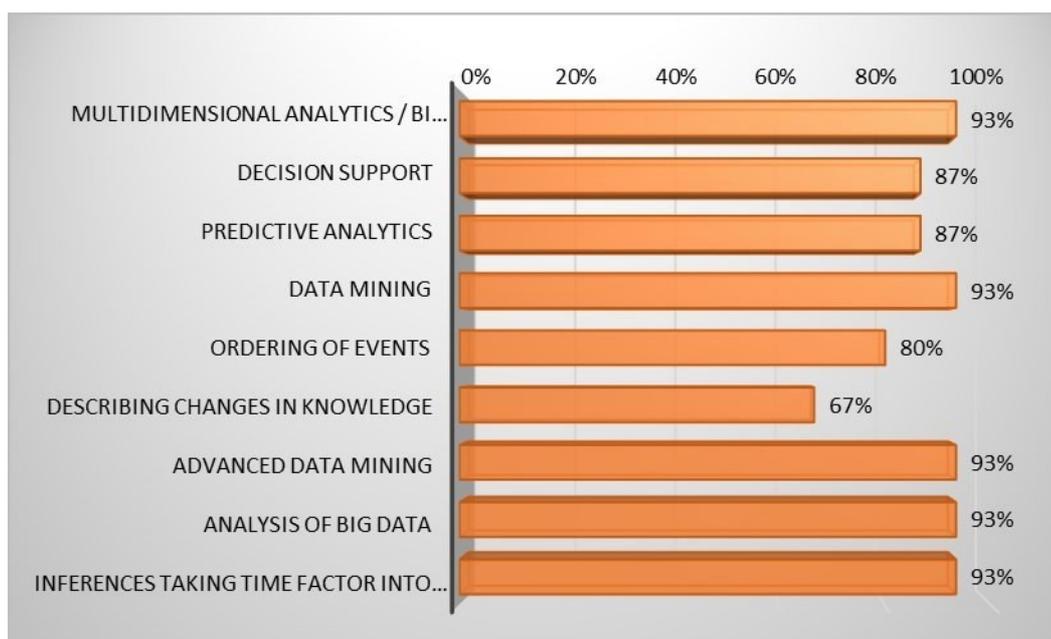


Fig. 3. The most desired IT functionalities for business analytics

Also the aim of the research was to establish the extent to which Polish organizations are prepared to start advanced Big Data analytics. Hence, the discussion areas encompassed such questions, as:

- using advanced business analytics in various areas of insight: to research customers, suppliers, competitors, other stakeholders, social media;
- how do managers assess the level of training for employees (their competencies, skills) in their organizations to draw up advanced business analytics;
- how do they assess the level of training for employees in their organizations to interpret the prepared advanced analytical outputs;
- how do respondents assess the suitability of the current IT infrastructure for executing advanced business analytics in their organizations;
- how do they evaluate the quality of data used in their organizations for advanced analytics.

The results of the first part of interview suggested that the interviewed managers were mostly well-informed in the area of new approaches to advanced business analytics. Hence, the natural thing was to check, in what areas of market research (if any) companies use advanced business analytics (implicitly: Big Data ones). Unfortunately, the majority of companies (10 responses) do not make use of such analytics while running their business. This may seem contradictory to the findings presented above, but only at the first sight. In

fact, it may rather suggest, that people are aware of Big Data existence, and analytical potential, but they are not ready to use it either because of lack of appropriate IT solutions/infrastructure/functionalities, or because they do not have access to needed data of good quality.

The reasons for such an unsatisfactory level of BD analytics adoption in Polish companies can be inferred from the findings from subsequent interview areas.

The respondents were asked about how they assess the level of training for employees (their competencies, skills) in their organizations to draw up advanced business analytics. They could have given only one answer from a 5-item scale, from “very bad” to “very good”.

9 respondents assess the above level as good or very good, while 4 of them assess it as bad or even very bad (2 answers). These results correlate with the results from next question, namely how do managers assess the level of training for employees in their organizations to interpret the prepared advanced analytical outputs. In this case, 10 respondents assess this level as good or very good, 5 of them selected the answer “bad” or “neither good nor bad”. It is worth noting that none of the interviewed managers selected the option “very bad”.

It may be thus stated that in general staff responsible for advanced analytics is well trained and prepared. What is then the reason for not using Big Data analytics in everyday business? The next two questions will explain this situation.

The respondents were asked to assess the suitability of the current IT infrastructure for executing advanced business analytics in their organizations. For 8 of them, the IT suitability in context of Big Data analytics may be considered insufficient: the answers chosen were “neither good nor bad” and “bad”. Nobody selected the answer “very bad”, and 7 managers selected the answer “good”. Nobody selected the answer “very good”. Hence, the general opinion on IT suitability could be given as middling, so probably mostly financial resources are needed to improve it, because people seem ready and prepared to draw up Big Data analytics.

The last question in this part of the interview concerned managers’ evaluation of the quality of data used in their organizations for advanced analytics. Managers mostly evaluate it as average (9 responses), 2 of them evaluate it as being of rather poor quality, 3 respondents assess it as being of high quality, and one manager indicated that such data is not used in his organization because there is no need to draw up advanced business analytics.

What is then the conclusion from the two above questions, in relation to Big Data adoption in everyday business? Obviously, data quality and IT infrastructure suitability are these areas which need improvement in context of BD analytics. Financial barriers are probably the first obstacle in BD adoption, which comes to mind. But is it the only one? The managers have been asked to list barriers in the process of Big Data analytics in Polish enterprises.

The following main barriers have been listed:

- lack of skilled staff with Big Data analytics competencies (10 indications);
- financial barriers, high implementation costs and lack of appropriate strategy (5 indications);
- lack of recognition among businesses concerning BD analytics (5 indications);
- unreliability, poor quality and randomness of Big Data (4 indications).

These obstacles may seem dissonant with managers' former opinions on data quality and level of training for employees. However, former opinions concerned managers' organizations, while the barriers listed in this part of the interview concern organizations in general.

The last part of the interview was devoted to possible benefits for organizations of Big Data Analytics. The most frequently listed benefits (8 indications each) are as follows:

- reliability of Big Data analytics outputs, resulting in better (more accurate) decisions, faster reactions to changes, greater confidence in analytics process, better conclusions;
- BD analytics enables organization to quickly influence the competitive market, and to quickly discover changing trends in consumers' needs.

## **DISCUSSION**

The most interesting observations concerning Big Data related issues, which were pointed out by the respondents, concern such questions, as data and knowledge for analytical purposes, analytical tools needed, and some most wanted IT functionalities.

In the first area, managers pointed out that data/knowledge for business analytics is highly purpose-, company-, and industry dependent. Also the choice of a data source is highly

dependent on project aims, on a company's profile, on the industry, and the market – sometimes companies do not use e.g. web data directly, but as an additional analytical help

There are two kinds of knowledge: the one labelled with time, and the dynamic one which are perceived as extremely significant in advanced business analytics. This indicates the role of time factor in business. This finding corresponds with the significance of the time factor in analysis and managerial decisions, indicated by the respondents: this factor is very significant for 26.7% of interviewed managers, and significant for 73.3% of them.

In the area of IT systems, the greatest role in advanced analytics is ascribed to BI systems, and systems with dynamic (changing) knowledge base very useful for advanced business analytics. Such a system may be called more formally a temporal knowledge base system, where knowledge base is automatically updated in response to changing circumstances, due to update mechanisms based on temporal logics.

Finally, a great interest in tools aimed at unstructured data (text and web data) processing can be seen. This leads immediately to all the IT solutions dedicated to Big Data sources processing and analysis. Even if “Big Data IT solutions” were not stated explicitly, the need for them may be inferred from respondents' answers.

Obviously, managers are generally aware of the existence of Big Data as a source of possible new insights. However, they seem a little bit lost in a jungle of possible sources, IT analytical solutions and functionalities. The most outstanding managers' need in the area of Big Data analytics – even if not expressed explicitly – is the proper account of time factor.

## **CONCLUSIONS AND FUTURE RESEARCH DIRECTIONS**

The selected research results presented in this paper revealed – in the context of Polish companies – two important notions.

The first is obviously the Big Data notion: it is present in almost all managers' responses, even if not explicitly as e.g. the need for unstructured sources analytics, dynamic aspects (e.g. time, pace of change, etc.), predictions, forecasting, and real time analytics.

The second notion is time/dynamics, which is perceived as the essential feature of modern business analytics. It is understood by managers, that the almost real-time influx of Big Data (it may be even called “Big Data in motion”, or more formally – temporal Big Data)

gives new insight possibilities, but at the same time presents new challenges concerning data/knowledge types, IT solutions, and IT functionalities.

Hence a possible new area of research arises: time in Big Data, and Big Data as temporal source of insight.

The research results also revealed the need to give managers a helping hand in Big Data analytics adoption, hence, some kind of a roadmap should also be constructed, taking into account the temporal characteristics of both data and analytical procedures.

The research concerned only Polish companies, as this is only the first step in the broader research agenda planned. Some selected other steps are as follows:

- Conducting analogous research in at least 2 other countries, including one from the “old” EU, and one from the “new” one, and comparing the results;
- Establishing the most important managers’ needs concerning IT support, IT functionalities, and Big Data sources;
- Preparing a kind of roadmap for Big Data analytics implementation, and usage in companies;
- Preparing IT solutions supporting temporal Big Data analytics in the context of sustainable competitive advantage.

The above research is planned to be conducted by an international research group, consisting of people experienced in programming, IT projects development, etc.

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# **An innovative customer-oriented approach to IT projects, based on TRIZ method**

by

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## **ABSTRACT**

Today, it is impossible to change or develop a business environment without transformations in the IT sector. Yet, recent studies have shown that the path of dynamic technological changes that has been followed so far is not sufficient any longer. Despite elaborate IT tools and diverse, proven IT project management methodologies, the proportion of dissatisfied clients (organisations) and project failures is too high. These observations prompted the author to analyse the causes of this situation.

The client, and his place and role in IT projects, has turned out to be a key element of any IT undertaking. The urge to look at this element in a new way involves the need to fill the gap in IT project management and introduce new processes and mechanisms that would enable the identification of clients' real problems and facilitate a pathway from the problem to the solution.

This paper presents the next stage of the author's studies of IT project management. Long years of research work have resulted in an effective IT – business alignment model for IT projects. Its focus is on the client's role, client type identification and the correct selection of an IT project management methodology. Relevant tools and model solutions are proposed. Both the tools and the model have been verified in real-life IT projects. The module for defining and verifying a client's needs is the final element of the model. The aim of this paper is to present the author's proposal to apply a method from a different subject area, so as to achieve a better IT – business alignment, which should be the primary goal of any IT project. This is the Theory of Inventive Problem Solving method - TRIZ. It offers tools and rules that enable changes in the weakest spots of IT project management.

With an approach like this, it will be possible to improve IT sector flexibility towards business and generate better IT project deliverables, thereby increasing the success rate of IT projects. Consequently, organisations – recipients and users of IT project deliverables – will

be able to better cope with the growing demands and expectations of their environment and with dynamic changes on the market.

**Keywords:** IT Project Management, client needs, TRIZ, Problem Solving, Innovation, software development

## INTRODUCTION

There is a particular emphasis on innovation and entrepreneurship in the contemporary economy, i.e. the business environment. The nature of IT-related innovations is even more special. Over the recent decades, innovations in business have turned out to be inseparably interlocked with the development of information technology [Hoque, Bruckner, 2011]. For many companies, IT products have become a basis for innovations in processes, models of co-operation, customer service and exchange of information, etc. IT staff play a key role here. Namely, IT workers are expected to suggest and adapt state-of-the-art IT solutions so as to meet a company's needs and make it innovative [Boratyńska-Sala, 2011]. And yet, the research reports of recent years show that the innovative potential of the IT sector is being increasingly challenged [Gartner Raport 2014, The Standish Group Raport 2014].

The IT evolution is close to the end of the stage where it played a supportive role to the organisational structure and operations of businesses. Due to technological progress, digitisation, changes in the market environment and legal requirements, an organisation's IT resources are increasingly becoming part of its business processes.

Thus, an adequate IT – business interaction can be a guarantee of success today. Considering that projects, including IT projects represent the most popular mode of operating these days, one should concentrate on a proper co-ordination of IT-related efforts with the development of business strategies. IT – business alignment should be seen in the context of mutual integration of two aspects: the alignment of IT with business and the alignment of business with IT. The alignment of IT with business is directed towards supporting business strategies with information technologies in the broad meaning of the term. The alignment of business to IT, on the other hand, enables the modification of business strategies based on adequately matched IT technologies. Each of these aspects handled separately does not generate such an added value as their interaction can produce [Shim, Shin Sheu, Chen, Jiang, Klein, 2010]. Furthermore, building alignment based on the interaction of these two aspects

brings new competences to an organisation and becomes a distinguishing factor in the business context [ISACA, 2012]. An additional role of IT in the process of alignment will involve developing transformation applications and the related infrastructure, thereby changing business competition models.

Under such circumstances, an expectation is rightly growing, of a dialogue between the IT team and the client, towards a better alignment of IT project deliverables. This is a challenge for researchers, motivating them to seek a language for a dialogue between very different professional groups: IT staff and business people.

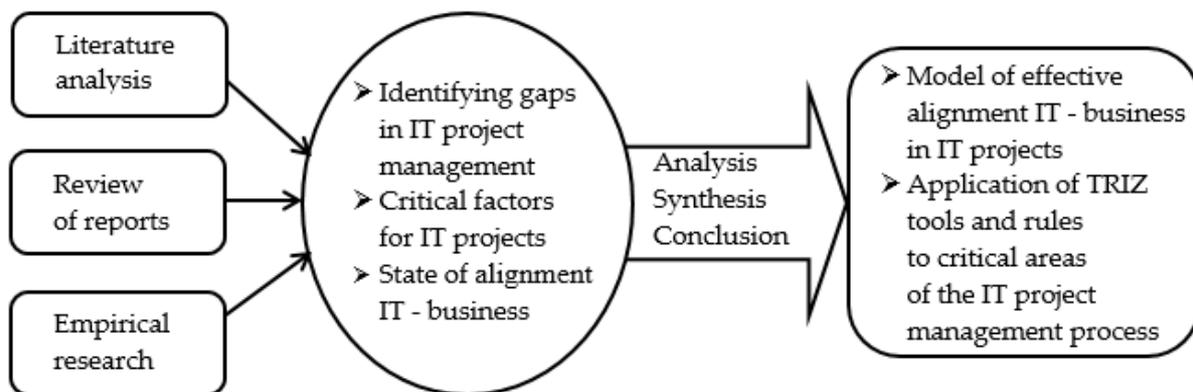
The author's research effort of the years 2010-2015 with regard to IT projects implemented in the Polish SME sector as a service of providing custom-developed software, revealed an evident need for creating mechanisms that would form a core to support the integration of project management processes with an organization's business processes, project deliverables, IT systems – with the real needs of an organization, and a need for building a common space of collaboration between IT system developers and users (clients). Long years of research work have resulted in an effective IT – business alignment model (the EIT-BA model) for IT projects. It enhances the role and the position of the client in an IT project, introduces unknown issues related to the need of identifying the client type and – consequently – selecting an adequate IT project management methodology [Woźniak, 2013]. Relevant tools and model solutions are proposed. Both the tools and the model have been verified in real-life IT projects [Woźniak, 2016]. Their relevance is proved by comparing client satisfaction measurements performed using the Servperv method.

An IT – business alignment module is the final element of the EIT-BA model. Its purpose is to define and verify the needs of the client. Since project management methodologies do not offer any methods or tools that would bring better results here, the author undertook an exploration of methods from other subject areas. TRIZ – the Theory of Inventive Problem Solving – seems to be a method whose tools and rules can be potentially applied in IT project management. The paper not only indicates the potential of TRIZ with respect to the problems referred to above, but also proposes, how the rules and tools of this methodology can be used in key areas of the IT project management process, where its consistency with the organization's needs is determined. In this way, there is a better chance of achieving a closer IT – business alignment, which should be the primary goal of any IT project.

**RESEARCH PROBLEM AND METHODOLOGY**

According to reports, the last decade saw a significant change in the structure and hierarchy of factors that determined the success of IT projects most. Presently, the awareness of the client role in IT projects has come to the foreground. This phenomenon has become an important area for research, as, despite the whole range of advanced IT project methodologies and high standards, the proportion of successful IT projects is still too low – merely 35% [Gartner Raport 2014, The Standish Group Report 2014]. Reports on IT systems indicate that only around 10% of software functionalities are actually used in most companies [Gartner, Raport 2016]. Business expects more flexibility from IT – this is what international corporations dealing with the most comprehensive IT solutions think. In the meantime, the perceptions of an IT project success have changed too – there has been a shift from the classic project triangle (time, budget, scope) [Atkinson, 1999] to the success and failure narration of the client [Ika, 2009].

The author’s research work in the field of study described above followed three paths (fig. 1), selected according to the principle of quality maximization and the volume of information collected, which is necessary to obtain a complete picture of the phenomenon being studied [Gauch, 2002]. They include an exploration and analysis of the literature of the subject, findings presented in the current research reports, information from relevant symposia, project documentation and conclusions from the author’s own empirical studies.



**Fig. 1. Research paths**  
Source: own

The aim of the empirical research work was to identify the causes of insufficient IT – business alignment in the area of custom software development. Surveys were conducted in the years 2010-2015. The subject of interest was custom software development projects in the Polish SME sector. In order to ensure a high quality of results, triangulation of data sources and methods was used [Denzin, Lincoln, 2006]. The methods used included unstructured

interviews [Silverman, 2006], observations [Hennink et al., 2010] and a project documentation study. This approach was adopted in an attempt to eliminate any subjectivism of data and of data analysis, which is particularly important in qualitative studies [Eisenhardt, Graebner, 2007].

The aim of this paper is to show, based on the author's own studies on IT project management problems and in the face of the absence of methods and tools in the subject area that would provide any better IT–business alignment, how TRIZ – a method from a different subject area – can be employed in the IT project management process. The main purpose is to find such solutions that will make the IT project management process more efficient and its deliverables – more satisfactory to their users. Due to the inertia vector [Arciszewski, 2016], these solutions are often beyond the present field of cognition of persons dealing with IT problems.

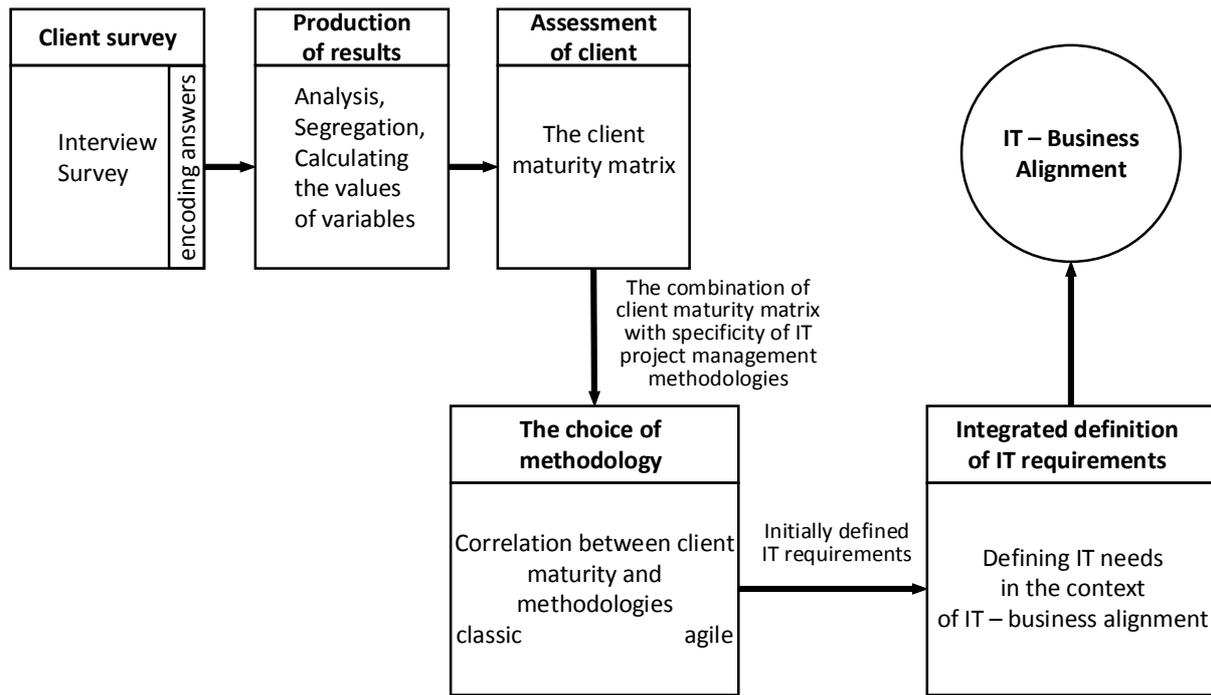
This paper not only proposes approaching the problems of IT projects in terms of the TRIZ method, but it also presents how the tools and rules of this method can be applied in practice in key areas of IT project management and what changes this will entail. The proposed approach may be a chance to improve the performance of IT projects.

## **STATE OF OWN RESEARCH**

As a result of the empirical research, the root causes of IT projects failures and critical success factors have been identified. In both cases, an awareness of the client's role and needs comes first. A definition of needs is closely related to determining the subject, the objectives, the scope and the plan of an IT project and – at the next stage – its derivative elements. Hence, to fill the substantial gap in this area, it is necessary to work out adequate methods and tools that will enable the specifying of the real needs of the client in a correct and complete manner and meeting these needs through adequately aligned IT products.

In response to this need, research work on the EIT-BA model for IT projects has been initiated by the author. The model consists of three main elements (presented in fig. 2):

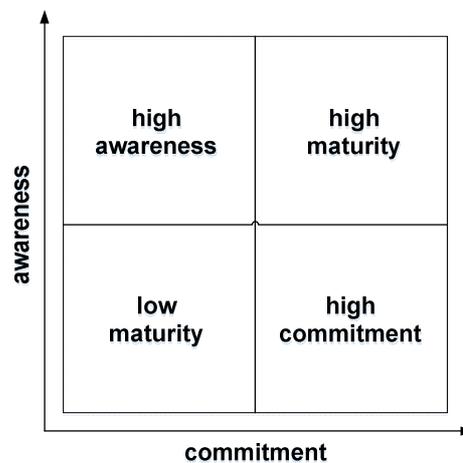
- I. evaluating client maturity,
- II. matching the IT project implementation methodology,
- III. IT – business alignment.



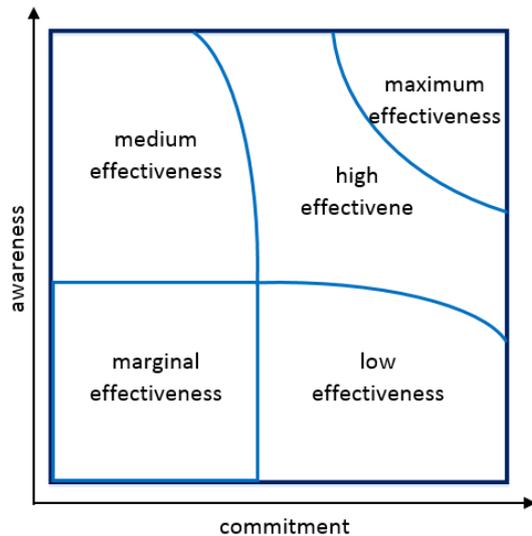
**Fig. 2.** A model of effective IT – business alignment in IT projects  
Source: own

The IT client maturity model designed, as a result of the author’s research work performed in the years 2010-2013, enables both an identification of the client type and the selection of an adequate IT project management methodology. The model was published and empirically verified. The model consists of the following elements/tools:

- a matrix for the IT client maturity assessment (fig. 3),
- matrices for assessing the effectiveness of methodologies (classic, agile) in the context of IT client maturity aspects (fig. 4 and 5).

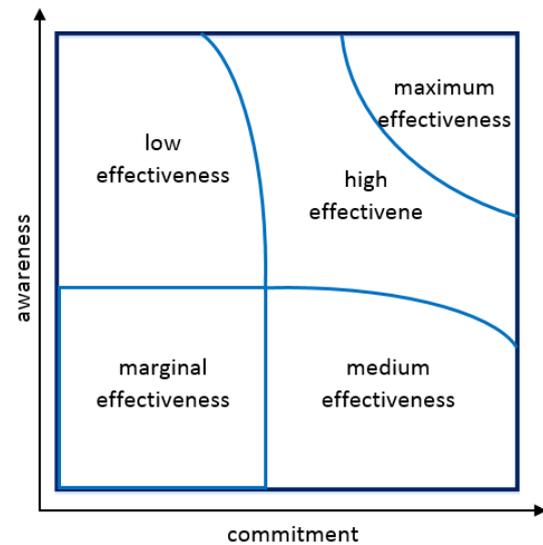


**Fig. 3.** The client maturity matrix  
Source: own



**Fig. 4.** The client maturity and the effectiveness of the classical methodology in IT project

Source: own



**Fig. 5.** The client maturity and the effectiveness of the agile methodology in IT project

Source: own

Fig. 2 shows the entire solution for matching an IT project management methodology to the client type - modules: client analysis, client evaluation, methodology selection.

Both the tools and the model have been verified in real-life IT projects. Their relevance is proved by comparing client satisfaction measurements performed using the Servperv method [Fogarty G., Catts R., Forlin C., 2000]. The study was conducted in the period from September 2015 through February 2017 and was divided into the following stages:

- selecting companies where IT projects are implemented using classic and agile methodologies (in the 50:50 proportion): 4 companies for classic methodologies and 4 companies for agile methodologies,
- analysing and selecting comparable projects (using pre-defined criteria) and analysing client types and selection within each of the companies,
- designing an instrument for measuring client satisfaction,
- measuring client satisfaction levels for the IT projects selected.

Clients of each of the IT companies were assessed using the client maturity matrix. The study involved 8 clients (SME organizations) from each company: 4 matching the IT project management methodology used by the company and 4 – not matching it. All analysed projects were similar in type – they involved building an IT system from the ground up. The key criterion used in this study was the role of evaluation [Farbey, Land, Target, 1994)] – the

assessment was intended to ensure the comparability of IT projects being managed using a methodology matching and not matching the client type.

The statements were rated using the 7-degree Likert scale, where 1 represented the respondent’s strong disagreement with the statement and 7 – their strong agreement [Edwards, 1957]. The results obtained for the dimensions accepted for the study are presented in the form of arithmetic means, in a breakdown by two client profiles – matching and not matching the IT project management methodology used (see Table 1).

**Table 1.** The rating of dimensions and Servperv for two types of clients - matching and not matching the IT project management methodology used.

Dimension	Clients matching the IT project management methodology		Clients not matching the IT project management methodology		Difference	
	arithmetic average in points of the Likert scale	arithmetic average in percent	arithmetic average in points of the Likert scale	arithmetic average in percent	arithmetic average in points of the Likert scale	arithmetic average in percent
Tangibles	5,59	80%	3,54	51%	2,05	29%
Reliability	5,64	81%	3,53	50%	2,11	30%
Responsiveness	5,72	82%	3,36	48%	2,36	34%
Assurance	5,49	78%	3,50	50%	2,00	29%
Empathy	5,80	83%	3,18	45%	2,62	37%
<b>Servperv indicator</b>	<b>5,65</b>	<b>81%</b>	<b>3,42</b>	<b>49%</b>	<b>2,23</b>	<b>32%</b>

Source: own

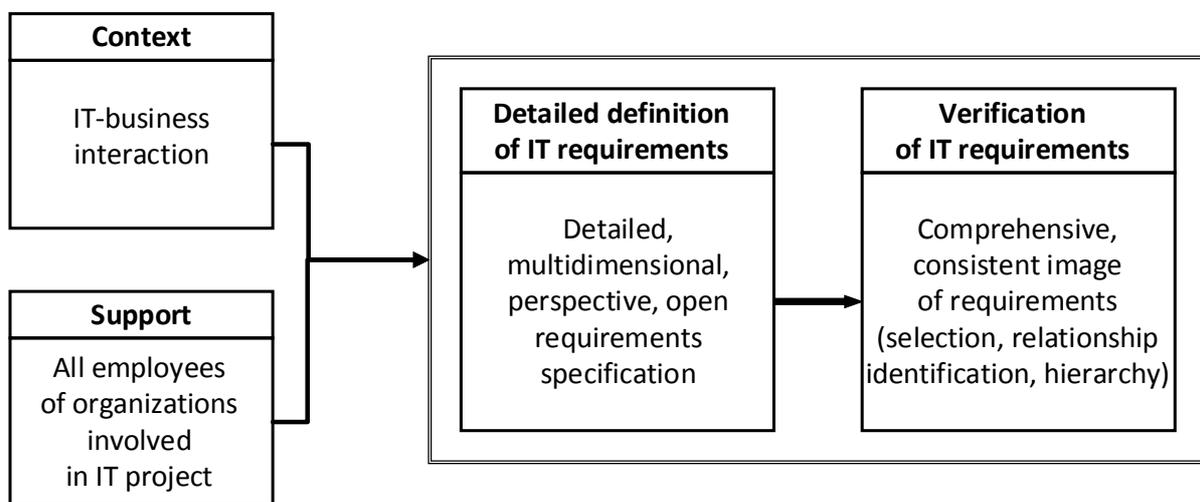
The projects implemented using a methodology matched to the client type show much higher client satisfaction levels with the IT project, its deliverables and results. The results of this study interpreted in the context of the contemporary understanding of project success [Bredillet, Tywoniak, Dwivedula, 2014] prove, that matching an IT project management methodology to the client type significantly enhances the probability of project success.

The next stage is the IT – business alignment module, aimed at meeting client’s real needs through IT project deliverables. According to professor Jerry N. Luftman, IT – business refers to “applying Information Technology (IT) in an appropriate and timely way, in harmony with business strategies, goals and needs” [Luftman, 2003]. This short definition covers all aspects of the IT strategy integration with the company business strategies. These include the alignment of: technologies, organisation of work, process flow, human factors, communication processes.

Only a small percentage of organisations in Poland use IT – business alignment as a basis for their business strategies. A lack of communication at the IT – business interface is very common. According to the strategic alignment maturity model [Brier et al., 1999], there are four key factors that have a negative impact on or even prevent IT – business alignment. These include a lack of:

- close relations between business and IT,
- prioritisation of IT initiatives and meeting commitments,
- understanding of business perspective by the IT,
- leadership skills among IT managers.

The IT – business alignment module of the model presented in Fig. 2 was intended as a response to the essence of these problems through the orientation towards the correct definition of client needs. Figure 6 illustrates a model-based approach to defining client needs in the context of IT – business alignment. An IT project’s performance should be improved, when the real needs of the client are verified in the context of the IT – business strategy interaction.



**Fig. 6.** Defining IT needs in the context of IT – business alignment  
Source: own

This is where an innovative approach should be introduced, based on specific tools that will enable the IT project to become a truly integral part of the organisation’s strategy. Such a goal prompts one to search outside the subject area being studied. This is because from a systemic point of view, improving processes in a subject area, using methods that represent namely this area, is not entirely effective.

## THE POTENTIAL OF TRIZ FOR IT PROJECTS

TRIZ in Russian – the language of its author, H.S. Altshuller – stands for *Teoriya Resheniya Izobretatelskikh Zadach* (Theory of Inventive Problem Solving). It was developed in 1956, based on long years of analysing more than a million patents. Altshuller designed algorithms for the procedure of identifying and solving engineering problems and a whole set of invention principles [Altshuller, 2000]. The method is still subject to modifications and improvements. Although rooted in a technical background, it saw many attempts of implementation in the area of organisation, social issues and business in broad meaning of the term. While not very popular in Poland and Western Europe, it is successfully used in Asian corporations, in the USA and – obviously – in Russia. The rate of TRIZ applications in a country is positively correlated with a growth in the number of patents and in the innovation rate.

ARIZ (a Russian acronym for *алгоритм решения изобретательских задач*) – an algorithm of inventive problems solving – is dedicated to solving complicated invention-related problems and in particular – to designing and analysing complex objects and to solving complex technical problems [Czinki, Hentschel, 2016]. All these elements are present in IT projects as a rule – the complexity of business processes being modelled combined with difficulties with software and hardware solutions.

TRIZ and IT projects aimed at developing custom IT systems have the same primary objective: “provide a methodology that would enable the development of such technical systems that ensure the best performance at the lowest cost” [Karendał, Yatsunenکو, Józwa, 2015].

Although TRIZ is not associated with the IT area, it seems to have all advantages of a method that could be applied there. TRIZ has morphology that is similar to development of IT systems within IT projects. It is based on a creative process, but on the other hand, to find a satisfactory solution, constraints and contradictions have to be taken into consideration and certain, specific principles have to be followed. In addition, the focus on proper identification of the problem is a crucial advantage of TRIZ. In IT projects, on the other hand, the process leading from problem to solution is too compact, therefore IT solutions implemented in organisations are not as efficient as they could be.

## **IT – BUSINESS ALIGNMENT USING THE TRIZ METHOD**

The IT – business alignment very much depends on the source initiating the needs to be met by an IT project. These needs can be initiated in three areas:

- IT,
- business strategies,
- IT – business interactions.

The first two of them gives a flattened picture of needs. IT itself may generate needs that are rooted in state-of-the-art technology trends, but inadequate to real needs of the organisation. Typically, the functionality of IT products or services developed in response to the needs initiated by this source is used in 10% only [Gartner, 2016]. On the other hand, taking an existing business strategy as a starting point results in the so-called passive approach to the definition of needs. It leaves no space for the innovative potential of new technologies and for the opportunities offered by transformation of structures and activities, aimed at maximization of the organisation's performance. IT – business interaction is the only basis for the correct definition of needs. Here, the definition of needs should be seen as a process rather, than a closed stage. As a result, a compound, multi-faceted, long-term and open specification of needs will be produced.

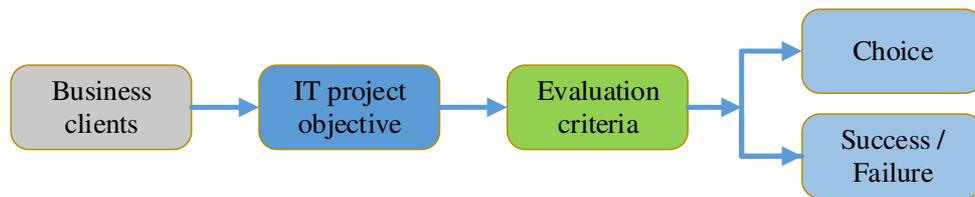
The problems of IT – business alignment cannot be analysed without giving consideration to studies on communication between project different stakeholders. A useful method would:

- standardise the language of communication at the meta level,
- be applicable, conceptually and technically, in the business area as well as in the IT area,
- be structured and yield unambiguous result, so as to be acceptable to IT people, while not using the IT language,
- be comprehensible and useful for business people.

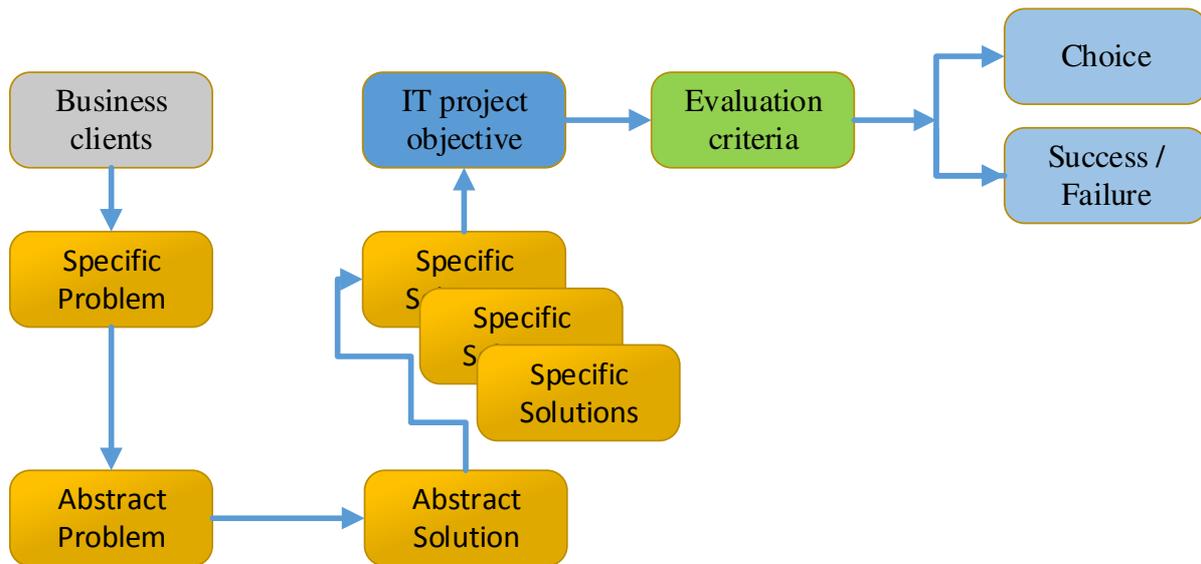
TRIZ is a method that has a potential for IT projects. TRIZ theory focuses on the ability to solve problems in a systematic manner. The purpose of TRIZ is to support innovations based mainly on technological or technological and economic solutions. It combines tools and methods oriented towards an analytical and rational approach. Its flexibility is demonstrated by the fact that several different directions have emerged within TRIZ: technology,

management, science, pedagogy, thereby confirming its applicability to many different areas that are very distant one from another [Chechurin, 2016].

Using TRIZ methodology, it is possible to replace the classic decision-making sequence presented in Fig. 7 with the model presented in Fig. 8. The project objective definition is transferred to a later stage, while priority is given to identifying problems of the client. On the other hand, the solutions for the IT project will automatically include the project objective that has emerged as a result of problem identification. This is how TRIZ methodology can contribute to making an IT project a solution to the problem that has been identified.



**Fig. 7.** Sequence of decisions in IT project management  
Source: own



**Fig. 8.** Sequence of decisions in TRIZ-based IT project management  
Source: own

The TRIZ methodology reorients an IT project from responding to consequences of problems, to responding to root causes of problems in the organization. It is a crucial redefinition of the IT project role. This alteration may become a key factor in eliminating common weaknesses of the IT project management process, such as the incorrect identification of user needs, scope creep, unused system functions or technical debt [Ozkaya, Nord, Kruchten, 2012].

Furthermore, TRIZ provides mechanisms that may reduce the problems of client needs management in IT projects and scope creep, by enabling:

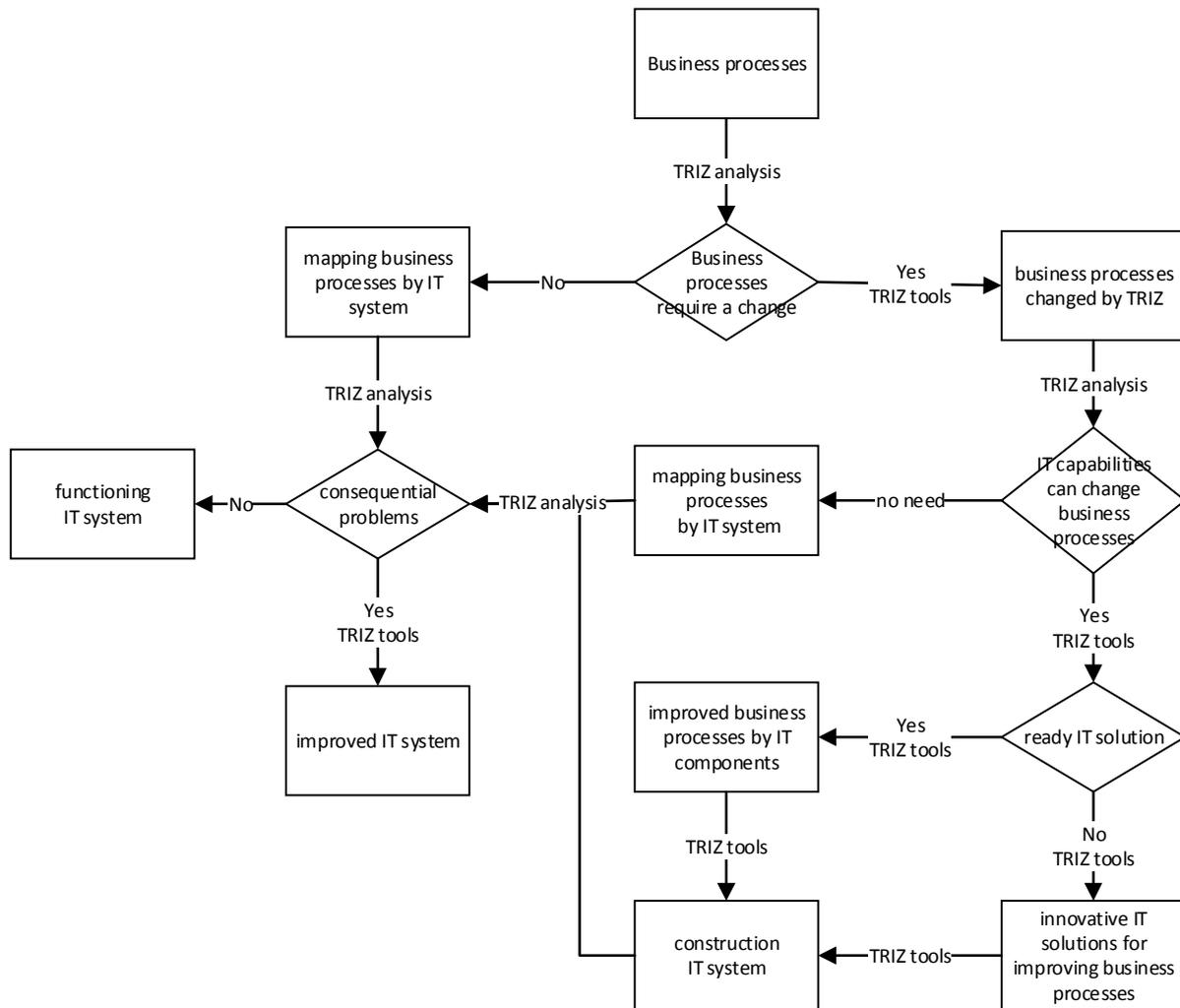
- looking at an organization's IT-related business needs from the angle of problems that have been identified,
- looking at IT project deliverables as tools to be used with respect to organization's business needs,
- identifying an organization's problems in a manner that defines all IT project deliverables,
- defining the IT project scope through the IT project deliverables that have been identified.

An approach like this will ensure the co-ordination of business processes and IT project deliverables transformation towards an improved IT – business alignment.

TRIZ may transform the way of looking at the IT system within an IT project. Fig. 9 shows the IT project implementation steps based on TRIZ. The procedure follows the primary principle of TRIZ: striving for an ideal final result. The most important characteristics of this solution include:

- eliminating the disadvantages of the current (real) situation,
- retaining the advantages of the current situation,
- avoiding a complication of the solution,
- avoiding new disadvantages.

Taking the identification of the organisation's problems by means of TRIZ as a starting point and using this as a determinant of the IT project deliverables will reduce the problem of unused functionalities of the IT system, which is one of the most commonly reported problems with IT projects.



**Fig. 9.** IT project implementation steps based on TRIZ

Source: own

With IT solutions supported by TRIZ methods and tools, IT projects may become catalysts for solving an organisation’s real problems, instead of generating new IT products only. An approach like this is a chance for a much better IT – business alignment and consequently – for an increased satisfaction with IT projects, which, in the light of the current definition of an IT project success, is equivalent to an increased proportion of successful projects.

**CONCLUSION**

Although the history of TRIZ development in business and management is not long, the evidence of its effectiveness is substantial. The advantages of this methodology include its applicability to a wide range of problems, as well as its compatibility with other methodologies, including in particular its ability to support their weak points.

When used in the field of IT, TRIZ enforces the often neglected analysis of the way how the project user – the organization – operates and the need for adequate preparation (modification) of business processes prior to deployment of IT solutions. Such an approach offers an immense chance for enhancing the effectiveness of IT projects. What has to be done in this process, is to work out a path where TRIZ tools will integrate the management of IT projects with the modification of business processes, in order to improve an organization's performance. Some of the activities and recurring contradictions can be standardised, while project-specific elements will have to be analysed following a pre-defined procedure (sequence). These elements require extensive studies in the field of IT project management.

TRIZ offers a number of approaches oriented towards problem identification – from benchmarking, through functional analysis, flow analysis, causal chain analysis, to analysis of trends in evolution and trimming [Altshuller, 2000]. By using the procedures and tools that correspond with these approaches, it is possible to identify problems and their sources, e.g. in:

- functional analysis – harmful functions or useful functions excessively or insufficiently performed (system flaw),
- flow analysis – system flaws,
- causal analysis – identification of key defects of the system.

Thereafter, IT project deliverables can be oriented towards an elimination of these sources of problems. With a decision-making system organised in this way, a decision to launch an IT project will not generate any random changes, but will lead to the most ideal solutions [Retseptor, 2017].

TRIZ might become a core of the IT – business alignment process that would integrate a problem-oriented modification of business processes with IT project deliverables and change management. This way, an IT project could be built into the process of strategic objective achievement, thereby maximizing the benefits of IT deliverables, inasmuch as the benefit can be fully achieved only when business and IT capabilities are co-ordinated in time (products, services and changes to processes).

The article is an innovative approach to IT project management using the TRIZ method. The TRIZ method, although used in the area of management, has not been used in the context of IT project management so far. The technical and managerial aspects of TRIZ were combined with the proprietary EIT-BA model in IT projects. The presented application of tools and rules of the TRIZ method in the last module of the EIT-BA model is a theoretical

model, based on the experience gained in two areas: IT project management and the TRIZ method. Up to now, the earlier elements of the EIT-BA model for IT projects: the matrix for the IT client maturity assessment, matrices for assessing the effectiveness of methodologies (classic, agile) in the context of IT client maturity aspects, have been empirically verified with a positive result. The IT - business alignment module using the TRIZ method is in the course of empirical research in the same research units from the group of implementers and recipients of IT projects.

Empirical research will allow us to verify the potential of the TRIZ method for IT project management. The proposed model, after correction and positive verification, will be able to constitute an algorithm for effective IT project management in organizations. The undertaken research expands a new area of the project management knowledge – Success Management – and corresponds with BizDevOps [Aihara, S., Inoue, M., Jin, A., 2017] – an emerging approach to software development, allowing fast and effective development thanks to unified teams.

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# Innovative training of technical students by TRIZ method

by

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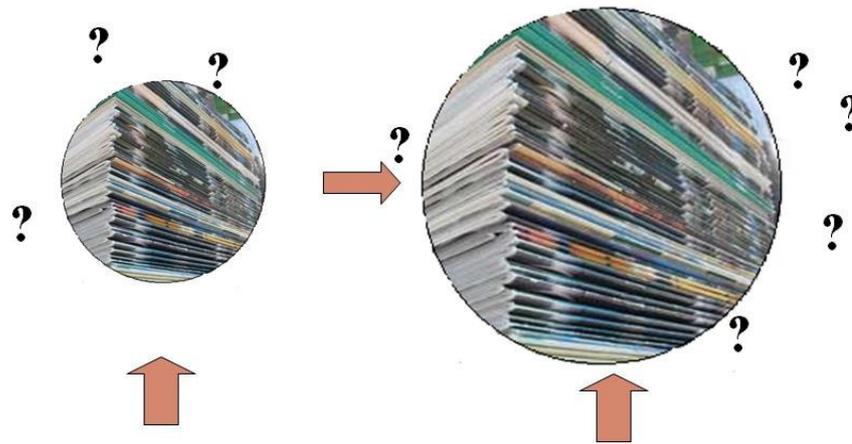
## ABSTRACT

The article presents the problem of "education" as another quality in relation to "knowledge". It has been shown that knowledge does not prevent cardinal errors and the knowledge base acquired during the course of study is today rapidly becoming outdated, while classical approach to the problem of learning is – in view of the avalanche of increasing information - simply ineffective. The TRIZ (Theory of Inventive Problem Solving) method and Leonardo da Vinci Principles were indicated as promising directions for the transformation of higher education didactics.

## INTRODUCTION

As a result of technology development and progress in civilization, the education of a young man in the 21<sup>st</sup> century differs diametrically from the teaching system used in the 17th century, when the first general principles of education were formulated. The main differences relate to methods, tools, patterns of human activity and the way of "thinking", understood as information processing and construction of conceptual models. Major tools used today by teachers include multimedia, networking and special educational technologies. As the growth of information is exponential, it is not possible to keep up with the ever-growing and ever-increasing number of publications, even within one domain.

This is shown by Leo Szilard's model: if the entire human knowledge is represented as a ball, then the space outside this ball will symbolize the "unknown". The surface of the ball is a boundary between "the known" and "the unknown". The larger is the amount of knowledge, the larger is the contact surface with the unknown, and each point in this space becomes a new challenge (Fig. 1).



**Fig. 1.** Leo Szilard's image (A. A. Гин, 2001)

A man learns all his life, which means that the volume of the ball is growing, and consequently the surface of the ball, i.e. the boundary between knowledge and ignorance, is growing, too. Every point on this surface is a new question and a new task. The conclusion is that a new approach to the problem of education is needed. It is not possible to identify education with "knowledge", especially the lexical one, or with the ability to use "modern toys", such as computers, tablets, etc. It seems that by "education" adapted to today's challenges it is necessary to understand mainly the ability to adapt to the rapidly changing world in all its aspects. This means the ability to quickly learn new things and overlearn – if needed.

## LITERATURE REVIEW

The teaching style was shaped around the 17<sup>th</sup> century. It focused mainly on knowledge and solving closed tasks. Here the teacher was a master and a model to follow. Today, however, the role of the teacher has changed, assuming a different form based on partnership and aimed at overcoming difficulties in solving the so-called open tasks where clear data or criteria are not available. The student must find the information needed, develop an action plan, and work out solutions. There may be many solutions, but proceeding according to the guidelines of TRIZ methodology he should be able to find the strong solutions.

The literature of the subject describes numerous techniques that help to assimilate information through technological achievements (Wu & Zhan, 2012). Contemporary pedagogy offers techniques to intensify the ever-increasing knowledge, such as speed reading, memory learning, learning through relaxation, and so on.

Dennis Congos, who distinguished 9 types of mnemonics, contributed to the development of fast memorization of the text. Mnemotechnique offers memory techniques that allow students to better master the material. Due to the use of these techniques, the author of the method has discovered that the results of tests conducted on trained students increased by 77% (Congos, 2006).

Other researchers claim that the method of making student active participant in learning is based on the identification of his or her skills and predispositions by defining the so called multidisciplinary intelligence (Tobias, 2017). The author explains that students have differently developed senses and this influences their ability to memorize, perform different activities, learn and understand (Gardner, 1991).

A relatively new concept in the work of teachers is the extensive use of multimedia. Support for didactic materials with multimedia materials seems to be beneficial for the educational process, as it expands the repertoire of the information media, accelerates assimilation of knowledge, helps to explain difficult problems, sometimes with simple animation only (Kotevski & Tasevska, 2017) (Valentine, Belski, & Hamilton, 2017).

The above methods help in individual learning and in memorizing larger amount of knowledge, but do not take into account the needs of the future world in which graduates will work.

The most important feature of modern education should be the attempt to help students adapt and develop skills of coping with new situations resulting from social and technical transformations and increasing information overload (Klinkov, 2014).

## **METHODOLOGY**

Engineering knowledge is growing rapidly. A technical college graduate must continue updating knowledge and skills throughout his whole active working life. In this process an undoubted support is information technology, which shortens the time to acquire knowledge, facilitates its processing, and creates interpersonal contact with specialists in the field from all over the world.

There is also a relatively new phenomenon, which is the excessive and uncritical confidence of students in information obtained from the Internet, or processed by computer and calculator. The consequence of this attitude is sometimes quite bizarre behavior and model of reasoning adopted by students. Examples given by Docenko include a 10 mm radius

of the Globe and the following explanation - "but this is the result given by the calculator", or the length of a route covered by the balloon of 108500 km (!), also accepted indisputably as a result given by the calculator.

At the same time, companies expect creative solutions from their employees, and this as quickly as possible because of the high competition (Woźniak, 2012). It turns out that teaching methods for creativity and problem solving are more important than acquiring knowledge from a given discipline. A confirmation is in the studies carried out by J. Bielski, R. Adunka and O. Mayer. (Belski, Adunka, & Mayer, 2016)

The great experience of engineers, entrepreneurs and researchers in TRIZ methodology has been the proof sufficiently convincing that one can develop the creative potential in an adult, shape it and make it part of creative personality. Yet, much better results can be achieved through the deliberate development of creativity in students, i.e. people with great flexibility and ability to master and fully assimilate the TRIZ methodology.

The didactic potential of G. Altshuller's TRIZ allows its users to implement the evolutionary approach of TRIZ in education. Traditionally, the this methodology has been focused on analyzing and solving non-standard tasks, mainly in the field of technical issues. Its further development and flexibility allowed it to emerge in five different embodiments as Technology, Management, Science, Design and Pedagogy.

An analysis of the professional achievements and everyday life of many eminent people allows generalizing the experiences, which conditioned their past successes. These experiences were captured using the biography of Leonardo da Vinci, who did not formulate his own principles of self-education and creativity, but applied them in life and work. Here are the rules (Gelb, 1998):

1. **Curiosita** – the curiosity of the world and the desire for continuous learning. Educational institutions, including universities, do not develop students' curiosity. Meanwhile, the era when people were subordinated to the authorities has long passed. The educational facility is not a factory where you have to follow all the instructions. The student who asks a lot of questions should be praised instead of being treated as a necessary evil. This attitude of the student, open to new challenges and cherishing the opportunity to ask questions, gives rise to the development of a future innovator capable of solving various problems.
2. **Dimostrazione** – the commitment to test all perceived phenomena through experience, persistence and willingness to learn from mistakes. Quite often students are banned from

operating complicated machines in expensive laboratories at colleges, while only through direct experience, "the touch of the matter" and questioning the status quo, the student has a chance to understand what the lecturer is trying to convey to him. Should we allow the student to have freedom of action and original thinking? It seems that this is a necessary prerequisite for the creative education of an engineer and a scientist.

3. **Sensazione** – the continual refinement of the senses, especially sight, as a means to enliven experience. It is very important for the student to be in a friendly environment. Designing an office environment full of colors, places of relaxation and entertainment gives employees the opportunity to develop their creativity. Very important is the eye and the sense of observation. Its essence is to understand what is perceived and describe it later in a report (Liker, 2004). In another company, in the training department, computer rooms were redesigned, their walls were embellished with new colors and images, individually customized desks were provided for the employees, and soft music was played. The effect was stunning. The rate of training effectiveness increased by 90%.
4. **Sfumato** – the willingness to embrace ambiguity, paradox and uncertainty. Every future engineer should develop the capability of intuitive decision-making. In times of huge information development, we are not able to filter out the most important pieces of information, and that is why the development of intuition can never be overestimated. TRIZ offers so-called task estimates, i.e. tasks where most of the data must be predicted, predicting also the estimates of numerical values.
5. **Arte / scienza** – the balance between science and art. The human brain in the decision-making process works with a logical, orderly, artistic and creative approach. Henry Ford is a good example. He evaluated if, for example, the engine design was correct looking at the technical drawing and evaluating its aesthetics. He thought that the design that looked good would also be technically good. Practice has shown that he was right.
6. **Corporalita** – the cultivation of ambidexterity, good posture, grace and elegance of movement. Movement in professional and university life is very important for the human condition. Co-ordination exercises are of great importance for the brain flexibility and creative development. Thanks to the phenomenon of lateralization, ambidexterity favors even activation of both cerebral hemispheres. The opinion of contemporaries about Leonardo da Vinci was that "he used his whole head to think".

7. **Connessione** – the art of systems thinking. This method incorporates a comprehensive look at the problem. You can not remove a piece of the puzzle and then try to lay all together. Peter Senge in his book "The Fifth Discipline" focuses on teaching organizations, showing through different tools how to see the problem differently and how to perceive relationships between systems. A similar tool has also been developed by G. Altshuller, who called it "system operator". Every problem can be embedded in time: in the past, in the present and in the future, and in the second dimension as a system, supersystem and subsystem. This allows for a comprehensive understanding of the role and interoperability of the analyzed system with the environment and also for the perception of intra-system problems.

## TEACHING OF STUDENTS

Based on the most far-reaching educational experiences, it is possible to formulate the basic principles of modern education of students, especially at technical universities. In this respect, TRIZ turns out to be an almost ready-for-use tool. TRIZ – Pedagogy focuses on teaching teachers how to solve tasks and problems within the following three methodological groups:

- developing creative and innovative intuition - and since intuition evolves with experience and the number of projects and tasks accomplished, the instructor's experience is what really matters here,
- training with the use of non-standard task solving methods. TRIZ – Pedagogy is based on the general TRIZ methodology, which comprises a number of the specific methods and tools,
- using specific methods based on TRIZ customized tools and concepts, such as:
  - undesirable effect in the system,
  - innovative task,
  - system operator,
  - analysis of system resources,
  - the concept of contradiction, types of contradictions,
  - methods for eliminating physical and technical contradictions,
  - algorithms for solving innovative tasks (ARIZs),
  - functional analysis searching for system ideas to fulfil a function and optimize the system,

At the same time - in line with the practice of such institutions as MIT, Stanford University, Kaltech, it is necessary to strive for "contact with matter" and organize studies so that students can have the opportunity to make the technological and experimental facilities themselves and conduct research.

## **TRAINING IN TEAMS**

It seems that one of the negative human characteristics, which emerges especially when innovative solutions are proposed for implementation, is the low level of preparation for teamwork. In the formation of the right attitude towards the opponents can help the experience of Edward de Bono. (de Bono, 1985)

The ability to organize work, which includes planning, designing databases, recording, conducting experiments and working in groups, often causes problems for students. There are more and more individualists who can't accept a different attitude, subordinate to a group or lead it to success. The final result of the joint work should be the ability to present this result and discuss it in a wider forum. (А. ГИИ, 2015).

### **Experiment conducted in the course of studies in a technical college**

Two groups of senior students (the 4th year of studies - each group included 20 persons) from the Cracow University of Technology were given a task. One of these groups was undergoing TRIZ training at the 1<sup>st</sup> level of international certification, the other was not. The task was as follows:

*"I did not kill him - please Sheriff, believe me, you must believe me!" "My duty is to believe only facts" the sheriff answered. "And facts are against you. You were threatening Bolton this week, there are witnesses. Bolton was killed, Colt is the murder weapon. The same as yours. The bullet was not found, but our expert claims that it was the same caliber. What's more, you have no alibi". "But you must believe me!" said Nick with despair." I did not fire the gun, I swear it. You can see for yourself that my revolver is quite clean". "The murder took place two days ago. You had enough time to clean the gun."*

How to determine the time when the last shot was fired from the suspected weapon? In the group not trained in TRIZ principles, there was no one who could solve this task.

The solution is as follows:

To solve this type of task we have to perform the analysis of resources against the background of system operator. These are the material, field, time and information resources. Then we have to build a system operator.

<b>SUPERSYSTEM</b>		air, gravity, Earth's magnetic field, temperature, humidity in the air	
<b>SYSTEM</b>		Colt revolver	
<b>SUBSYSTEM</b>	barrel fully magnetized	barrel partly magnetized by Earth's magnetic field, drum, trigger, firing pin, spring of firing pin, handle	barrel demagnetized
	PAST Before shooting	TODAY When examined by the sheriff	FUTURE After shooting

**Fig. 2.** System operator

It is enough to exactly fill the system operator table to know that after shooting the barrel will be demagnetized, while barrel that remains at rest for a long time will be "fully" magnetized.

So, in the case under discussion, it was necessary to determine the degree of magnetization of the barrel (using a magnetometer or another improvised instrument) when the weapon was examined visually, fire a control shot and wait a few days until the weapon magnetization reached the same level as at the moment of the visual inspection. Since the shot causes demagnetization of the barrel, then the time lapse between the control shot and the moment when the magnetization level returns to the same value as on the day of the inspection will show the time lapse between the last shot and the moment of the inspection.

In the group trained in TRIZ, 16 students solved the task. The remaining four were not familiar with the effect of barrel magnetization in the magnetic field of the Earth and its demagnetization on firing the shot.

## CONCLUSIONS

The epoch of absorbing and memorizing information has gone forever. Under the present conditions it can have some significance only in learning foreign languages. Modern studies should be guided by a set of modern rules which assume:

- active involvement of students in the selection of didactic materials,
- the entire course of study subordinated to one leading idea - "to teach effective and adaptive thinking at all stages of the educational program",
- using methodologies tested and approved by the majority of countries and by large industrial and commercial corporations,
- awareness of the fact that today the leading methodology is the Theory of Inventive Problem Solving - TRIZ, and in the area of pedagogy it is TRIZ - Pedagogy,
- focus on experiments, especially on those planned and performed personally by students working in groups. The equipment used in the experiment should be made, as far as possible, by students (the exception is very sophisticated apparatus).

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# The customer – the unsung source of enterprise innovation

by

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## ABSTRACT

Nowadays, sharing knowledge has got a significant influence on the competitiveness of enterprises. There are many different ways to identify innovation development in enterprises – endogenous factors, knowledge sharing, clusters, international cooperation. But there is still one factor, which is able to contribute to the innovative development of the enterprises. This factor is the client.

In the economy, the customer is the buyer of goods (products) or/and services, who delivers income to enterprises. However, this is not the only role which the client can play for the enterprises. The aim of present article is to show that the client is also the source of knowledge about the products and/or services provided by enterprises, and also about expectations connected to them. In that meaning the client can be an exogenous source of an enterprise's innovational development.

The research consisted of two parts - a literature review as well as in-depth interview conducted in the Opolskie Region among the representative group of enterprises.

Results of conducted research allow to state that companies which have developed relations with clients can possess a lot of information which may help to develop not only offered products and/or services but also contribute towards innovation at the enterprise's level. The results of the presented research may contribute to due an application of the knowledge gained from clients towards using it for their competitive and innovational development

**Keywords:** innovations, enterprises' development, customer, sharing the knowledge

JEL: L17, L25, O33

## INTRODUCTION

Creating innovations is typically seen as the entrepreneur's role, to whom Schumpeter came to view as the primus motor of economic growth [Elert et al. 2017, p. 35]. In accordance to McGowan (1994) the creative activity, where strong emphasis is put on the idea of the innovative process implementation as well as is defined as “the constant process, which begins with noticing the chance and ends in making a decision about implementing this idea and accessing it to the accomplishment [Jasińska-Biliczak 2015, p. 79].

In some industries, innovation is largely driven by the users (customers) rather than by enterprises. This users' role is particularly common in industries that produce technical appliances and scientific instruments [von Hippel et al. 2011, p. 61]. The knowledge transfer is possible to identify as planned combination of knowledge and knowledge management for obtaining the economic profit [Gangeswari 2016, p. 569]. The knowledge transfer which takes place between the customers and the enterprises, is one of the ways of sharing the information and knowledge to develop the enterprise.

### 1. INNOVATION AS THE DRIVER OF ENTERPRISES' DEVELOPMENT

Innovation, from an economic perspective, is understood as the ability of an enterprise to creating and implementing new products and/or services. It is also understood as the ability to introducing new or modernized products, using new or changed technology or updated organizational and technical processes [Horizon 2020, p. 49]. Nowadays, in the literature, innovations are commonly associated with ICT and are one of the human development's factor [Blecharz & Štverková 2011, p. 374]. Innovations also may be defined in a variety of ways, by emphasising different paths or areas of impact [Hobday et al. 2011, p. 14]. Thus, the concept of innovation comprises:

- - the ability of developing products to meet the needs of the market,
- - the ability of using existing technology for products' development,
- - the ability of developing new products or updating existing products to meet the needs of the markets, and
- - the ability of acquiring new technology to create new opportunities [Rahmani & Mousavi 2011, p. 163].

The ability to providing the innovation can be described as an „ability of a firm to recognize the value of new external information, assimilate it, and apply it to commercial

ends” [European Commission 2013, p. 2]. Innovations are essential to organizational development, because they support economic growth [Štverková & Humlová 2015, p. 791]. Innovative activity of enterprises includes actions about research, scheduled, financial (investment), technical or organizational character. The innovative enterprise is leading own activity at the field of research and development, many times simultaneously with procedural planning, investment, implementing product and/or service innovations. In that meaning innovative activity can bring for enterprise triple effect:

- 1) activity successfully finished with implementing the new innovation,
- 2) current activity in the course of realization which did not lead so far to implementation of innovation,
- 3) activity discontinued before innovation implementing [Oslo Manual 2005, 114].

The crucial factors being able to support the improvement of enterprises' competitiveness are constant innovative actions, where, as the innovative activity, is understood the sequence of operations about scientific (research), technical, organizational, financial and commercial character. Its aim is drawing up and implementing the purpose of new or improved products and processes, which, in addition, are new at least from enterprises point of view [Kuriyan and Ray 2008, 103].

Irrespective of the understanding of the definition of the concept of 'innovation', there is no doubt that it remains an important measure of the economy, the status of the region and the enterprises placed in the region (Jasińska-Biliczak 2014, p. 119).

## 2. AIM AND METHODOLOGY

The study of the issue of the role of the customer in innovations in the enterprises as the specific way of initiating them are the article's aim. Research was conducted as the pilotage research at the example of Opolskie region in Poland.

For achievement of so stated aim there will be used the literature review from the scope of knowledge transfer, foreign investment and documents of bodies of the European Union (*desk research*). There was also undertaken the analysis of data corresponding to the high technology sector in Opolskie Region (*data analysis*) as well as the example of the knowledge transfer from that sector to region (*case study*).

### **3. CUSTOMER AS THE SOURCE OF KNOWLEDGE FOR THE ENTERPRISES - RESEARCH AND FINDINGS**

#### **3.1 Characteristic of analysed group**

Enterprises of the Opolskie Region took part in the questionnaire survey conducted anonymously by using the questionnaire form. 150 enterprises were evaluated, including 89 microenterprises, 23 small enterprises, 32 medium-sized enterprises and 6 big enterprises. In fact all enterprises answered all questions in the questionnaire form; this is related to the analysis of presented data collected from 150 enterprises of the Opole Province.

#### **3.2 Findings**

Consumption is the ultimate goal of production. In economics conditions products must meet the consumers' demand. The most demanding consumer (customer) function as particularly crucial sources of information regarding consumer (customer) needs and preferences. One of important entrepreneurial skill is thus identifying and cooperating with the customers' right [Elert et al. 2017, p. 49].

Literature points that the customer base itself is a valuable financial asset, and should be treated accordingly [Peppers 2014, p. 2]. Because of that the most difficult problems of any enterprise confronts when the enterprises tries to improve its customers' experience is reconciling the time and expenses required to deliver a better experience with the actual economic benefits of so improved experience.

For the enterprises customers create two kinds of value for the enterprises. Short-term value is created when the customer buys something, what is offset by the short-term cost to serve. But long-term value is created when the customer has got positive experience and becomes more likely to buy in the future products or services provided by the enterprise. Also the same value is created when the customer has recommend the company to family members, friends or colleagues. Thus, the customer may be the source of the information about the enterprises, but also for the enterprises – information about the products or services provided by the enterprises but also information about the customers' expectations for the future development of the enterprises.

Conducted research concerned identifications of ways and reasons of communications between enterprises and their customers as well as kinds of information which customers deliver to the enterprises.

At that base it was possible to formulate conclusions regarding the actions, especially innovations, which initiation was based at the knowledge delivered to the enterprises by the customers.

Beginning questions - after the question about the size of the enterprise - concerned the ways of communications with the customer used by the enterprise and the reasons on that communication – given answers are presented in the following table (Tab. 1).

**Tab. 1.** Ways of communications with the customer used by the enterprise and the reasons of that defined communication.

Size and number of enterprises taking part in research	Number of enterprises contacting their customers	Ways of communication	Reasons of communications of the enterprises with their customer*
Big – 6	6	Phone -5 Internet (e-mail) – 1 Other – 0	MC - 6 PN - 6 CC – 1
Medium-sized – 32	24	Phone – 10 Internet (e-mail) – 11 Other (direct client’s visit in the company) – 3	MC - 17 PN - 5 CC – 2
Small – 23	17	Phone – 11 Internet (e-mail) - 4 Other (direct client’s visit in the company) – 2	MC - 6 PN - 11 CC – 0
Micro – 89	21	Phone – 8 Internet (e-mail) – 1 Other (direct client’s visit in the company) – 12	MC - 4 PN - 16 CC – 1

\*Enterprises could give more than one answer; Legend:

Monitoring of their satisfaction from consumption – MC

Purposing of new products or services – PN

Customers’ claims - CC

Source: own research.

Only 45% enterprises indicated that they had contacted their customers – 68 from 150 with pointing that 100% of big enterprises, 75% of medium-sized, 74% of small and only 24% of micro- enterprises had declared so. Among the answers given by respondents it is possible to notice certain correctness: as bigger the enterprise as larger its knowledge about the role and meaning of contacting the customer. As the way of communication respondents pointed phone, Internet understood as the communication via e-mail and direct customer's visit in the company. And there it is also possible to notice certain correctness: as bigger the enterprise as often communicate its own customers via phone (83% of big, 31% of medium-sized, 47% of small and 9% of micro- enterprises) and e-mail (16% of big, 34% of medium-sized, 10% of small and only 1% of micro- enterprises), as smaller the enterprise as often has communicated its customers directly by the way of customers' visit in the company, including customers' claims, (none of big, 9% of both enterprises pointed: monitoring of their satisfaction from consumption (MC) - (100% of big, 43% of medium-sized, 26% of small, 4% of micro- enterprises), purposing of new products or services (PN) - (100% of big, 16% of medium-sized, 48% of small, 18% of micro- enterprises) and customers' claims (CC) - (20% of big, 6% of medium-sized, none of small and 1% of micro- enterprises). In that case the correctness is also certain: as bigger the enterprise as larger the knowledge about importance of customer's monitoring, purposing new products and/or services. As smaller the enterprise as often the contact was direct by the way of customers' visits in the enterprise, including their claims.

Further part of research concerned to the knowledge possessed by the enterprise from the customers. Its results are presented in the following table (Tab. 2).

**Tab. 2.** Number and percent of enterprises which had got additional knowledge from their customers and used it to their own innovation development.

Size and number (percent) of enterprises taking part in research/ Number (percent) of enterprises contacts their customers	Number (percent) of the enterprise got additional knowledge from customers (besides MC, PN, CC) and its kind?	Number (percent) of the enterprise which used that knowledge in their further functioning	Number (percent) of the enterprise which think that knowledge from customers let them undertake innovation actions
Big – 6 (100%) / 6 (100%)	2 (33%) – products	2 (33%)	1 (16%)
Medium-sized – 32 (100%) / 24 (75%)	12 (37%) - products, selling process	3 (9%)	2 (6%)
Small – 23 (100%) / 17 (73%)	7 (30%) – how can be the product useful by changing it	4 (17%)	1 (4%)
Micro – 89 (100%) / 21 (23%)	14 (16%) – mistake in the product, changing the way of servicing the client	3 (3%)	2 (2%)

Source: own research.

Research allows to point that 6% of big, 75% of medium-sized, 17% of small and 23% of micro- enterprises contacts their customers and 33% of big, 37% of medium-sized, 17% of small and 14% of micro- enterprises has got additional knowledge, besides MC, PN, CC, from them. Analyzed enterprises pointed that customers shared with them the knowledge about enterprises' products, selling process, how to change the product to make it useful in other way, about the mistake in the product as well as changing the way of servicing the customer. Some enterprises - 33% of big, 9% of medium-sized, 17% of small and 4% of micro- enterprises - found that knowledge useful for own development and used that knowledge in business practice. Some of enterprises - 16% of big, 6% of medium-sized, 4% of small and 2% of micro- enterprises – pointed that thanks so possessed knowledge from customers they had the possibility to begin the innovation in their company.

Research allows to state that “knowledge transfer is the conveyance of knowledge from one place, person or ownership to another.” [Liyanage, et. al. 2009, p. 37]. Moreover, besides the differences at the level of number of the enterprises which declared contacts with their customers, possessed knowledge and reasons of that contacts connected with the size of the enterprise, it is possible to point, that all enterprises used the knowledge possessed from their customers used it to innovate the enterprise. The correctness pointed previously, concerned the size of the enterprise, as bigger the enterprise as higher the percent of innovation actions undertook at the base of knowledge possessed from their customers – 16% of big, 4% of medium-sized, 4% of small and 2% of microenterprises.

Conducted research, based at regional data, also corresponds to the domestic scale research (GUS 2016) as well as to the international research focused on innovations in many forms – not only on the behavior of firms, but whole societies (Vokoun 2016, p. 116) or regional disparities (Uramova & Koziak 2008, p. 12). Research may be the supplement of the knowledge about the innovations led by the enterprises as well as the knowledge about the way of possessing by enterprises information about the possible ways of changing them by themselves and products and/or services provided by them.

## CONCLUSIONS

Enterprises should possess their knowledge from different sources. The customer should be one of them. Nowadays the knowledge possessed from the customer is still not undervalued source of knowledge for the enterprises. Research allows to state, that enterprises are possessing additional information from their customers by the way of communicating them because of reasons, which the enterprise points as reasonable for it. All enterprises are using that knowledge for their development.

So the conclusion is that enterprises should develop their contacts with customers and analysing all information possessed this way.

The final conclusion regards the recommendations on supporting the enterprises in the form of knowledge transfer from customers. It would be worthwhile verifying, establishing and organizing their own teams contacting customers and possessing from the additional information about the company, offered products and/or services as well all any additional information they can provide to the enterprise.

So leading the monitoring of relations with customers, asking and/or answering them not only about things, which are interested from enterprises' point of view, but also let them to share

their feeling and ideas about the enterprise, its product and/or services, or just any information about the enterprise and its surrounding they want to share. That knowledge may be the potential way to get the knowledge to potential innovation development of the enterprises.

Also supporting the smallest enterprises, in their way to innovation and growth, there should be recommended, especially to local and regional authorities, the actions having at its aim development of contacts of the smallest enterprises with their customers.

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**Session:**  
**Psycho-social, economic and educational aspects  
of ICT innovation**

Session Co-Chairs:

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# **Increasing the innovation potential of companies by human resource development in international corporation**

by

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## **ABSTRACT**

The aim of the paper is to investigate human capital development and present the results in the context of the innovation increase that takes place in international corporation. Entities working in an international environment are important for the regions where companies are located due to the possibilities of transferring knowledge and experience, which have significant value for business areas.

The objective of the study was carried out based via a literature review of human resources, development of human capital and innovation of international enterprises. The practical aspects of the study subject were illustrated via a case study which describes the instruments and possibilities of human resources development which affect the innovation of international business. The problem was also mentioned in the literature (Kowal, Jasińska - Biliczak A & Hafner 2016).

After this analysis it is possible to indicate that activities aimed at the extension of opportunities related to the development of the area of human capital have a positive impact on knowledge transfer, which is the base of innovation. It increases the attractiveness of the region where an enterprise is located. The working area of innovative entities attracts qualified workers and consequently new investment.

The results of the study will be applied as a pilot investigation in the preparation of a scientific thesis. The thesis concerns knowledge transfer which takes place in enterprise entities connected with international environments and located in the Opolskie region. The pilot study was carried out based on an analysis of cases of knowledge and experience transfer which took place in an entity located in the Opolskie region and were directly connected with international corporation.

**Keywords:** innovation, human resources, international corporation

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[http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2824602](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2824602)

# **Modernization of the management system in self-government administration, as part of the implementation of the Smart Governance policy on the example of Siedlce and Ostrołęka**

by

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## **ABSTRACT**

Smart Governance is one of the key areas for the development of the Smart City concept. It is a sector in which citizens participate in decisions about urban development. Smart Governance improves the quality of public and social services, and by using state-of-the-art technologies, enables the implementation of electronic Services that enhance the capacity of local government. The evaluation will be conducted by the municipal authorities of Siedlce and Ostrołęka in terms of strengthening the potential of the Commune of the City of Siedlce and the Commune of Ostrołęka the functioning, quality and availability of public services. The evaluation also concerned the improvement of the competence of employees in the use of the Internet for the provision of public services. The aim of this article is to analyze the "Efficient Office" program implemented between 01.02.2014 and 18.09.2015 jointly by the City of Ostrołęka and Siedlce.

**Keywords:** Smart Governace, Smart City, E-Services, ePUAP, Siedlce, Ostrołęka, Poland.

## **INTRODUCTION**

The development of the Internet and its gradual dissemination have created opportunities for the use of modern software to solve current problems related to the functioning of modern cities. People living in cities expect that large cities will have access to a wide range of highquality services.

The priority of each city's development should be to constantly improve the comfort of its inhabitants. This is a common goal that should be implemented in every city, regardless of its size and resources (Szoltysek, 2016).

Roman Modernization of the management system in self-government administration, as part of the implementation of the Smart Governance policy on the example of Siedlce and Ostrołęka

As the agglomeration grows and expands, problems related to urban space management become more and more complex. City leaders in response to current challenges are looking for ever-smarter ways to deal with them. (Nam, Pardo, 2011).

One of the possibilities for dealing with the problems that affect modern cities is the use of modern technologies to improve basic administrative services. The development of modern information and communication technologies has largely enabled communication between the various participants in the global Internet.

The use of these new technologies to realize the tasks connected with the implementation of electronic services in the Polish cities is an important challenge. This article analyzes the report on the implementation of "Efficient Office" program, which was made available by the city council of Siedlce. The publication also outlines the essence of Smart Governance as one of the core components of the Smart City concept and outlines the benefits of implementing the Electronic Platform for Public Administration Services (ePUAP) in the analyzed cities.

## **DEVELOPMENT OF SMART GOVERNANCE IN POLAND**

Smart Governance is widely regarded as one of the elements of the Smart City concept, whose core is the active participation and commitment of the residents in determining the direction of the development of modern cities.

Smart Governance is a complex operation in which the main stakeholders (residents, entrepreneurs, local politicians, officials) actively contribute to the city development.

The implementation of Smart Governance may involve activities in areas such as:

- Integrated urban space management to continuously improve the quality of provided services,
- Cooperation between individual urban units to improve the quality of services provided to residents through the use of available technology and IT solutions,
- The active involvement of the inhabitants who participate in the city's decisionmaking process,
- Increasing transparency by sharing with residents information about actions taken and decisions taken.

The main goal of Smart Governance is to develop a city management system based on the active role of its residents. In this approach, the city is increasingly focusing on the

inhabitants, their needs and requirements, and the achievement of the goals of supporting the development of social capital, involving citizens in the decision-making process or supporting civic initiatives. (Morawska, Wawrzyniec 2015).

These processes are supported by the use of Information and Communications Technology

(ICT), which enable (European Parliament, 2014)

- Create data, information about people and organizations,
- Rebuilding the relationship between public administration, the private sector, public benefit organizations, the community and the residents.
- Ensure synergy between urban policy implementation and intelligent systems.

Meijer and M. P. Rodriguez Bolivar have published an article reviewing the Smart City Governance research work, where they made recommendations for research in this area.

In their work they have made a number of recommendations for Smart Governance research areas, which are primarily focused on: (Meijer, Rodriguez-Bolivar, 2016)

- Defining the concept of intelligent city management as a current socio-technological problem. The authors have shown that in the current literature there are no adequate studies that deal with the correlations between technological and social factors in the aspect of intelligent management.
- Concentration on the transformation and behavior of city management units. In the current literature, there is a lack of exploration of the relationships between the transformations of organizations and the conservation of organizations and institutions. Therefore, it is necessary to investigate whether this type of dependence exists in the case of Smart City,
- Analyzing the degree of involvement in the development of society. Another important research issue of Smart Governance is the impact of smart governance practices on urban growth in cities. It is possible to explore how the implementation of Smart Governance contributes to,
- Analyze the politics of smart city governance project development. The current review of scientific publications indicates that Smart Governance is currently only considered in the context of the use of modern ICT and other urban management issues., therefore It is necessary to place more emphasis on the analysis of the policy leading to the particular technology in its use for intelligent management.

Smart Governance is a new and constantly updated subject, which raises the interest of many researchers. As indicated by the research conducted by Meijer, Rodriguez-Bolivar there is a need for further research in this area.

## **METHODOLOGY OF RESEARCH**

To assess the degree of implementation of the Smart Government concept the source document analysis method was used, which was received from the city of Siedlce on December 16, 2016. The study also included an analysis of literature and data available on the websites of the Siedlce and Ostrołęka city office.

The aim of this article is to identify and evaluate the practices undertaken by the City of Siedlce and Ostrołęka in the area of Smart Government. This article focuses on the "Efficient Office" project implemented in the years 01.02.2014, which focused on strengthening the capacity of both cities to improve the functioning, quality, and availability of public services.

## **ANALYSIS AND EVALUATION OF THE PROJECT EFFICIENT OFFICE**

The "Efficient Office" project is a partnership initiative of Siedlce and Ostrołęka, co-financed by the European Social Fund, which was implemented under the Human Capital Operational Program, Priority V, Good governance, Measure 5.2 Strengthening the capacity of selfgovernment administration, Breakdown 5.2.1. Modernization of management in selfgovernment administration, whose implementation was completed on 18 September 2015.

The project was aimed at enabling residents to carry out administrative tasks using the Internet. Under E-government, we can understand the use of new technologies to provide citizens with access to public services provided through online access. (Budziewicz-Guźlecka)

Studies on the level of E-government development in Poland indicate that in 2008 only 2% of all services were available electronically (Banasikowska, Banasikowski, 2008). According to the report of the Supreme Chamber of Control in Poland, despite the many investments made in the field of electronic services in public administration, the level of their use was low (2016). In 22 out of 24 offices controlled by the institutions, as a basic way of documenting and implementing public affairs Paper form is indicated.(Najwyższa Izba Kontroli, 2015)

The development of e-government solves many organizational problems by introducing following solutions: (Kasprzyk, 2011)

- Possibility of settling official affairs and checking the status of their realization by using the internet,
- Significant reduction of waiting time for the resolution of an official matter,
- Introducing larger facilities for people with disabilities and reduced mobility,
- Limit quantities of databases to one central system, which will reduce the access time to information.

The "Efficient Office" project was implemented in a partnership between the city of Siedlce (leader) and the city of Ostrołęka (partner). The project was managed by a steering group consisting of selected representatives of both urban centers.

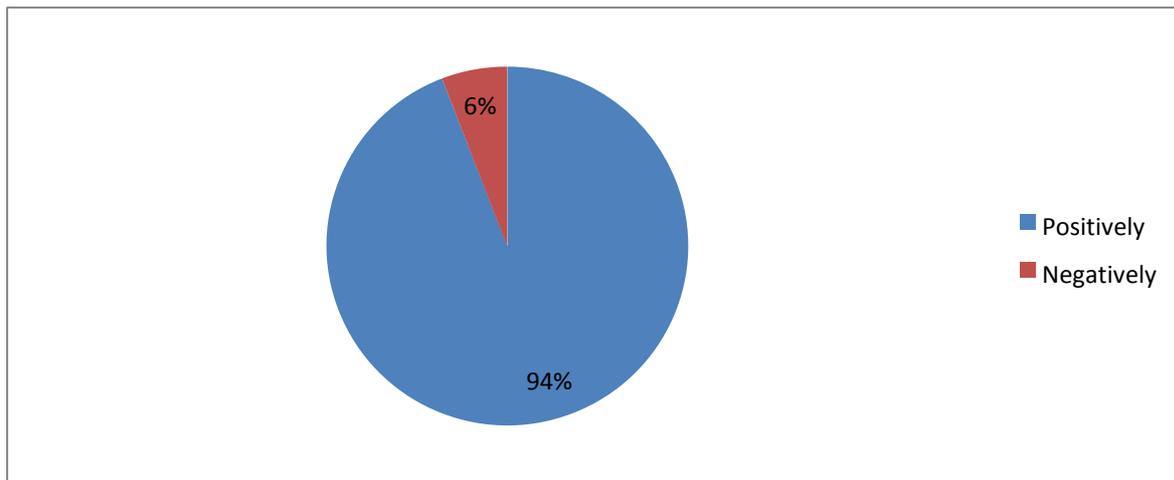
In order to assess the project's expected results and to assess the risks and to respond to them on an ongoing basis, measures were taken to continuously assess the progress of the activity.

These mechanisms will allow for continuous monitoring, collection, and processing of data for subsequent analysis. One of the aims of the project was to increase the potential of the Municipalities of Siedlce and Ostrołęka in the area of improvement and quality of access to public services. In the assessment of the performance of this indicator, the competence of the employees of local government units and voivodeship government administration in the aspect of providing public services by e-mail was measured.

One of the aims of the project was to strengthen the potential of the Municipalities of Siedlce and Ostrołęka in the area of improving the quality and availability of public services. The assessment of the implementation of this indicator was made by measuring the competence of employees of local government units in the aspect of providing public services by electronic means. Training was then provided to all employees to increase their skills in providing services to the residents. Within the framework of the "Efficient Office" project, a survey was conducted in the municipal offices in Siedlce and Ostrołęka in the period March-June in a sample of 902 people.

The aim of the research was to learn about the opinions of the residents on the changes made in the offices regarding the potential benefits of office digitization, the improvement of the quality of the services provided or the availability of e-services.

Figure 1 shows the percentage distribution of the obtained results.



**Fig 1.** Program „Efficient Office” and office digitization, customer service quality, E-Services availability.

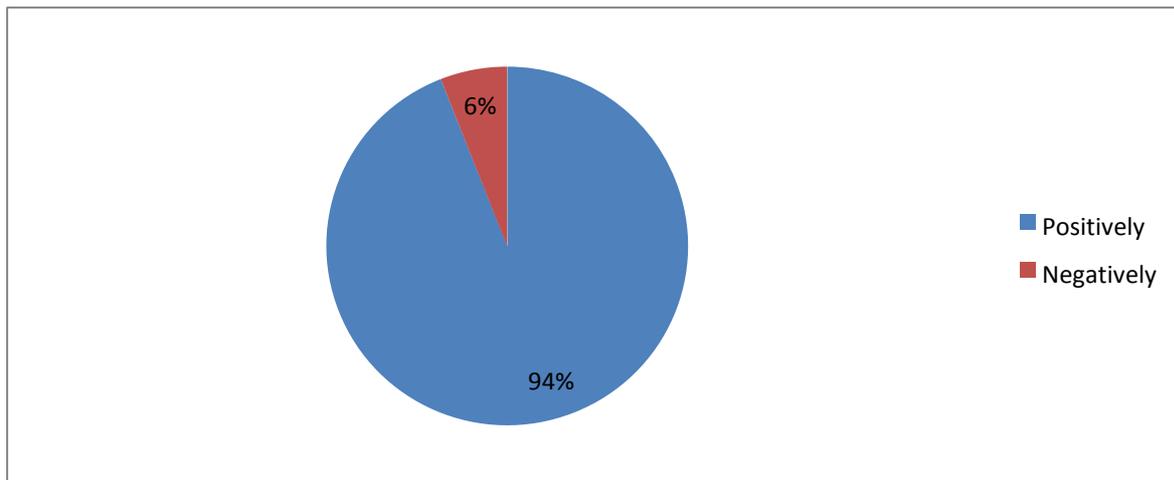
Almost 849 respondents (94,12%) positively assessed the changes that took place in the above-mentioned offices after the Implementation of the project "Efficient Office", the opposite opinion was 53 respondents.

The obtained results indicate that through the implementation of the "Efficient Office" project, the realization of the specific objective of the realized task could be realized in terms of strengthening the potential of both cities in the aspect of providing services by electronic means. The vast majority of respondents in Ostrołęka and Siedlce are experiencing improvement in the quality of E-Services or increase their availability.

The inclusion of large financial, organizational or modern technology can have a positive impact on the level of public administration services through online channels. In order to increase the use of the Internet for the implementation of basic urban services, it is also necessary to increase the awareness of the inhabitants and to promote this form of service in municipal offices. In Siedlce and Ostrołęka, this was achieved through the organization of information seminars with citizens, where citizens could speak in the discussion, raise their comments and suggestions on the planned and implemented projects and actively participate in the creation of city policy.

The questionnaire survey was used to assess the awareness of the clients of the municipal offices. Exactly 902 people had to answer the question, "Do you acknowledge the increase in e-government awareness?"

The results are shown in Figure 2.



**Fig 2.** Program „Efficient Office” and office digitization, customer service quality, E-Services availability.

The figures in Figure 2 show that the actions carried out by the municipalities under the "Efficient Office" program have made it possible to increase the awareness of the public about the use of public services online.

In this aspect, it is also important to take care of the competence of urban officials in order to increase the level of dissemination and use of e-services in public administration.

Smart Administrator should have the ability to work with people, active involvement of citizens in city affairs and have competence in social communication, big data and data security competencies(Vinod Kumar, 2015). Under the program "Efficient Office" 322 employees of local government units were trained. 286 out of 322 employees (88, 81%) have confirmed that participation in this type of training has increased their knowledge and skills in the use of modern IT solutions implemented during the process of providing official services electronically.

Another important goal was to increase the number of public services that are provided by local government units. The number of electronic services launched in the analyzed cities was chosen as the indicator of the measure of the achievement of this goal. As part of the implementation of this goal, the Electronic Platform for Public Service Administration (ePUAP) was implemented in Siedlce and Ostrołęka.

This solution allows residents and local businesses to handle many official matters by electronic means. By using the ePUAP platform, citizens submit and send their request at any time and from anywhere. The main reasons for implementing the ePUAP system in Poland are focused on(Drobiazgiewicz, 2012)

- Enabling citizens, local businesses and other entities working with the office to benefit from a secure and modern channel of access to urban services,
- Reduce costs for access to information and speed up processing,
- Reduction of costs related to the functioning of public administration,
- Creation of interoperability of informatic systems in processes performed under public tasks for all entities.

The "Efficient Office" program also enabled the implementation of IT solutions whose main purpose was to increase the use of electronic administrative services.

Within these activities in Ostrołęka and Siedlce, a Confirmation of Trusted Profiles was created, procedures for using this system were created and training was provided for platform administrators and their current handlers.

Under the "Efficient Office" program, the number of profiles established in relation to the number of personal ID cards issued in 2012 was examined (Ostrołęka 4339, Siedlce 6755).

As indicated by the data obtained from both offices in the period 24 October 2014 to 18 September 2015 in Ostrołęka City, 539 profiles were set up in that period, with 4339 issued in 2012 proving the rate of implementation of the assumed index at the level of 12.42%. In Siedlce, 867 trust profiles were established, with 6755 issued evidence showing a target achievement rate of 12.83%.

Within the framework of the implementation of the "Equal Opportunities Policy", the aim was to provide all residents with access to the services they were implementing.

- Promoting e-Services among residents,
- Increasing the level of knowledge and skills of employees in the use of IT systems,
- Implementation of the e-Government service package,
- Carrying out automation processes for e-Government services provided to residents,
- Activation of Trusted Profiles.

The surveyed cities focused their efforts on ensuring that all residents had equal access to information within the ePUAP system. Promotion of this service was made through the creation of publications in the local press, the emission of advertising spots and advertising with billboards and leaflets.

Within the framework of the "Efficient Office" program, each employee was provided with the opportunity to access training in the provision of urban services electronically. The

locations where the credential creation points were located were adapted to the needs of the people with reduced mobility and with disabilities.

## CONCLUSION

The growth of the Internet and the gradual increase in the use of new technologies among the public bring new opportunities for public service delivery. Access to the funds from the European Union enabled the city to modernize its city infrastructure and implement solutions to promote the use of ICT in public administration.

The "Efficient Office" project is an example of an initiative realized in collaboration between two cities – Siedlce and Ostrołęka. The analysis of the data included in the report from the "Efficient Office" project indicates that the project was implemented in accordance with its timetable.

According to the representatives of the analyzed cities, the main difficulties in implementing this project focused on dependence on the external application of ePUAP, which was fully independent. Any flaws, modifications to the platform directly impacted on the project. Another problem was the simultaneous implementation of ePUAP2 in Poland, which significantly contributed to the complications and delays in the implementation of the project.

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# Decision-making participation and age among MIS users in the Polish Army

by

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## ABSTRACT

The purpose of the research was to find the subjective determinants of decision-making participation among military leaders of the Polish Army – management information systems (MIS) users. We were interested in collectivism, individualism and the locus of control in young and middle-aged military leaders.

We used three questionnaires in our research. We used “The Problem Set”- SET (by Mączyński, 1988, based on Vroom-Yetton, 1973), to assess what the decision-making style the participant prefers. The I-E Scale (elaborated by Gliszczynska, 1990, based on Rotter, 1962, 1966) was employed to diagnose the locus of control. The third questionnaire, KIRH (prepared by Adamska, Retowski, and Konarski, 2005), measured collectivism and individualism. The research sample consisted of 168 randomly selected military leaders from military units in the Lower Silesia region. The study involved military leaders (managers) serving as officers in command positions, such as unit commanders, deputy unit commanders, platoon leaders, divisions, department chiefs, and section commanders.

The main research questions concerned the levels of collectivism, individualism and the locus of control and their effects on the participation in decision making among military leaders in relation to age.

Our findings showed a greater willingness to use participative leadership styles among military leaders. The older military leaders manifested higher egalitarian collectivism and internal locus of control compared with young ones. Young military leaders more often declared authoritarian leadership styles and hierarchical individualism.

Our findings broaden the existing knowledge of the participatory decision-making process in the modern military.

**Keywords:** individualism, collectivism, hierarchical, egalitarian, model of decision-making participation, military psychology, psycho-social conditions.

## **INTRODUCTION**

The problem of participation becomes increasingly popular, especially in economic sciences (Moczulska, 2011; Chyłek, 2011; Ignyś, 2014). Including participation into an organization results in the raising the economic efficiency of the organization (Ogbeide, Harrington 2011; Skorupińska, 2004; Szelągowska-Rudzka, 2011, 2014). It creates the possibility for meeting the higher ranks' needs for subordinates (Mendel, 2001; Wratny, 2000; Kożuch, Jończyk, 2011). Participation also leads to trust and tolerance (Weber, Weber, 2001) and helps to resolve organizational conflicts through negotiation (Yeatts, Hyten, 1998). It contributes to increasing employer knowledge of employees (Allen, Lucero, Van Norman, 1997) and develops the effectiveness of decision making (Vroom, Yetton, 1973; Vroom, Jago, 1988).

The main purpose of the research is to detect subjective determinants of the participation in the decision-making process among young and middle-aged military leaders – MIS users - in the command processes in the Polish Army. These determinants comprise hierarchical collectivism, egalitarian collectivism, hierarchical individualism, egalitarian individualism as well as the locus of control.

The role of a military leader as a management information system (MIS) user is to focus on the organization's information and technology systems in the army. Military MIS users analyze organizational and business problems and then use, or design or maintain computer applications to solve the organization's problems. Such kinds of activities require an effective participation in the decision-making process.

## **DECISION-MAKING PARTICIPATION AND LEADERSHIP STYLES**

Decision-making participation is broadly based on "exerting influence on a partner that is the opposite of unilateral decision-making" (Wratny, 2000, p. 15). It is closely related to the style of people's leadership. A leadership style refers to all relatively durable and purposeful

ways a manager uses to influence his employees in order to motivate them to perform their tasks (Mroziewski, 2005).

Our research methodology is based on the model of decision-making processes in the context of relationships, from Victor Vroom, and Philip Yetton (1973), and Victor Vroom, and Arthur Jago (1988). The authors identified the following leadership styles characterized by the participation of employees in the decision-making process:

- a) purely autocratic (AI) - the manager himself decides on the basis of the information,
- b) autonomy (AII) - the manager also makes the decision himself, but after gathering information from employees without explaining to them the substance of the problem,
- c) consultative (CI) - the decision-maker precedes the decision-making by the discussion of the problem with the staff individually in order to know their opinions and suggestions,
- d) purely consultative (CII) - before making a decision independently, the manager meets with all employees to discuss the issue in a group,
- e) total participation (group, democratic) (GII) - decision is taken jointly (in a group) by the superior and his subordinates.

## **PARTICIPATIVE BEHAVIOR VERSUS COLLECTIVISM AND HIERARCHICAL AND EGALITARIAN INDIVIDUALISM**

The model by Harvey Triandis and Michele Gelfand (1998) was the theoretical basis of the KIRH method used in this research. The KIRH method was employed to identify the individualism and collectivism in their hierarchical and egalitarian aspects (Triandis and Gelfand, 1998). Individuals perceive the social world as a collection of independent human beings, basing their self-esteem on successes in the struggle in gaining concrete resources. An individualistic approach implies the principle that everyone is responsible for himself. (Clark, Powell, and Mills, 1986; Clark, Powell, Oullette, and Milberg, 1987). If we take into consideration decision-making styles in the context of individualistic orientation, we can assume that officers with an individualistic orientation can choose authoritarian decision-making styles more often. Collectivistic orientation, in turn, is connected with thinking that the individual is a part of a larger social whole. The group is a value for collectivists, including the acceptance of the members of their group, respect for group rules, fulfillment of social roles and the co-responsibility (Reykowski, 1994). Therefore we believe that officers

with a collectivistic orientation will be more likely to choose participatory decision-making styles of a consultative nature.

## **PARTICIPATORY BEHAVIOR AND THE LOCUS OF CONTROL**

Another subjective factor that can influence the choice of participatory or authoritarian behavior by military leaders is the locus of control (LOC). The LOC affects the way decisions are made, from the issuing of orders to posting. This construct, the locus of control, elaborated by Julian Rotter (1966), describes the subjective convictions of people about the influence of individuals (internal control) or external situations (external control), on what they encounter.

Research on the locus of control and decision-making relationships show that managers with an internal locus of control, tend to prefer consultative decisions rather than group collective opinions, and tend to make the final decision on their own (Rotter, 1966). However, the impact of the locus of control on participatory decision-making styles among military leaders has not yet been verified. Therefore, we decided to explore this issue.

## **DEVELOPMENTAL DETERMINANTS OF DECISION PARTICIPATION**

Previous studies on decision participation did not take into account the developmental aspects of this issue. Therefore, we conducted our research in relation to age dividing the participants into two groups: a younger group and an older one. Participants in the study were either in early (young) adulthood (23-35 years old) or in middle-aged adulthood (36-52 years old). According to developmental psychology, they were in different stages of development with slightly different developmental tasks (Gurba, 2011).

## **EARLY ADULTHOOD AND DECISION PARTICIPATION**

Early adulthood, according to Robert Havighurst (1981) and Eric Erikson (1997), assumes a particular model of life related with a quick marriage, and mainly focused on family and intimate and friendly relationships and not on professional development. Meanwhile, some authors (e.g. Arnett, 2002; Gurba, 2011; Oleszkowicz, Senejko, 2013), doubt the validity of Havighurst's model. At present, young adults are more focused on self-development, improvement and taking action that makes their CVs attractive to potential employers (Arnett, 2002). During adulthood, a person typically achieves maximum physical strength. The level of energy at his/her disposal and his/her ability to mobilize is now at its

highest point. This gives young people the opportunity to cope with a multitude of tasks and challenges (Bee, 1998).

Young military leaders, in view of the nature of their work, often change their place of work and have to adapt to new conditions and social systems, not only in their military unit. The need to establish new relationships develops a sense of being an authority for subordinates. This might not encourage the use of participative decision-making styles by officers at their development at the early adulthood stage. Therefore, we assume that facing all of the above-mentioned tasks favors the tendency to use less participative and rather more authoritarian styles of decision making among young officers.

### **MIDDLE ADULTHOOD AND DECISION PARTICIPATION**

Middle (average) adulthood is one of the longest stages in a person's life, extending from 35 to 60 years of an individual's life (Appelt, 2004). The developmental tasks pertaining to the middle-aged adults can be divided into two groups – the first one related to the fate of others: their own children, pupils, co-workers, subordinates and the second one – concerning taking care of their own personal and professional development, as well as managing and taking responsibility for it (Havighurst, 1981; Erikson, 2002). During this period, people have the greatest influence on their social environment and become natural leaders in their communities (Havighurst, 1981). Middle adults, feel greatest responsibility for their social fate, occupying the highest positions in the structures of power. In the middle adulthood, professional activities usually result in the promotion or consolidation of their positions in the workplace (Bee, 1998).

A willingness to share their achievements and educate a successor in the workplace can make officers at this stage of life more likely use the participatory styles of employee management. Especially in military organizations that aim to ensure the safety of citizens, managers should feel a greater responsibility for their decisions. As a result, there should be a growing awareness of the value of feedback from colleagues and subordinates, which may lead to a more frequent selection of participative targeting styles, especially among soldiers of a middle age.

**SUBJECT OF STUDY:**

Previous studies on the evolution of management styles in the context of decision-making were conducted among military leaders in the business world, but not in the army (Vroom and Jago, 1988; Mączyński, 1996). The military, with its own system of hierarchy, is a very interesting field of research for the styles of participatory decision-making used by people in leadership positions.

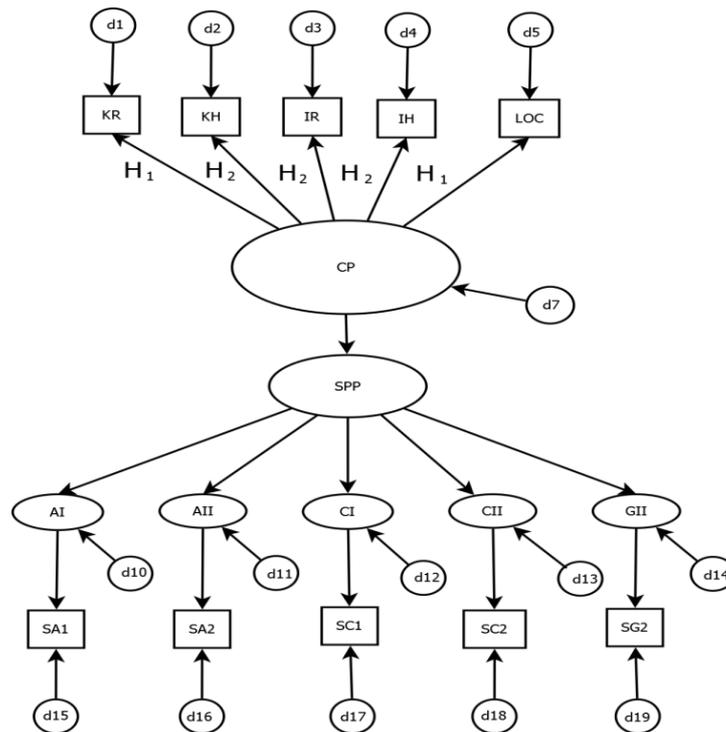
The research questions that have been put forward are as follows:

1. Are there differences between the two age groups of military leaders in the selected subjective factors and in the readiness to use autocratic or participatory decision-making styles?
2. What are the relationships between the subjective factors and the willingness to use autocratic or participatory decision-making styles in the surveyed age groups?

Therefore, the following hypotheses were made:

- H1.1. Military leaders of a middle age are characterized by the choice of more participatory decision-making (CI, CII, GII) as compared to those of young adulthood.
- H2.1: Military leaders who are characterized by egalitarian collectivism (KR) and of an inner locus of control (LOC), display more willingness to use participatory management styles (CICII, GII).
- H2.2: Military leaders characterized by: hierarchical collectivism (KH), egalitarian and hierarchical individualism (IR, IH) - have more willingness to choose an authoritarian style (AI, AII).

The theoretical model is shown in Figure 1.



**Figure 1.** Theoretical model of the research

In the described model, participatory decision-making (SPP) is a dependent variable. SPP manifests by its coexisting five dimensions that are the styles of decision-making from the most autocratic (AI, AII) to group-oriented (CI, CII, GII). The independent variable is a subjective factor (CP) with its sub-dimensions as a locus of control (LOC), individualism hierarchical (IH), individualism egalitarian (IR), collectivism hierarchical (KH), and collectivism egalitarian (KR). The model was used in two of the above-mentioned age categories of the surveyed officers.

### TEST PROCEDURE AND TEST SUBJECTS:

The research was conducted in ten military units in Lower Silesia in Poland.

The subjects were military leaders such as: unit commanders, deputy commanders of the unit, commanders of subdivisions at the platoon level, heads of divisions and sections of at least two people.

The study involved a total of  $N = 168$  people. 46.43% of the respondents had a higher education, 49.41% were in the corps of officers, and 50.60% were in the corps of non-commissioned officers. 74.40% work for a sub-unit, while 25.60% were staff (Table 1.).

<b>Variables and categories</b>	<b>Quantity</b>	<b>Percent</b>
<b>Age in years: mean 36.5, standard deviation 6.42</b>		
19-27	6	3.57
27-34	57	33.93
34-41	60	35.71
41-48	40	23.81
48-56	5	2.98
<b>Gender</b>		
Male	163	97
Female	5	3
<b>Education</b>		
Secondary education Civil	24	14.29
Secondary education Military	9	5.36
NCO training course	41	24.40
Other secondary school education	2	1.19
Master's degree Civil	36	21.43
Master's degree Military	42	25
Education officers course	12	7.14
Other higher education	2	1.19
<b>Military body</b>		
Officer	80	47.62
N.C.O.	85	50.60
Serial	3	1.79
<b>A place of service to soldiers</b>		
Sub-unit military	125	74.40
Military Staff	43	25.60

**Table 1.** Sample Characteristics (N=168)**METHODOLOGY:**

The following methods were used:

1. ***Set of Hypothetical Decision Problems (SET 5)*** (Problem Set), edited by Victor Vroom and Phillip Yetton (1973). A Polish adaptation was designed by Jerzy Mączyński (1998). This is a method for determining a person's preferred decision-making style. The method consists of a set of thirty one-page scenarios for decision-making. The military leader chose his decision-making style by marking the appropriate answer.

The level of decision participation can be determined on a quantitative scale. The level of participation (SPP) indicates the willingness to participate in decision-making. In the presented studies, the reliability of the "SET5" method of measuring the SPP was Cronbach's  $\alpha = 0.88$  ( $N = 168$ ).

2. ***Questionnaire to measure egalitarian and hierarchical collectivism and individualism (KIRH)*** – edited by Harvey Triandis (1995) and in the free Polish adaptation of Krystyna Adamska, Sylwiusz Retowski, Roman Konarski (2005). The KIRH questionnaire consists of 39 statements to which the participant relies on a seven-level scale to determine to what extent the statement relates. The global results of KIRH was calculated as the sum of scores obtained from the four scales (sub-dimensions): IR- egalitarian individualism; KR: egalitarian collectivism; KH: hierarchical collectivism; IH: hierarchical individualism (Table 3.). The Cronbach reliability coefficients for the above mentioned scales were respectively: KH - 0.73, IH - 0.78, IR - 0.71, KR - 0.72.

3. ***I-E Scale in Work***, edited by Xymena (1981, 1990), to measure the locus of control at work. The I-E Scale Labor test contains instructions and 25 pairs of forced-choice statements. Each item contained two sentences (a and b). The military leaders indicated which sentence suits them better (Table 3).

<b>Dimensions of SPP</b>	<b>Dimension – Latent Directly Non-observable Variable Name</b>	<b>Observable Measured Variable – Sum of Points</b>	<b>Interpretation</b>
Authoritarian Style	AI	SAI	a) purely autocratic (AI) – the military leader alone decides on the basis of the information available,
	AII	SAII	b) almost autocratic (AII) – the military leader decides, but after gathering information from employees without explaining the nature of the problem,
Consultative Style	CI	SCI	c) partially consultative (CI) – a decision is preceded with a discussion of the problem individually with employees in order to know their opinions and suggestions,
	CII	SCII	d) purely consultative (CII) – before making an independent decision, an officer meets with all employees to collectively discuss the problem,
Participatory, Democratic Style	GII	SGII	e) totally participatory (Bang, democratic) (GII) – a decision is taken collectively (groups) by the military leader and his subordinates.
	All items are measured as sums of points given by respondents		

**Table 2.** Dimensions of SPP (Adapted by Mączyński, 1996)

Dimension - Construct	Observable Measured Variable – Sum of Points	Examples of Items - Statements
CP	KIRHIR	IR: egalitarian individualism - examples of statements: <i>You have to live your life independently of the others.</i> <i>What happens to me is my own business.</i>
	KIRHKR	KR: egalitarian collectivism - examples of statements: <i>I like to share information with my neighbors.</i> <i>The success of my co-workers is important to me.</i>
	KIRHKH	KH: hierarchical collectivism - examples of statements: <i>Usually, I do what pleases my family, even if I hate what I'm doing.</i> <i>Usually I sacrifice my own interests for the interests of my group / team.</i>
	KIRHIH	IH: hierarchical individualism - examples of statements: <i>It is important for me to do my job better than others.</i> <i>I am pleased to work with other demanding competition.</i>
	I-E LOC	I-E locus of control- examples of statements <i>Man can achieve a lot without a favoritism.</i> <i>Our career path depends from favoritism.</i>
All items are measured as sums of points given by respondents.		

**Table 3.** Constructs of: KIRH - by Krystyna Adamska, Sylwiusz Retowski and Roman Konarski (2005) and I-E by Gliszczyńska (1981, 1990).

## FINDINGS:

In order to show the numerical characteristics of the variables from the model, first the basic descriptive statistics were calculated (Table 1).

	Group Total			Group of Middle-Aged Adults			Group of Early Aged (Young) Adults		
	Mean	Median	SD	Mean	Median	SD	Mean	Median	SD
I-E Locus of Control LOC	17.42	17.00	4.61	18.49	19.00	4.71	16.26	17.00	4.22
IR Egalitarian Individualism	43.99	45.00	7.64	43.03	44.00	8.35	45.01	45.00	6.69
KR Egalitarian Collectivism	41.90	40.00	16.31	53.29	56.00	12.31	29.68	30.00	10.02
KH Hierarchical Collectivism	42.31	42.00	7.69	42.15	42.00	8.07	42.48	42.00	7.30
IH Hierarchical Individualism	46.94	48.00	11.78	39.91	41.00	9.92	54.49	57.00	8.50
AI Authoritarian Style	3.65	2.00	3.94	0.68	0.00	1.36	6.85	7.00	3.24
AII Authoritarian Style	5.51	5.00	3.91	2.93	2.00	2.77	8.28	8.00	2.92
CI Consultative Style	5.88	6.00	2.77	6.25	6.00	2.75	5.47	5.00	2.76
CII Consultative Style	8.26	8.00	3.89	10.66	11.00	3.56	5.69	6.00	2.57
GII Participatory, Democratic Style	6.70	5.00	4.13	9.48	9.00	3.58	3.70	4.00	2.06
SPP (Level of Participation)	5.60	5.65	1.89	7.14	7.27	1.10	3.94	3.83	0.90

**Table 4.** Basic descriptive statistics: mean, median, and standard deviation – data for the general population and age group.

	Group of Middle-Aged Adults Mean	Group of Early (Young) Adults Mean	T	Df	P
IR Egalitarian Individualism	43.03	45.01	-1.69	166.00	0.09
KR Egalitarian Collectivism	53.29	29.68	13.58	166.00	0.001
KH Hierarchical Collectivism	42.15	42.48	-0.28	166.00	0.78
IH Hierarchical Individualism	39.91	54.49	-10.20	166.00	0.001
SPP (Level Of Participation)	7.14	3.94	20.55	166.00	0.001
AI Authoritarian Style	0.68	6.85	-16.30	166.00	0.001
AII Authoritarian Style	2.93	8.28	-12.18	166.00	0.001
CI Consultative Style	6.25	5.47	1.84	166.00	0.07
CII Consultative Style	10.66	5.69	10.71	166.00	0.001
GII Participatory, Democratic Style	9.48	3.70	12.71	166.00	0.001
I-E Locus of Control LOC	18.49	16.26	3.23	166.00	0.001

**Table 5.** Differences in mean between older and younger military leaders in terms of diagnosed variables (t-Student for independent trials).

Based on descriptive statistics and the t-test used for independent groups, it can be stated that officers and non-commissioned officers of different age groups differ in terms of subjective and organizational variables. Analyses of the test results obtained by the Student's t-test for independent trials have shown (see Table 5) that these differences in the range of multiple variables are significant.

In terms of subjective variables, middle-aged military leaders were more likely to be characterized by KR-egalitarian collectivism, an internal locus of control LOC (high scores), more participatory CII and GII decision-making styles, and a higher level of participation SPP as compared to young military leaders. On the other hand, young military leaders were significantly more likely than those of middle-aged ones to have HI - hierarchical individualism and the use of authoritarian decision-making styles: AI and AII. Both groups did not differ in terms of KH-hierarchical collectivism. Also, at the level of the statistical trend, there were differences in RI-egalitarian individualism among the groups (slightly more often represented in the group of young military leaders) and the CI consultative style (slightly more often used by middle-aged military leaders).

For both groups of participants, correlations between subjective factors and decision participation factors were also calculated (Table 6 and Table 7).

	<b>SPP</b>	<b>A_I</b>	<b>A_II</b>	<b>C_I</b>	<b>C_II</b>	<b>G_II</b>
IR egalitarian individualism	0.05	-0.07	0.04	0.03	-0.08	0.11
KR egalitarian collectivism	<b>0.38</b>	-0.07	-0.21	<b>-0.23</b>	0.15	<b>0.53</b>
KH hierarchical collectivism	<b>0.26</b>	-0.10	-0.19	0.03	0.17	0.18
IH hierarchical individualism	<b>-0.32</b>	0.10	<b>0.31</b>	-0.14	-0.15	<b>-0.22</b>
I-E Locus of control LOC	<b>0.26</b>	-0.19	-0.12	0.09	<b>0.21</b>	0.08

**Table 6.** Correlation between decision-making and subjective and organizational factors for a group of middle-aged leaders (r-Pearson).

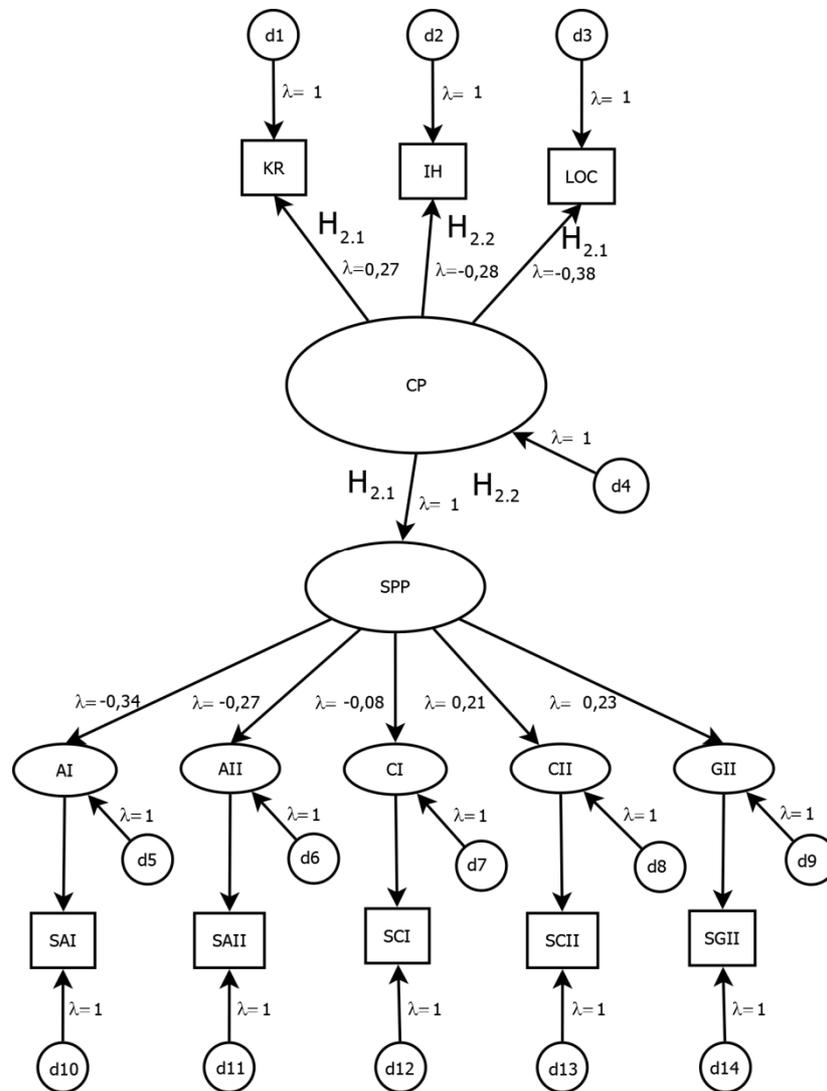
	<b>SPP</b>	<b>A_I</b>	<b>A_II</b>	<b>C_I</b>	<b>C_II</b>	<b>G_II</b>
IR egalitarian individualism	0.06	0.15	-0.12	-0.11	0.06	0.06
KR egalitarian collectivism	<b>0.36</b>	-0.20	<b>-0.34</b>	-0.18	<b>0.27</b>	<b>0.23</b>
KH hierarchical collectivism	-0.15	0.10	0.15	0.04	-0.08	-0.10
IH hierarchical individualism	0.08	0.02	-0.19	0.09	0.08	-0.01
I-E Locus of control LOC	<b>-0.32</b>	<b>-0.27</b>	-0.14	<b>-0.29</b>	0.08	<b>0.36</b>

**Table 7.** Correlation between decision-making and subjective and organizational factors for early (young) adults (*r*- Pearson).

Results of our research showed, that there were significant correlations between subjective factors and a willingness to use autocratic or participatory decision-making styles in the surveyed officers and non-commissioned age groups (Table 6 and Table 7). It was found that in the middle-aged military leaders, the strongest positive correlations between the subjective variables KR (egalitarian collectivism) and SPP (level of participation) and GII (Participatory, Democratic Style, group style) were obtained ( $r = 0.38$ ;  $r = 0.53$ ,  $p < 0.05$ ). The strongest negative correlations were found also between IH (hierarchical individualism) and SPP (level of participation) ( $r = -0.32$ ,  $p < 0.05$ ). The positive correlation was found between IH (hierarchical individualism) and the authoritarian style of AII ( $r = 0.31$ ,  $p < 0.05$ ). The locus of control LOC was positively associated with the SPP (level of participation) ( $r = 0.26$ ,  $p < 0.05$ ) and CII ( $r = 0.21$ ,  $p < 0.05$ ) for the group of the middle-aged military leaders.

For the younger group of officers and non-commissioned officers, in early adulthood, the largest number of significant correlations was found between the locus of control variable (LOC) and variables of decision participation. Positive correlations occurred between LOC (locus of control) and: SPP (mean average participation rate index) ( $r = 0.32$ ,  $p < 0.05$ ) and GII group style ( $r = 0.36$ ,  $p < 0.05$ ). Negatively, the LOC correlated in this group with the authoritarian style AI and the CI consultative style ( $r = -0.27$  and  $r = -0.29$ , respectively). In the group of young military leaders, there were also significant correlations between the subjective variables of KR (egalitarian collectivism), SPP (level of participation) and the authoritarian style AII ( $r = 0.36$ ,  $r = -0.34$ ,  $p < 0.05$  respectively).

We elaborated on an empirical model for young adult participants according to the methodology of SEM structural equation modelling (Kowal and Roztocki 2015b, Kowal and Keplinger 2015). This model is shown in Figure 2.



**Figure 2.** The empirical model for young adult participants.

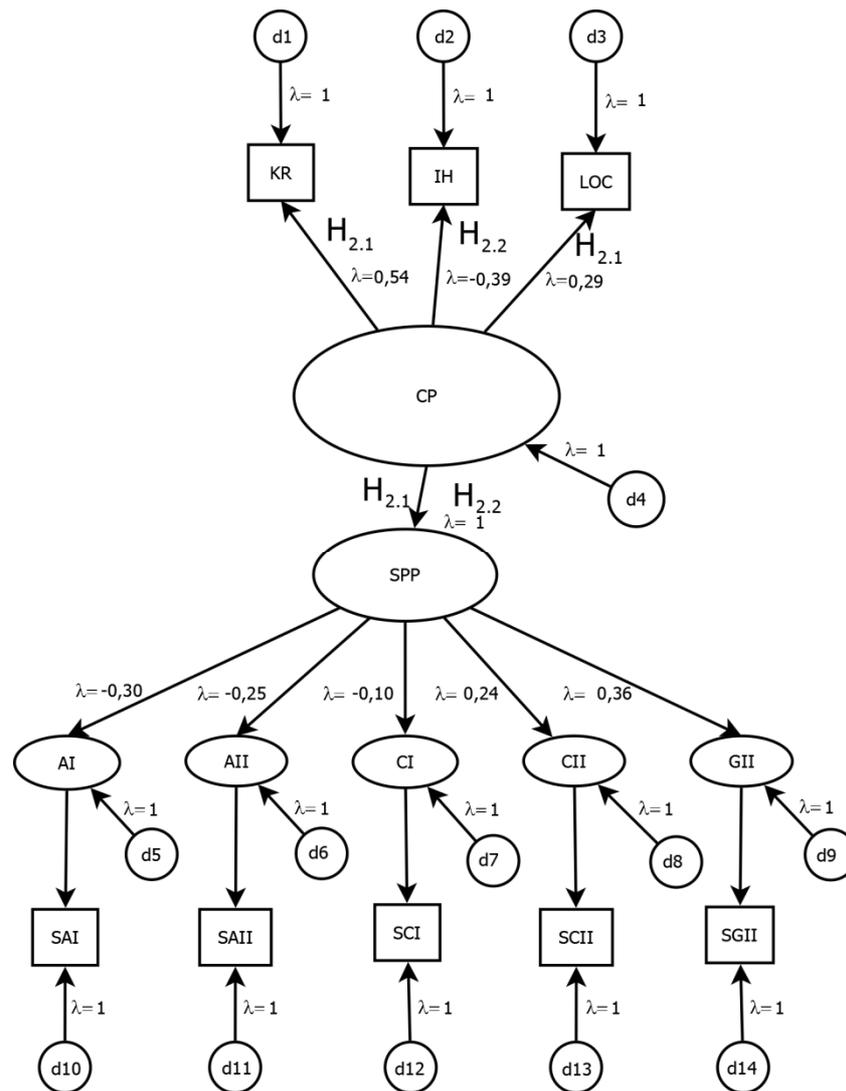
The employed measurement instrument meets the criteria for psychometric reliability and validity (Kowal and Gurba, 2016). SEM analysis parameters – model fit measures, basic statistics, and indexes based on non-centrality - show a good fit of the established model to the data. Each dimension of our model indicates more than 50% of variance explained (AVE greater than 0.5). The estimated test reliability - Cronbach's alfa indicators are greater than 0.7. All the Root Mean Square Errors of Approximation (RMSEA) are less than 0.1. The fit

index GFI indicators are greater than 0.8 (GFI values range from 0 to 1, with larger values indicating better fit). The ratio of the chi-square and the degrees of freedom  $\chi^2 / df$  are less than 5 indicating a good fit, too. Thus, all model fit indexes point to an acceptable adjustment. Thus, the model explains the high percentage of variance of the dependent variables (Kowal and Roztocki 2015b, Kowal and Keplinger 2015).

The structural model for early adults participants showed, that the strongest path coefficients in terms of subjective factors are the locus of control LOC ( $\lambda = -0.38$ ) and IH- hierarchical individualism ( $\lambda = -0.28$ ). They indicate that the internal locus of control LOC and IH affect the SPP (level of participation) reduction in this group. Only KR-egalitarian collectivism ( $\lambda = 0.27$ ) influences the increase in the SPP.

The strongest loadings of path coefficients were obtained in the style of decision-making in authoritarian styles: AI ( $\lambda = -0.34$ ) and AII ( $\lambda = -0.27$ ), however the path coefficients are negative, i.e. the contribution of these factors decreases the SPP. In contrast, consulting styles: CII ( $\lambda = 0.21$ ) and GII (democratic style with  $\lambda = 0.23$ ) have positive path coefficients. So, the contribution of these factors increases the SPP (level of participation).

The empirical model for middle-aged adults is shown in Figure 3.



**Figure 3.** The empirical model for middle-aged adults

The Cronbach's alfa indicators greater than 0.7, the ratio of the chi-square and the degrees of freedom  $\chi^2 / df$  less than 5, the RMSEA approximation error less than 0.1 and GFI equal to 0.8 (AGFI = 0.72) indicate that the model explains the high percentage of model variance (Kowal and Gurba 2016).

The structural model for the middle-aged group showed, that the strongest path coefficients in terms of subjective factors are the KR- egalitarian collectivism ( $\lambda = 0.54$ ) and IH - hierarchical individualism ( $\lambda = -0.39$ ). They signify that KR (egalitarian collectivism) influences the increase in the SPP (level of participation) and IH (hierarchical individualism) influences the reduction of SPP.

The strongest factor loadings were obtained for consultative styles CII ( $\lambda = 0.24$ ) and the participatory, democratic style GII ( $\lambda = 0.36$ ). These loadings are positive, i.e. they increase the SPP (level of participation). The lower factor loadings were also obtained in the style of decision-making in authoritarian styles: AI ( $\lambda = -0.30$ ) and AII ( $\lambda = -.25$ ), however the path coefficients are negative, i.e. the contribution of these factors decreases the SPP (level of participation).

## RESULTS

Based on the results of the research and analysis presented above, you can refer to the research questions and hypotheses. The first research question concerned the differences between the selected age groups of soldiers in terms of the influence of selected subjective factors on the willingness to use autocratic or participatory decision-making styles. The analysis presented shows that differences in age groups actually occur. According to hypothesis H1.1, middle-aged military leaders were more selective in participatory decision-makings (CI, CII, GII) compared to young ones. Although in H1.1, all styles of consultation and group styles were assumed, but the CI consultative style was almost irrelevant for both groups of participants. Among the possible reasons, the relatively poor reliability ratios of this style were obtained for the overall model as well as the models for the study groups. The results obtained from the descriptive statistics as well as the structural equation model showed a slightly different prediction model of influence on the SPP (average participation level) in both groups: young adults in military management mainly through the external locus of control LOC and in the middle-aged adults group first of all by egalitarian collectivism (KR) and hierarchical individualism (IH).

The second research question was related to the relationship between subjective factors and the willingness to use autocratic or participatory decision-making styles in the examined groups. According to hypothesis H2.1, there was a greater willingness for participatory steering styles (CICII, GII) in both young and middle-aged military leaders, who are characterized by KR- egalitarian collectivism and high scores of the internal locus of control LOC. According to psychology, both factors characterized persons who are developed enough to bear responsibility for themselves as well as for others (McCrae, Costa, 2005; Gurba, 2011; Appelbaum, Louis, Makarenko, Saluja, Meleshko, Kulbashian, 2013).

Hypothesis H2.2 concerned the greater willingness to choose styles of authoritarian leadership (AI, AII) among military leaders. Thus, H2.2 was confirmed by HK-hierarchical

collectivism, IR and IH - egalitarian and hierarchical individualism. The results showed that hierarchical individualism (IH) correlated strongly with authoritarian styles only. We hypothesised that the authoritarian styles correlate with the personal needs of independency and individualistic behavior. Furthermore, we believe that the authoritarian styles relate to the tendency to be a member of a group in which competition and hierarchical relationships are preferred (Hofstede, 2001; Reykowski, 1994). Thus, hypothesis H2.2 was partially confirmed.

## CONCLUSIONS AND DIRECTIONS FOR FURTHER RESEARCH

The most important result of the current research is the confirmation of the appropriateness of the assumed model examining generational differences in the level of decision participation that occurs among Polish military leaders in young and middle adulthood.

The revised model showed that in two different developmental groups of factors, collectivism and individualism and the locus of control influenced the level of decision-making. The results of our current research broaden the existing knowledge of the participatory decision-making process in modern military armies in countries undergoing systemic transformation. This knowledge can be used by educators and military leaders to improve and increase the operational efficiency of the army, as well as to improve the image of the Polish army. Collectivism and individualism and locus of control are important competencies of human capital in the Polish army, which should be assessed and included into account by MIS users in their personal development. The specificity of solving organizational and business problems in the army with the use of management information systems (MIS) implies specific types of communication and personal characteristics. It also has to be taken into account that the process of communication, argumentation and culture appear to be crucial to understand the decision-making process (cf. Kuzio 2014a, 2014b).

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# Professional competences and career planning by physical education teachers

by

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## ABSTRACT

The purpose of the research, which was carried out in 2016, was to identify opinions about career and an image of one's own career among academic students at the major of physical education. A diagnostic survey method and a questionnaire technique were used. 'A. Cybal-Michalska Questionnaire' (2013) was applied to plan career prospects and development in the modern society by academic students. The research results showed that professional expectations of the respondents were met to a large extent. Students who graduate from MA studies at the major of physical education evaluate the choice of their study major as relevant and consistent with their interests; they are also aware of problems which are connected with building a professional career – regardless of the bachelor degree competence level. The respondents differ with respect to defining the concept of 'career' and evaluating the importance of selected factors for building their own professional career paths in view of the level of professional achievements (bachelor degree). Students who obtained the highest marks in the professional competence level plan to pursue their own careers.

People with a lower level of professional competences are less likely to succeed in this area; however, their high awareness of numerous globalisation changes and greater difficulties in finding a satisfactory job as well as their personal impact on this process can become a factor which will support the planning and implementation process of their own career.

**Keywords:** professional career, career approach dimensions, factors conducive to the achievement of a professional success

## **Keynote address**

# Towards Better Understanding of ICT Acceptance by Older Workers: Learning from Polish Enterprise System Practitioners

by

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## ABSTRACT

Population ageing, taking place in a majority of developed countries, results in workforce shrinking and ageing. Prior studies suggest that as employee age increases, their attitudes towards computers tend to be more negative. In addition, with age work capacity changes and older employees experience decline in physical abilities and decreased perception and work pace. Therefore, in the light of a widespread use of information and communication technology (ICT) in today's organizations and an ageing workforce it is essential to investigate considerations of ICT acceptance by older workers. In doing so, the current papers focuses on enterprise systems (ES), which are very complex ICT-related systems supporting the management and integration of the whole company. The main goal of the current paper is to better understand considerations of ICT adoption by older workers. To this end, the study draws from investigations performed among ES practitioners in Poland. The analyzed considerations include impediments, failure factors, problem solutions, and recommendations for improvement perceived by older workers. The findings suggest that the most critical issues perceived by older workers include system and data quality, organizational and system fit, trainings, finance, and project preparation.

**Keywords:** ICT, enterprise systems, acceptance, labor force age, ageing, Poland.

## INTRODUCTION

Nowadays, information and communication technology (ICT) has a paramount role and its impact refers to various aspects of the today's world such as business, technical, social, political, cultural, economical, educational, and legal issues. Among the most advanced ICT-related solutions are enterprise systems (ES), which are very complex systems that support the

management and integration of the whole company and offer inter-organizational integration with company's clients and suppliers (Volkoff, Strong and Elmes, 2005). ES implementations are difficult and risky projects having a multi-faceted impact on adopting organizations and involving a great number of stakeholders.

In consequence of a full-scope ES adoption, practically all company employees are affected by the ES. Therefore, due to workforce ageing and shrinking (e.g. Boersch-Supan, 2008), older workers are being exposed to the mandatory use of software in organizations. In this context, prior research suggest that a person's age might play an important role in acceptance of ICT-based solutions (e.g. Hill, Beynon-Davies and Williams, 2008; Soja 2017, Wagner, Hassanein and Head, 2010). As a result, a question arises how to help older workers to accept and effectively use ICT-based solutions.

Prior research suggest that European countries differ with respect to various age-related considerations (e.g. European Commission, 2016; Kurkiewicz and Soja, 2015, 2016; Soja, 2016). There are also differences between highly developed and developing European countries as regards companies experience and various considerations including social, cultural, legal, and ICT-related issues (e.g. Gawin and Marcinkowski, 2017a, 2017b; Roztocki and Weistroffer, 2015). Nevertheless, most of ICT adoption-related studies are grounded in the context of well-developed economies and research on the results of ICT investments in less developed countries is scarce (Roztocki and Weistroffer, 2015). This also refers to transition economies, i.e. economies in transition from a central planning system to a free market system (Roztocki and Weistroffer, 2008).

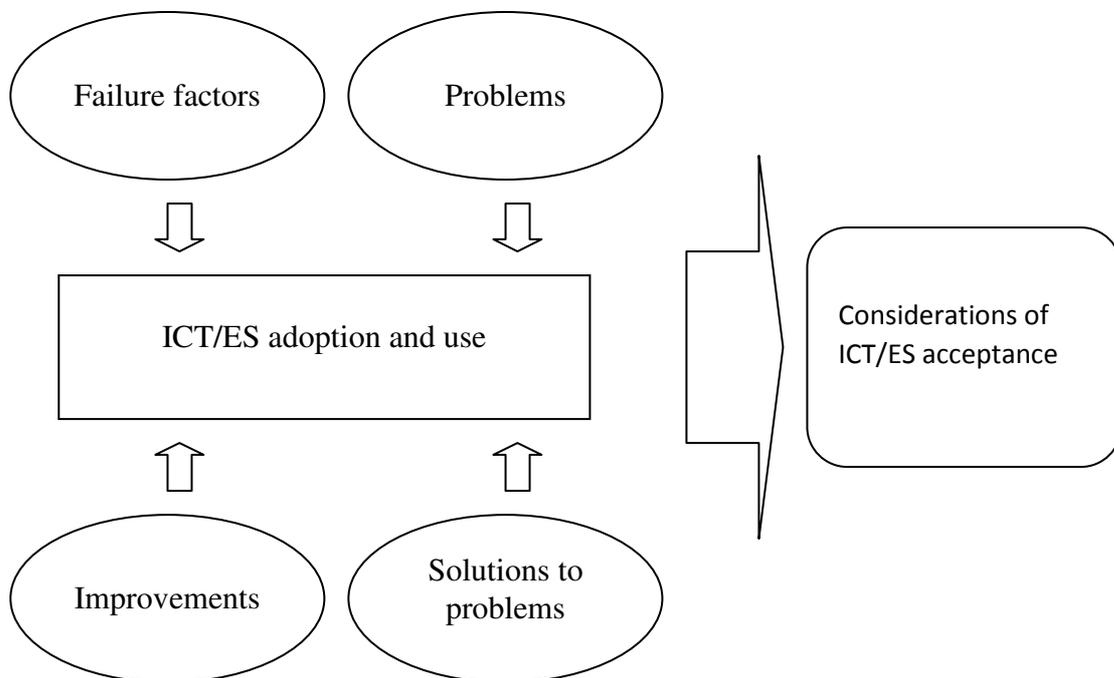
The current study aims to help to bridge the aforementioned research gap and investigate determinants of ICT acceptance by older workers in a mandatory environment. In doing so, the current study employs a multi-dimensional approach and draws from data gathered in Poland, a transition economy. The specific research question that this study aims to answer is:

- What are the considerations of ICT adoption and use perceived by older workers?

In order to answer the research question, this study builds upon and extends the author's previous studies on the role of employee age in the perception of various determinants of ES adoptions. The remainder of the paper is structured as follows: we first describe our research method, then we proceed with the presentation of results and discussion of findings, and the paper closes with lessons learned and concluding remarks.

## METHOD

The current paper draws from investigations conducted among ES practitioners in Poland and analyzing their results from an employee age perspective. The studies used in the current analysis gathered data among various stakeholders of ES implementation projects including users, members of the project team, members of the steering committee, and project managers. In order to achieve the richest possible picture of ES adoption considerations relevant for older workers, the current study approaches these issues from two perspectives: impediments and improvements. The research approach adopted by the current study is displayed in Figure 1.



**Figure 1.** Research model

In the first standpoint, the analysis focuses on problems perceived by older workers during ES adoption and use, and, on the other hand, on ES adoption failure factors reported by older workers. The analysis of problems was based on the classification of difficulties described in (Soja and Soja, 2017a), while the examination of failure factors was based on the categorization elaborated in (Soja and Soja, 2017b).

In the second perspective, related to improvements of ES adoption projects perceived by older workers, the analysis focuses on recommendations how to improve ES projects and on solutions applied by ES practitioners to solve the problems encountered. The analysis of

recommendations was based on the classification described in (Soja and Soja, 2016), while the examination of solutions was based on the categorization worked out in (Soja, Soja and Paliwoda-Pękosz, 2016).

The understanding of older workers has been adopted from the demographic literature and covers employees at age 50 and more years (e.g. Conen, van Dalen, Henkens and Schippers, 2011; Soja and Stonawski, 2012).

## RESULTS

### *Impediments to ES adoption success perceived by older workers*

The older workers, on the basis of their experience with ES adoption and use, perceived various impediments to successful implementation of an ES in an organization. The reported difficulties include issues related to people involved in/affected by an ES project, considerations of the implementation process, and issues related to technology. The most important impediments perceived by the older employees include the following issues:

- project definition,
- trainings,
- company organization and condition,
- project schedule,
- provider,
- company's finance,
- system quality,
- system fit to company's needs,
- infrastructure,
- data quality,
- people's attitudes,
- people's competence,
- people's adaptation and habits, and
- managerial staff (military leaders).

Another perspective of perceiving impediments to successful ES adoption and use was related to failure factors, i.e. factors contributing to ES adoption failure. Failure factors perceived by older workers include the following issues:

- system,

- top management,
- employees,
- company preparation,
- change management (e.g. trainings, communication),
- company's finance, and
- project status.

#### *Improvements of ES adoptions perceived by older workers*

The first perspective related to improvements of ES adoption projects was associated with recommendations formulated by the respondents how it is possible to make better the adoption projects. The older workers formulated a number of recommendations related to project preparation, implementation process run, system being implemented, trainings, and implementation services provider. Recommendations reported by the older employees include the following issues:

- detailed analysis and needs definition,
- employees IT skills,
- extended schedule,
- better project and employee preparation,
- performing BPR,
- securing project financing,
- effective communication,
- better team composition,
- cost control,
- system flexibility and better fit to company needs,
- infrastructure,
- employees trainings,
- extending training time,
- better quality of trainings, additional and earlier trainings, and
- better consultant choice.

The second perspective related to improvements of ES adoption projects refers to solutions applied by ES practitioners to problems encountered during ES adoption and use. As in the case of the above discussed recommendations, the reported solutions are related to various aspects such as system, trainings, employees, implementation process, infrastructure,

company, and provider. The actual solutions perceived by older employees include the following elements:

- system adjustment to company's needs,
- system functionality and flexibility,
- data verification,
- additional and continuous trainings,
- trainers' training,
- employees' cooperation and involvement,
- better project team composition,
- introducing an incentive system,
- top management involvement,
- project schedule extension,
- equipment and network modernization,
- business process change,
- securing project financing,
- provider support, and
- better consultant choice.

### **RECAP: FOSTERING ICT ACCEPTANCE BY OLDER WORKERS**

The examination of ES adoption considerations from various perspectives allows us to discern issues that are of paramount importance for older workers. Such issues might be candidates for determinants of ICT/ES adoption by older employees and thus might present useful guidelines for increasing ICT acceptance by this group of workers.

The most important issues for the older workers are represented by elements which are present in all perspectives examined, i.e. problems, failure factors, solutions, and improvements. Such considerations are especially important because on the one hand the older workers might perceive them as threats and they might be perceived as inhibitors of ICT/ES acceptance. However, on the other hand, being perceived as possible improvements, these considerations might represent enabling factors. The considerations which are subject to such a dual perception include the following factors:

- data and system quality,
- organizational and system fit,

- trainings,
- company's finance, and
- company/project preparation.

The above listed factors were perceived in each of the four perspectives. The findings suggest that older workers have a holistic perception of the company and ES implementation project and point to considerations of various notions, such as system-related, organizational, financial, and people-related.

The older employees seem aware that enterprise system being implemented is of paramount importance with respect to its quality and fit to the company needs. Nevertheless, as suggested by prior research, older employees tend to put a lesser emphasis on detailed technical issues and focus more on general issues (e.g. Soja, Paliwoda-Pękosz and Soja, 2015). Talking about the system being implemented, the older workers rather expect that the system will be adjusted to the company needs and they appear to require the system flexibility.

The older employees appear to place a significant emphasis on a proper preparation of the ES implementation project. They perceive the idea of preparation in a complete, holistic way, being aware of both benefits and challenges associated with the preparation. While perceiving the preparation-related issues, the older workers focus on financial considerations, alternative solutions, and training program. They appear to express their concerns about the company and also about their readiness to work in a changed business and system environment.

It appears that older workers underestimate several issues with respect to their potential negative role. These issues are associated with infrastructure, provider support, project schedule, and company's organization and conditions. As regards these considerations, the older workers tend to perceive related solutions and improvements; however, they do not fully perceive threats associated with these issues. In particular, although the older workers notice some problems related to the abovementioned considerations, they do not perceive them as failure factors, which was noticed among younger workers.

However, on the other hand, the older workers seem fully aware of challenges and threats associated with several people-related considerations. These are employees' attitudes, competence, and skills, and the role of managerial staff (leadres) with a special emphasis on top management. The older employees appear to perceive the above listed considerations as

enablers; however, they do so to a limited extent, reporting these issues either as potential solutions or improvements.

## **LESSONS LEARNED AND LIMITATIONS**

The analysis of the current study's results helps us in formulating several recommendations which should assist the older workers to accept new technology and overcome fear of change:

- ICT/ES practitioners should take into account company's age structure in their change management programs; in doing so they should align the project pace, trainings program, and system interface design to the needs of an ageing workforce,
- following the change management-related considerations, it is useful to involve older employees as project team members, which should help in building their positive attitudes towards the adoption project and related organizational changes,
- during ICT/ES adoption process it is beneficial to organize age-balanced project teams, which should help in a better diagnosis of the project considerations and minimizing the risk of overlooking some important considerations. As suggested by the current study's findings, restricting team composition to just one age group (e.g. older employees) might result in a risk of overlooking some important considerations.

The main limitation of the current study refers to generalization of findings, due to the research setting, i.e. Poland. Since research was conducted in one country, its findings and recommendations might be applicable first and foremost to Polish organizations. We might generalize the findings to other countries; however, we should do this with caution. Countries that might benefit from this study include first and foremost transition economies from the Central and Eastern Europe (CEE) region: Czech Republic, Slovakia, Hungary, and Baltic states.

## **CONCLUSION**

On the basis of empirical studies among Polish ES practitioners, the considerations of ICT acceptance by older workers have been investigated. The considerations have been examined from various perspectives: impediments, failure factors, problem solutions, and recommendations for improvement. The adopted research approach allowed us to suggest the most critical issues perceived by older workers, which include system and data quality,

organizational and system fit, trainings, finance, and project preparation. The results also suggest that older employees might underestimate threats associated with several project management-related considerations such as company organization and condition, project schedule, and provider support.

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# On Education of Cyber Physical Systems Engineering

by

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## ABSTRACT

To develop state-of-the-art cyber physical systems (CPS), today's engineers need to possess both technical and social skills. Technical skills are crucial to master the complexity of products and systems integrating hardware, software and some kinds of communication mechanism with the physical world. Excellent social skills are the key success factor for CPS development projects that usually run within multidisciplinary and multicultural teams. Ideally, students need to gather experience in practical projects focusing on up-to-date topics. In this work we describe a novel task-centric holistic agile teaching approach (T-CHAT) for teaching CPS-engineering in realistic industry-like scenario. We present the implementation of this approach and discuss the evaluation results based on the students' feedback.

**Keywords:** Agile teaching, Cyber-Physical Systems, Education of Cyber-Physical Systems Engineering, Education of Global Software Engineering, Perceptual teaching, Problem-based learning, Project-based learning, Research-oriented teaching.

## INTRODUCTION

Cyber physical systems (CPS) are applied in multiple areas like transportation (next-generation airplanes and space vehicles), medicine (prostheses that may be controlled by brain signals), manufacturing (smart factory), power supply (smart grid), homes (smart home). In CPS the physical world (hardware) meets the cyber world (software). The different characteristic behaviors of both worlds (cyber - discrete behavior, physical - continuous behavior) make both the teaching and the development of CPS challenging. When developing CPS, both practical and theoretical knowledge in multiple disciplines is needed, for example

in control theory, calculus, real-time embedded systems, verification of infinite state systems, and in many other fields of computer science, mathematics, physics, and electrical/mechanical engineering. The interdisciplinary nature of the topic causes difficulties in teaching CPS. Even CPS introductory courses require from the students a relatively broad technical knowledge in multiple areas.

The Committee on 21st Century CPS Education concerns in its report (National Research Council, 2015) both the future industrial and academic needs of knowledge and skills in the area of CPS engineering. The report explores the “knowledge and skills required for cyber-physical systems (CPS) work, education, and training requirements and possible approaches to retooling engineering and computer science programs and curricula to meet these needs.” It stresses the importance of focusing on the core ideas and core principles of CPS as well as on social skills like strong communication and collaboration capabilities in the CPS education.

To learn the required CPS skills, the students need to be faced with realistic design and implementation problems having a large cross-disciplinary scope with interesting, reachable and challenging goals. Projects must be designed with the right amount of “messy” having a right balance between theory and practice. Overly complicated projects are discouraging. The concept presented in this work is a holistic approach of teaching in which the task plays a central role. The leading idea here is that the perception plays a fundamental role in all learning. Social skills are especially stressed.

## **MOTIVATION**

Being of a multidisciplinary nature, CPS engineering is a novel evolving field that requires knowledge and skills from engineers in several disciplines. Representatives of several industrial sectors emphasize the growing demand for CPS talent capable to develop heterogeneous and partially autonomous CPS that are able to collaborate, adapt, and continuously evolve (National Research Council, 2015). Together with representatives of academia they specify the competences needed by CPS engineers and identify the existing gaps in education. These requirements even originating from different industry sectors show important common ground defining the key attributes of CPS engineers. These attributes are the ability to have the big picture thinking about a system, multi- and interdisciplinary engineering expertise, deep comprehension of the cyber part of a system, and excellent social skills. To address the growing need of industry, engineering education requires developing

and implementing new teaching approaches for raising CPS engineers having the corresponding knowledge and skills.

This research paper proposes a practical approach for CPS teaching. This approach unifies the theoretical and practical aspects of CPS engineering and implicitly focuses on soft skills, like communication skills and teamwork experience. The next section gives an overview of competences needed by industry for CPS engineers as well as discusses how the existing CPS courses and curricula address these needs.

## **LITERATURE ANALYSIS**

The fast ongoing development of technical possibilities makes the education of engineers a challenging endeavor. During recent years, the need for CPS talent in industry is increasingly growing. The mission of academia is to identify and concretize these needs and based on this knowledge to develop new curricula and courses suitable to educate capable CPS engineers. Indeed, multiple academic research activities investigated the requirements of industry and formulated the competences that characterize CPS engineers. For example, the program started by the National Academy of Engineering describes the educational requirements and current efforts as well as strategies and programs for development of CPS curricula in (National Research Council, 2015) and (National Research Council, 2016). The results of international projects ARTEMIS/DECOS and CyPhERS FP7 in the area of CPS education and CPS teaching are presented in the studies (Schoitsch, 2014) and (Törngren et al., 2015) respectively. In (Erol, Jäger, Hold, Ott, & Sihm, 2016) a literature review on competences required for Industry 4.0 is conducted. An overview of educational needs in the CPS area and discussion about the key issues of CPS curriculum design are provided in (Törngren & Herzog, 2016) and (Törngren, Grimheden, Gustafsson, & Birk, 2017).

Most of these studies emphasize the multidisciplinary nature of CPS engineering. The resulting set of needed competences is thus large and beyond the capabilities of most single individuals. The solid CPS foundations play in CPS development major role. The non-functional quality characteristics of CPS such as security, privacy, safety, reliability and stability are getting more and more significance. Additionally, Systems Engineering and Engineering capabilities as well as competences in project management, humanities and economics are stressed by multiple studies

to be important qualities of CPS engineers. The studies emphasize that along with theoretical knowledge in CPS field hands-on experience, or skills, is important for CPS engineering graduates. Because of multidisciplinary character of CPS and because of their complexity, CPS development is usually conducted within heterogeneous interdisciplinary and often multicultural teams. Multiple studies emphasize that to efficiently collaborate in such teams excellent social competences such as communication, collaboration, presentation and technical writing are strongly required. Personal attitudes such as critical thinking, cross-disciplinary thinking, analytical skills, ability to define and solve problems, creativity, entrepreneurship, and understanding of lifelong learning are much appreciated competences as well.

Existing CPS curricula and courses concentrate predominantly on development of technical competences while paying little attention to social skills and attitudes. However, some studies describing CPS curricula and courses directly address such social competences as collaboration and communication, stressing heterogeneous, interdisciplinary, and multicultural character of CPS teams (cp. (Laird, 2016) (Grega & Kornecki, 2015) (Taha et al., 2017) (Mäkiö, Mäkiö- Marusik, & Yablochnikov, 2016) (Erol et al., 2016)). Some studies address such social competences as technical writing and presentation (cp. (Grega & Kornecki, 2015) (Mäkiö et al., 2016) (J. C. Jensen, Lee, & Seshia, 2011) (Lee, Seshia, & Jensen, 2013) (Ali, 2015). Personal attitudes like analytical skills, critical thinking, definition and solving problems, creativity, entrepreneurship, and lifelong learning are focused on only by a minority of CPS courses (cp. (Bauer & Schneider, 2013) (Erol et al., 2016) (Laird, 2016) (Lee et al., 2013) (Jeff C Jensen, Lee, & Seshia, 2013).

Along with profound technical skills CPS engineers need to have excellent social skills to efficiently collaborate in CPS development projects. The current CPS curricula and courses, however, focus on the development of social skills insufficiently. The following sections present a CPS teaching approach and its implementation.

## **CPS TEACHING APPROACH**

Task-centric holistic agile approach for teaching CPS - T-CHAT - provides a set of interlinked pedagogical approaches and teaching/learning methods aligned to the defined teaching process. It guides academic institutions and staff in designing and planning CPS courses and curricula. T- CHAT is a generic method and may be adapted, if required, to suit specific needs. The approach is described more in detail in (Mäkiö et al., 2016).

## **COURSE IMPLEMENTATION**

To test the concept of T-CHAT, a concrete development task is elaborated focusing on core ideas and principles of CPS. Within this task the students should learn the development of CPS by practical interactions. The course took place in the winter term 2016/2017 as cooperation between two universities, A located in East Europe, and B located in West Europe.

This section briefly describes the course implementation containing the task description and the course setting.

### ***The task***

In our task, robots shall transport building blocks from one palette (source) onto another palette (goal). Two intermediate operations shall be performed with the building blocks on the way from the source to the goal: cleaning and painting. For these activities a cleaning and a painter's shop floors are organized. At the beginning, the building blocks are located on the source palettes. Robots can pick, carry, place, clean and paint building blocks. These skills, or operations, are diverse developed by each robot. Each capability is characterized by its costs (low/ medium/ high) and duration (short/medium/long). One robot, for example, needs a short time for the operations "carry" and "clean", but a medium time for the operation "paint"; another robot needs a short time for the operations "paint" and "clean", but a long time for the operation "carry". All robots together form a robot team. The overall goal of the robot team is to transport the building blocks from the source palette onto the goal palette and in between to clean and paint them. Because the skills of the robots are distinct, they need to cooperate to manage the overall goal efficiently. A more detailed description of the task can be found in Mäkiö et al. (2016).

### ***The course setting***

The course was executed in three phases. The first phase took place in A as a workshop in which students from both universities were participating. The second phase was dedicated to the software development that took place in distributed manner. The third phase took place in B as a workshop with the students from both universities. During the third phase the further software and hardware development took place as well as their integration.

### ***Phase 1***

The main goals of the phase 1 were to teach the basic knowledge of the topic, to develop a common understanding of the task among students, and to create personal contacts that are needed for friendly and trustful project atmosphere. The first phase took place in A as a workshop according to the so called “sandwich principle” (Strittmatter-Haubold and Ehlail 2012) to give the students the feeling of competence, autonomy and social integration.

### ***Phase 2***

The second phase was run as a distributed Scrum software development project in which students in both locations actively participated (Sutherland et al. 2007). As the work was organized in an agile way, the software was developed in an iterative and incremental manner meaning that final requirements were determined iteratively during the development and the communication between the members took place during the entire development process.

### ***Phase 3***

Phase 3 took place in B. It was dedicated to finalize the CPS development, construct the robots, and to summarize and to document the course results. The applied concepts were adapted from Colombo et al. (2015) where the authors present several Internet-based technologies and concepts dealing with the industrial automation, and particularly with integration of devices.

## **COURSE EVALUATION**

The authors used a non-randomized experiment on a small sample (Katz et al. 2004) according to the social research methodology and due to the constraints associated with the study program, the size and equipment of the laboratory. In addition, the authors had a limited budget, time and workforce. The non-random sample was conducive to gaining in-depth knowledge by selecting people interested in studying IT in design teams, including research and business collaboration. So the target population was limited and possessed special traits (Babbie, 2001, 2007: 204-208). The authors did not assume conclusions towards generalizations to the whole population of students. Our experiment had the features of a collective case study (Maryam Nazari 2010, Lombardi and Marani A2015), because the aim of our methodology is broadly to cover research and practices that tend to describe,

implement and examine novel T-CHAT and CPS teaching practices in a specific project related to the international group of students within a study

program. We used mixed-methods research (Kaplan and Duchon, 1988, Kowal, 2012) as a new holistic approach to evaluate the course in the sphere of effects of teaching as gained knowledge, skills and social competencies. Thus, the authors applied qualitative methods (Frankfort-Nachmias and Nachmias, 2001, Kowal, 2012) as talks with students, participant observation, research in action and quantitative methods as structured survey and statistical analysis. The survey was conducted using a novel authors' Questionnaire of Evaluation (QE) based on the theory of human capital (Becker 1985, 1993, Kowal et al 2011, Simkovic 2013), on the review of the best practice in teaching technical courses (Speranza, 2017, Admiraal et al., 2017) and on talks with students and consultations with academic teachers and scientists.

Due to MacGowan's (2011), Heinsman's and Shadish's (1996) approaches, the experiment was prepared as an integral part of the course, so that all students participated in the activities during the class and if required in out-of-class work. The group consisted of 15 students, who registered in the chosen educational path (Babbie, 2001, Katz, et al. 2004). This non-randomized small sample could face less difficulties in sustaining cooperative and synergy outcomes than randomized or larger one (Nosenzo et al. 2015, Mäkiö-Marusik et al. 2017). Non-randomized and small samples are popular in educational experiments requiring special traits' participants (Cook, 2001). The current analytical analysis met the requirements and yielded accurate answers according to non-randomized experiment approach (Shadish et al., 2012, Mäkiö-Marusik and Mäkiö, 2016, Mäkiö-Marusik et al. 2017).

After both of the opening and closing meetings the students were asked to fill out a questionnaire to provide their individual assessment of the course. Both surveys were aimed at investigating the students' subjective feelings about the course and its outcomes at the beginning and the end of the course. Students evaluated the course using a Questionnaire of Evaluation (QE).

The main overall dimension of the QE - GlobEv - consists of two sub-dimensions: 1) self- evaluation (SE) and 2) evaluation of the course organization (EC). The subscales of SE are teaching effects of knowledge (EF), skills (SKILLS), and social competencies (SC). The subscales of EC are evaluation of organization of the course (ORG), evaluation of teachers (TE), motivation (MOT) and individual development (ID). ORG includes the course organization optimality, organization and preparation in the classroom. TE comprises a level of preparation, clarity, logic and structuring of teaching methods. MOT contains importance

for the future, levels of waking up motivation, usefulness, learning faster than in other courses. ID comprises evaluation of individual development, accounted knowledge overview of the field of the topic, enlarging horizon, improving skills, developing and improving knowledge.

All items were measured on a 5-point Likert-type scale: very low (1), low (2), neutral (3), high (4), very high (5). Each dimension was depicted as a mean of points given by students to dimension items.

Statistical analysis comprises the descriptive statistics, as measures of a central tendency (mean, median, mean rank), measures of dispersion (standard deviations, coefficients of variability), skewness, kurtosis, measures of the correlation as Spearman rank correlation analysis, Pearson linear correlation analysis and multiple regression analysis with the use of the methodology of passive experiment design (Taguchi et al. 2004, Taguchi and Wu, 1979, Wawrzynek, 1993, Kowal, 2002).

## RESULTS

The students enjoyed the method of teaching in both stages of the course. In all dimensions, the means of evaluation were high, greater than 4, and so above the neutral point of the scale. The medians were mostly higher than means, coefficients of skewness were mostly negative, thus dominated high results above the neutral point of the scale. Thus the evaluation was very good.

At the beginning and at the end of the course the students gave the highest grades to effects of teaching such as knowledge (EF), to skills (SKILLS), and to social competencies (SC). The overall evaluation of the course was high, at the end of the course better than at the beginning.

Effects of knowledge were assessed similarly at the beginning and the end of the course. The best scores at the end had such effects as 1) understanding the basic definitions of the subject, 2) ability to find and compare significant associations in the field, and 3) ability to formulate solutions using the methods of the subject, knowledge on techniques adequate to the subject.

The most developed skills comprised 1) an ability to use basic theoretical knowledge and practical skills in the subject, 2) understanding analyzed phenomena and processes on the

basis of the methods of the course, 3) an ability to use knowledge and skills obtained during the course for analyzing proposed solutions of concrete problems and for elaboration of new solutions using methodology, techniques and tools of the course, 4) an ability to introduce proposed solutions in similar projects.

Students emphasized development of social competencies like 1) spending time with their team members also in their free time, 2) feeling comfortable in sharing their time with their team members, 3) being more respectful to each other in their team, 4) being more helpful to others in the team, 5) being able to more properly formulate priorities that support the implementation and solving an assumed task as a team.

At the end of the course, the students appreciated 1) enlarging horizons, 2) feeling to learn new things that are important for their future, 3) a conviction that the course improved their skills, 4) a conviction that the course improved their knowledge, 5) a conviction that the course developed their knowledge, 6) a conviction that the course delivered the students a good overview about the problematic of the fields of the topic, 7) an ability to understand the subject more clearly, 8) motivation to participate in this course, 9) a recommendation of this course to other students.

The following aspects were problematic for the students at the end of the course (however all average results were above the middle point of the scale, thus positive): 1) teachers preparation for the course, 2) learning faster than in other courses, 3) organization of the course in the classroom, 4) giving the knowledge in a clear and understandable way.

## **CONCLUSION**

Students developed their social competencies the best and they were less differentiated and more similar to each other in this dimension. Most of them emphasized the elimination of their deficits and development of their social competencies. The students appreciated the development of the ability to cooperate and work in a group while taking different roles during preparation for common projects, with the use of the methods, techniques and tools of the course. They also developed the courage of openly speaking about personal topics. They emphasized that after the project is over, they would like to have another project with the same team. The students enjoyed communication improvement and an ability to talk openly about critical issues in the team. Thus, students' evaluations support the importance of communication for future work in the sphere of maintaining labor discipline and

implementation of a project (Mäkiö-Marusik et al. 2017). Thus, the realization of assumptions of the authors' novel holistic approach helped to overcome technological-economic component dominance over social-humanistic ones (Mäkiö- Marusik et al. 2017).

The students enjoyed skills development, despite higher differentiation at the end. The students emphasized their developed ability to use basic theoretical knowledge and practical skills in the subject. They also better understood the phenomena processes and analyses on the basis of the course methods. The students emphasized developing the ability to use knowledge and skills, to analyze proposed solutions of concrete problems and to propose new solutions using methodology, techniques and tools of the course.

Despite differentiation at the end, students highly appreciated new knowledge. The course helped to find the students who are more capable and more versatile. Perhaps, therefore, some of them, being not so brilliant, were a little disappointed. Students emphasized the development of the ability to see and understand better whether the proposed education meets their expectations in terms of knowledge and its acquisition, and whether it is the expected field for them. Thus, the course confirmed the need for individualized attention to knowledge development, to develop the engineers of the future, to embrace innovative, student-centered practices (Mäkiö-Marusik et al. 2017). Students emphasized beneficial new knowledge that enables them to choose the adequate methods for the types of problems, to find and compare significant associations and correlations, and to formulate solutions using the methods of the subject. This corresponds to the best practices in teaching technical courses (Speranza et al., 2017).

We believe that such future studies may help to improve the teaching of technical subjects in general. To conclude, we hope that more research projects in higher education will follow and T- CHAT will create a robust foundation for this research.

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# **Session:**

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# Towards Integration of Mobile Technology and Knowledge Management in Organizations: a Preliminary Study

by

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## ABSTRACT

Mobile technology is commonly present in almost every domain of a contemporary society. Numerous examples include successful projects, specifically the use of mobile technology in knowledge management. It should be noted, however, that the vast majority of existing publications and research in the field of knowledge acquisition pertains to the use of mobile technology and mobile learning in education. Research works concerning the investigation of the real benefits and possibilities for utilizing mobile technology in knowledge management are still scarce. In a knowledge-based economy, effective knowledge management in an organization allows us to gain a competitive advantage in the marketplace and is essential for a company's survival. Hence, the dynamic development of mobile technologies observed in recent years can make an important contribution to achieve this goal. This study aims to analyze the state of the art in the field of utilizing mobile technology in knowledge management. It attempts to identify and discuss the key research gaps in the field of mobile technology and knowledge management integration highlighting future research directions.

**Keywords:** knowledge management, mobile technology, mobile learning, organization.

## INTRODUCTION

The development of various technologies affects the functioning of both individuals and organizations. Mobile technology's rapid growth can be observed in the last decade and offers several benefits including connectivity, flexibility, interactivity, and location awareness (Nord et al., 2016). Literature contains many definitions of this concept and, at the same time, many

authors also use interchangeable terms (e.g. mobile device, mobile computing) to describe mobile technology. Dearnley et al. (2009) defines mobile technology as a coexistence of an easy-to-transport device that allows for instant access to information. Hussain & Adeeb (2009) states that mobile technologies refer to areas defined by mobile internet connections and mobile devices. The latter can be defined as a portable, wireless computing device that is small enough to be used while held in the hand (Caudill, 2007). Today, billions of users have mobile devices that are opening up new possibilities in many areas providing access to information, processes, and communication anytime and anywhere (Martin & Ertzberger, 2013).

The widespread use of mobile technology is reflected in the number of scientific studies. Table 1, the first row, shows the number of mobile technology publications indexed by Google Scholar in the last seven years. In the last decade, we can observe a steady increase in the number of publications each year. By comparing the figures at the beginning of the decade to the previous year, the number of papers in 2016 is more than twice as large as in 2010. This indicates a strong interest among scientists in this subject.

Despite the undoubted advantages of mobile technology, it has, however, numerous limitations. In her study, Kukulska-Hulme (2007) distinguishes some areas with limitations and weaknesses, namely: (1) physical attributes of mobile devices, (2) content and software application limitations, (3) network speed and reliability, and (4) physical environment issues. However, with the advancement of technology, some of these limitations are gradually eliminated.

The development of mobile technology has also dramatically changed the way business is conducted, and we can observe this technology utilization in numerous domains. With a mobile connection, the employees have the ability to access corporate resources anytime and anywhere, which leads to increasing their efficiencies from enhanced communication and connectivity. Considering its properties (particularly access to information anytime and anywhere), mobile technologies should operate well in the process of gathering, provision, and the use of knowledge. It should be noted, however, that the vast majority of studies in the field of knowledge pertains to the use of modern technology, especially mobile learning and e-learning in education (Hwang & Wu, 2014; Paliwoda-Pękosz & Stal, 2015; Kukulska-Hulme, 2013; Hsu, 2013). Unfortunately, few studies have been carried out on the possibilities of utilizing mobile technology, especially mobile learning, in knowledge management in organizations. The reason for this may be the limitations mentioned earlier,

which may be a significant obstacle for the use of mobile technologies in organizations, such as security of data access and hence the resistance to the use of mobile technology in organizations on a larger scale. Hence, the intention of this paper is to review the literature in the field of mobile technology and knowledge management integration highlighting future research directions. In particular, the study attempts to answer the following question:

*What issues have been raised in the context of mobile technology and knowledge management?*

This paper is organized as follows. The next section provides an overview of the knowledge management concept and its impact on a modern organization. The following section presents an overview of research concerning the utilization of mobile technology in knowledge management. The paper concludes with the summary and future research directions.

## **KNOWLEDGE MANAGEMENT**

Knowledge management (KM) emerged as a research domain in the early nineties of the previous century (Prusak, 2001). Since then, research has been undertaken in different domains that incorporated the KM concept and, as a result, a domain-specific definition of this concept has been developed (Girard & Girard, 2015). In the context of an organization, KM might be defined as “*a conscious strategy of getting the right knowledge to the right people at the right time, and helping people share and put information into action in ways that strive to improve organizational performance*” (O'Dell & Grayson, 1998). On the basis of his experience, Probst (1998) proposed the key interrelated blocks of KM that include knowledge identification, acquisition, development, distribution/sharing, use, and preservation. Additionally, he distinguished the two blocks: knowledge goals and knowledge measurement. It should be noted that knowledge identification stems from the definition of knowledge goals whereas knowledge use results in knowledge assessment/measurement that provides feedback to knowledge goals. Similarly, Bhatt (2001), while investigating the interrelations between technologies, techniques and people, proposed the process model of KM that involves: creation, validation, presentation, distribution/dissemination, and application.

Knowledge distribution is interrelated with education and in recent years e-learning has become widely recognized as a promising contemporary method of employee education

(Wyslocka, 2015; Cheng et al., 2014). The interrelation between e-learning and knowledge management focused attention of numerous studies that concerned the following aspects of knowledge management (Judrups, 2015): knowledge creation and acquisition, tacit knowledge conversion into explicit knowledge, knowledge organization and storage, knowledge dissemination and retrieval, and evaluation and feedback.

Furthermore, several e-learning and knowledge management integration models were developed (Judrups, 2015). Recently, Judrups (2016) proposed the general Knowledge Management and e-Learning Integration Model based on the competence-based framework that involves four stages: (1) identification of an organization's strategic learning needs, (2) identification of individual employees' learning needs, (3) development and deployment of a learning strategy, and (4) quality control. Considering its characteristics, this model, in our opinion, might be applicable to mobile learning as the vital part of mobile technology utilization in an organization.

## **MOBILE TECHNOLOGY IN KNOWLEDGE MANAGEMENT**

The rapid development of mobile devices has shown great potential and has become the driver for the use of mobile technology within an organization. In business settings, mobile devices facilitate communication, Internet access and data exchange. In their study, Nord et al. (2016) highlight some positive attributes for using mobile technologies for business support, namely: (1) increased productivity, (2) better customer support, (3) improved access to business information, (4) more timely results, (5) happier employees, and (6) increased levels of revenue and profit. For using the capability of the devices and increasing mobility and flexibility, enterprises allow employees to bring personally owned mobile devices (Bring Your Own Device - BYOD) to execute enterprise applications and access business data. Thus, leveraging BYOD significantly increases employees' engagement and offers considerable advantages, in particular, unlimited by time and place accessibility to corporate data, and increases engagement in the workplace and after hours (Eslahi et al., 2014). Stal & Paliwoda-Pękosz (2016) pay attention to the use of mobile technology in mobile learning in organization settings. Mobile learning might be considered as a component of knowledge management. The comparison of the number of papers indexed by Google Scholar referring to mobile technology/ies, e-learning, and knowledge management in the years 2010 to 2016 provides a quick insight into the importance of these topics and researchers' interest (Table 1).

**Table 1.** The number of scholarly papers indexed by Google Scholar in relation to mobile technology and knowledge management studies.

Search expression	2010	2011	2012	2013	2014	2015	2016
"mobile technology" OR "mobile technologies"	9700	12100	14500	15700	14700	16300	16600
("mobile technology" OR "mobile technologies") AND "education"	5600	7190	8880	11200	12700	14800	14800
"knowledge management" AND "e-learning"	4460	4530	4840	5010	5150	5760	4600
"knowledge management" AND ("mobile technology" OR "mobile technologies")	894	976	1070	1290	1370	2240	1520

As illustrated in Table 1, the interest in applications of e-learning in KM has been rather steady in the years 2010 to 2016, whereas the issue of mobile technology/ies in the context of KM is becoming increasingly important. The number of papers on utilizing mobile technology in KM is, however, still low when compared to the number of studies concerning “mobile technology/ies” in general. It seems that the research body dealing with interrelation between mobile technology and knowledge management is still scarce. We provide an overview of some vital issues raised by researchers in this area below.

### *New values provided by mobile technology*

Derballa & Pousttchi (2004) coined the term “mobile added value” that, in the context of KM, manifests itself in:

- ubiquity – the possibility of delivering content anytime and anywhere,
- context sensitivity – in the areas of personalization (specific context delivered to the specific user), interactivity (the possibility of immediate response and dialog), and location determination (the possibility of the specific content delivered at a specific location),
- identifying functions – the possibility of user identification,
- command and control – the possibility of using mobile devices to control applications or other devices.

Context sensitivity was also emphasized by other researchers, including Balfanz et al. (2005), who developed the concept of context-aware information processing.

### ***KM phases that might be enhanced by mobile technology***

In this area, the division between researchers might be noticeably connected with the KM blocks or stages on which they based their research (Probst (1998) or Bhatt (2001) – see the previous section). The research results are difficult to compare straight away since both models have slightly different stages/blocks. Table 2 presents our proposition of mapping that allows a comparison of the research results and a drawing of common conclusions. Taking this mapping into account, we can state that mobile technology can support all stages of KM process as was described by numerous studies (e.g. Derballa & Pousttchi, 2004; Balfanz et al., 2005; Gröger et al., 2016).

**Table 2.** The mapping of Probst's (1998) KM blocks into stages of Bhatt's (2001) KM process model.

<b>KM blocks (Probst, 1998)</b>	<b>The stages of the KM process model (Bhatt, 2001)</b>
<i>knowledge goals</i>	
identification	
acquisition	creation
<i>knowledge measurement</i>	validation
	presentation/formatting
development	
distribution/sharing	distribution /dissemination
use	application
preservation	

### ***Conceptual models providing guidance on how to utilize mobile technology in KM***

The research body concerning conceptual models of mobile technology utilization in the KM context is still scarce. A reference model for a mobile KM architecture was proposed by Balfanz et al. (2005). In this model, they stressed the possibility of context-aware information processing and in this vein defined mobile KM as “*information generated or needed within the specific context of an action (here: working action) a person is performing or is going to perform*” (Balfanz et al., 2005, p. 5). Hence, mobile KM involves three key components: (1) information, (2) context, and (3) action. The reference model shows how the phases of KM

(capture, validation, sharing, presentation) might be enhanced by taking into account the context in which they were generated, owing to mobile device support.

Similarly, the possibility of context-aware information processing was employed by Gröger et al. (2016) in their information technology architecture for manufacturing. One of the key components of this architecture is a mobile middleware that facilitates mobile visualization, mobile context aware data handling, mobile synchronization and caching. However, it should be noted that this architecture is domain-specific and might be used in manufacturing.

Features of domain-independent mobile KM systems were defined by Lima et al. (2016). On the basis of an analysis of the six mobile knowledge management use cases, they formulated the following properties of KM process enhancement by the mobile technology:

- knowledge creation/acquisition – facilitating an access to tacit and explicit knowledge that allows consolidation of new knowledge, coding new knowledge in an explicit form that requires setting the guidance for this coding (photo, text, audio, video) and the development of mobile applications for facilitating knowledge capture,
- knowledge validation – facilitating editing and deleting knowledge, reporting mistakes and facilitating collaborative validation,
- knowledge organization and storage – facilitating the management of data gathered in different formats (image files, text, audio, video), using tags or keywords for data classification,
- knowledge distribution – management of access rights to the specific knowledge, facilitating the possibility of delivering knowledge when required in the specific context,
- knowledge application – the possibility of immediate access to the knowledge anytime and anywhere.

Finally, Zhang, & Jasimuddin (2015) propose a model that captures the relationships between a central knowledge base and mobile devices.

### ***Prominent use cases of successful enhancement of KM by mobile technology***

Mobile technology has supported knowledge management in the following domains:

- manufacturing (Gröger et al., 2016),
- airplane maintenance (Thiele et al., 2008),

- on-site inspection, trade fair information system (Balfanz et al., 2005),
- health care (Rodriguez et al., 2003),
- knowledge creation through Virtual Teamwork, knowledge validation in the Case of Lessons Learned Database – choosing appropriate sale strategy for the particular customer; knowledge distribution through Case Based Reasoning - on site property evaluation; knowledge application with Virtual Reality – assistance during an aircraft assembly (Derballa & Pousttchi, 2004),
- journalism (Fagrell et al., 2000).

## **CONCLUSIONS AND FUTURE WORK**

The remarkable development of mobile technology has changed the nature of the modern workforce and employees are no longer restricted to working in one location. By carrying out a literature review, we examined the research question on utilizing mobile technology in knowledge management. The analysis leads to the following conclusions: (1) in the last few years, the interest in using mobile technologies in knowledge management has increased considerably, yet the number of studies are still scarce, (2) mobile technology can successfully enhance the knowledge management phases and support all stages of knowledge management process, (3) a widespread adoption of mobile technology should consider technology limitations when used in an organization.

Further work needs to be done, particularly a systematic literature review in the domain of mobile technology and knowledge management. It is recommended that future research should concentrate on the development of a comprehensive model of mobile technology utilization in KM that will embrace technical issues, security considerations, and social aspects of mobile technology usage.

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# From Service-Driven to Data-Driven: Study Design for Modern Facility Management

by

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## ABSTRACT

Traditional business models in Facility Management (FM) companies are aimed at handling service processes on commercial premises. Nowadays, such companies tend to collect large volumes of data from different sources and develop data-based products that assist in managing facilities. This is causing changes within their business models. In this paper, the authors investigate qualitative methodologies behind designing a two-stage research venture that, firstly, describes a current FM company business model and, secondly, helps to create a blueprint that could be an effective guide for a Data-Driven Business Model (DDBM) to be implemented by FM companies in order to advance their models from service-driven to data-driven. The rationales behind the method selected for launching the target study as well a design of the on-going research are provided.

**Keywords:** Data-Driven Business Model, Business Intelligence, Big Data, Facility Management.

## INTRODUCTION

Big Data can help organizations to manage large data volumes, perform complex analyses and a real-time integration of data from a variety of data structures and sources (Bange, Grosser & Janoschek, 2015). While Big Data is revolutionizing the way companies identify new business models and define their advantages over competitors, Bulger, Taylor & Schroeder (2014) bring up a definition originally introduced by Tim Davis: Big Data refers to data on a significant level of complexity and scale that cannot be managed with conventional analytic approaches. Big Data describes the methods and technologies for the highly scalable

loading, storage and analysis of polystructured data (Bange, Grosser & Janoschek, 2015) and usually refers to unstructured web data (Matsudaira, 2014). Handling unstructured data from multiple sources data comes with its own set of issues, such as ambiguousness and duplicated datasets (Maślankowski, 2016). However, for operational/financial purposes, companies usually scrutinize data through Business Intelligence (BI) analyses – where data comes from database-related systems, such as Customer Relationship Management (CRM), Enterprise Resource and Planning (ERP) or Workflow Management Systems (WfMS). Such data seem to be more structured than Big Data built around blogs, tweets, Facebook content etc. – hence, Big Data can be represented as Business Intelligence & Analytics 2.0 and 3.0 (Chen, Mao & Liu, 2014).

While literature provides definitions for data and places data at the bottom of DIKW (Data, Information, Knowledge, Wisdom) pyramid, it is more essential to establish what data really means for modern companies. According to Rotella (2012), data have become the lifeblood of organizations. In 2017, modern BI tends to become the top priority for global enterprises, early-stage startups, and everything in between. Palmer (2006) blogged back over a decade ago: *Data is just like crude. It is valuable, but if unrefined it cannot really be used. It has to be changed into gas, plastic, chemicals, etc., to create a valuable entity that drives profitable activity.* For start-ups, data is new oil (Lokitz, 2015). Finally, people are starting to work with data in a more instinctive manner, and, as far as the Top 10 Business Intelligence Trends for 2017 are concerned, the interface to data will start to feel even more natural – to a significant degree thanks to improvements in domains such as natural language processing and generation (Peterson, 2016). Nowadays, companies must begin to treat data as an enterprise-wide corporate asset. This enables sharing the data regarding customers and products – which often provides opportunities to up-sell, cross-sell (Kubiak & Weichbroth, 2010), as well as to create customer service and retention plans (Rotella, 2012).

Companies seek for ways to monetize their own Big Data in hope that new revenue streams can be captured (Lokitz, 2015). If data is the next big thing, then companies need to reflect a new business model that exploits this valuable resource (Rotella, 2012). Mature companies, e.g. Apple and Amazon, have built solid business models around Big Data; both use it to present products and services that might prove to be of high relevance to consumers (Lokitz, 2015). The Data-Driven Business Model (DDBM) is based on data as a product and determines how users shall benefit from the service provided, how this product can be managed – e.g. promoted, priced, delivered and sold (Bange & Derwisch, 2016). Companies

are developing new business models, prioritizing analytics and operations research throughout the organization. It involves data-driven – and a based on data-fueled decision making – style of entire organization, in every function and business area (Intel, 2015). However, leveraging Big Data and constructing data-driven business models still remains a challenge for many companies.

The authors observed a lack of information regarding business models in the Facility Management (FM) profession, which encompasses multiple disciplines to ensure functionality of the built environment by integrating people, place, process and technology (Wagnon, 2009). The following section provides an overview of related works ranging from business models to Big Data research. Next, the design behind an on-going empirical study within a Facility Management company is discussed. The final section summarizes the paper.

## **RELATED RESEARCH**

Analytics and other data product can derive value from the huge amounts of data being stored by businesses (Bange & Derwisch, 2016; Rotella, 2012). According to McAfee & Brynjolfsson (2012), companies that inject Big Data and analytics into their operations show productivity rates and profitability that are 5% to 6% higher than those of their peers. A business model describes how a given company intends to create value in the marketplace with unique combination of products, services, image, distribution, organization of people, and the operational infrastructure (Chesbrough & Rosenbloom, 2002). The extant body of knowledge from business model research (Osterwalder, 2004; Johnson, Christensen & Kagermann, 2008; Bouwman et al., 2008; Baden-Fuller & Haefliger, 2013) specifies the more general business model frameworks. According to Chesbrough & Rosenbloom (2002), the business model articulates the value proposition, identifies a market segment and defines a value chain within a company. Hedman & Kalling (2003) propose a seven-component framework – customers, competitors, offering, activities / organization, resources / supply of factor and production inputs, as well as a longitudinal process component to *cover the dynamics of the business model over time and the cognitive and cultural constraints that managers have to cope with*. The framework of Johnson, Christensen & Kagermann (2008) consists of four interlocking components (the customer value proposition, the profit formula, key resources and key processes) to deliver the value proposition profitably. In the corporate world, the practitioner-oriented business model canvas of Osterwalder & Pigneur (2010) is widely applied (Stuckenberg, Fieft & Loser, 2011). The canvas consists of nine building

blocks: value proposition, key processes, key resources, key partners, customer relationships, channels, customer segment, revenue streams and cost structure.

In the digital age, most papers describe business models that rely on data. To set up data-driven business models, companies build data products (Bange, 2016), which can be arranged into four analytics categories (Brownlow et al., 2015): *Exploratory* – searching for dependencies and correlations within the data, *Descriptive* – determining what has happened in the past, *Predictive* – concluding what could happen in the future, *Prescriptive* – prescribing the best course of action for the future. Based on the research of Bange & Derwisch (2016), there are four challenges in implementing data products: business model, marketing and sales, delivery of data products and data management. Three categories of Big Data business models are distinguished by Lokitz (2015) based on their value propositions and customers: Data, Information and Answers as Services. The Data-as-a-Service model (DaaS) is focused on delivering raw data for further actions upon it on the client-side. The Information-as-a-Service model (IaaS) on the other hand focuses on providing insights based on the analysis of processed data. Finally, the Answers-as-a-Service model (AaaS) is dedicated to providing higher-level answers to specific questions, rather than simply the information that can be used to come up with an answer. Barton & Court (2012) suggest three keys to building a data-driven strategy: choose the right data and sources using Information Technology (IT) support than build models that predict and optimize business outcomes and transform your company's capabilities.

Traditional business models are changing as a result of digitalization. This evolution refers to companies in various industries. Bachmann & Müller-Jones (2016) identify four factors – mobility, social media, Big Data and cloud computing – that drive the digital shift in retail companies as well as manufacturers active as retailers. Vestas, a wind turbine manufacturer, uses Big Data to create new sources of value and competitive advantage. Vestas managed to collect data on global wind flow patterns to model how the wind flows around the world – and now advises customers on where to place the wind turbines they purchase to ensure the most efficient energy production through the turbine's life (Nemode, 2017). A recent Global Information Technology Report (Dutta, Geiger & Lanvin, 2015) identifies Big Data application areas for economic development purposes (e.g. Health & Healthcare) and emphasizes the importance of data analysis and developing adequate business models. However, there is a real diversity of Big Data business models representing an interdependent data ecosystem (Bulger, Taylor & Schroeder, 2014). Making the most of Big

Data means having a clear business model and putting it in the very center of the business.

## ON-GOING STUDY DESIGN

The study aimed at providing the foundation for extending the company's offerings for data management and analytics through supplementing its service-driven business model with a data-driven one is qualitative in nature. Therefore, a number of qualitative and mixed research methods were taken into account. On-going research is devoted to exploring the nature of a contemporary real-life phenomenon: shedding a light on the reasons behind taking a set of decisions, the ways of implementing those decisions as well as results achieved (Yin, 2014). Additionally, while the research initiative implicates delivering a practical solution to an interdisciplinary challenge (involving both information technology and management), the constraints of the undertaking enable neither a joint intervention by both practitioners and researchers nor introducing a cyclic approach. Hence, a two-stage method portfolio narrowing-down process ultimately led to selecting a single-unit case study approach over action research.

The research is driven by a couple of research questions: (1) *what is the business model of the FM industry*; and (2) *how Big Data influence it?* As pointed out by Yin (2014), a single case design of the case study method assigns it a role in applying, testing, or building of theory following an empirical enquiry. The inquiry is being carried out in a multinational company headquartered in Poland, EU. All members of the Management Board of the company were recruited to participate in the research. The complete results of the empirical research shall be digitally recorded, transcribed, coded using dedicated NVivo software and analyzed. In order to increase the robustness of the analysis (Soja & Soja, 2017), the initial structure of research nodes was decided to be elaborated by each of the research team members separately and a cross-checking process is accounted for.

After establishing the “as-is” state of the company under research, a Data-Driven Business Model is to be developed. In order to elaborate the DDBM, the representatives of the company involved in the study shall be approached with the questionnaire covering six fundamental questions (Brownlow et al., 2015):

1. What do we want to achieve by using Big Data?
2. What is our desired offering?
3. What data do we require and how are we going to acquire it?

4. In what ways are we going to process and apply this data?
5. How are we going to monetize it?
6. What are the barriers to us accomplishing our goal?

## SUMMARY

Companies are developing new business models specifically designed to create additional business value by extracting, refining and ultimately capitalizing on data (Hartman et al., 2016). Literature provides examples of DDBMs in different business areas (Zaki, Lillegraven & Neely, 2015; Smith et al., 2015) that typically are based on similar frameworks (Brownlow et al., 2015; Hartman et al., 2016). Our research is driven by the motivation to innovate DDBM in Facility Management domain, where a high volume of operational and sensor-based data (Gawin & Marcinkowski, 2017) create added value in terms of new products; thus building a business model that enables decreasing property utilization costs.

At the current stage, the authors successfully launched a single-unit case study initiative within a multinational company in accordance with the design discussed in the previous section. Empirical data gathered shall be used to discover the “as-is” business model of the company involved in the research as well as elaborate a DDBM proposal.

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# **Business Intelligence Competency Center – Establishing the Assets behind Delivering Analytic Business Value**

by

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## **ABSTRACT**

While Business Intelligence brings new buzzwords each year, the maturity of many companies in terms of practical use of Business Intelligence (BI) often leaves much to be desired. Research shows that setting up Business Intelligence Competency Centers (BICCs) is among the means to narrowing the gap between the technological potential of BI and its utilization by business stakeholders. This paper is devoted to elaborating a proposal of a BICC Establishment and Evolution Model for a mid-sized company assuming the parallel implementation of a BI-class solution. This paper delivers a development version of a general competence-centric framework that substitutes thinking targeted specifically at releasing a BI product with phase-based evolution towards increasing the scale of Business Intelligence utilization company-wide and ensuring a continuous involvement and feedback regarding future IT functionality enrichment.

**Keywords:** Business Intelligence, Business Intelligence Competency Center, Model, Analytics Maturity.

## **INTRODUCTION**

It is providing adequate data to enable advanced analytics and decision-making that is one of the motivations behind managerial commitment regarding investments in Information Technologies (IT). In practical applications, advanced analytics is usually associated with the concept of Business Intelligence (BI) – an integrated set of tools applied in various domains that is used to support the transformation of data into information in order to take better

decisions and to solve different problems (Azma & Mostafapour, 2012; Seah, Hsieh & Weng, 2010).

Despite implementation of numerous IT solutions that might be classified as Business Intelligence, ensuring high competences of BI team members often remains a challenge. Moreover, while technology plays a key role in effective data analytics (Owoc, Hauke & Weichbroth, 2016), the successful development of such an initiative depends upon the stakeholders. The latter must be engaged, demonstrating their belief that enterprise data analytics will provide a sufficient return on investment in either money saved or that outcomes achieved will outweigh the cost of such projects (McCoy, 2013). Ipso facto, the maturity of a company in terms of the practical use of Business Intelligence often leaves much to be desired. Gartner summarizes the evolution path of corporate BI capability with its Business Intelligence and Analytics Maturity Model, as shown in Fig. 1.

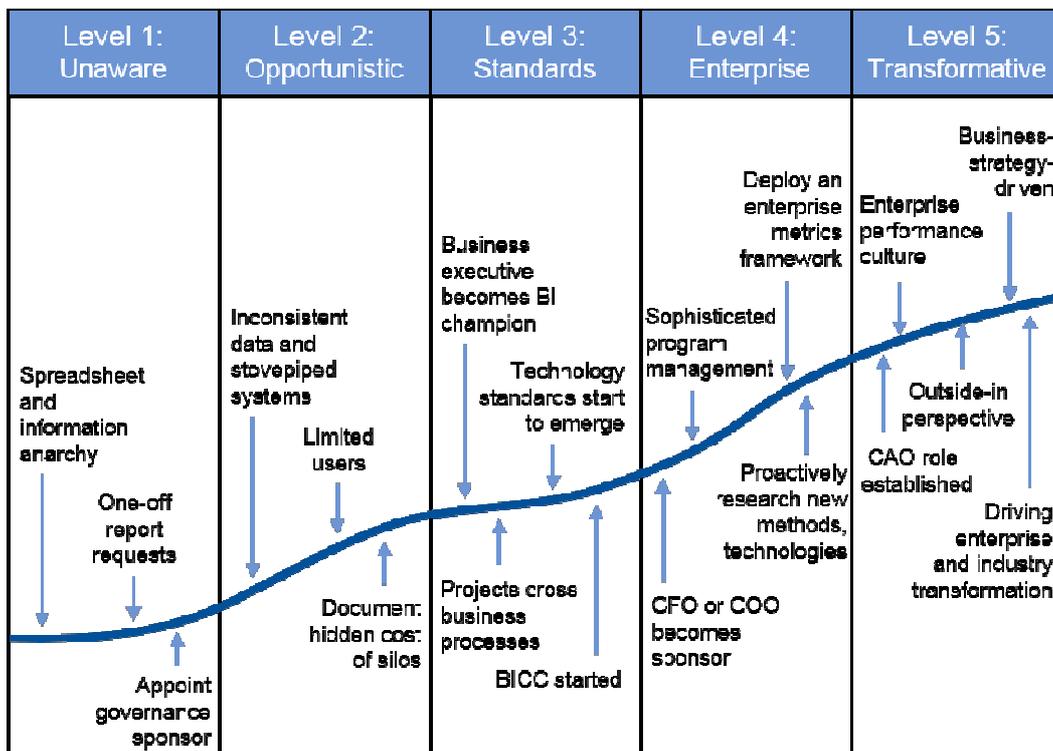


Fig. 1. Gartner’s Business Intelligence and Analytics Maturity Model.

Source: (Howson & Duncan, 2015)

Advancing beyond Level 3 remains rather an aspiration rather than a historical milestone for most of the companies that utilize BI solutions, and even reaching the aforementioned level proves to be a challenge. As reported by Wilbanks (2007), many companies are in the infancy stages of effectively managing their business information, as in a

survey of 175 professionals worldwide, less than a quarter reported that senior management relies on corporate BI to make decisions.

It should be noted that the accelerated success of Business Intelligence throughout the company is correlated with the establishment of a Business Intelligence Competency Center (BICC). BICC, sometimes also called a BI Center of Excellence (CoE), is a part of a BI strategy framework as critical element in increasing BI adoption, enabling BI self-service, and ensuring that organization has the right analytic capabilities to deliver analytic business value; it incorporates governance, program management, a BI strategy roadmap and milestones, education and training as well as support (Saporito, 2015). Therefore, the goal of this paper is to put forward a BICC Establishment and Evolution Model for a mid-sized company assuming the parallel implementation of a BI-class solution.

After the Introduction, Section 2 provides an overview of related work addressing both challenges regarding launching Business Intelligence initiatives and materiality of BICCs for the success of such initiatives. The BICC Establishment and Evolution Model proposal is discussed in Section 3, followed by conclusions and an overview of work-in-progress regarding practical application and verification of the model.

## **RELATED WORK**

A number of contributions stress the fact that Business Intelligence-related projects goes beyond typical system implementations that might be successfully handled by an IT department internally. For instance, Healy (2010) states that a traditional IT deployment effort often underestimates the unique issues associated with BI projects, including governance, executive sponsorship, data quality, data transformation and content delivery – that all must be weighed at the outset of any project. Hostmann (2007) confirms that organizations tend to treat data quality and accessibility problems as an IT issue (expecting IT staff to fix fundamentally flawed business intelligence/performance management initiatives), and concludes that blaming technology is a flawed, knee-jerk approach to data problems – without business user involvement, BI problems cannot be solved.

In order to respond to a number of specific BI-related issues, some companies set up BICCs. Foster, Smith, Ariyachandra & Frolick (2015) analyze and describe the development of a Business Intelligence Competency Center at New Tech Insurance, a multi-line insurance company operating in 23 states of the USA. In this case, the goal of establishing a BICC was

to empower strategic decision-makers to accomplish vital business objectives through a structure with strict data governance and information delivery. While centers are built with supporting BI technology and aligning target solutions with business demands regarding data analytics in mind, business stakeholders are often simply not aware of BI potential and its fit within the organization. Havenstein (2006) brings up a case of Raytheon Missile Systems and cites its BI manager, who stated that Business Intelligence was not a well-known subject outside of IT and it was up to his team to perform a considerable work regarding explaining the concept and BI-related evangelism. Saporito (2015) notes that despite approximately 80% annual growth in data and the projection of 75% of company employees to use analytics by 2020, most organizations reached only a 10-20% business intelligence adoption rate.

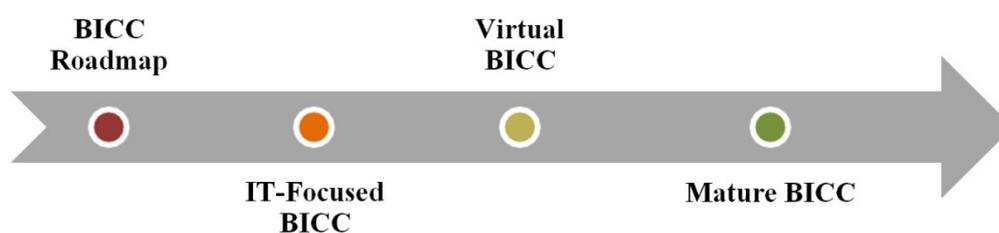
Although extensive in function, BICCs can vary in their breadth of responsibility, depending on what other shared service organizations already exist within the company (Graham, 2008). Healy (2010) sheds some light on experiences of Maine Medical Center regarding the value of supporting BI initiatives company-wide. In case of Maine Medical Center, the biggest evolutionary step involved a renewed intent to collaborate with Information Systems division, as a small, self-sufficient BICC can only benefit from the expertise and resources of a larger, operationally focused information systems group. Moreover, political issues dominated over technical ones in a process of breaking down barriers. Vierkorn & Friedrich (2008) point out an additional benefit of introducing BICCs. According to them, since companies with a BICC view business intelligence tasks from a more integrated standpoint, such companies integrate more data sources (comp. Gawin & Marcinkowski, 2017a) into the central reporting system – 65% of the companies with a BICC have integrated more than four data sources into their data warehouse, in contrast to only 47% of companies without this organizational structure.

The issue of Business Intelligence Competency Center responsibility and establishment has been raised *inter alia* by Hitachi Consulting (2015), Burnett (2007) and Velaris Consulting (2008). Hitachi Consulting (2015) proposes a three-phased approach for setting up a BICC along with key activities that are supposed to last between 6 and 24 weeks. In this proposal, the Initiation phase comprises defining a vision and assessing the current as-is state, followed by a Mobilization phase (design- and development-oriented) and finalized with an Execution phase (that stresses education, training, transition and support). Burnett (2007) covers typical BICC functions (i.e. deployment of new BI projects, analytics, data warehousing, supplier management, standards & training, support & maintenance of existing BI, and user support)

as well as points out different ways of funding a BICC establishment. While charging its internal customers is found to be one of the funding sources, corporate development funds or a mixture of the two are also used. Relevance of training and mentoring constituting basic areas of BICC responsibility is confirmed by Velaris Consulting (2008).

## BICC ESTABLISHMENT AND EVOLUTION MODEL

It is developing both competences and technology simultaneously that is the main assumption behind the BICC Establishment and Evolution Model proposal. Factors such as time constraints, the rhythm of internal and European projects as well as current inadequate awareness of BI technology potential and its impact on the growth of the organization do not mix well with prior establishment of the BICC and making it the driving force of building BI-related IT from scratch in the future. On top of that, while human resources recruiting from IT departments might be regarded a natural starting point for building BI competencies company-wide, initial research has shown that achieving high level of BICC maturity goes hand in hand with its initiatives being strictly driven by business objectives and goals – which change over time. A well-established BICC needs to be able to evolve with the business and with the needs of the people in the organization, regardless of country-specific (Soja & da Cunha, 2015) or cultural differences (Gawin & Marcinkowski, 2017b). Hence, the proposed model provides for a relatively rapid establishment of a BICC taking advantage of competencies built by IT staff over time and phase-based approach to parallel increase in the maturity of both BICC and BI technology (Fig. 2).



**Fig. 1.** BICC evolution path.

Source: own elaboration

The *BICC Roadmap* phase introduced in Fig. 2 is planning-oriented and intended to ensure a coherent blend of a vision behind BICC operation with the business strategy of target organization. It is obtaining strategic executive sponsorship that is the critical success factor while launching such an initiative – however the actual work does not involve a broad

involvement of top-level management yet (see Table 1). At this stage, it is valuable to take advantage of prior experiences with BI-related technologies along with their potential and to realize that Business Intelligence as such goes beyond just a technology. After organizational strengths and weaknesses are assessed, a transition plan is to be worked out and get approval among the key stakeholders.

**Table 1.** BICC Establishment and Evolution Model – milestones.

Phase	Competence-related readiness	Technology-related readiness
BICC Roadmap	<ul style="list-style-type: none"> <li>- Management Board passively involved</li> <li>- organizational “as-is” operation confronted with “to-be” projections</li> <li>- transition plan approved</li> </ul>	<ul style="list-style-type: none"> <li>- early concept of custom BI solution or adoption plan</li> <li>- inception of BI development project</li> </ul>
IT-Focused BICC	<ul style="list-style-type: none"> <li>- fundamental BICC roles assigned</li> <li>- BICC operational under temporary Chief Information Officer (CIO) supervision</li> <li>- opportunities and ideas explored</li> <li>- data sources investigated</li> <li>- BICC both business- and technology-driven, yet based on human resources provided by the IT department</li> </ul>	<ul style="list-style-type: none"> <li>- key system requirements gathered</li> <li>- feasibility study of BI technology deployment</li> <li>- possible external funding acquired</li> </ul>
Virtual BICC	<ul style="list-style-type: none"> <li>- Management Board actively involved</li> <li>- stakeholders across entire organization engaged</li> <li>- seeking technological solutions to analytical problems</li> <li>- BICC authorized to make strategic decisions</li> <li>- promotion and mentoring plan drafted</li> </ul>	<ul style="list-style-type: none"> <li>- BI solution under development or procured</li> <li>- additional system requirements accounted for</li> </ul>
Mature BICC	<ul style="list-style-type: none"> <li>- regular rotation of cross-organizational stakeholders</li> <li>- value derived from BI technology maximized through promotion of company-wide BI use</li> <li>- employees trained with best practices and mentored as an ongoing process</li> <li>- internal and external changes within BI environment monitored</li> </ul>	<ul style="list-style-type: none"> <li>- BI solution successfully deployed</li> </ul>

Source: own elaboration

The *IT-Focused BICC* phase is the result of pragmatism – any implementing organization should be aware that shaping BI competency within organization is a long-term process and assuming instant jump in competency growth while establishing a BICC is many-

a-time unrealistic or at least introduces a significant risk. As a consequence, the establishment of the early BICC is proposed to be supervised by a Chief Information Officer (CIO), while the dominant human resources-related contribution is expected to be provided by the organization’s IT department. Fig. 3 introduces the proposed composition of the BICC, in which blue/non-accented nodes along with maroon/solid line-drawn nodes denote its original members at the time of its inception. Within the *IT-Focused BICC* phase, more attention is devoted to elaborating concepts, ideas, and innovations as well as exploring end-user demands than to reaching target solutions, hence business development- and innovation-oriented R&D initiatives remaining under the parent organization’s control are supplemented with active co-operation with academia.



**Fig. 2.** Projected BICC membership fluctuations.

Source: own elaboration

On the other hand, legal and financial repercussions of a BICC establishment implicate the involvement of lawyer(s) and financial analyst(s) – who are not supposed to remain being active members of the center after it initiates day-to-day operations (see Fig. 3, maroon/solid line-drawn nodes). The expected time of technological BI component development requires extensive analyses and discussions regarding its capabilities, hence the trade-off between the focus on business and IT needs. Having said that, the BICC itself is expected to focus more on strategy, people, processes, metrics, readiness, and adoption assessments than on deliverable technologies. Within this phase it is necessary to make the final decision on whether the BI technology is to be developed in-house or acquired from a vendor and comprehensively parameterized/customized. Apart from the fit to business needs and the Total Cost of Ownership of each variant under consideration, the ability to successfully secure external financing sources (e.g. from European projects) constitutes a decision-making factor as well.

The *Virtual BICC* phase spins off a cultural change within the organization – as a result, a data-driven organizational activity might be accomplished. The BICC evolves beyond housing the provision of BI functionality based upon the IT department resources. The entire organization is involved in creating information and knowledge based on available tools while the IT department itself manages the IT solution development process. Virtual BICC is accounted for taking strategic decisions and focuses more on processes, architectures, services and technology vendors, technology development as well as integration.

The Chief Executive Officer (CEO) is supposed to take over business intelligence strategy design and take an active role regarding facilitating organization-wide cooperation regarding analytics enhancement and absorption. As stated by Olszak (2016), it is the strong support of the CEO – alongside all users' trust in BI – that constitutes a critical success factor behind achieving the highest level of BI maturity within a company. At this stage, it is highly advised to draft future Business Intelligence promotion (as initiated by the CEO) and mentoring plans as aforementioned activities constitute vital components of a mature BICC. The Virtual BICC day-to-day operations involve a number of additional business stakeholders (see Fig. 3, green/dotted line-drawn nodes) – albeit each business is likely to engage a unique combination of BICC members recruiting from different business departments, since organizations differ in processes layout and added value is heavily dependent on the unique expertise of each introduced member. We propose including the personnel responsible for carrying out sales (that is naturally affected by the transition towards far-reaching BI use) as well as project managers on such domain experts list and to supplement them with given

industry-specific experts.

The final phase, i.e. *Mature BICC* phase, is aimed at achieving critical success factors regarding mentoring system in operation as well as promoting the company-wide use of BI. Moreover, a wide rotation of BICC members is proposed to be put into practice, as maturity rises when – instead of relying on even the greatest professionalism of an individual – the diffusion of these competences is ensured. Value derived from BI technology (that at this stage achieved working state) is to be maximized by promoting the routine use of applications and tools, approaching the employees with benefits of Business Intelligence, mentoring, as well as supporting corporate culture focused on information analysis. Due to the dynamic changes taking place both within business analytics and the IT world, the BICC development process involves continuous improvement and should constitute a key element reviewed as part of an overall BI strategy review and update. Business needs evolve – and new capabilities are needed to adapt to these demands and enable technological advances.

## **CONCLUSIONS AND WORK-IN-PROGRESS**

This paper proposes the BICC Establishment and Evolution Model that enables the launching of a joint Business Intelligence technology- and competence-development project within a limited timeframe. The model stimulates leaning away from thinking that is targeted specifically at releasing a BI product, to introducing a phase-based evolution towards increasing the scale of Business Intelligence utilization company-wide and ensuring a continuous involvement and feedback regarding further IT solution advancement instead. The target, mature BICC involves top management-sponsored mentoring and BI capability, applications, opportunities and added value promotion and is a vital step towards data-driven company.

As a part of on-going research, the BICC Establishment and Evolution Model is being applied in practice and submitted to a verification process within a Small/Medium-Sized Enterprise (SME) listed on the Polish stock market. Knowledge and practical experience gained during the verification stage shall be the basis for introducing revisions and enhancements within the model.

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# The Essence of Humanistic Innovation

by

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## ABSTRACT

Generally speaking, innovation in the humanistic aspect means any progress in human action, which can be implemented in two ways. The first is technical and the second is in the area of the humanities. Most people, especially in the sphere of business, think that any form of innovation is made only in technology. We want to show that this type of thinking is not always correct. Innovation also applies to the world of humanities. This point of view is the "creed" of this article. The humanistic sense of innovation can be realized in three aspects: 1) methodological, 2) cognitive or cognitive context, 3) purely scientific.

This article considers all three aforementioned ideas. For example, firstly we introduce a new method called "definition", in German called "Treffsicherheits". As stated earlier, most people think that innovation is done mainly in business or technology, which is a mistake, of course. Innovation in the humanities takes place in many practical activities and ideas. This process is quite up-to-date. All these issues will be discussed in detail in further parts of this abstract. Innovation can also be realized in the "cognitive" sphere. It means progress (increase) of knowledge or education. This is a fundamental issue in all innovations. Finally, innovation can be realized in pure abstract science and plays a key role in science. All these issues will be described in detail in an article. We will give more examples that show how innovation can be useful in the humanities. Our point of view is based on hard scientific arguments. We hope that our presentation will provide valuable insights.

**Keywords:** Humanistic Innovation, Socioeconomic Development, Wellbeing, Internet

## INTRODUCTION

In this paper we discuss how one should understand innovations in the sense of humanities, in the aspect of practical activities at the initial stage, before any scientific

phenomenon, understood as an element of civilization progress, etc. In socioeconomic sciences, innovations from the perspective of human capital and information and communication technology (ICT) mean the capability of developing novel competences, knowledge, skills, social and managerial competencies for social or economic communities (Qureshi, 2007; Kowal, and Jasińska-Biliczak, 2016; Kowal and Paliwoda-Pękosz, 2017). In the humanistic approach, it will primarily concern each human being. First of all, every person should be treated subjectively. The humanistic approach assumes the use of methods, technics and actions to protect human dignity.

Contemporary civilization is focused on increasing work efficiency and maximizing profit, thus limiting the satisfaction of human needs to the material sphere. In our assumption, this is an obvious and serious mistake.

### 1. Innovation in practice.

The magazine "Ogólnopolski Przegląd Medyczny" (2017) has recently reported about innovative equipment in vascular surgery. It is a really great achievement in medicine as well as in science and technical technology itself. But sometimes, it is quite unpredictable that a robot will get an unplanned electrical impulse that can damage a patient's organ or even lead to a patient's death (Budzowska, 2017; Xu Liu; Yuan Liu; Lulu Zhang; Wannian Liang; Zenghong Zhu, 2013).

Is there a real factor in this situation? This is, of course, a question which touches the area of morality and ethics. Is there a monad responsible for such an unexpected situation? Who, or what is responsible then?

These issues are discussed by Armstrong, (2017), and Sorokin (2010) in the popular magazine *Pressje*, among many others. In addition to this directive, humanism recommends that people should not think only about themselves, but also about other people. Humanism is not an ideology, a political theory or a religion. It is our human reflection about man.

### 2. Innovation in humanism.

Science is not divided, however, some researchers prefer to speak about natural sciences and the humanities. But this is the division of W. Dilthey (1911). Science has one face, whose name is "symbiosis" or "unification". If, for example, you consider business psychology, it belongs neither to the humanities nor to the natural sciences.

So what is the connection with innovation?

Innovation in the humanistic context consists of the means and methods to help and provide service to people (Kowal and Paliwoda-Pękosz, 2017) and this has radically changed thanks to enormous technological progress. It is nothing but innovation. In the future, help will have forms different than today. It is going to be innovation. Psychological contact between people is different now than in the past because of ever appearing new cybercommunities using mobile phones, personal computers, Internet network as social media etc. These are examples of innovation. All social life can be subject to innovation. Such innovations are a hope for many people and can lead to socioeconomic growth (Roztocki and Weistroffer, 2016). However, they need to develop competencies for information and communication technologies (Kowal, Kwiatkowska, and Patro 2010). While innovations in technology relate to the improvement of machines, products, services or technological and organizational processes they concern a specific environment (local-innovation) and economic profits. Meanwhile, humanistic innovation is the property of all humanity. Humanistic innovation can mean, of course, the novel technological and organizational changes and the capability of developing novel competences, knowledge, skills, social and vocational competencies (Qureshi, 2007, Kowal, and Paliwoda-Pękosz, 2017) but first of all for man's wellbeing, quality of life (Roztocki and Weistroffer, 2016), happiness, and protection of human dignity. Thus, for a human being; a good or satisfactory condition of existence is a state characterized by health, happiness, prosperity and welfare. Innovation should influence the well-being of the nation and its people (Oxford Dictionary 2017, Dictionary.com 2017). A special role can be played by pharmacological or medical innovations that can heal and prolong human life. For instance, innovations should be continuous to help people in poor areas or in areas affected by war, or to help refugees, to balance economic and social inequalities.

## CONCLUSION

Humanistic science offers various forms of activities and never closes its development. It offers natural progress. For this reason the ideas of humanism are, beautiful and unlimited. It ensures the development of culture and civilization in the ancient Greek sense which means the unity of science and educational progress and medical progress. Deepening man's humanism makes life more pleasant, joyful, calmer, more efficient and happier. For this reason, the ideas of humanism can be beautiful.

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**Session:**  
**Psycho-social, economic and educational aspects  
of ICT innovation**

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# Improving the quality of healthcare through Internet of Things

by

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## ABSTRACT

This paper attempts to outline how the adoption of Internet of Things (IoT) in healthcare can create real economic value and improve patient experience. Thus, getting the maximum benefits requires understanding both the IoT paradigm and the enabling technologies, and how IoT can be applied in the field of healthcare. We will mention some open challenging issues to be addressed by the research community, and not only. Besides the real barriers in adopting the Internet of Things, there are some advantages regard collecting and processing patient data, and monitoring the daily health states of individuals, just to name a few. These aspects could revolutionize the healthcare industry.

**Keywords:** Internet of Things, IoT platforms, healthcare, big data, cloud computing.

## INTRODUCTION

In recent years, a transformative paradigm known as Internet of Things (IoT) is coming in our lives. According to (Lucero & others, 2016) the IoT “is a technology concept that is currently transforming and redefining virtually all markets and industries in fundamental ways”. Among the types of services that stand to benefit from Internet of Things technology, healthcare is one of the most promising. In order to benefit from the full potential of Internet of Things, we need to understand where real value can be created; we also need to successfully tackle challenges.

Over time, several definitions for IoT have been provided worldwide, but currently, none of them have been universally accepted. Nevertheless, these different definitions reflect various perspectives and support different business interests and their analysis can help us understand the Internet of Things phenomenon.

Despite the fact that the list is not complete and will certainly be extended in the future, we can mention some definitions considered relevant by scientific literature.

**Table 1.** Definitions of the Internet of Things

<b>IoT Definition</b>	<b>By</b>
“The term ‘Internet of Things’ (IoT) denotes a trend where a large number of embedded devices employ communication services offered by the Internet protocols. Many of these devices, often called ‘smart objects,’ are not directly operated by humans, but exist as components in buildings or vehicles, or are spread out in the environment.”	(Tschofenig, Arkko, Thaler, & McPherson, 2015)
“A network of items — each embedded with sensors — which are connected to the Internet.”	(IEEE Institute, 2014)
“The Internet of Things (IoT) is the network of physical objects that contain embedded technology to communicate and sense or interact with their internal states or the external environment.”	(“Internet of Things Defined - Tech Definitions by Gartner,” n.d.)
“The IoT creates an intelligent, invisible network fabric that can be sensed, controlled and programmed. IoT-enabled products employ embedded technology that allows them to communicate, directly or indirectly, with each other or the Internet.”	(Chase, 2013)
Interconnection of sensing and actuating devices providing the ability to share information across platforms through a unified framework, developing a common operating picture for enabling innovative applications. This is achieved by seamless large scale sensing, data analytics and information representation using cutting edge ubiquitous sensing and cloud computing.	(Gubbi, Buyya, Marusic, & Palaniswami, 2013)

Most Internet of Things definitions focus on common aspects, such as the interconnection of uniquely identifiable things and the connection of things to the Internet, big data, intelligence, etc. There is also a general agreement on the fact that IoT changes the way things are perceived and used in the smartest way possible, in order to meet the individual’s needs to the best possible extent. For example, patients with heart or respiratory diseases or diabetes could be monitored through ingestible or attached sensors. These devices can transmit readings and alert the patient, nurses and doctors when vital signs indicate an imminent problem; the purpose is to take action in order to avoid crises, and also unnecessary hospitalization.

According to a survey conducted by Forrester Consulting on behalf of Zebra Technologies (“IoT to Revolutionize Healthcare Industry: Survey,” 2015), 97% of the surveyed healthcare industry professionals agree that “the IoT is the most strategic solution

their organization will undertake this decade”. Nine of ten healthcare IT departments are prepared to make the necessary changes in order to implement IoT solutions. Moreover, the survey reveals that over half of the healthcare respondents have already begun implementing IoT solutions in their practice.

By analyzing various worldwide studies and surveys, we can ascertain that over the last years, the interest and intention to invest in an IoT-based solution has steadily increased. Just a few years ago, some companies didn't even know what IoT was. And now there is a belief that for any new societal challenge, there is always an IoT-based solution that successfully addresses it (Atzori, Iera, & Morabito, 2017). Nevertheless, IoT is proposed almost anytime and anywhere, as a panacea of the Information Communication Technology (ICT) world and we cannot but ask ourselves if this is hype or reality. But only the future will tell. Meanwhile, industrial players are taking advantage of this impressive increase in the market momentum and use the popularity of IoT as a strong brand for consumer-oriented technology solutions (Atzori, Iera, & Morabito, 2017).

It cannot be denied that IoT could provide many benefits in different fields, including healthcare. And this is confirmed by the numerous results obtained in research activities. Thus, over the past years, the number of publications related to IoT in healthcare grew noticeably. Nevertheless, it should be noted that scientific literature does not always contribute to clarifying problems, as is the case with IoT definitions, which sometimes are inconsistent with each other. In order to explain what IoT refers to, several surveys have been published worldwide, each of them focusing on certain aspects: things (Atzori, Iera, & Morabito, 2010), architecture (Gubbi, Buyya, Marusic, & Palaniswami, 2013) (Weyrich & Ebert, 2016), standards (Stackowiak, Licht, Mantha, & Nagode, 2015), enabling technologies (Al-Fuqaha, Guizani, Mohammadi, Aledhari, & Ayyash, 2015), platforms, challenges (Miorandi, Sicari, De Pellegrini, & Chlamtac, 2012), applications (Man, Na, & Kit, 2015), etc.

This paper attempts to outline how the adoption of IoT in healthcare can create real economic value and improve patient experience (PX). Thus, getting the maximum benefits requires an understanding of the IoT paradigm and the enabling technologies, and how they can be applied in the healthcare domain. Also, the paper presents the key issues that remain to be tackled.

The rest of the paper is organized as follows. Section II overviews both the positive and negative aspects IoT has ever the field of healthcare. Some of the main enabling technologies,

such as big data, cloud computing, etc. that allow the expansion of power and reach of information are presented in Section III. Some of the various barriers that hamper the wider uptake of IoT in healthcare are presented in IV. Section V and VI introduce some existing IoT platforms and IoT-based applications. Section VII briefs on a few future research directions. The last section concludes the paper.

Currently, it is difficult to estimate how the healthcare field will benefit from the adoption of IoT and which will be the real financial benefits resulting from these new insights. In the next subsection, we present some of the worldwide studies and surveys that estimate the economic impact of adopting IoT in healthcare.

## **IMPACT**

The goals of applying IoT in healthcare support the key objectives of the Digital Agenda for Europe: “improving the quality of healthcare, reducing medical costs and fostering independent living for those needing care” (eHealth Action Plan 2012-2020-Innovative healthcare for the 21st century, 2012).

(Manyika et al., 2015) estimates a higher potential value for IoT in advanced economies over the next ten years, due to higher value per use. Moreover, there is a high potential for Internet of Things in developing economies. Thus, according to the same report, nearly 40 percent of the value could be generated in the developing economies.

According to a report from MarketResearch.com, the healthcare Internet of Things market segment is poised to hit \$117 billion by 2020 (“Big Data in Internet of Things (IoT): Key Trends, Opportunities and Market Forecasts 2015 – 2020,” n.d.). A McKinsey report estimates that by 2025, the economic impact of the Internet of Things (IoT) will be between \$3.9 and \$11 trillion dollars a year, equivalent to about 11 percent of the world economy (exhibit) (Manyika et al., n.d.). In (Manyika et al., 2013), cloud computing (and related trends such as big data, and the Internet of Things) is projected to have a "collective economic impact" of between \$10–20 trillion annually in 2025. By 2025, healthcare applications and related IoT-based services, such as mobile health (m-Health) and telecare (that enable medical wellness, prevention, diagnosis, treatment and monitoring services to be delivered efficiently through electronic media) are expected to create about \$1.1–\$2.5 trillion in growth, on an annual basis. It is the biggest economic impact on a global scale, taking into account that the whole annual economic impact caused by IoT is estimated to range from \$2.7 trillion to \$6.2

trillion by 2025 (Manyika et al., 2013).

It should be noted that, in addition and in relation to the direct effects of adopting IoT technologies in various areas, an entire dynamic industry is evolving. IoT creates new opportunities for both incumbents and new players. For instance, producers of medical devices are creating new business models by using IoT links and data, in order to offer their products as a service.

In “The Patient Will See You Now” (Topol, 2015), Eric Topol, one of the nation's top physicians, quoting an article in MIT Technology Review (Cutler, 2013), argues that the patient is the “single most unused person in health care”. The author highlights how the delivery of healthcare and related services from health sciences (pharma and devices) is influenced, among other things, by the developments of information technology.

Also, according to (Cutler, 2013), the role of the patient should be re-imagined, so that the patient becomes a participant and a contributor to healthcare.

Currently, there are numerous mobile health devices and software applications for mobile devices that offer information related to the owner's health status.

Giving patients the chance to monitor their own health could change the way people perceive themselves, their illness, and the people who care for them (Cutler, 2013). Patients play an active role in their own care and this can be accomplished by granting them access to their personal health records and by empowering them to own their personal medical data. Therefore, integrating user-generated data with official medical data enables integrated and personalized healthcare. Despite the fact that this approach proves useful to patients, some doctors are hesitant to apply it in reality.

According to various research teams (McKinsey, 2011), healthcare providers, for instance, discard 90 percent of the data they generate. Instead, they should convert the terabytes and zettabytes of big data that is not currently used (classified as dark data) into useful data in order to improve patient experience. Moreover, both patients and physicians must be willing and able to use insights from this data. But this is possible only with adequate technologies (Manyika et al., 2015).

The following significant changes in technology have come together to enable the rise of IoT.

## **ENABLING TECHNOLOGIES**

Over the past several years, the development of various technologies has enabled the evolution of the Internet of Things. Thus, the progress of the IoT concept involves bringing together RFID, connectivity, cloud (Abawajy & Hassan, 2017) (Atlam, Alenezi, Alharthi, Walters, & Wills, 2017), big data analytics (Papadokostaki et al., 2017) (Bhatt, Dey, & Ashour, 2017), and application development capabilities, just to name a few. Related to healthcare, we could mention the development of the IoT infrastructure in this field, which includes home monitoring and remote care, such as telemedicine, smart wearables, etc. (figure 1).

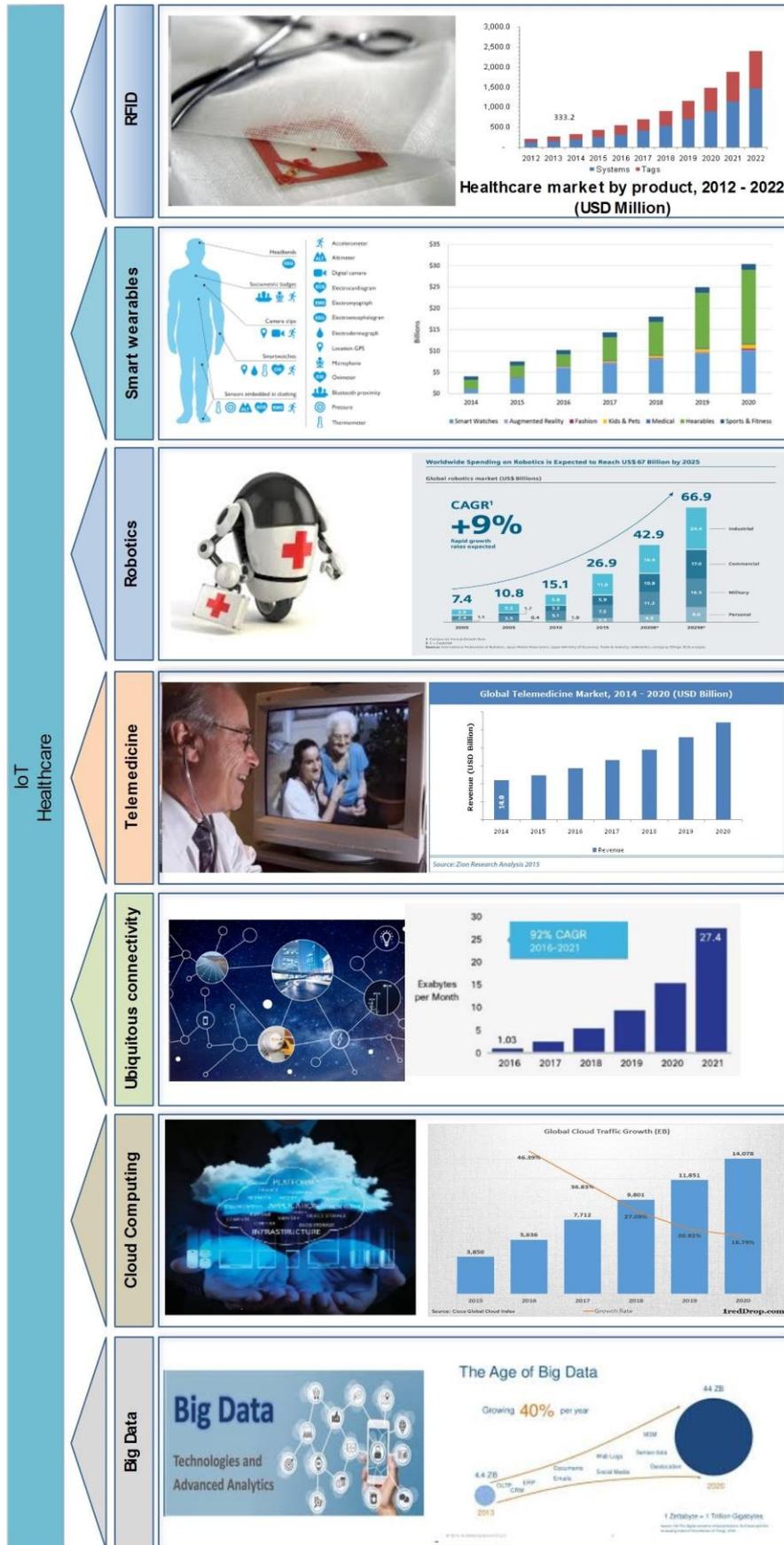


Figure 1. Enabling technologies for IoT Healthcare.

The millions and millions of things connected to IoT produce huge volumes of data. In these circumstances, an efficient, scalable and accessible way is needed in order to handle securely all this information and to produce value. Cloud technologies enable a solution for securely storing, processing and analyzing data, especially large data.

In order to monetize data and extract meaning, it does not suffice to collect or access larger sets of data. There is also a real need for analyzing and mining large amounts of data for the benefit of citizens, researchers, practitioners, businesses and decision makers (*eHealth Action Plan 2012-2020-Innovative healthcare for the 21st century*, 2012). Hence, the wealth and complexity of data and information collected from an increased number of different devices, systems and sensors, makes it essential to adopt big data technology in order to store, analyze, search, share, view query and update it. To allow faster and smarter decisions-making required for high performance and competitive advantage, machine learning, a branch of artificial intelligence, is used to add an intelligence layer to big data. Thus, in order to harness true benefits, big data is turned into smart data. But some healthcare scenarios need real-time data in order to enable doctors to give recommendations to the patients who need them. So, fast data is needed to provide instant results and responses.

For example, in the case of patients with heart diseases, doctors can develop predictive scenarios based on the patient's various biological parameters, and they can figure out how to intervene before a heart attack occurs. Moreover, chronic disease management can also benefit from the implementation of IoT-based solutions.

The application of IoT in healthcare will be accelerated by the convergence of the above mentioned technologies and not only.

Nevertheless, the implementation of the Internet of Things in various fields, such as healthcare, is raising concerns about data privacy and security. Worldwide, numerous studies reveal the need for greater focus on cybersecurity in order to protect patient data. Several scientific papers and reports that diagnose cyber threats and identify mitigation techniques and good practices for healthcare industry, e.g. ("Cyber security and resilience for Smart Hospitals — ENISA," 2016) have been published.

The U.S. Food and Drug Administration offers guidelines for medical devices (Health, n.d.) ("Postmarket Management of Cybersecurity in Medical Devices. Guidance for Industry and Food and Drug Administration Staff," 2016) and regulators regulate connected devices used by patients.

By adopting new specific legislation, governments are making a major step forward in the widespread adoption of the Internet of Things, but they should also remain very cautious and rigorous regarding the potential misuses of IoT technologies.

Internet of Things provides new and great opportunities, but also new and great challenges, some of them being illustrated in the next subsection.

## **CHALLENGES**

The adoption of IoT in healthcare faces several challenges. This shift from traditional healthcare to using new technology and engineering innovations requires healthcare reforms & mandates. The lack of IoT skills and knowledge among employees and management is an important challenge that healthcare providers need to address. Moreover, there is a general lack of confidence in IoT solutions among patients, citizens and healthcare professionals, that might be generated by certain lack of transparency regarding the use of data collected from various devices, such as mobile devices, sensors, etc. (*eHealth Action Plan 2012-2020- Innovative healthcare for the 21st century*, 2012).

The Internet of Things will definitely change the way both doctors and patients perceive healthcare. Thus, as we mentioned before, the role of the patient needs to be re-imagined.

Currently, software applications, including those for mobile devices, could provide information, various possibilities of 'self-quantification' and could even prove to be efficient diagnostic tools. In fact, they represent new ways of care, which reduces the distinction between the traditional provision of clinical care by doctors, and the self-administration of care by the patient. Therefore, the issue revolves around defining the roles that healthcare professionals, but also software and hardware developers, equipment suppliers, and so on, could play in the value chain of IoT healthcare.

Besides, there are also technological challenges. One of them, raising concerns, is the lack of widely accepted standards (Jabeur & Haddad, 2015). There are serious interoperability problems due to the heterogeneity of hardware/ software specifications and capabilities, the inconsistency of data representations, and their random mobility, the use of various medical devices, sensors, and patient own-devices.

In order to meet the specific requirements, it is necessary to extend and/or revise the existing standards for storing, viewing and sharing data.

Also, additional challenges concerning trust, privacy, and security need to be addressed in respect to making the adoption of IoT a reality in healthcare. Effective data protection is vital for building trust in IoT. According to (Contu, Middleton, Perkins, & Akshay, 2016) "the effort of securing IoT is expected to focus more and more on the management, analytics and provisioning of devices and their data". The importance given to this subject is highlighted, among other things, by the estimated spending. Thus, the worldwide spending on the Internet of Things security will reach \$348 million in 2016, a 23.7 percent increase from 2015, when the numbers mounted up to \$281.5 million, according to (Contu, Middleton, Perkins, & Akshay, 2016). The same report estimates that in 2018, the costs will reach \$547 million (see Table 2).

**Table 2.** Worldwide IoT Security Spending Forecast (Millions of Dollars) (Contu, Middleton, Perkins, & Akshay, 2016)

2014	2015	2016	2017	2018
231.86	281.54	348.32	433.95	547.2

Artificial intelligence techniques, which have proven their performance in addressing the issues of extremely dynamic, uncertain and heterogeneous environments, could bring solutions to some issues in the field of IoT, such as data processing and even security problems. At present, there are already some papers published addressing the integration of such techniques in the context of IoT, with applicability in various domains, e.g. (Rapti, Karageorgos, Houstis, & Houstis, 2017) (do Nascimento & de Lucena, 2017) (Singh & Chopra, 2017) (Mzahm, Ahmad, & Tang, 2013) (Mzahm, Ahmad, Tang, & Ahmad, 2016) (Kortuem, Kawsar, Sundramoorthy, & Fitton, 2010). Also, we could mention some publications analyzing various solutions provided by artificial intelligence to issues related to IoT, specific to the field of healthcare (Qi et al., 2017) (Korzun, 2017) (Vargiu & Zambonelli, 2017).

## INTERNET OF THINGS PLATFORMS

Internet of Things platforms are a key tools in addressing and redressing the aforementioned problems.

One of the main purposes of IoT platforms is to provide a solution to the increasing

demand of IoT applications in various domains. Thus, these platforms enable the IoT developers and

implementers to focus on the specific, differentiated and unique value the application provides and “outsource common, industry-wide features and functionality” (Lucero & others, 2016). In fact, these IoT platforms are dedicated software suites that offer a full spectrum of functional capabilities (Natis, Lheureux, Thomas, Pezzini, & Velosa, 2015).

The many versions of the IoT platforms vary widely in functionality. At present, there are numerous IoT platforms; some of these platforms that have been applied in healthcare are mentioned in Table 3; nevertheless, neither one of them is adequate to support the end-to-end workflow of an advanced IoT solution.

**Table 3.** IoT Platforms

<b>Platform</b>	<b>Producer</b>	<b>Ref</b>
Aeris	Aeris	(“IoT Services and Healthcare Focus on the Patient   Aeris,” n.d.)
AllJoyn	AllSeen Alliance	(“AllSeen Alliance,” n.d.)
General Electric’s Predix	General Electric (GE)	(“Cloud-based Platform-as-a-Service (PaaS)   Predix.io,” n.d.)
HealthSaaS	HealthSaaS, Inc.	(“HealthSaaS   The Internet of Things (IoT) Platform for Healthcare,” n.d.)
IoTivity	Open Connectivity Foundation, Inc	(“OCF - Healthcare,” n.d.) (Lee, Jeon, & Kim, 2016)
Kaa	KAAIOT	(“IoT Healthcare Solutions - Medical Internet of Things for Healthcare Devices and Hospitals,” n.d.)
Kore	Kore Inc.	(“M2M Healthcare Applications,” n.d.)
Telit	Telit	(“Healthcare – Telit,” n.d.)
ThingWorx	PTC	(“Enterprise IoT Platform,” n.d.)
Xively	LogMeIn	(“IoT Platform for Medical Devices   Xively by LogMeIn,” n.d.)

The list is open and at any moment, new producers or early market leaders could provide new alternatives.

The potential of IoT platforms enable the development of a large number of

applications. In the following subsection, we present a range of applications for the field of healthcare and also some futuristic applications.

## **APPLICATIONS**

At present, the Internet of Things has moved beyond concepts and trials and a range of industries begun to benefit from it (Geschickter, 2016).

Applications resulting from the adoption of the Internet of Things in healthcare are numerous and diverse. They can be grouped into various categories, such as:

- tracking of objects and people (staff and patients); identification and authentication of people; automatic data collection and sensing (Atzori, Iera, & Morabito, 2010) (Vilamovska et al., 2009); disease diagnosis applications;
- single-condition applications (refer to a specific disease or infirmity) and clustered-condition applications (deal with a number of diseases or conditions together as a whole) (Islam, Kwak, Kabir, Hossain, & Kwak, 2015).

The IoT-based applications lead to what is called the “quantified self” movement, allowing people to get highly involved in healthcare by using different devices and sensors, mobile phones, etc.; for example, there are blood pressure or ECG monitors or devices that monitor sleep activity, even ingestible sensors which can transmit information to doctors.

Thereby, new opportunities occur in managing health and disease aspects.

## **FUTURE RESEARCH DIRECTIONS**

In order to recast and revolutionize patient healthcare on a worldwide level, other trends take into account Web of Things (WoT) and the shift of the WoT towards a Social Web of Things (SWoT) (Zeng, Guo, & Cheng, 2011) (Chung et al., 2013) (Jabeur & Haddad, 2015) or even Social Web of Intelligent Things (Console, Lombardi, Picardi, & Simeoni, 2011). The WoT paradigm implies the use of web protocols and technologies in order to integrate and connect things (various real-world living or non-living entities) that become part of the World Wide Web. The Social Web of Things concept involves the use of social networks. One research trend treats Social Web of Intelligent Things (SWIT), as “an evolution of both the ‘Web of Things’ and ‘Smart Objects’ paradigms. In a SWIT, things become entities capable of an intelligent and social behavior” (Console, Lombardi, Picardi, & Simeoni, 2011).

But so far, in the current literature, there aren't many publications dealing with these approaches, especially regarding the field of healthcare. This can be explained by the many challenges as well as the lack of maturity of some of the technologies involved.

## CONCLUSION

The emerging development of Internet of Things is expected to provide solutions across a wide range of areas, including healthcare. Currently, more and more companies in this field recognize the transformational role of IoT solutions. In recent years, the momentum for IoT solutions in healthcare, and also in other domains, has increased and it is expected to be further facilitated by the development of enabling technologies, some of which presented in this paper. Thus, in order to determine better outcomes, enable faster decisions, and increase autonomous decision making various technologies need to be used, such as big, smart, and fast data, cloud computing, etc. The way these technologies and the emergence of new ones will impact the healthcare business strategy should be carefully considered. In this paper, we highlighted some of the challenges of adopting IoT in healthcare. Thus, for instance, the IoT development is plagued by cybersecurity and data privacy issues that will present major challenges for the widespread adoption of IoT. In time, these barriers will be overcome through rapid innovations brought by technological developments.

IoT platforms, of which the most popular have been presented in this paper, play an important role in enabling the development and implementation of IoT applications. IoT-based applications could improve the delivery of healthcare services in a time-saving and low-cost manner, which will also be reflected in the potential economic impact of IoT technology in healthcare.

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# Generic modeling language for e-learning

by

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## ABSTRACT

The design of e-learning products is a time-consuming process. This paper describes a novel component-based approach to specify e-learning products and their concatenation. The composition of the components results in e-learning products spanned by the components. The logical connection of the components themselves is based on rules defining the teaching and learning process. The characteristics of the component-based approach propose a new way of designing e-learning products applying the teaching and learning definition language (TLDL). The TLDL is used to configure the hybrid e-learning platform STIMEY. Both STIMEY and TLDL support the generation and research of a novel e-learning concepts by improving and enabling the conception of e-learning contents and by providing a generic environment for e-learning modeling.

**Keywords:** Innovation, technology, research projects, science, mathematics, education for the young, e-learning, teaching and learning description language TLDL.

## INTRODUCTION

The international competitiveness of European countries is highly dependent on well-educated citizens, especially in the fields of science, technology, engineering and mathematics (STEM). Thus, European countries need high quality and attractive education in STEM.

The traditional way of teaching has dramatically changed due to the progress of the information technology in the last two decades. These changes were coupled with new kinds of freedom in respect of time and place for learning and teaching, and with a number of advantages, for example in searching for information and learning materials.

Nowadays, various technological and media components may be used to attract young

people to education. This is one of the major goals of the EU-funded project STIMEY (Science, Technology, Innovation, Mathematics, Engineering for the Young). In the STIMEY project, a generic hybrid educational environment based on a well-researched pedagogical framework is being developed. STIMEY social media components, robotic artifacts, and radio are designed to make STEM education and careers attractive for young people. Additionally, it offers educators, parents, and organizations modern tools to deliver STEM education in an interesting and engaging manner.

As a generic hybrid educational environment, STIMEY is a configurable platform in which the teaching content presented as well as other aspects can be configured according to the stakeholders' needs. Creating suitable e-learning content is a time-consuming, costly, and risky task that is hardly supported by standardized modeling methods.

We define “teaching” as a process in which knowledge or abilities are transmitted from the teacher to the learner. The “learning” in turn is the process of gaining the knowledge or abilities, so the learning material that is taught. Teaching and learning together build up a mutual communication process with two main roles: sender (teacher) and receiver (learner). However, because of the mutuality, the roles in teaching may change, for example when the degree of the reached knowledge level is tested or the learner makes questions about the learning material.

For e-learning, multiple definitions exist. Some of them solely focus on the adoption of electronic means in learning generally. However, by doing so, no clear differentiation is done and even the use of a loudspeaker would be covered by it. Also, more accurate definitions exist. For example, Tavangarian et al. (2004) defines e-learning in the following way: “We will call e-Learning all forms of electronic supported learning and teaching, which are procedural in character and aim to affect the construction of knowledge with reference to individual experience, practice and knowledge of the learner. Information and communication systems, whether networked or not, serve as specific media (specific in the sense elaborated previously) to implement the learning process.” This definition emphasizes the learning process including the teaching process as a natural part of it. By doing so, the differentiation between the teaching and learning process is not clear. Additionally, the above definition does not mention the learning material explicitly. In e-learning, the content is presented electronically and the teaching process is partially controlled by the learner.

An e-learning platform is a software system that supports e-learning and the management of the learning material. We define a generic e-learning platform as an e-

learning platform that conceptually may support any form of e-learning. This universal character requires that the teaching and learning process as well as the teaching material need to be configurable. For this purpose, a generic configuration language needs to be created. This will be called the Teaching and Learning Definition Language, or TLDL for short.

This paper presents the TLDL which will be used for the configuration of the generic e-learning platform STIMEY. The acronym STIMEY stands for “Science, Technology, Innovation, Mathematics, Engineering for the Young”. The STIMEY platform is developed within the STIMEY project that is funded by Horizon 2020 H2020-SEAC-2015-1 program, ongoing between September 2016 and August 2019, with partners in Germany, Spain, Finland, Greece, and Belarus. The remainder of this paper is organized in the following way: In Section 2, the concept of the TLDL is presented. Section 3 discusses related works. In Section 4, the TLDL concept and approach are presented briefly. Section 5 concludes this paper with a summary and discussion about future works.

## **THE IDEA OF THE TLDL**

The purpose of the generic e-learning platform STIMEY is to demonstrate how novel pedagogical concepts may increase the interest and engagement of European youths in STEM education and careers. For this, within the STIMEY project novel pedagogical concepts will be developed. On the one hand, these concepts are supposed to combine robotic artifacts, social media components, radio, and e-learning materials as well as e-learning and e-teaching processes and on the other hand to connect students, educators, parents, and organizations to support the students learning (Assaad et al. 2017). The TLDL is easy to set up by configuring the e-learning environment implementation to the desired pedagogical concept. Thus, the TLDL may be described as a configuration language that may be used to define and to describe:

- e-learning and e-teaching processes and the
- e-learning materials,

to be executed within the STIMEY platform.

## **CONCEPT AND APPROACH**

The concept of the TLDL is based on the idea that a generic e-learning platform should support 1) generic content i.e. the e-learning material and 2) the generic teaching and learning process. The “generic” is understood in this context as the ability to support any thinkable

electronically-representable learning material used in any kind of e-learning and e-teaching process.

In our context, characteristic for e-learning is that the:

- content is presented electronically;
- teaching process is partially controlled by the learner;
- content consists of one or more components that are linked to each other;
- links between the components define the frames for the e-learning and e-teaching processes.

The central questions for the composition of the e-learning components are:

1. which links and are needed to combine components? and
2. how they can be implemented and finally composed to a concrete e-learning component?

In this content we define a component as follows:

**Definition: Component**

Given is a set of links  $L = \{L_1, L_2, \dots, L_n\}$  with  $L_i, i \in \{1, \dots, n\}$ ,  $n$  mutual independent links, and set of e-learning materials  $M = \{M_1, M_2, \dots, M_k\}$  with  $M_j, j \in \{1, \dots, k\}$ ,  $k$  mutual independent e-learning materials. Then we define the component  $C$  as a set of links  $L$  and e-learning materials  $M$  that is  $C = \{L, M\}$ .

To concatenate the components to new components and finally to new e-learning curriculums, we define a logic composition operation for two or more components as follows:

**Definition: Composition**

The composition is a logic operation that combines two components  $C_1$  and  $C_2$  in a new component  $C := C_1 \circ C_2$ . In this case  $C_1$  and  $C_2$  are subcomponents of  $C$ .

This definition allows the creation on new components by concatenation of existing components. Based on that the definition of component based e-learning and e-teaching structure may be defined:

**Definition: Component based e-learning and e-teaching structure**

Given is a set of links  $L$ , a set of e-learning materials  $M$ , and  $n$  components  $C_i = \{L_i,$

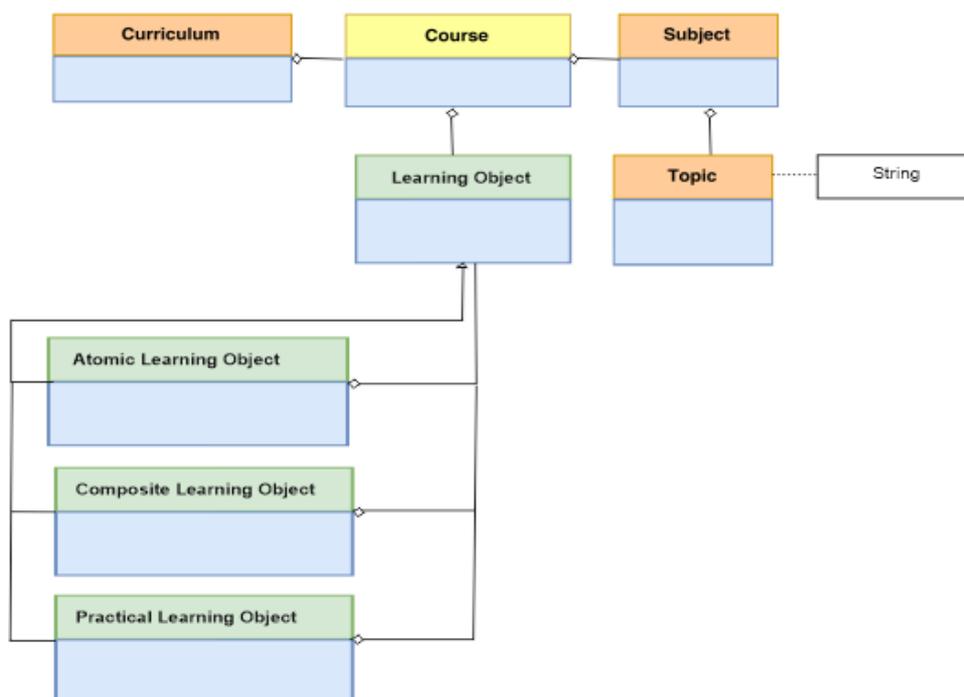
$M_i\}$  for  $i = 1, \dots, n$  with  $L_i \subseteq L$  and  $M_i \subseteq M$ . We define e-learning and e-teaching structure  $S$  based on components as a composition of  $n$  components, that is a component based e-learning and e-teaching structure as:  $S = C_1 \circ C_2 \circ \dots \circ C_n = \{ L_1, M_1\} \circ \{ L_2, M_2\} \circ \dots \{ L_n, M_n\}$ .

The above definitions allow the definition of any e-learning and e-teaching combinations in an easy manner. According to these definitions, a e-learning and e-teaching structure may be defined as a composition of components.

Note that the previous definitions are recursive. This means, that the composition may be considered as a component, too. This allows us formally to set up complete curricula with the TLDL.

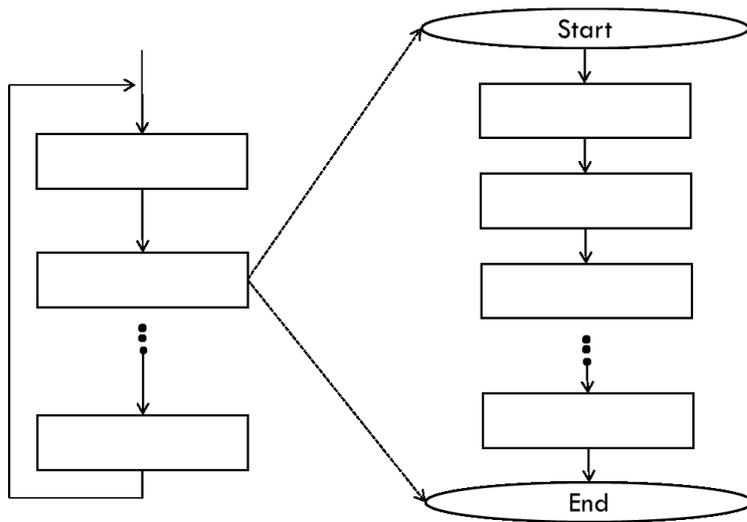
## MODELLING THE TLDL

The recursive definition leads to the following UML model (cf. Figure 1). In Figure 1, the curriculum (a component based e-learning and e-teaching structure) consists of multiple courses. Each course consists of multiple learning objects (components). In the class diagram the subdivision of components (learning object) in more concrete objects is depicted. The classes “Subject” and “Topic” are descriptions of the current course having a supportive character and therefore not a part of the definitions above.



**Figure 1.** TLDL as a UML class diagram

The link in the component definition is used to define the e-learning and e-teaching processes. The recursive definition of the S is visible in the generic process. The links in the components define their order in the teaching process. Each component may contain subcomponents, which define their own processes. This is illustrated exemplarily in Figure 2. The loop in Figure 2 stays for the situation, in which for one or another reason the process needs to be restarted.



**Figure 2.** A sequence of a generic process with sub processes

The recursive composition of components allows their reuse. This means that one learning object may be used in various courses. Consequently, novel compositions may easily be created by adding and removing of single components.

## FUTURE WORK

Our future work towards a component-oriented building of e-learning contents will concentrate on both the technical and pedagogical conception and the implementation. Our starting point in future research has the following background: a given platform including several synchronously operating e-learning products synchronously. This scenario raises issues such as to how the components can be concatenated?, what are concrete links to concatenate the concrete components?, which components cannot be composed into one market model? and what do the components look like?

This paper presents the fundamental idea configuration and creation of e-learning

products through composition of orthogonal components. It defines components as a set of links and e- learning materials that can be composed by a logic operation. The composition of orthogonal components can be used for e-learning product composition. In such instances, the composition operation must be extended to contain rules to define the correct order of components valid at any one time.

The proposed composition is relevant to the design and creation of novel e-learning products. We believe that our component oriented approach provides an effective manner to construct e- learning products.

## ACKNOWLEDGMENT

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# **Digital skills in formation of professional competences of students studying Economics**

by

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## **GOAL**

The purpose of the investigation is to identify the need for digital skills in the formation of professional competences for students studying economics in Peter the Great St. Petersburg Polytechnic University. Digital skills are an important part of professional competence for university graduates. A literature review confirms the lack of research focused on the need for digital skills development for students studying economics.

## **CONTRIBUTION**

First of all, the contribution is determined by the use of research methods. The following methods were used in the course of the investigation: content analysis, comparative analysis, techniques of survey development, and methods of primary data gathering through interviewing. The research is based on a competence approach to develop professionals in economics based on the concept of competence as an ‘alloy’ of knowledge and skills (hard, soft, digital, and social). The steps of the investigation are as follows: (1) structural analysis of digital skills necessary for professionals in economics; (2) analysis of study plans and programs for students studying economics at Peter the Great St. Petersburg Polytechnic University aimed at identification of disciplines focused on digital skills development; (3) verification of results obtained by interviewing students using the survey developed by the authors; and (4) formulation of

purpose of providing advanced digital skills needed for students in economics.

## **FINDING AND DISCUSSION**

The competence model according to the Federal State Educational Standards (FSES) imposed by the Russian Ministry of Science and Education includes three types of competence: general cultural, general professional, and professional (instrumental). Curricula and content of courses fixed on explicit study programs are defined by this set of competences.

An analysis of FSES for students in economics confirmed the low significance of digital skills and ICT. The share of ICT competencies in the total number of competencies varies from 7% up to 16%. Current standards of Peter the Great Polytechnic University include one general professional ICT competence only. Curricula and explicit study programs for students studying economics at Peter the Great Polytechnic University include ICT courses in the volume of 6 to 8 ECTS, which is equal to 2% to 3% of the total number of academic hours.

On the other hand, the investigation based on a developed survey and interviews with students showed a demand for the mastery of ICT in order to expand their professional capabilities (51%), to realise a business idea or to create a mobile application (27%) or for self-improvement (22%).

We see the same picture in different studies [1-3]. To cover the gap between the current state and the real needs of students in mastering digital skills, the authors recommend the following: to investigate the current state of art in ICT usage by university students and make a comparative analysis; to globally analyze the best practices of the leading universities in ICT usage in teaching economics; and to strengthen the components of curricula and study programs focused on digital skills development.

## **IMPLICATIONS**

The results of the research are to be of interest to the Ministry of Science and Education of the Russian Federation implementing federal standards of higher education and university administrative bodies supervising acting study programs and running the development of new ones.

## CONCLUSION

current level of digital skills of students. In addition, the research shows that students understand the need to improve their ICT skills and the need for ICT training.

## LIMITATIONS

The research is focused on a limited target group of students studying economics at Peter the Great St. Petersburg Polytechnic University. The basis for analysis is limited as well by the investigation of study plans and programs. To analyze the actual state of art it is necessary to investigate the real usage of ICT by students in their study process for professional competence formation through online interviewing according to standard methodology [4]

## FUTURE RESEARCH

The paper highlights the need for digital skills development for students studying economics. The investigation is based on gathering original data concentrated on acting study plans and curricula for students studying economics at Peter the Great St. Petersburg Polytechnic University and the results of interviewing representatives of the target group. So it is interesting to investigate digital skills development for students studying economics, management and business in different universities and countries.

**Keywords:** Digital skills; professional competences; university study process; students in Economics

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# Legal aspects of sharing economy in tourism studies: view from transition countries

by

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## INTRODUCTION

Development of information and communication technologies, especially drastic growth of Internet usage by mobile and tablet devices driven by consumerization of digital technologies (Sundararajan, 2014) has been facilitating new models of economic relations featured by peer-to-peer interaction (Cohen & Kietzmann, 2014; Fraiberger & Sundararajan, 2015; Stephany, 2015). This phenomenon has been labeled as sharing or collaborative economy (Botsman & Rogers, 2010; Belk, 2010). Online platforms providing new type of business communication between consumers and entrepreneurs has become a key element of the sharing economy. In the same time, it has posed new challenges to the existing legal framework and triggered discussion on possible ways for adaptation current regulation to the new conditions (Kassan & Orsi, 2012; Dyal-Chand, 2015; Chasin & Scholta, 2015, Palombo, 2015). The tourism industry is one of the main sectors, where the sharing economy has been flourishing.

The purpose of this study is to explore to what extent transition countries support expansion of the sharing economy, specifically in the tourism industry, and adjust existing regulatory framework to the new conditions. This paper highlights key legal issues appeared with the rise of the sharing economy in the tourism industry through illustration of 14 transition countries (i.e. Belarus, Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Russia, the Slovak Republic, Slovenia, Ukraine). Authors seek to contribute to the ongoing academic discussion on legal concerns related to sharing of resources through online platforms focusing on the transition economies. This study will be of interest to tourist industry professionals and scholars interested in the current phenomenon of the sharing economy and its future.

## **SHARING ECONOMY IN THE TOURISM STUDIES AND TRANSITION COUNTRIES**

Being among the world's largest industries, tourism contributes 9,8% of global GDP, amounting for US \$ 7,2 trillion and employs 284 million people, which is 1 in every 11 jobs on the planet (WTTC, 2016). In many transition countries, it is the tourism industry, which has been actively developing in recent decades (Aguayo et al., 2009) promoting innovations in the whole service field. Modern tourists are highly interested in new experiences (Richards & Wilson, 2006; Andersson, 2007; Oh et al., 2007) and getting to know local, authentic culture that makes a destination stand out (Cohen, 2002; Olsen, 2002). Because of high level of authenticity provided by local entrepreneurs for their consumers coming from other places (Stors & Kagermeier, 2015; Oskam & Boswijk, 2016), sharing economy perfectly meets tourists demands. Not surprisingly, in the tourism industry, the sharing economy is widely represented. In 2015, there were almost 500 tourism related sharing economy platforms, of which 11% provide travel (and accommodation) services, 50% transport, and 39% leisure (Report on new challenges..., A8-0258/2015).

Besides well-known examples of Airbnb, Couchsurfing and Uber there are other options for tourists to get to know a destination, as if they were locals. Such platforms as Toursbylocals or Trip4real enable tourists to learn about the area on guided tours with locals, which are devoted not only to various aspects of historical heritage, but also cultural and social life. As gastronomy is one of the key elements towards the authenticity of a place (Gordin & Trabskaya, 2013), rich tourist experience can be gained through services like Meal Sharing, Cookening or Eatwith.

Recently, the concept of sharing economy or collaborative consumption has been widely discussed in academic literature (see Belk, 2014; Cohen & Kietzmann, 2014; Hamari et al., 2015; Stephany, 2015). A range of studies on the sharing economy were motivated in relation to the tourism industry in general (Dredge & Gyimóthy, 2015; Tussyadiah, 2015; Heo, 2016; Wearing & Lyons, 2016), its effects (Guttentag, 2015; Tussyadiah & Pesonen, 2016; Fang et al., 2016; Oskam & Boswijk, 2016) in particular, on hotel business (Zervas et al., 2014; Neeser et al., 2015; Richard & Cleveland, 2016) and current media discourse (Cheng, 2016). However, to our knowledge, only few studies are focused on sharing economy in the tourism industry in the transition countries: in Bulgaria (Ivanova, 2015) and Poland (Krajewska-Smardz et al., 2016). The present study is aimed to fill this gap and generates valuable knowledge in the research field.

## **METHODOLOGY**

The paper provides theoretical analysis of legal challenges emerged within the rise of the sharing economy and review of the European agenda for the collaborative economy (COM/2016/0356). The legal analysis is based on academic literature review and existing regulation norms related to activities of taxi companies to illustrate the case of Uber presence and terms of regulation in the transition countries. The analysis of the existing regulation in the transition countries has been conducted with the help of the national legislation databases. In cases, when the national legislation is not available in English language, the search regarding adoption of relevant regulation was conducted on the Internet using keywords in relation to the relevant state: “Uber”, “national law”, “restricting”, “supporting”. In most of the cases, this search enabled finding information regarding recent developments of the theme and allowed secondary source analysis.

In the paper, a range of sharing economy companies based in the transition countries are listed to illustrate the scope and dissemination of the concept. Search of the companies was conducted using directories at the following websites: [www.collaborativeconsumption.com/](http://www.collaborativeconsumption.com/); <http://meshing.it/>; [www.thepeoplewhoshare.com/](http://www.thepeoplewhoshare.com/). The search was processed by location feature entering name of states and capital cities. Then webpages of companies were checked to confirm the existence of the companies. Some of the companies presented in the directories no longer exist and were not added to the list.

## **TOWARDS LEGAL REGULATION OF THE SHARING ECONOMY**

Economics and law always function in strong relationship. International and national norms impact economic processes and activities, provide legal grounds for purchasing goods and services, protect rights of the economic actors, form bases for tax regulation and affect other domains of the economic sphere. The existing legal rules and principles were developed and adopted from the perspective of the traditional economic model. At the same time, shift from the traditional economic model to sharing economy has led to the necessity of developing and adopting new legal norms and regulations. The reason for this is twofold. Firstly, existing regulation doesn't consider the principles of sharing or consider them in an old-fashioned way. Secondly, the new economic model creates relations between actors that can't be regulated by the existing norms

The first legal challenge that arises from the perspective of the sharing economy concerns identification of the main actors of these economic relations and the problem of defining their legal status. In other words, the question is who the actors are and what scope of rights and obligations they have. The problem is that relationships based on the sharing economy model can't be considered as traditional relations, where it is possible to define quite easily, who the consumer and the producer are, who the employee and the employer are, classify, if certain activity relates to the commercial sphere or not. Besides that, shift to the sharing economy has led to emergence of the brand-new type of economic and legal actor – platform companies or just platforms.

Platforms, being the new type of actors, illustrate strong connection between the sharing economy model and the ICT application. Generally, from technical point of view, an online platform is a web site often coupled with sophisticated mobile applications (apps), through which one deals with a wide range of tasks from cooking to banking and e-commerce. Various researchers paid attention to certain aspects of platforms trying to define it, explore its structure and determine its legal status. Thus, platforms were explored by dividing into four different levels: relationships – agreement – organization – infrastructure (Kassan & Orsi 2012). Platform and its principles of functioning were examined in terms of platform economy and WEB 3.0. revolution (Lobel, 2016). Legal aspects of platforms were observed in relation to labor law (Aloisi, 2016; Prassl & Risak 2016) and from the perspective of competition law (King, 2015; Geradin, 2015). Problems of legal regulation of specific sharing economy services, such as ride-sharing (Witt et al., 2015; Dotterud Leiren & Aarhaug, 2016) and accommodation (Kaplan & Nadler, 2015; Interian, 2016) has been also addressed by scholars.

Being in the center of the sharing economy, platform accumulates money, people, goods and services. However, determination of the legal status of platform is a matter of a lot of disputes and discussion, both at theoretical and practical level. One of the main problems of legal approach towards platforms is the problem of its main activity or, in other words, question of what exactly platform companies do. Do these platforms produce services or goods, or do they just play a broker role? Answering these questions would help to define legal frames in which this type of business should operate.

Indeed, if one considers platform only like a digital marketplace, where individuals can meet and conduct transactions, it would be incorrect to engage these companies to obey hospitality law, transport and health legislation, etc. However, even brief exploration of how

platforms work and what kind of services they provide for individuals shows that platform is a very complex entity, which provides a lot more services than just connecting of individuals with each other and without any doubts it plays bigger role than just of a broker. For instance, Airbnb provides photo services, services related to dispute resolutions and provides an insurance for hosts.

Another problem of legal status of platforms is a problem of applicable law. The biggest online platforms such as Airbnb, Uber, Lyft operate and provide services in different states. Using the ICT, the platform companies can provide their services without physical presence under jurisdiction of a state and therefore may not obey a national law.

The problem of defining the scope of legal activities and the problem of applicable law lead to another important issue related to the obligation of platform companies in some cases to receive business authorizations or licenses (Koopman et al., 2015). Putting this another way, the question is should Uber be licensed as a taxi company, or Airbnb as an accommodation service provider?

Answering these fundamental questions would help to define legal status of platforms and define the legal frameworks in which these companies should operate. However, due to the lack of international and national law, differences in national legal regulation, differences of the states' level of the ICT development it becomes incredibly challenging task. Moreover, the situation has been worsening by existence of different, even opposite governmental views and attitudes to the sharing economy. In this regard, there is pressing need for development of common ground for understanding the sharing economy principles and mechanisms of defining the legal status of its main actors and legal framework for their activities.

The major important step towards building the sharing economy legal framework was taken in June 2016, when the European Commission published the European agenda for the collaborative economy (COM/2016/0365). This agenda clarifies, how existing EU rules should be applied to the collaborative economy based on the Services Directive, E-Commerce Directive, and European consumer legislation.

This European agenda has valuable meaning to the member states as it can be considered as a solid base for regulating companies belonging to the sharing economy concept. First of all, the document examines service provision and states that putting "absolute bans and quantitative restrictions of an activity normally constitute a measure of last

resort” (COM/2016/0365, p.4). This statement demonstrates that the existing regulation should be adjusted to the activities related to the sharing economy and not just be banned.

Another important issue in terms of service provision is the requirement for providers to have necessary authorizations or licenses only, if it is necessary to serve essential public interest objectives. According to the document, there is no need to platforms to receive authorizations or licenses, when a platform just connects consumers and service providers. At the same time, it is stated that, when platform begins to provide other services, which are different from the connection of individuals, for example, transport services, there is an obligation to receive appropriate authorizations or licenses. This norm illustrates the necessity to determine correctly platform’s activity and answer the question, what exactly platform do. Moreover, it is highly important to consider that in different states the same activity may require specific authorizations or licenses.

Thirdly, the agenda provides the obligation for platforms to demonstrate responsible behavior and perform activities to increase consumer trust and set measures to cooperate with states authorities. We can assume that this obligation is mainly related to the regulation of tax issues.

Another important issue considered by the agenda is the obligation of the EU member states to differentiate, who exactly provides services through the platform: individuals or professionals. This division will clarify some of the tax issues, license and requirements issues. However, unfortunately, sometimes it is quite challengeable task. For example, how can one identify the status of individual, who bought a number of apartments and rent them out through the Airbnb? What would be the criteria for this differentiation is an open question.

Besides above mentioned points, the agenda provides two important aspects of sharing economy regulation. The first one requires from the EU member states to contribute to people benefit from the opportunities that they might get from the sharing economy, for instance, employment (self-employment) opportunities. The second one is the recommendation to the states to review and revise national legislation taking in account the agenda recommendations, social and consumer rights.

Another domain of existing challenges relates to the issues of competition and how sharing economy businesses compete with traditional ones. Income of such companies as Airbnb, Uber, EatWith is comparable to income of major hotel chains like Hilton, Hyatt, taxi

companies and restaurants chains. Hence, companies without any rental property or cabs successfully compete with companies providing this kind of services (Lobel, 2016). This state of affairs poses another question of who exactly competes with these business giants, platform companies or association of individuals formed by this platform? On the one hand, there is a product of digital world, mobile app or Internet site, which provides services of connecting individuals, providing information and reviews about services and goods. However, on the other hand, there are individuals, who provide services in the real world. These individuals share their cars, apartments, cook food etc. Moreover, it is crucial to highlight the issue of the applicability of the existing competition law to sharing economy companies. As business models and business processes that are employed by platform are different from business models that are used by other companies in the field the possibilities of applying the existing competition regulation can be limited.

Although the sharing economy is booming, there are many other legal challenges that are needed to be addressed to guarantee sustainable development of this economic system. They concern the issue of liability, in other words, who has liability for what in relations emerged based on the sharing economy model, for example should the platform be able to take risks for damage that can be made by the Uber cab? Another important issue is related to the labor and tax regulation, basically the main problem in this case is how to define individuals that are using platforms to provide their services and goods. Are they micro enterprises or employees of these platform companies. Notably, nowadays there is large number of lawsuits brought by Uber's drivers, who would like to be treated by the company as employees rather than independent business contractors. The identification problem of legal parties leads to the problem of taxation. Here the question is what type of taxes a party should pay. Tax avoidance is one of the reasons for lower prices of the platform companies comparing to traditional ones.

Despite of the supporting character of the EU agenda towards sharing economy, currently not only member states embrace activities of platform companies, but rather restrict them. Based on the results of the analysis of the transition countries' regulation of ride-sharing we distinguish three different ways of how governments react on activities of platform companies in a state. They apply restricting regulation that in the most cases lead to banning of platforms, they have positive attitude to platforms or they just keep silence and do not implement any specific regulation and are called "silent" states (see Table 1).

**Table 1.** Ride-sharing regulation in transition countries

Type of regulation	Countries
Development of supporting regulation	Estonia, Lithuania, Belarus
Development of restricting regulation	Bulgaria, Hungary, Romania
“Silent” states	Croatia, the Czech Republic, Latvia, Poland, Russia, the Slovak Republic, Slovenia, Ukraine

In Estonia and Lithuania, bills that provide legal framework for Uber and other ride-sharing companies have been actively discussing in parliaments (Palling, 2016; Šumskis, 2016). Governments of these states believe in the necessity to amend existing regulation to provide sound legal framework for operations of ride-sharing companies. In Belarus, the preparation of the bill to amend the law on automobile transport and automobile transportation was initiated in the beginning of 2017 (Legislative initiative..., 2017). It is worth mentioning that previously, in November 2016, Uber concluded an Agreement on Interaction and Cooperation with the Ministry of Taxes and Duties of Belarus aimed at creation of healthy competitive environment and transparent market conditions in transport services (Stuckey, 2016).

Within the “silent” group, there are different approaches towards regulation development. Some states also prefer to negotiate with sharing economy companies and encourage development of regulation in this sphere. In the Czech Republic, the discussion was initiated in 2016 (Johnstone, 2016). In Poland, the Office of Competition and Consumer Protection recognized Uber as innovative business model encouraging competition in the industry (Uber – Statement..., 2016). On the contrary, in Slovenia the existing regulation is unfavorable for ride-sharing in such a way that it has led to impossibility of starting operations in the country. In Russia, Ukraine, Latvia, Croatia and the Slovak Republic no significant shifts in discussion of regulation are identified.

Bulgaria, Hungary and Romania applied restrictive policy to Uber that caused actual banning of the company operations in these states. In Romania, the law regulating taxi and car rental services was adopted in 2015. It deems illegal to transport people for a fee without a

taxi authorization (New law makes..., 2015). In late 2015, the Commission for the Protection of Competition of Bulgaria banned Uber's operations in the country for unfair competition. The decision was made after massive opposition of taxi drivers. Later, the Supreme Administrative Court approved this decision (Markova, 2016). In Hungary, a new law that permits authorities to temporarily block websites that run "illegal dispatcher services" was passed in 2016. It inevitably led to suspension of operations of Uber (Than & Fenyo, 2016), but the niche has been successfully carved out by the Estonian-based ride-sharing company Taxify (Keszthelyi, 2016). It operates in accordance with the Hungarian legislation allowing passengers to use mobile application, rank drivers and their cars and trace back previous rides.

A number of Uber-like taxi companies have been established in other transition countries. They operate on national or regional market, but some of them, like Taxify, have entered international market and work worldwide. Using websites devoted to the sharing economy concept and collaborative consumption we identified other companies working in the tourism industry originating from the transition countries. The list is presented in Table 2. Being innovative hub in Europe, Estonia has the highest number of start-ups per capita in Europe (Rooney, 2012) and is home for the largest number of companies in the list. Speaking about types of services, most of the companies are represented by the transportation sector and not only by car rental and ride-sharing, but also by boat rental in Croatia, popular summer vacation destination. Leisure services companies from the list provide guided tours with locals. Accommodation services allow renting an apartment through online platforms with offers from local markets.

**Table 2.** Sharing economy companies in transition countries

Type of service	Company name	Country
Accommodation	ApartmentsApart	Poland
	Dobovo	Ukraine
Transportation	Carpool	Bulgaria
	Darenta	Russia
	Mobocars	Latvia
	Orvas boating	Croatia
	Hopin	Slovakia
	Taxify	Estonia
	Autolevi	Estonia
Leisure	Like a local city guide	Estonia
	Everaround	Estonia
	Sputnik8	Russia

## CONCLUSION

The present study highlights main legal challenges and approaches used by transition countries in treating new model of sharing economy in tourism industry. Despite of the fact that the sharing economy has been steadily growing in tourism sector and other industries, most of the transition countries have not amended its regulation in relation to the emergence of new economic and legal actors yet and keep silence regarding the issue. However, initiative taken by the European Commission in addressing the need for collaborative consumption regulation has pushed forward a few states to start the discussion with the major platform companies and other stakeholders. It is obvious, that only through the negotiation process it is possible to achieve mutually beneficial results and build such a framework that would encourage innovative development of the transition economies.

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# The effect of personality traits on organizational silence

by

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## ABSTRACT

The aim of this study is to investigate empirically the effect of personality traits on organizational silence. Correlation and regression methods are used to examine the relationship between personality traits and organizational silence. The data were collected by using a questionnaire survey from employees of various small-scale furniture industries in Kayseri, Turkey. A hypothesized model was used to i) Investigate the relationship between employees' personality traits and organizational silence and ii) Explore the type of effect of the big five personality traits on Organizational silence. The findings of the study give clear evidence that the factors related to career success extroversion, neuroticism and conscientiousness predictors of organizational silence have direct negative personality impact on employee silence. The future research could involve examining the interactions by using multiple regression analysis of personality traits dimensions with organizational silence and together investigates if other variables also sharing their variance on organizational silence. It would be more effective to examine the current model by using mediating variables in future research.

**Keywords:** Organizational Silence, Personality Traits, Employees

## INTRODUCTION

Nowadays, organizations are more focused on the behaviour of employees and trying to understand their interests and concerns in the workplace. There could be different reasons that affect these interests. One of the reasons could be their personality. Employees with distant characteristics possess different attitudes. Sometimes, such deviant behaviours would account

for serious complications in the organizations. To avoid such consequences, it has become important to understand their concerns or silence in the workplace. Many employees report that they are unable to share knowledge, information, and plans due to restrictions and limitations announced by their administration. On the other hand, employees do not convey information that could be perceived dispirited or threatening to senior leaders in the organizational chain of command (Roberts and O'Reilly, 1974). As a result of silence could be the reason for the employee to fear from the manager who may react negatively to the opinions and may deplete the employees' ability to work in the organization (Milliken, et al., 2003). Precisely, shortage of information and lack of confidence, doing or speaking very little in response to the imperative problems or issues facing an organization, are what Morrison and Milliken call "organizational silence" (Morrison and Milliken, 2000).

Employees occasionally don't have open communications either with colleagues and superiors; neither actively participates in decision making and other relevant activities. This could be caused by the characteristics of their personality. Personality traits are one of the core factors affecting performance and clear communication in the workplace. In a couple of research, the relation between the personal characteristics and behaviour of the employees has been explained (e.g., Bennett & Robinson, 2003; Douglas & Martinko, 2001; Salgado, 2002).

### **Organizational Silence**

Silence transforms disfavour, resistance, approval which becomes uneasy for both employees and the organization (Gambarotto & Cammozzo, 2010; p.169). According to Pinder and Harlos (2001), silence is represented as voiceless communication, which has its own representations, emotions, desires, exceptions. "Organizational silence depending on the situations takes various contexts. The main problem in the employees to keep silent is due to lack of knowledge on the topics, less experience and less interaction. The relation between the supervisors is too formal and this formality makes limitations among employees in behaviour, thoughts, sharing of knowledge, giving new ideas and makes them less productive, creative, and innovative. This is how many organizations are suffering from the organizational silence. Morrison and Milliken (2000) cited in Dimitris and Vakola (2005) that organizational silence leads to lack of cognitive inflexibility, lack of discipline and equivalent which in turn leads to low encouragement and commitment which affects turnover, efforts towards the job and increase stress level. Blackman and Sadler –Smith (2009) classified organizational silence into two basic forms, silent and silenced. Silent is something where the individual cannot

speak and cannot yet speak yet. Silenced is the situation individual could speak but does not do so. When the employees keep calm concerned about the organizational talks, silence converts to collective behaviour (Henriksen and Dayton, 2006). In addition, Zehir and Erdogan, (2011) imply that withholding and disclosing behaviours might appear contradictory because silence signifies not speaking but while speaking, the important issues and problems are presented. Some employees keep the vengeance since the situation occurred and wait for the proper time to take avenge.

Organizational Silence has concentrated on the further three dimensions of silence during the review of the literature and it is listed as follows: defensive silence, prosocial silence and acquiescent silence. Dyne et al. (2003) emphasized three different types of silence and voice: defensive silence, prosocial silence and acquiescent silence as disengaged behaviour, self-protective behaviour, and other-oriented behaviour.

### **Acquiescent silence**

Acquiescent silence is outlined as employees withholding of the work-related thoughts, information, plans depend on the resignation. Employees remain silent due to the fear (For extra details please review Kish-Gepharta, Detert, Trevino, & Edmondson, 2009) and employees store the information in self due to a different environment from their perspective (Knoll, M. and Van Dick, R. (2013). Employees in acquiescent silence in some situations are not conscious of other options to change the conditions (Pinder and Harlos, 2001: 349). Limitations and some exterior factors make them remain silent (Morrison and Milliken, 2000) in various events. In some scenarios' they aren't ready to speak up and no efforts are shown by them and convinced to continue the status quo (Dyne et al., 2003: 1366). Such idle behaviour makes them passive consciously and enters irrelevant behaviour (Çakıcı, 2008: p.87). Hence such type of passive behaviour makes employees constantly agree to the situations and never speak up even though if it is wrong or right, this makes them feel pessimistic and avoid speaking or response to the situations. Employees with this behaviour are scared of losing job and fear if the same benefits are not present in the other job. Individuals are more self-protective and active in such situations.

### **Defensive silence**

The term defensive silence was developed from acquiescent silence by Van Dyne et al.(2003) and defined it as withholding of appropriate information, notions and thoughts as a

sort of self security, based on fear', which was associated with the study conducted by Morrison and Milliken's highlighted fear as a crucial motivator of organizational silence. In order to hold security from external threats, defensive silence is a proactive and intended behaviour (Schlenker & Wigold, 1989; p.30). Individuals of such type always conscious of the situations and secure themselves by always having alternatives and options. Kish-Gepharta et al. (2009) has suggested that with the level of fear encountered by the employees can be categorized into three (low-high) and the time is taken to act upon by the employee as (short-long) and they are Non-deliberate defensive silence, Schema-driven defensive silence, Deliberate defensive silence and Habituated silence (For the comprehensive details refer: Pacheco, D.C. et al., 2015: Silence in organizations and psychological safety: a literature review: p.297).

### **Prosocial silence**

Employees withhold work-related information, ideas, and opinions, in order to provide aid to organization and employees, are defined as prosocial silence by Dyne et al. (2003) In comparison with defensive silence, prosocial silence is conscious of alternatives, identically, prosocial silence is worried more about others rather than negative results while speaking up (Dyne et al. 2003). Employees with this type of silence are more helpful and charming in nature. This type of employees' profits others such as completing others target during deadlines, also helping the HR team by finding the appropriate candidates.

### **Personality Traits**

Personality traits play the crucial role in employees' performance and development of the organizations. It not only affects the performance but also the learning and sharing knowledge among individuals. An individual difference in personality structure by the Big Five Model, explains the personality traits based on five main dimensions. These five factors are Extraversion, Neuroticism, Conscientiousness, Agreeableness, and openness to experience (McCrae & Costa, 1997). These personality traits represent the human behaviour and the differences in the individual.

### **Extraversion**

Extraversion is one of the important factors associated with the psychology especially by its personality. According to Hogan, (1986), this dimension includes two items, sociability

(thoughtful, energetic, and gregarious) and ambition (impulsive, leader, enthusiastic, vigorous). Watson and Clark, 1997 (cited in Judge et al, 1999; p.624) that “extroverts are more sociable, active, passionate and less self-concerned, less introspective compared to introverts and also Extroverts are affiliated with the positive emotions with a high number of friends and leadership qualities. Such Individuals have a more charismatic attraction like the well-known leaders around the world.

### **Neuroticism**

Neuroticism chiefly related with emotional behaviour like anger, depression, uneasiness, annoyance. Costa & McCrae, 1995 cited in Işık and Üzbe (2015, p.588), that individuals with this dimension have lack of self-acceptance, perfectionism, not open to criticism. Additionally, Judge et al classify neuroticism into anxiety (instability and stress proneness), and one's well-being (personal insecurity and depression) (1999). Employees with this characteristic are isolated from groups and often in negative moods, aggressive when things don't go as they please. They expect that everyone should respect his/her belief and decisions.

### **Conscientiousness**

According to Hogan (1983) and Fiske (1949), conscientiousness is also named as dependability. In addition to this, other researchers suggested that conscientiousness is concerned with job performances (Barrick & Mount, 1991; Salgado, 1997) which included three facets: achievement-oriented (victory and persistent), dependability (prudent and responsible), and orderliness (strategist and organized). Individual with this trait may play a good role as a leader or a manager to get the things on the legitimate path.

### **Agreeableness**

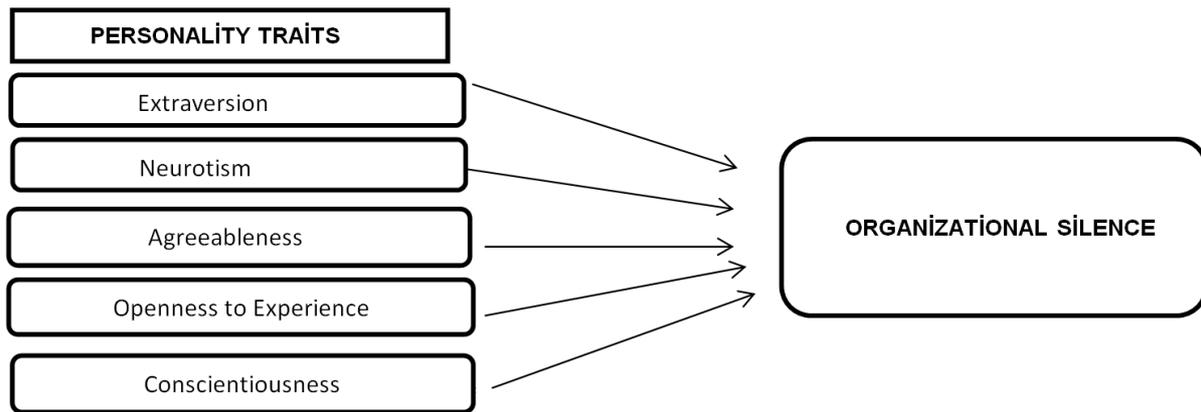
Agreeableness itself explains that you often agree with everyone and everything around you. According to the different writers, this dimension is called a willingness to cooperate by Norman and Friendly Compliance (cited in Digman and Inouye, 1986), Social obedience (Fiske, 1949), Love (Peabody & Goldberg, 1989); Friendliness (Guildford & Zimmerman, 1949). Authors have also found compliance, trust, and modesty among the individuals (Costa et al. 1991). Such a co-operative nature of agreeable individuals fosters things easy in life. This dimension is helpful for the employees in the organization to make things easy around

and be satisfied with the current situations. Such employees may acknowledge less towards the aggressive environment.

### **Openness to Experience**

The last dimension openness to experience often named as intellect or intelligence (Borgotta, 1964; Digman & Takemoto-Chock, 1981; Peabody and Goldberg, 1989) and culture (Norman, 1963) (cited in Goldberg, L. R. 1990; p.1217). Employees with this experience should be more cheerful and simple, tolerance towards obstacles. However, employees with openness to experience and agreeableness are career oriented and successful in the occupations with more flexibility and teamwork mindset (Judge et al, 1999). For example, the one with such trait also compromises their own benefits to help others.

The purpose of this study is to examine the effect of personality traits on organizational silence. Specifically, to understand which among the five traits of personality (Extraversion, Neuroticism, Conscientiousness, Agreeableness, and openness to experience) causes the organizational silence. The hypotheses are designed to examine: i) Significance of the relationship between dimensions of big-five personality traits and organizational silence. ii) Effect of Extraversion, Neuroticism, Conscientiousness, Agreeableness, and openness to experience on Organizational silence. To describe the above-hypothesized relationship precisely, a conceptual model has been created. Please refer figure 1.

**Figure 1.** Conceptual Model

By inferring various above references, there are numerous studies presented on personality traits but this research is concentrated on effects of the personality traits on organizational silence. Scholars have recognized that silence of employees is possibly multi-level construct (e.g., Dyne et al., 2003). Therefore, we emphasized the relationship between these two concepts by creating hypotheses to understand the different effects of personality traits on organizational silence. To investigate the cause of employee silence in the organization, an effect of each dimension of the personality traits on organizational silence is examined and constructed the following hypotheses.

- H1: The relationship between dimensions of big-five personality traits and organizational silence is significant.
- H2: Extraversion has a significant effect on Organizational silence.
- H3: Neuroticism has a significant effect on Organizational silence.
- H4: Conscientiousness has a significant effect on Organizational silence.
- H5: Agreeableness has a significant effect on Organizational silence.
- H6: Openness to experience has a significant effect on Organizational silence.

### **Sample and Data collection**

Data for this study was collected in Kayseri, Turkey. The surveys were conducted using Turkish and English language. The questionnaires were translated from English to Turkish and analysed in English. The sample subsists of the employees working in private sectors including furniture, trade and marketing. The survey sample was obtained from 62 out of 100 distributed surveys. The percentage of employees responded the questionnaires are 62% and

39% of employees were females and 61% were males. 66% of employees were married and 34% were unmarried. The respondent's average age was 35.

## **Measures**

The scales used to measure the big five traits is named as (TKÖÖ) in Turkish version and developed by, Gençöz & Öncül (2012). It is 45 - item scale. The five-point Level of familiarity scale ranging from 1 (Not at all familiar) to 5 (Extremely familiar). The questions were related to the personal characteristics of hardworking, ability, self – security etc. The scale was used in Turkish language for the respondents and translated in English for analysing the data.

Organizational Silence was measured using the 30-item scales developed by Çakıcı's (2008). This scale was used in the Turkish language for the respondents and translated in English for analysing the data. The five-point Frequency scale was used to measure ranging from 1 (Never) to 5 (Always). This scale consisted of five subgroups: Administrative Reasons, Work-related, Experience related, Isolation Fear and, Relationship Damage, which defines the fears about the work, experience, and organizational position. For example: “The belief that the administrator should know everything.”

## **Methods**

### **Data Analysis and Findings**

The data were analysed in this study to get an idea of distribution, frequency, mean, and Cronbach's alpha analysis to know the reliability of all the variables. Furthermore, correlation and regression are used.

### **Reliability and Factor Analysis**

Reliability is used to determine if the scale is reliable or fit to the existing model. As there are multiple questions used so it is important to know the consistency, which is defined by Cronbach's alpha. In the current study, the Cronbach's alpha coefficient of organizational silence is 0.928 which indicates excellent internal consistency for the scale and Cronbach's alpha coefficient of personality traits is .774 with good internal consistency.

**Table 1.** Reliability of the scales

Personality Traits	Gençöz & Öncül (45 items)	Cronbach's Alpha .928
Organizational Silence	Çakıcı (30 items)	Cronbach's Alpha .774

Factor analysis of the organizational silence and personality traits is performed to know if the relevant factors of organizational silence and personality traits dimensions are separated and to check the fit of the factors in the model. The factors were formed as five expectedly for personality traits and the organizational silence and reliability for each factor is defined below in table 2 and 3. Bartlett's test of sphericity, the value of sig.; 0.000. As the value is significant there is a strong relationship between the variables.

**Table 2.** KMO and Bartlett's Test of Personality Traits

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.532
Bartlett's Test of Sphericity	Approx. Chi-Square	2.323.537
	df	946
	Sig.	.000

**Table 3.** KMO and Bartlett's Test of Organizational Silence

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.632
Bartlett's Test of Sphericity	Approx. Chi-Square	1.208.060
	df	435
	Sig.	.000

### Test of Hypotheses

Correlation and regression were used to examine the effect of personality traits on organizational silence.

### Correlation between the variables

Since it is hypothesized that personality traits have significant relation with organizational silence, the sub-dimensions of personality traits and organizational silence are considered in the below table 4. The means and standard deviation are shown in the below table 4. According to the result obtained by correlations, there is a significant but negative relationship between the extraversion and organizational silence ( $r = -.303^*$ ,  $p < 0.05$ ), relationship of Neurotism between organizational silence is significant but negative ( $r = -.321^*$ ,  $p < 0.05$ ), relationship of conscientiousness between organizational silence is strongly significant but negative ( $r = -.383^{**}$ ,  $p < 0.01$ ), there was no significant relationship found between organizational silence with agreeableness ( $r = -.178$ ,  $p > 0.05$ ) and openness to

experience ( $r = .023$ ,  $p > 0.05$ ). Thereupon, no correlation was found between organizational silence with Openness to experience and agreeableness.

**Table 4.** Correlations

	Mean	S.D.	Pearson Correlation	1	2	3	4	5	6
1.Extraversion	2.5	0.52	Sig. (2-tailed) N	1 60					
2.Neurotism	2.5	0.6	Sig. (2-tailed) N	.486** .000 57	1 59				
3.Consciecetiousness	3.5	0.43	Sig. (2-tailed) N	.187 .156 59	.450** .000 58	1 61			
4.Agreeableness	4.1	0.56	Sig. (2-tailed) N	-.175 .181 60	-.003 .983 59	.675** .000 61	1 62		
5.Openness to Experience	4.1	0.55	Sig. (2-tailed) N	-.317* .013 60	.064 .631 59	.423** .001 61	.567** .000 62	1 62	
6.Organizational Silence	2.3	0.66	Sig. (2-tailed) N	-.303* .046 44	-.321* .034 44	-.383** .009 45	-.178 .237 46	.023 .879 46	1 46

\*\* . Correlation is significant at the 0.01 level (2-tailed) \* . Correlation is significant at the 0.05 level (2-tailed).

### Regression effects of personality traits on organizational silence

With reference to the observed relationship between personality traits and organizational silence, regression analysis is performed to determine whether personality traits have a significant effect on the organizational silence. The regression effects of extraversion, neuroticism, conscientiousness, agreeableness and openness to experience on organizational silence comprehensively determined in the below tables independently.

## Results of Linear Regression

**Table 5.** The effect of Extraversion on Organizational Silence

Variable	Standardized coefficient ( $\beta$ )	t-value	Significance
Extraversion	-0.303	-2,058	.046

( $R^2 = 0.070$ ,  $F=4,235$ :  $p < 0.05$ )

The regression model is significant ( $R^2 = 0.070$ ,  $F=4,235$ :  $p < 0.05$ ) and  $R^2$  value explains the variance of organizational silence in the model. It explains the variance of 7.0% of the extraversion on the organizational silence. From the Table 5, the extraversion has a negative and significant effect on organizational silence ( $\beta = -0.303$ ,  $p < 0.05$ ). In this context, the H2 hypothesis is supported.

**Table 6.** The effect of Neurotism on Organizational Silence

Variable	Standardized coefficient ( $\beta$ )	t-value	Significance
Neurotism	-0.321	-2.193	.034

( $R^2 = 0.81$ ,  $F=4,811$ :  $p < 0.05$ )

The regression model is significant ( $R^2 = 0.81$ ,  $F=4,811$ :  $p < 0.05$ ) and  $R^2$  value explains the variance of organizational silence in the model. It explains the variance of 8.1% of the neuroticism on the organizational silence. From the Table 6, the neuroticism has a negative and significant effect on organizational silence ( $\beta = -0.353$ ,  $p < 0.05$ ). Hence, the H3 hypothesis is supported.

**Table 7.** The effect of Conscientiousness on Organizational Silence

Variable	Standardized coefficient ( $\beta$ )	t-value	Significance
Conscientiousness	-0.383	-2.715	.009

( $R^2 = 0.126$ ,  $F=7,372$ :  $p < 0.05$ )

The regression model is significant ( $R^2 = 0.126$ ,  $F=7,372$ :  $p < 0.05$ ) and  $R^2$  value explains the variance of organizational silence in the model. It explains the variance of 12.6% of the conscientiousness on the organizational silence. From the Table 7, the conscientiousness has a negative and significant effect on organizational silence ( $\beta = -0.532$ ,  $p < 0.05$ ). In this context, the H4 hypothesis is supported.

**Table 8.** The effect of Agreeableness on Organizational Silence

Variable	Standardized coefficient ( $\beta$ )	t-value	Significance
Agreeableness	-0.178	-1.198	.237

( $R^2 = 0.010$ ,  $F=1,435$ :  $p > 0.05$ )

The regression model is not significant ( $R^2 = 0.010$ ,  $F=1,435$ :  $p > 0.05$ ). From the Table 8, the conscientiousness has no significant effect on organizational silence ( $\beta = -0.201$ ,  $p > 0.05$ ). In this context, H5 hypothesis is not supported.

**Table 9.** The effect of Openness to Experience on Organizational Silence

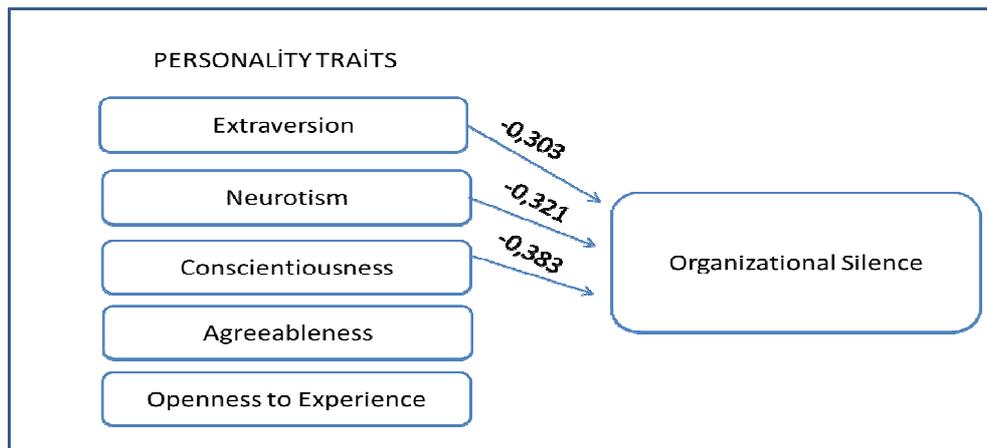
Variable	Standardized coefficient ( $\beta$ )	t-value	Significance
Openness to Experience	0.023	0.153	.879

( $R^2 = -0.022$ ,  $F=0,023$ :  $p > 0.05$ )

The regression model is not significant ( $R^2 = -0.022$ ,  $F=0,023$ :  $p > 0.05$ ). From the Table 9, the openness to experience has no significant effect on organizational silence ( $\beta = 0.027$ ,  $p > 0.05$ ). Thus, H6 hypothesis is not supported.

## Conclusion and Discussion

At work, employees may intentionally remain silent (rather than speak up) about important issues, situations, events, concerns, or ideas they have. The reasons employees may have for intentionally remaining silent are potentially quite varied. The main purpose of the current study is to explore the influence of the sub-dimensions of personality traits on organizational silence.

**Figure 2.** Concluded Model

Research has shown a considerable association between the Big Five Personality factors on organizational silence. Conscientiousness has shown highest impact on organizational silence ( $\beta = -0.383$ ,  $p < 0.05$ ). To strengthen the evidence, another literature review has stated that Pro-social silence was predicted by conscientiousness (Şimşek & Aktaş, 2014). Thus, employee silence would be more likely less when they are more strategic and responsible. Identically, neuroticism has also identified valid predictor of organizational silence by its medium level impact ( $\beta = -0.321$ ,  $p < 0.05$ ) and neuroticism is reported as the primary source of negative affectivity (Watson and Hubbard, 1996 cited in O'Neill, 2010: p.654), and the employees experiencing high in neuroticism less likely develop positive thoughts and often stay calm to protect themselves. Extraversion has found lowest impact on organizational silence ( $\beta = -0.303$ ,  $p < 0.05$ ). Judge et al (1999, p.624) cited that neuroticism, extraversion, and conscientiousness are more related to the career success and it appears that employee' silence more likely stops displaying a higher level of voice when they aren't given more opportunities for continuous professional development. This also gives us a brief idea that neuroticism, extraversion, and conscientiousness have direct negative personality influence on employee silence.

In contrast, employees with agreeableness characteristics are easy going and respect social harmony always agree to the norms created in the environment and happy with the given situation rather having negative thoughts or behaviour towards the organization. Especially, people with such attitude can adjust to any job and complete the given task. However, individuals with openness to experience are more outgoing, imaginative and creative prefer to bring out the changes in the workplace to encourage innovation among

colleagues and other mates and identically employees never adopt any silence in the organizations.

Other research has shown the effect of the personality traits on each dimension of organizational silence (Şimşek & Aktaş, 2014), whereas this study has focused on organizational silence comprehensively and to identify which among the Big Five personality factors affects organizational silence.

The longer the employees' extroversion (social, active, charismatic), neuroticism (anxiety, depression, not open to criticism), and conscientiousness (strategist, organized, responsible) increases, the greater the strength of the passive silent behaviour, potential confusion, and aid to the organization decreases. It can be concluded that the individuals at the workplace maintaining silence could be related directly to their personal interpretation of the environment as a hindrance to building a successful career. Secondly, various personality attitudes; such as conscientiousness, being more responsible for the task carried out increases when the perceived injustice decreases and vice versa. The manifestation of employee silence is likely the result of factors affected by the dimensions of the personality, such as conscientiousness, extraversion and neuroticism. Moreover, in the small-scale sectors, the individuals' do not speak up for fear of losing their jobs; it may be particularly resulting in the feeling of being passive consciously and leads to irrelevant behaviour. Therefore the employer should encourage such personnel for smooth and convenient operation, reduce delays at work that may give the employees an opportunity to communicate and make the work environment more efficient and secure.

### **Limitations and Future Research**

Since this study investigated the effects of the big-five personality traits on organizational silence as a single dimension in the small private furniture sectors of a specified city, future study should expand the scope by increasing the population proportion and investigating the research in different governmental sectors such as universities, hospitals, and service-providing industries with more experienced employees.

The fruitful direction for future research involves examining the interactions by using multiple regression analysis of personality traits dimensions with organizational silence and together investigate if other variables also sharing their variance on organizational silence. Furthermore, it would be more effective to examine the current model by using mediating variables in future research to find the indirect and direct effects of the related model.

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# Technological and cultural demands and difficulties in adjustment to them among Polish young adults

by

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## ABSTRACT

Contemporary globalized world can be defined as an informational reality and world of dynamic changes. The new technologies and changes in culture can be associated with this world. Psychology of globalization (Arnett, 2002; Senejko&Los, 2016) is aimed to describe and understand people's reactions towards variety aspects of globalization. This project attempted to fill the knowledge gap about how people react upon this reality and what is their perception of it's different aspects. The main research question was: How do young Polish adults perceive technological changes and how this perspective is connected with their global view of the world and what kind of reactions people activate in that context.

To investigate this question, two models were used: The model of attitudes toward globalized world (Senejko, Los, 2011, 2014, 2016) and the model of globalizational threats and defensive reactions based on function-action approach to psychological defense (Senejko, 2010). Two questionnaires and set of demographic questions were used to collect data from 305 participants: the Questionnaire I-World (Senejko, Los, 2011, 2014), elaborated by Senejko & Los and Senejko's GTDQ-Questionnaire (Globalizational Threats and Defenses) (Senejko, 2015). First questionnaire assesses 3 different attitudes toward globalized world: Accepting, Critical and Fearful. The second questionnaire assesses 4 types of threats: Technological-culture, existential – the identity threats, social and lastly systemic threats. This measure also diagnoses some types of reactions (defences) to these threats which are classified according to two dimensions: Constructive (developmental) - non-constructive (just adaptive); and psychosocial (based on interpersonal relations) - psychic (based only on psychic resources).

Results indicated that technological-culture threats were the most often (in 37% of cases) chosen by participants as the most threatening for their psychological development.

Also, the mean for those threats was statistically higher than other kinds of threats. Young adults with higher scores on this kind of threats had more often Critical and Fearful attitudes toward globalized world. These were more eager to use non-constructive behavior and tend to look for a support among friends (psychosocial constructive defense). The results of our research show, that even for this young group of participants, technological and cultural changes can be perceived as threats. Suggestions for future studies and proposals on how to support acculturation towards the New were presented.

**Keywords:** globalizational threats, psychological defenses, attitudes toward globalized world, technological – culture threats

## INTRODUCTION

Recently, cultural changes have been extensive (Inglehart, 1995). Contemporary globalized world can be characterized by new technologies, information overload, changes in culture values and traditions (DeSousa, McConatha, Lynch, 2011). This phenomena can be even more vivid in an emerging economies, where the gap between the past and the actual reality is here very big.

The process of globalization is defined as a process of strengthening the bonds and interdependence between different countries and culture. The influence of globalization is described not just as an impact of global reality on local markets and society, but also, using a term glocalization, when ideas and phenomena from small localities have an impact on a global reality (Giddens, 2002). Integral tools for these processes are the Internet and new technologies which allow people to communicate, travel and share goods and information (Senejko, Los, 2011). People today cannot imagine a life without constant access to the Internet and modern technologies. The information revolution is described as even more influential for people's life than industrial revolution (Appadurai, 1996, Castells, 200, 2007). The Internet became more than just a medium of communication and source of information. In many cases it is a new area of people's functioning. And this area has a strong impact on emotions and people's cognitive activity (Bauman, 2011, Levinson, 2010; Car, 2012, Illouz, 2008). This expansion of media, availability to Internet and cell phones, coexist with intermingling of cultures that influence on social changes (Senejko, Chmielewska-Łuczak, Łoś, 2013).

Today, mass migrations and social sciences have allowed people to better understand global changes. Especially, psychology can be used to assess the influences of rapid technological changes on capabilities and human functioning (Bandura, 2002, Beck, 2006, Elliott, 2009). The main objectives of psychology of globalization are the changes in identity (Berzonsky, 2012) caused by globalization, such as bicultural identities, identity confusion, self-selected cultures, and emerging adulthood (Arnett, 2000, 2002, 2004). Recently also a wider perspective is being analyzed – this view emphasizes that psychologists should take into consideration all psychological aspects of functioning, which are directly connected with the process of globalization (Senejko, Łoś, 2011, Marsela 2012).

Two extreme actions could be observed as a reaction toward a globalized world: Exclusionary and integrative actions (Chi-yue, Gries, Torelli, Cheng, 2011). The first one is connected with fear as an emotion related to the erosion of culture; the second is connected with perceiving a contemporary world as a valuable source of knowledge, goods and skills.

This dualism of reactions toward a globalized world was captured as well in the *model of attitudes towards globalized world* (Senejko&Los, 2011,2013) where three different attitudes were described: Accepting, Critical and Fearful. Attitudes in this model consist of emotional, cognitive and behavioral aspects. *Accepting attitude* toward a globalized world is characterized by the openness towards the contemporary reality, active participation and the need to explore it. The *critical attitude* is connected with objection, condemnation of many facets of globalization and moral judgement of global actions. The third, *fearful attitude* toward a globalized world is characterized by a sensitivity to potential dangers of the contemporary world, feeling of uncertainty about the future and feeling that one is lacking an important skill to fulfill the requirements the future holds. This model was taken under our consideration in planning our research.

The second was the *model of globalizational threats and defenses*, connected with the function-action approach of psychological defense (Senejko, 2010, 2015). Development here is understood as a process of achieving the most important standards of regulation, or motivation factors (such as values, needs, convictions), which grant meaning to one's activity and the whole life. *Psychological defenses*, according to this model, are activated when realization of the main individual motivational factors are blocked or impeded. They can be divided according to two categories. The first category is related to direct results of defenses in the connection with personal development. According to this division, defenses can be *constructive* (oriented on solving a problem, and through that contribute in some extent

with development) and *non-constructive* (oriented on minimalizing negative effects of not achieving motivational factors (standards of regulation), therefore they do not contribute to development, but can be adaptive. While the second category of defenses reflects their social or psychic character. According to this division, defenses can be *psychosocial* (they occur when interacting with others) and *psychic defenses* (they realize without interactions with others) (Senejko, 2010, 2015).

A factor, which can block one's main motivational factors (standards of regulation) can be perceived by individual as a threat. In context of globalized reality, the four categories of perceived *globalizational threats* were distinguished: 1) *technological-culture threats* (informational overload, too high technological requirements, declining of traditional cultures, and so on); 2) *existential – the identity threats* (lack of purpose in life, difficulties with finding an own place in life, etc.); 3) *social threats* (feeling of overwork, lack of time for family and friends, competition, etc.) and 4) *systemic threats* (feeling that democracy is failing, radicalization of national-religious movements, dictate of money, climate changes, etc.).

## RESEARCH

Previous studies connected to psychology of globalization in Poland were focused on characteristics of different developmental groups (emerging and young adults; Iwaniec, Senejko & Stecko, in print), relation between attitudes toward globalized world and identity formation (Senejko, Los, 2011, 2016, Los, Senejko, 2003) and perception of time and money resources among young and older people (Senejko, Los, Oleszkowicz, 2017). However, the main research problem in our study is connected with globalizational threats. The research assumed that globalizational changes are often characterized by technological and culture changes, therefore focus on threats which those changes can evoke among people, should be an important issue. (e.x. Levinson, 2010; Car, 2012; Castels, 2011; Senejko, Chmielewska-Łuczak, Łoś, 2013; Bandura, 2002; Carr, 2012). Some theories even suggest that intensification of technology might lead to a new psychological dysfunctions (like digital dementia (Spitzer, 2013). Therewith contemporary people report that they are afraid of being on a “lost position” because of their feelings that they are technological or informational disabled (Golka, 2013).

According to this background two research questions arose together with connected with them 2 hypotheses: 1) Are the Technological-Culture threats the most common among young adults in Poland?; 2) How those threats are connected with attitudes toward globalized

world and to psychological defenses?

Hypothesis 1: A technological-culture threats are not the most common among young adults in Poland.

Technological issues can be treated as a source of fear and uncertainty, as was mentioned above. But it is also reasonable to predict that for young adults this threat would not be represented more often than others (for example existential-the identity, which often is reported as an important problem for this age group). Also, in common sense group of young people is also perceived as more adjusted to technological requirements.

Hypothesis 2: Perceiving technological-culture threats of globalization will be associated with fearful and critical attitudes towards globalized world, and with non-constructive defenses.

Since technology is often described as a part of contemporary reality, perceiving technological issues as a threat should be connected with perceiving the whole world as unsafe and dangerous. Previous research (Iwaniec, Senejko, Stecko, in print) confirmed that fear is usually strongly connected with non-constructive defensive reactions, therefore this research is expected to reveal similar results.

## METHODS

Two questionnaires and a set of demographical questions were used for research purpose.

1) *World-I Questionnaire (W-IQ)* (Senejko, Los, 2011) – consists of 35 items which refer to attitudes towards globalized world. It includes 3 scales: Accepting attitude, Critical attitude and Fearful attitude.

The scale of *Accepting attitude* consists of 9 items related to feelings as a citizen of the world, being satisfied with many aspects of contemporary globalized world and fascination with opportunities which this reality offers (alpha Cronbach = 0,7).

The scale of *Critical attitude* – consists of 10 items related to negative attitude to global organizations and condemnation of some aspects of global culture and globalization itself; connected with a need to maintain a tradition; (alpha Cronbach = 0,73).

The scale of *Fearful attitude* – consists of 11 items related to the feeling of anxiety about the future of individual and insecurity, and being unprepared for demands of globalized world (alpha Cronbach = 0,68).

2) *The Globalizational Threats and Defenses Questionnaire (GTDQ)* (Senejko, 2015) – consists of 42 items, divided into 2 parts:

First part of *GTDQ* consists of 20 items related to individual perception of globalizational threats. 4 scales of different threats are elaborated: *Technological&culture* (alpha Cronbach = 0,71); *Existential& the identity* (alpha Cronbach = 0,79); *Social* (alpha Cronbach =0,72); and *Systemic* (alpha Cronbach =0,72). Each scale consists of 5 items and high scores indicate high level of perceived and experienced that type of threat.

A second part of *GTDQ* consists of 22 items related to manifested and predicted reactions toward those threats, named as defenses. Items are divided into four categories of defenses: 1) *Non-constructive psychosocial* (alpha Cronbach = 0,67); 2) *Non-constructive psychic* (alpha Cronbach = 0,83); 3) *Constructive psychosocial* (alpha Cronbach =0,59); 4) *Constructive psychic* (alpha Cronbach = 0,75). High scores indicate a preferred and manifested defenses.

3) Set of demographical questions – included questions about participants' gender, age, education, type of employment and place of living.

## **PARTICIPANTS**

Research was conducted in Poland, at the beginning of 2016. Three hundred and five young adults in age between 18 to 41 years ( $M=28.22$ ,  $SD=5.17$ ) took part in the research. The sample consisted of 164 women (53,8%) and 141 men (56,2%). All participants were living in a region of Lower Silesia and 68,9% among them were from Wroclaw, the biggest city of this region; 15,1% lived in a cities of population up to 30 000 citizens and the rest (16,1%) lived in a cities with population between 30 000 and 300 000 citizens.

The majority (55,1%) of participants had a master degree, 26,6% ( $N=81$ ) were students, and the rest (18,3%,  $N=168$ ) declared themselves as having at least a bachelor degree (5 people declared that they finished their education after high school).

Majority of participants (42,6%,  $N=130$ ) were working at full-time; 12,8% were not working at all, 12,1% were working at a part-time, 11,8% were working as a freelancer on projects and 12,1% declared being an owner of their own company.

Participants from research sample had travelled abroad: 37,4% travelled from 4 to 8 countries, 28,2% travelled from 9 to 15 countries, and 13,8% just from 1 to 3 countries in their lives. People from the sample also were users of social media: 44,3% declared that they

are spending more than an hour per day on social media; 22% - less than an hour per day, and 23,6% - less than half an hour per day.

## RESULTS

### 1) The most common threats perceived by young adults.

The dominant perceived globalizational threat was distinguished for each participant verifying which of four scales had the highest score. 77% of participants were characterized just by one of the four threats. The most often declared threats for young adults were *technological-culture* (for 37% it was the strongest threat), but *existential-the identity* threats were just slightly less often declared (for 31% it was the strongest threat). The percentages are represented in graph 1 in appendix.

The average of each threat were also taken into the analysis. *Technological-culture* threats had the highest mean among participants. The difference between technological-culture threats and existential-the identity threats were checked by Student's t-test for dependence factors. The difference was statistically significant ( $t=3,51$ ,  $df=303$ ,  $p<0,01$ ). So hypothesis 1 was rejected. Graph 2 presents means for all 4 categories of threats (see appendix).

### 2) Relationship between *Technological-Culture* threats and attitudes toward globalized world and defenses.

The research sample was divided by median ( $Mdn=14$ ) into two groups by their scores on *technological-culture* threats. The group with the scores higher than sample's median ( $N=154$ ) were characterized as perceiving issues connected with contemporary world, such as being overwhelmed with information and technology, as more threatening than group with scores below median ( $N=126$ ). Kurtosis and skewness of variables allowed to maintain assumption about normality of distribution. Therefore, was executed Student's t-test for dependent samples in order to compare attitudes toward globalized world and defenses toward globalizational threats.

There was a significant difference between groups in critical and fearfull attitudes: the group with higher scores on Technological-Culture threats scale had also higher scores on fearfull and critical attitudes. Significant differences were noted also for defences; for both non-constructive defences, and for constructive social defences. The means, standard deviation and results of t-test are presented in table 1 (in appendix). So we can state that Hypothesis 2 was confirmed.

## DISCUSSION

The results indicate that, against assumption, technology can be perceived as the major threat for the young adults. The existential- the identity threats were also often experienced by the participants, that can be explained through psychological – developmental problems, which this age group is facing (Erikson, 1985).

Perceiving technological-culture aspects of contemporary globalized world as a threat is related to non-constructive reactions of both types (psychic and psychosocial). People who might face that kind of threat, are likely to look for a support in social groups (using constructive and non-constructive social defenses). In agreement with the research hypothesis, those threats are also connected with perceiving the contemporary, globalized world as a whole, as scary and uncertain (so it was anticipated, and it showed, that fearful and critical attitudes towards globalized world were the highest at the group of participants).

Unexpectedly, young adults, instead of being really immersed in the new technologies and cultural changes (as it is commonly surmised), are reporting those changes as threatening for their development. It is an important message for social policy makers and for technological companies. Together with technological and cultural changes, for people (even young generations) should be provided some social and informational support aimed at helping people to adapt easier to these changes. This support can be carried out through policies focused to accustoming young people to the new reality, or more careful (for example, less often) introduction of big changes in some branches of technologies.

A few limitations of the research can be noted. First, in the model of threats of globalization (Senejko, 2015) threats of technology and culture changes were treated as a one threat (which was dictated through statistical analysis). For a better understanding of this issue, future separation of those two aspects could be beneficial. Second, research was conducted on one age group, and therefore it is limited just to young adults. A comparison of older (adults) and younger (adolescents) groups could present more comprehensive information about how people react to technological and culture threats. A third limitation is a group size and character of this research participant group. 305 people took part in this research and they were representative of quite homogenous group: Young, educated (the majority having a master's degree) and who live in a bigger city. Future research should also focus on another groups of people. Lastly, during the research the exact occupation of participants was not controlled for. It is reasonable to assume that people working in IT would have different approach toward new technologies than people working in different fields.

Therefore, a set of demographical information should be definitely more complex, which may have allowed more detailed analysis and better understanding how different groups of people react upon globalized world.

Future research on how perception of technological and cultural changes are treated by different groups of people as a threats of globalized world – how it is connected with their reactions to new software and hardware, should be carried out to have more specific knowledge of this issue. This research was also focused on quantitative data and to better understand how young people and people in general perceive globalized reality, the results should be supported by qualitative data.

From different analysis (Senejko, Los, 2016; Iwaniec, Senejko, Stecko, in print) came suggestions that attitudes towards globalized world can be really vulnerable to social and political situation. Therefore, in future similar research circumstances of background in which participants function, should be taken into consideration.

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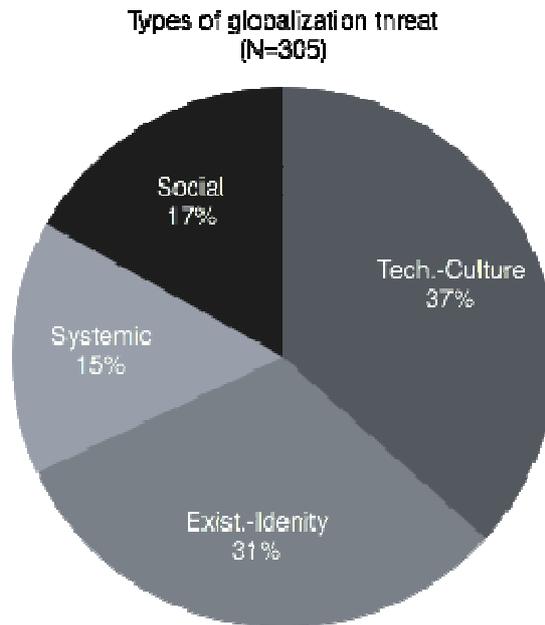
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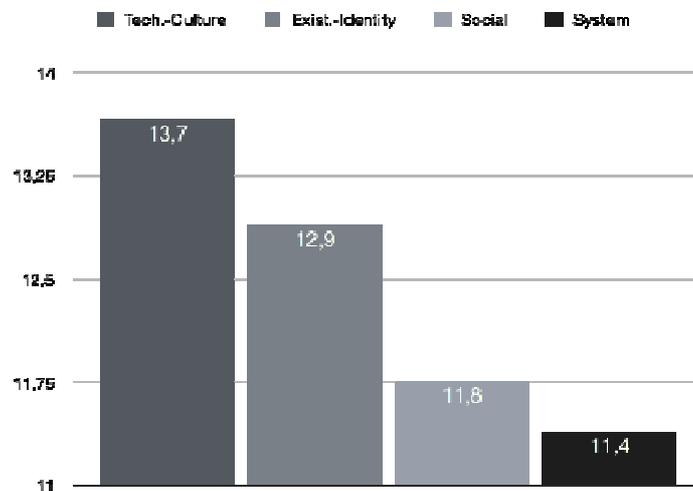
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**APPENDIX**

**Graph 1.** Percentage representation of type of the most common perceived threats.



**Graph 2.** Means for perceiving globalizational threats (possible scores between 5-20).



**Table 1.** Differences in means connected to attitudes towards globalized world and globalizational defenses for groups with high and low scores on Technological – Culture threats. (Student's t-test for independent groups)

	Variable	Group	I	M	SD	t	df	p
Attitudes	Accepting	High scores	154	22,22	5,19	0,31	278	0,76
		Low scores	126	22,03	4,93			
	Critical	High scores	154	29,12	5,27	8,60	278	0,00
		Low scores	126	24,02	4,49			
	Fearful	High scores	154	38,37	4,34	9,00	278	0,001
		Low scores	126	32,49	6,52			
Non-constructive psychosocial	High scores	154	20,10	2,81	2,24	278	0,03	
	Low scores	126	19,29	3,24				
Defenses	Non-constructive psychic	High scores	154	15,94	3,08	5,92	278	0,001
		Low scores	126	13,36	4,20			
	Constructive psychosocial	High scores	154	11,16	2,47	3,67	278	0,001
		Low scores	126	10,06	2,49			
	Constructive psychic	High scores	154	14,20	3,48	0,66	278	0,51
		Low scores	126	13,93	3,40			

# Towards Holistic an Agile Teaching Approach for Economics

by

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## ABSTRACT

The empirical approach to collecting data was fulfilled within the work. On the example of students of economics and management fields, an analysis of the obtained information showed that students possess vast theoretical knowledge and scientific research skills. However, a comparison of them with labour market requirements demonstrated that the employers of the appropriate spheres of work look, in many cases, for practical experience and skills on specific tasks solutions.

The comparison of the demand for and supply of the youth labour in the spheres of economics and management in the market, provided valuable information for the sphere of education on what specific tasks it is important to put the emphasis on in the time before students graduate.

**Keywords:** youth employment; theory and practice problem; labour market imbalance.

## 1. INTRODUCTION

The labour market of modern Russia is going through significant changes. External factors, such as innovative technologies and globalization, set new requirements for employees. As a result, these factors either replace human or make the elder generation employees' performance less efficient. A structural shift between different types of labour services takes place (Hangzhou, 2016). The growth of knowledge creation is accelerating annually by a significant value. Today it is getting more and more difficult to answer the

requirements of the market (labour market, in this case). Especially, it concerns the younger generation that has to learn a large number of skills during their preparation for entering the labour market in order to be as much competitive as possible. The Federal National Bureau for Statistics indicates that, in 2015, the level of unemployment among youth (15-24 years old), was equal to 15.1%, compared to the average rate of national unemployment that is 5.8% (Federal state statistics service, 2015). Today, the labour market in Russia has grown into a self-driven mechanism, where the state authority does not regulate demand and supply (Zhgun, Pascoal, 2016). External factors give the impulse to the labour relations changes. Moreover, the skillset of modern students has also changed (Bickenbach, et. al. 2017). The question of the research is – what should be changed in the current educational policy or education approach so that the skillset of the graduates fulfills the requirements of the changing labour market better?

The tasks fulfilled in the research are:

- To find out if the students of higher education are involved in the labour activity?
- How well are they prepared for the labour market?
- What skills have they already obtained before graduation?
- What are the requirements of the labour market?

The investigation is based on the data from the national statistics (Federal state statistics service, 2015), an analysis of the statistics data provided by the leading job finding online service, and the results of the empirical research among students of the economic and management field. The choice of the specific field of study of the investigated information is explained by the relevance. Graduates of the faculties of economics and management are employed in 20% of cases in the first year after graduation (Ministry of education of Russia statistics service, 2016). Moreover, the fields of economics and management are some of those with the highest rate of new knowledge creation growth (Bickenbach, et. al. 2017). This factor also contributes to the novelty of the research. This study focuses on the involvement of the students in the labour activity. Previous investigations were devoted to the employment statistics analysis among graduates.

In following sections, the research fundamental research work demonstrating the current situation in the education will be presented. Subsequently to that, an adaption of a novel agile educational approach to teaching business and management will be presented.

## 2. THE RESEARCH METHODS USED IN THE WORK

Methods used in work include various approaches depending on the stage of the research. Firstly, we collected data on the students' skills and knowledge in terms of an online interview performed in the form of open and multiple-choice questions. In fact, the method of statistical enquiry was used in the research, data compilation, identification of general population for the inquiry and sample population. For identification of the sample population, we used the method offered by Malhotra (Malhotra, 2012). The sample population must correspond to the proportion of male/female/age proportion in the general population.

Within the enquiry, we asked the students of Peter the Great Polytechnic University, Institute of Industrial Management, Economics and Commerce. The investigation included multiple and open questions requiring the following information.

- Whether the respondent studies and works in the same/different field or does not work;
- Level of education (BSc, MSc, Specialist) and major;
- Year of graduation;
- Education (if any other fields studied, education abroad);
- Preferences for the field of study of the future employment;
- Work experience;
- Foreign languages with level;
- Hobbies;
- Skills in theory and practice;
- Achievements, and
- Questions on personal information (name, email, date of birth).

Secondly, we investigated the demand for skills and knowledge in the fields of economics and management in the labour market. We analyzed the requirements of the employers that provide jobs in the spheres of economics\management: economist, analyst, financial specialist, operationist of the bank, senior economist, accountant, service manager, sales manager, electronic platforms manager, procurement manager, and assistant manager. We collected data by gathering information from the website of a Russian employment online agency *Headhunter* (Russian internet-recruiting company statistics, 2016). A confidence interval method was used (Nasledov, 2013) for determining the general and sample

population. Based on the data obtained, we drew up graphs and charts used for comparative analysis.

Finally, we performed an analysis of the gathered data. The method used for statistical analysis was correlation/regression, factor analysis on how the fact that the student is involved in labour activity or not, is connected with the skills that he or she possesses. We evaluated the Student's criterion and Fisher's test for each case.

### **3. LITERATURE REVIEW**

The stated problem of application of theoretical knowledge obtained within the educational institution in practice was studied by the state institutions, centers for national statistics, and separate researchers. The topic of students' work experience was analyzed by Iliasov E. and Lebedev V. They both supposed that the problem of lack of the practical experience takes place in today's education system and could be solved by creation of career centers in universities (Iliasov, Lebedev, 2008). Karataban I.A. looked at the problem from the social point of view and its impact on the society. She proposed a new system of interaction between universities and employers and analyzed academic results of students with and without a job (Karataban, 2012). Schaefer M. offered ways to downsize the gap between students' demand for jobs and employers' supply by providing short-term internships in terms of junior enterprises (Schaefer, 2016). The question of the demand for job applicants among graduates, as products of the labour market, was revealed by Lebedev V. (Lebedev, et. al., 2006) and Mihalko V. (Mihalko, 2009). Cherednichenko G.A. states in her work that today we can observe a significant change in behavior and employment paths of students and graduates (Cherednichenko, 2016). The researchers analyze statistics based on the real data from students' polls without distinguishing between different fields of study. The characteristics of the working student was also studied by several national researchers and considered to be a phenomenon (Gerchikov, 2003).

### **5. RESULTS AND DISCUSSION**

*General and sample population.* First task included determination of the general and sample population for the further research. In fact, we came up with the following conclusions. Total number of students in Russia in 2015 reached 5 737.8 thousand persons, whereas the number of students of economics and management was equal to 13% of the total

number. The volume of the general population for St.Petersburg is 37,7 thousand of students. The total amount of students in St.Petersburg is equal to 580 students for 10 000 of persons in total population of the city, according to the national statistics (Abdrahmanova, et. al., 2014).

According to the method of N.Malhorta (Malhorta, et. al., 2012), 10 questions of the poll will require 150 respondents. The demographic content of the sample population is represented by 24% male and 76% female respondents, which repeats the content of general population in students of economic and management fields. (Nasledov, 2013)

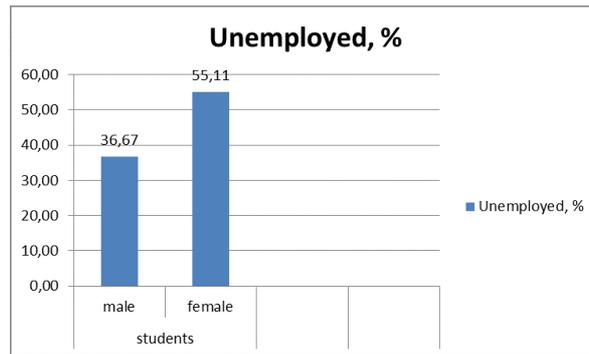
In fact, 36 male respondents and 114 females participated in the enquiry, filling out the form of ten questions on the topic of education and work experience and three questions on personal information (age, name, contact).

At the second stage, we analyzed the requirements of the employers for the appropriate fields of study. To do so, it was necessary to determine the general and sample population. Among the employers registered in *Headhunter*, there were discovered 2636 job offers in Russia for economist, 296 in St.Petersburg. It was also considered that there are 12 451 offers in Russia and 1157 in St.Petersburg for accountant, as one of the wide-spread positions of graduates of economic faculties. Finally, there are 67 933 manager vacancies in Russia, 6691 in St.Petersburg. In total, it makes 8144 positions, and using the method of confidence interval, we indicate that 207 positions' requirements are to be analyzed for a representative sample population.

*Enquiry results.* The poll included answers of students from 17 to 23 years old currently studying Economics and Management. 44.5% of them are future Bachelors in Management, 23.5% are Bachelors of Economics, and the others include students of MSc degree (6.3%) and other similar to Economics and Management fields.

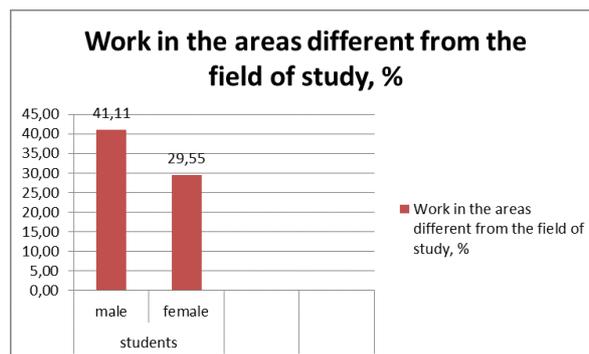
According to the results of the poll, we came up with the following outcomes. 49% of the respondents among current students do not work and dedicate their time to studies, whereas the majority of students that have a job, are involved in labour activity in the area different from Economics and Management (33.5%).

Among current students, nearly 37% of men do not work at all, whereas women work even less and devote their time only to studying (55%). (Fig. 1)



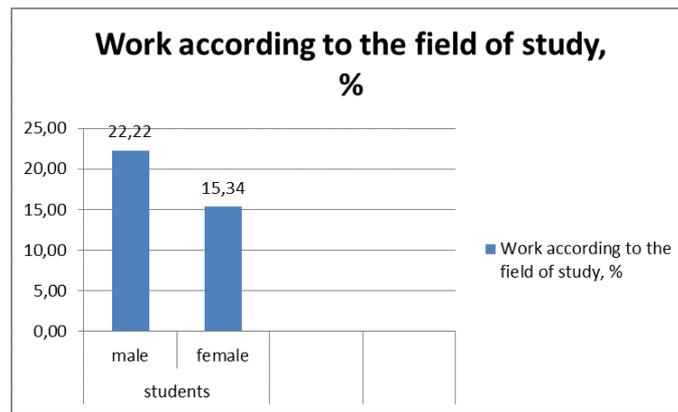
*Fig. 1: Share of unemployed students in the total number of respondents (by gender)*

During the studying process, more men prefer to work, no matter what the field of work is. (Fig. 2) According to Rodionova A., the reason for it could be that the main incentive of students applying for job, is financial necessity (80.5%) (Rodionova, 2011).



*Fig. 2: Share of students and graduates in the total number of respondents that work in the areas different from Economics and Management (by gender)*

Considering those who work in the field of study, we see that, in total number of male respondents, 22.2% work in the study area, which is 7% more than the same indicator for the case of females (Fig. 3).



*Fig. 3: Share of students and graduates in the total number of respondents that work in the areas of Economics and Management (by gender)*

In fact, more males compared to females, are employed. It was also planned to reveal the preferences of the students, so they were asked if they have changed their mind on the chosen field of study. The majority of the respondents (64%) chose “Management” as a desirable area of the future work. The second most popular answer was “Marketing” (63%), and, finally, 58% of respondents chose “Project Management”. The least popular answer was “Business- informatics” (9%), in spite of the fact that this is one of the most demanded fields in the Labour market. Among other areas, students named such as Sales (38%), Logistics (41%), HR Management (49%), Economics (40%), Planning (40%) and Business Analytics (41%).

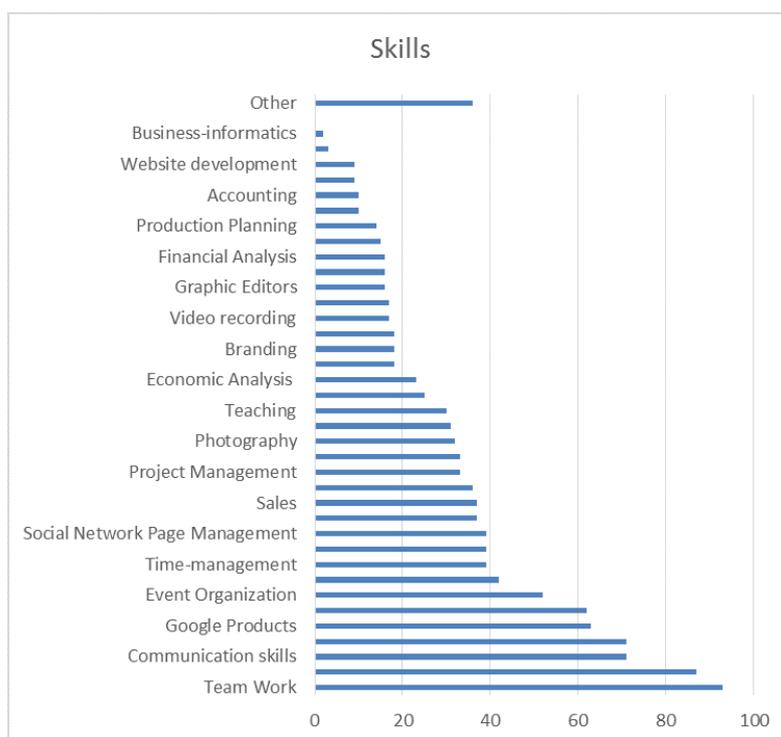
Among those who answered the question on work experience, 75% have some work or volunteering experience. 45% of them are future BSc in Management, 23% are BSc in Economics. Among all the respondents, 30% are part-time employees. 23% of the respondents have experience of studying abroad whereas the most popular destinations are Germany and Finland.

Speaking about the skills (Fig. 4), which the students obtained during their studying, the most popular answer (93%) is Team Work. 87% of students learned how to apply Microsoft Office products. 71% obtained communication skills, and 52% of students can organize events. Although 40% mentioned that they want to work in Economics, only 23% learned how to do the economic analysis, among 31% of students willing to work in finance, few know how to do the financial analysis. Project Management – 58% interested, 33% have the skill. 9% students want to work in Business informatics, and only 2% of them have the skills required. Among the least popular skills, there is financial analysis, pricing, production

planning, 1C Accountant software, business-informatics, and advertising.

As a result, students of economics and management possess professional skills in less than 30% of cases. The majority belongs to humanitarian skills, like team work and communication.

However, it is essential to take into account, that the poll did not consider the year of studying. This is one of the disadvantages of the work, as the skillset that students obtain during the study process in many cases depends on how long they have been studying for.



*Fig. 4: Skills obtained by the students of economics and management fields according to the poll.*

We also analyzed hobbies of students and what they do in their free time in order to perfect their professional skills. As a result, no one has a hobby directly related to their field of studying.

The second part of the research was devoted to gathering information on the *requirements*. As a result of the analysis of economic vacancies, we came to conclusion that in 39% of the cases, the employers require work experience in the related field of study no less than 3 years. 33% do not have this requirement. Among the skills necessary for obtaining

the economic positions, the most popular is Microsoft Office software knowledge, in particular, Excel (33%), and a skill of PC management. Then comes accountant software 1C. The employers also want the candidates to know how to use SAP software, to possess the knowledge in law peculiarities of the field, skills of document support of business, practical experience in economic modelling, skill to work with large amounts of numbers.

They expect the candidates to be responsible (28%), attentive (17%), communicative (19%), quickly learning, result-oriented, and able to work in team. Half of the employers indicated that it is important to have higher education, and in 33% of cases, it should be the education in the sphere of economics.

As for the managers, the requirements for these positions are slightly different: in 38% of cases the work experience does not matter. In order to obtain the manager position in the company, it is essential to be able to use PC, work in the internet, 1C accountant software, have the skills in selling, grammatically correct speech, and know the Microsoft Office package.

The prospective manager should be communicative (17%), active (14%), striving for growth (14%), ambitious, able to work in team, responsible, goal-oriented, and resistant to stress.

If we compare the results of the first and second parts of the research, we will see that 12 of the requirements the skills of the students respond the requirements of the market (MS Office required in 33% of cases and possessed in 86.8%, sales 10.3% and 36.8% respectively, economic analysis 11.5% and 22.5%, interviewing and polls 5.6% and 61.3%, economic

analysis 5.6% and 22.5%, pricing 5.6% and 16%, statistics 5.6% and 33%, cold calls 6.9% and 25%, communicative skills, teamwork, budget planning 3.4% and 9.4%, business correspondence).

The list of the knowledge and skills that are not provided for the students include 1C accountant software, logistics methods, document support experience, legal support in the related sphere (including taxation), program software (SAP, Autocad, Parus), financial instruments.

On the opposite, students have high excess of creative thinking skills, work experience with creative tools (photoshop, creative editors).

Speaking about language requirements, 100% of the respondents possess the minimum

required knowledge of English language and it satisfies the demand of 21% of the employers. German language is the second popular among students and is necessary in 3.5% of cases. Moreover, many students apply business language and technical language skills in their studying process.

In general, the highest supply is offered in marketing, management, project management and human resources management. However, the demand from the employers in majority of cases is for the sales managers, call-center managers, consultants, service managers, economist assistants, accountant assistants. There is a high demand for candidates with interdisciplinary knowledge (IT, internet technologies, engineering). Minimum work experience is required in 92.5% of cases, and only 74.5% have this experience.

*Correlation analysis.* To test the results of the comparative analysis, the correlation analysis was applied to the results of the poll among students. Based on the correlation analysis, it became obvious what factors influence the level of involvement of students in the labour activity.

Among those skills and knowledge that are mostly valued by the employers, we chose a short list of them, which included skill in sales, teamwork, previous work experience in the field of study, achievements, communicative skill, grade point average (gpa), foreign languages, basics of accounting knowledge, experience of studying abroad. We also considered such factor as year of study.

Firstly, we considered each pair separately. We discovered that the connection between the majority of factors presented in the analysis and the status of employment is, in the best case, weak. The factor that influences the status of employment the most, is the previous work experience (average characteristics of connection). Those students who did some kind of labour activity, whether it is volunteering or not, whether they worked according to the field of study or not, tend to be employed in more cases. However, the coefficient still shows the weak connection.

We can differentiate some other factors that show a weak, but positive connection, that are communicative skills, year of study, and achievements. It is important to note that the methods used for evaluation of the factors considered, were based on the “yes or no” answers in majority of cases, as the poll did not include the evaluation type of questions. Consequently, the disadvantage of this method has to be considered in further research.

If we continue the analysis, we discover that the F-criterion of Student in this case

(1.9713) shows the greatest value in case of previous work experience, communicative skills and year of study, that is more than the estimated value. It means that the correlation coefficients for these factors are certain.

In the process of construction of the model based on the results of the regression analysis, the value of determination  $R^2$ , was too low for confirmation of the dependence. Separately, the three most influencing factors show average and week type of connection, however, together they do not make a good model of dependence, as the coefficient is equal to 0.19117.

In fact, it became impossible to construct the model based on the data obtained in the poll, although, we revealed valuable data on the separate influence of the factors and discovered that in order to increase the chances of the employment.

## 6. A NOVEL AGILE TEACHING APPROACH

Graduates from business faculties have difficulties in finding a job corresponding to their education (cf. Iliasov, Lebedev, 2008, Karataban, 2012, Schaefer, 2016, Lebedev, et. al., 2006, Mihalko, 2009, Cherednichenko, 2016, and Rodionova, 2011). The reasons therefore are manifold. In the present economic situation there is an oversupply of graduates from business schools in the labor market. Also recently the focus of the education has been criticized. Multiple business schools understand them as academic organizations, which excellence is measured mainly by the output of their scientific research. This self-understanding is misleading arguing that business is not an academic discipline but, “in fact, business is a profession, akin to medicine and the law, and business schools are professional schools—or should be” (Bennis W. and O’Toole J. 2005).

In (Bennis W. and O’Toole J. 2005) several requirements respecting the business education standards are listed. The utmost important are the following:

- Students need to be literate in business and economics.
- Students need to practice the interpersonal, teamwork, and leadership skills that will help them function successfully in that environment.
- Students need to hone the lifelong learning skills that foster flexible career paths and confidence in adapting to a workplace that demands constant retooling.
- Students need to have strong knowledge in technology and understanding in Technology has accelerated the pace and frequency of change not only in business but

also in life. Today, life and work activities tend to overlap. This trend is likely to continue and will require more sophisticated decision-making in all spheres.

Approaches to fulfill the given challenges have been implemented and discussed in the scientific literature. Common to the approaches is the appeal between the theory and practice and the application of business theory in realistic scenarios.

In the literature the realistic scenarios are implemented using case studies or context rich problems. The term “case study” is defined as “summaries of individual historical events that provide background information, analysis or synthesis of that information, and an evaluation drawn by the author”. The case presents “the background information and the substantive dilemma”. The students need to use the given information to analyze the case placing them in a decision-making analytical role (cf. Boehrer, J. 1994).

Context-rich problems are “short realistic scenarios” in which “the problem is a short story” having the student as the major character (cf. Bangs et al. 2017). Context-rich problems reflect the real world including excess information, or requiring the student to recall important background information.

To response the appeal of practice-orientation of the business education, we adapted the model of the task-centric-holistic-agile-teaching-method (T-CHAT) (Mäkiö et al. 2016) for cyber physical systems engineering into the field of economy. We call it “T-CHAT-B” to underpin the adaption into the business field. The central element in this approach is the task that students need solve.

The teaching process is based on agile teaching methodology coping "with changing and diverse learning needs" and "with changing research, business, and technology environments" (cf. Chun A. H. W. 2014). This allows tutors to change their teaching method in demand. As depicted in Figure 1, the teaching process is organized around the task. The methodology combines five teaching methods: project-based (Mills J. E. and Treagust D. F. 2003, McDermott et al. 2007); problem-based (Mills J. E. and Treagust D. F. 2003, De Graaf, E. and Kolmos, A. 2003; research-orientated (Healey M. 2006), face-to-face (Wood, D. et al. 1978), and perceptual (Kurki-Suonio, K. 2011).

The teaching process is based on agile teaching methodology coping "with changing and diverse learning needs" and "with changing research, business, and technology environments" (Conway et al. 2010). This allows tutors to change their teaching approach in demand.

In the project-based teaching the learning is organized around projects. The central element of the holistic approach is the task that is organized as a project.

The problem-based teaching (Savery J. R., 2015) defines teaching as "an instructional (and curricular) learner-centered approach that empowers learners to conduct research, integrate theory and practice, and apply knowledge and skills to develop a viable solution to defined problem." Essential here is that the task is constructed so that the students face with problems that they need to solve.

To respond the academic needs of the education, we adapted the research-oriented teaching into the T-CHAT-B. The research-oriented teaching focuses on the knowledge construction in the subject. The research-oriented teaching is teacher-focused and emphasis on research process and problems.

Under the face-to-face teaching we understand the traditional teaching in which the teacher is the controller of the learning environment and in which the teacher causes learning to occur (Novak, J. 1998). The teaching approach is switched into this form when needed - e.g. as short input presentations, in which relevant topics are presented to provide the context and motivation for a topic.

Perceptual teaching is based on the idea that perception plays a fundamental role in all learning. Understanding the principles of concept formation forms an essential basis for teaching. Concept formation is essentially based on the perception of empirical meanings of concepts.

The T-CHAT-B is a student-centric (O'Neill, G., and McMahon, T. 2005) approach by given the responsibility of the learning to the students.

## **7. IMPLEMENTATION.**

The T-CHAT-B is a concept that needs to be concretized and implemented. Its origin, the T-CHAT, has been already successfully implemented with promising results (Mäkiö et al. 2006). Based on our experiences, we propose first to analyze the existing curriculum to find potential study subjects in which the T-CHAT-B is to be implemented. Simultaneously, metrics to measure the positive effects resulting from the implementation need to be developed. Subsequently, follows the implementation and the evaluation based on the metrics. The evaluation results should be used to adjust the T-CHAT-B accordingly.

Currently, we cooperate with companies that have defined tasks containing context-rich tasks, which the students are currently solving. The tasks were presented to the students by the company members. The teaching approach applied is the perceptual teaching. Thus, only little theoretical lectures were given.

In the future work the expectations of firms in respect of the graduates from business faculties will be analyzed. For this face-to-face interviews in firms will be conducted. Additionally, an online survey to analyze job ads in business field will be executed. By doing so, we expect to get hints for the development of business curricula to prepare business graduates better to meet the needs of the business and to get a good job after their graduation.

## **8. CONCLUSION AND FUTURE WORK**

This investigation of this paper considered the following topics:

- The statistics on the students' of economics and management fields academic and labour experience collected, including general statistics on students' employment in St.Petersburg, the status of employment among students, type of their work experience (in the field of education or in another field), gender statistics, the portrait of modern economics/management student based on the skills they possess;
- Data on the employers' requirements for the positions of economists and managers obtained, comparison analysis fulfilled;
- The dependence of the status and type of employment among students on the certain skills they possess revealed.

This work identifies weaknesses of the current business educational methods based on examples. Business students need concrete practical skills related to their future professional field. Thus, within the educational process students need to learn how to apply the knowledge and skills, they need to learn by practice in order to be competitive with those who already have work experience. They need to receive the knowledge and the practical experience at the same time.

Additionally, this paper presents a novel agile teaching model for business education i.e. the T-CHAT-B. The presented novel model is an adaption of an existing teaching model T-CHAT that defines an agile approach in teaching CPS.

Based on the results of the research and data obtained from analysis, we plan to elaborate and test a new educational approach that can become a solution to the problem of

the labour market imbalance.

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## **Impact of ICT on new modalities of labour in digital economy: 'race against the machines'?**

by

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The main focus of this article is a reflection upon the contemporary changes within labour modalities, both in the context of defining and understanding the contemporary concept of labour, as well as its modes of organisation within the new, dynamic environment of the global 'digital economy'. The starting point refers to the dynamics of the 'disruptive changes', evoked by the information and communication revolution that is fundamentally changing the economic, social and cultural spheres. This is resulting in the effect of synergy whose effects are difficult to predict. Often, when talking about the information and communication revolution, described also in terms of the 'third industrial revolution' [Rifkin 2011, 2012], or 'third wave' civilization [Toffler 1980, 2006] or 'global episteme' [Kumon and Yamanouchi 2008], we have the tendency to compare it with the dynamics that took place within the Industrial Revolution. While the Industrial Revolution focused mainly on the automation of mass production (industrial economies based on production of industrial, material goods), the current information and communication revolution is characterised mainly by a rapid growth in information and knowledge (post-industrial economies based on production of cognitive, intangible goods). According to Toffler (Future Shock 2007), the accelerative curve of knowledge-acquisition, fuelled by new technologies, impacts the ever-increasing pressure of 'rapid changes', bringing forth a growing sense of uncertainty and impermanence, reflected in relation to people, things, values and ideas (emergence of 'homo asociativus' living in the world of 'liquid modernity' where "the only known experience becomes a discontinuity, uncertainty and change" Bauman, 2000).

New information and communication technologies confers on the contemporary world such a dynamic, that none of the current modes, strategies or institutional repertoires can be considered as fully closed and/or effective, instead they rather require a constant 're-defining' and/or 're-structuring', as well as a search for new alternatives. As a result, the syndrome of

impermanence (inadequacy) applies not only to the existing models or strategies, or/and institutional arrangements, but also to their current description of knowledge. As such, we could simply speak of the dissipation of the current cognitive paradigm, as the intellectual categories used to describe or understand the existing reality were coined in different circumstances, and therefore can hardly grasp what is new (the future) by referring to the past. This applies in particular to the concept of radical technological breakthrough or disruptive innovations which J. Schumpeter wrote about as having the power of creative destruction, destabilizing both the economical and social operational modes, strategies, or institutions ("from the inside constantly destroying the old and creating the new"). Alvin Toffler (1984) talks about "breaking with the past", in which spatial and temporal restrictions have been aborted (disrupted), causing both the existing models (modes of operations) as well as actual descriptions of reality (modes of knowledge) to quickly become outdated.

**Coming back to an analysis of contemporary changes in labour modalities, a classical approach** refers mainly to the paradigm (concept) of industrial labour, thus emphasizing the transition from the traditional Fordist to post-Fordist modalities of labour as a result of fundamental, structural changes within the economy - the transition from industrial economies (production of material, tangible goods) to the economies of services (mostly intangible) into the post-industrial economy: often defined in terms of the information or digital economy, knowledge-based economy, or creative economy. This classical approach is mainly focused on an analysis of the structural transformation of labour within the economy, described previously by D. Ricardo (20 XIX) or J. M. Keynes (30 XX) in the context of industrial capitalism, or more recently by D. Bell (1973) in terms of post-industrial society, A. Toffler (1980) third-wave society (civilization), or J. Rifkin (2011) as the third wave of the industrial revolution (cognitive capitalism or post-capitalism).

*Fordist modalities of labour associated with the industrial economy*, molded in the 20's of the XX century, refer to the production of (material) industrial goods, based on economies of scale (mass production and mass consumption; push economy/manufacturer's market) or "particular configurations of the technical and social divisions of labour involved in making long runs of standardized goods" (Jessop 1992, 2013). The classical Fordist model of labour, symbolized by a qualified industrial worker (usually male), was based on stable employment model on the basis of a permanent employment contract (for an indefinite period/duration), mainly because companies operated in a stable, durable and sustainable environment. In the Fordist model of labour, employees perceived their environment, in which they functioned as

stable, both in the social (male as a dominant figure on the labour market: the sole supporter of the family with remuneration enough to ensure stability not only for himself, but also for his family, accessing various entitlements/allowances in the field of social security as a derivative of employment) and the economic sphere (low levels of unemployment, steady economic growth, low inflation). In short, the Fordist model of labour can be summarized as a model assuming far-reaching subjugation (compliance) of the employee to the employer in return for far-reaching social protection and employment security. The socio-economic system was relatively predictable, with the exchange focused mainly on material goods (predictability, linearity and materiality of the processes of production, consumption and exchange within industrial economy).

*Post-Fordist modalities of labour, associated with the post-industrial economy, have been shaped by technological changes, mainly the development of information and communication technologies (ICT) and related economic, social and demographic changes, especially changes in the family structure and women entering the labour market. The primary determinant of this model is the transition from the dominance of the sphere of production (tangible/industrial goods) into the sphere of services (intangible assets) towards symbolic goods (information, knowledge, culture/symbols), often described as a transition from an industrial to a post-industrial economy, where both the production and consumption is personalized (customerisation and customization) and flexible, based on a wide range of niche products tailored to variables and specialized needs of narrow target audiences (pull economy, consumer market). As a result, the characteristic features of post-Fordist modalities become an unstable employment model - a transition from classical, stable modes of employment (for an indefinite duration on a full-time basis) to unstable, flexible modes of employment (fixed-term contract, or others form of contract under civil law i.e. the contract orders or managerial contracts), often referred in literature as so-called "junk contracts" (mainly because they not only offer unstable employment model, but also do not include any social or security benefits). As a result, the flexibility of employment brought an increased labour mobility on the one hand, with a lack of stability or continuation of employment (erosion of the traditional employment relations) on the other. As a result, part of the risk of employment has been projected from the employer to the employee (transition from models of subordination/subjugation of the employee, specific to the classic model of employment, to the economic dependency from the employer).*

When coming to **post-modern approaches (analysis of the contemporary changes in labour modalities)**, one could observe the emergence of a new paradigm of digital labour (immaterial labour 2.0) as a result of fundamental changes within technology, using the metaphor of 2.0 (it refers to civilization 2.0, economy 2.0, society 2.0), as a reference point of the world after the information and communication revolution (Prokurat 2017). As such, the post-modern approach underlines the progressive process of the digitalisation of the economic, social and cultural sphere as a result of fundamental (disruptive) changes within technology (digital revolution), imposing a constant transition (moving 'in between') two different environments simultaneously: the physical environment, embedded in a real space and time continuum, and the digital environment of 'virtual reality', embedded in a virtual time and space (timeless time and space of flows Castells, 2007). The new paradigm of the network society (informational society) introduces new categories for the analysis of labour relations 'in between': human- tool- object (described in research trend STS science-technology studies, exploring the relations between science-technology-society), described in the theory of actor-network ATN (Latour 2005, 2010) as well as in the new science of networks (Barabási, 2002, studies of social networks, multi-agent system analysis, including research on algorithms and artificial intelligence or technology cooperation networks Reingholt, 2000). This new paradigm, focuses mainly on the dynamics of the relations (constantly shifting networks of relations) 'in between' objects, ideas, processes as well as actors, or rather actants (expanding the existing definition of human actor(s) with nonhuman categories of: tools, technologies or objects), both in the context of the individual and collective, launching new areas of study (tension) in between: the real/physical and symbolic/virtual (environment, organization or identity), as well as humans and non-humans - machines/ new technologies (algorithms or AI artificial intelligence).

To conclude, a post-modern analysis of labour processes tends to highlight the growing productivity and efficiency of machines (technologies), weakening the existing position (subjectivity and agency) of human labour (Rifkin *Third Industrial Revolution 2011*, Brynjolfsson and McAfee *Race against the machines 2011*). As a result, we could observe the increasing tension between "dead work" objectified by machines which do not progress (evolve) themselves (proceeding automation of labour) and "living work" performed by human, creative and subjective (but linked with physical and cognitive limitations and lower efficiency of the labour process). According to B. Arthur (2011), the author of the concept of the 'second economy', within the digital economy traditional, physical analogue processes are

converted into the algorithms, executed by communicating machines within a framework of inter-algorithm communication. As a result, in the labour process more and more functions: research, cognitive or analytical are taken over by machines, which due to their productivity and efficiency are becoming dominant over humans, who in most cases are slowing down (constricting) the efficiency of the machines (McAfee 2011). This is leading directly to structural unemployment, exposing the basic contradiction of technological capitalism: in a post-industrial economy jobs are generated mainly by consumption, meanwhile, in order to produce more goods, we could see the increasing replacement of human labour by more efficient technologies, significantly reducing the existing workplace. As such, the question arises: who would consume more production surplus: machines? In the context of the digital economy, there arises a dilemma of effective investment in network development: in whom to invest more: the employee or technology? No wonder that in the context of an increasing 'human gap', we could find more and more hybrid models or solutions, combining the subjectivity of human and non humans in order to increase the cognitive potential of humans (emergence of trans-human or cyborg: fusion of the human and the machine; Bobryk 2014). The end result is, that we are becoming more and more dependent on (influenced/defined) the relations with the tools/objects- this applies not only to digital networks, but in general to cooperative networks in which we participate alongside the inhuman(s) - creating techno-human collectives, where human(s) and nonhuman(s) form a symbiotic system engaged in the process of learning (Levy and Murnane 2004, Hirschhorn 1986, Rotman 2013).

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# **Some consequences of the development of Internet technologies in the light of the humanist management**

by

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The reasoning of this text is quite complex, as is coming from the application quite innovative, or at least not very popular instruments. It must be so first consistently described and justified and, secondly, be used in accordance with the description and justification. Field of research, which these instruments introduces is the management embedded in the Humanities. This is a field of relatively new kind of insights and introducing specific ways of understanding the organization and the management, which is the result of a certain exhaustion or incompleteness associated with the traditional approach. For this reason it is not only fully formed and understood, but also full of places imprecise or new, and its description must, of necessity, take these situation into account. It is also opened and promising for example in the part, close to the author of this text, which, through the basic questions on its territory, can distort the believes about how to understand research methods and processes of meaningfulness of the scientific fields such as Humanities. Described circumstances make this reasoning to attempt to enlighten these aspects of humanistic management which are important from the theoretical point of view – this takes place in the first part of text – and to move in the next part to the proposed model of the Internet. This model is based on certain assumptions coming from the theoretical basis and then focus on the examples like the case of the network, which will serve as a guide to identify the latest trends in this field.

## **THE MAIN CONTEXTS OF HUMANISTIC MANAGEMENT**

Humanistic management is in its foundations directed to scrutinize situation of man in the organization. This main output perspective refers to the idea of moral by Kant, which causes at least two consequences: first, it determines the personal dimension of the human being and the second – it defines him transcendently. We may, for the purposes of this text, understand the latter one as a reference to a universal and out of the questioning essence of his

being. Secondly, it introduces a reflection of ethical issues, and so shows a kind of a noninstrumental approach, designating the man a special role and supporting its unique properties. It is the extremely noble prospect which is needed in a world that seems to be not only indifferent in this field, but even cruel and ruthless.

In the more advanced interpretation of the humanistic management it is also – and this is the second most important perspective – a research project that refers to the specific field of science which is the Humanities. The latter can be usually understood a bit trivially as "human-oriented" – then the core of the linguistic base is regarded as the human (*humanus*), but in the second possibility that remains it refers to another word: humanity (*humanitas*), meaning an "anthropological and philosophical project" [Borowski, 2009, 125]. In the latter case, humanity is understood as the layout of the intrinsic man potency: opportunities, prerogatives, or talents letting him to provide the unique and very important role in the world. In particular, gives him the right to put himself in front of the world in the role of a full and peer researcher, interpreter and a working actor. Change in the perspective is dramatic; moves look out of the man to the all that surrounds him (the world). This means, for example, the emergence of questions about the possibility of human knowledge and creativity.

Both described perspectives are extensive and fundamental, but they are also very precisely operationalized, filling the pragmatic condition involving placing the humanities next to the management. The project of the humanistic management is not fully implemented in both these areas. As far as the prospect of the first is in its quite mature phase, the other is in the start-up phase. Interesting is the development of the third, somewhat random path between both types of research, especially in the drop-down of the Jagiellonian University Institute of Culture as a field of cultural institutions recognized as a specific management area, demanding their own tools [Kostera 2015].

The man in the organization recognized from the perspective of humanistic management is seen generally as the recipient of the various procedures and processes that violate its subjectivity, especially in the area of certain values, such as freedom, understood for example as a freedom of creativity. It is clear that this situation is perceived as oppressive and produces negative effects for the organization in which that person is present. It appears therefore potential field of the activities for the head of the organization perceived of course in the theory of management before, but now getting a mature philosophical shape. What's more, producing different (philosophical) image of man in the organization and following at the same time the most fundamental beliefs in the defining organization as a kind of a collection

of people, we need to reconstruct the image of the organization itself. Questioning its internal elements, so basic as man, causes to explode the whole structure from the inside, because it produces a different basis for the interpretation of its presence in the world<sup>1</sup>.

Monika Kostera, rightly seen in Poland as one of the leading exponents of the humanist management, sees the 4 directions of its reflection: "within the framework of the Polish humanist management, you can extract the four that are not necessarily disjoint, the main areas of interest of researchers: (1) reflection on the scope and method, (2) reflection on the ethos and the meaning of management practices, (3) the management of cultural organizations (and science), and (4) the organization management in human experience." [Kostera 2015, 11]. This statement clearly dominates the mainstream focused on the person of a man which is operationally recognized in three ways: as a base for the axiological system (ethos), as the foundation of the meaning, which can be understood in many ways, but it certainly refers to the purely human competence, and thirdly as an actor operating in a certain reality, which is defined as the reality of his existence. Because this reality is experienced by him in a peculiar way, this situation can also be differently conceptualized. Clearly one can see in these four possibilities the philosophical inspiration, rich and quite basic from the perspective of Western thought. All, however, revolve around a pretty single axle.

Otherwise is in the case of the first and third point; the latter one has rather the particular nature in the sense that it concerns a very specialized research actions, about which we have already mentioned here. The most interesting is the first point, that refers to a certain pragmatic basics of the humanistic management. Indeed a major impetus in the theoretical work in its case concerns the methods, although one can find also the term such as "scope", which can be considered as an echo of a dispute that casts by Dilthey and Windelband at the end of the 19th century [Kuderowicz 1987]. This is a significant reminder because the merits of the theoretical work in both of two philosophers and contemporary humanistic management concerns epistemological issues. In the case of humanistic management it is the subject of a dispute concerning his identity, which, after all, is also an expression of criticism for its foundations or even the meaningfulness of his project as an area with sufficient reasons to play the role of an independent field. This kind of reservations could be however qualified as a clear evidence of a complete misunderstanding of the project. It's hard to describe it here in a detailed way, but to put clearly: humanistic management proposes a superior perspective

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<sup>1</sup> Extensive evidence for the presence of this kind of problems is the publication [Nierenberg 2015].

reflection on the management, that's mean that it could include any type of scientific narrative and its instruments of conceptual and methodological type.

In this sense, the individual research fields such as economics, psychology, anthropology, cultural studies, etc. are seen as a separate and specific components of a more general study, which can operate on the transdisciplinary level. Due to the essentially philosophical shape of this design, which operates on the meta description level, its area can be only Humanities. In this way, also, and perhaps above all, one should understand the humanistic part the humanist management. At the same time, it is also the realization of the other general way of understanding it, described earlier, referring to the base coming from the notion of *humanitas*, which here means rethinking the philosophical foundations of the opposition man/world founding an anthropological project since the time of the Renaissance. It appears in particular as epistemic problem, including a problem of legitimacy of science and its cognitive status.

It is worth to recall at this point that the Humanities today is the territory that in the 20th century has been struck by the fundamental undermining of existing prejudices within both mentioned areas. This is so important because the Humanities are the natural territory of the examination of both of them. The major project of human subjectivity collapsed, project which has been built at the West at least since the time of the Enlightenment, in which an important role the technological component has played [e. g. Hyles 2012]. Twentieth century was also the time when fall down the certainty of the scientific judgments giving the place, for example, for the constructivist approaches. Especially in the second half of the 20th century there appeared a number of concepts based on distrust to these judgments, that took its reason from the constatation that scientific insights are deeply determined by their social contexts [Siemek1978]. Management is a subject of the same scrutinize procedures, though it is not often perceived and approved, and yet this situation seems to be a sign of reaching out a pretty basic problems of science. It is enough here to take under the consideration a so-called multiparadigmaticity (multiplicity of the basic cognitive paradigms) of the management [Sułkowski 2012, Czarniawska 2010]. This expressly formulated property of it should be considered as a deep articulation of the problems relating to the science as such, which is a proof of the correctness and proper insight of the project of the humanistic management, however mostly commonly experienced as a discomfort or an argument against him. Humanistic management seems very interestingly and accurately placed in this light, though not always aware of this situation is common. This can be seen in the search for identity,

which very often come down to a single field of the two mentioned by Kostera by the overestimating the area of the methodology. At the same time these methodologies, for example, paradoxically, getting inspiration from the social sciences, by appealing to the sociological instruments, which is related to the research of a qualitative type, what one can understand rather as a different field of interest: the scope.

## **MODEL OF THE HISTORICAL DEVELOPMENT OF THE INTERNET**

Management located in the Humanities, is here defined as a plane of the super reflection in the sense that it is not subject to one particular narrative of scientific research, that is, not being involved in one kind of cognitive and descriptive apparatus (the system of concepts or symbols which reflect chosen phenomena, the methods of writing, the ways of acquiring data, the type of reasoning and logic etc.). This kind of location is associated with the prospect of meta description, that describes and justifies the conditions of similar generalizations. At the same time, it becomes at this point, the field thinking about broader, epistemological way, that must be the “humanistic” in the sense that it has broadly philosophical core. Actually it is also the only a perspective that can be applied to the description of similarly complex phenomena like the Internet, considered as a whole. Need for this description is self-explanatory; this is a space of the processes of great importance, for example, the economic kind, interesting of the pragmatic reasons, typical for the management. Thinking in terms of whole appears as a hindrance, because it refers to a bit naïve way of the description of the phenomena, to the conviction, for example, that their precise definition is possible. In the case of the Internet this seems tempting, because it has a very strong technological and physical face; it is, put simply, a thing made by human hands. In this part, for example, Internet very easy inscribe itself in the tradition of the description such as technological determinism and find the easiest way to reach the popular level of public awareness. However, on the other hand, it is also easy to drop certain cultural or social contexts which are more clear and interrelated in the holistic approach, approach evidently more suitable for such massive phenomena as Internet.

Maneuver, which allows you to deal with these obstacles is the interpretation of the Internet as a discursive entity. In this way, the subject of the study is not the Internet itself as such treated essentially or idealistically, but rather the set of the ways of speaking about him. In the other words the subject of the study becomes no less complex reality of the language trying to name the Internet (and thus take it under the control of man and his processes of the

acquisition of knowledge). One can see in this maneuver, of course, the effects of a strategy which is the result of the turn in the ways of the understanding the science and the cognitive capabilities of man, based on the decision to take into account the social (historical) determination of the knowledge constructions aimed to describe the world, among which is also such a construction as organization. Although that breakthrough is usually seen as a fruit of poststructuralist French philosophy of the sixties of 20th century (called within the management a postmodernism), in fact we are dealing with the older and longer process which is still vivid<sup>2</sup>, and also no doubt the area understood as a par excellence humanistic field. This maneuver is primarily a move made on the level of description: the possibility to reach the metadescriptive level, what means the ability to speak about itself. The deep source of this attitude lays in the assumption that the language not as something transparent, "objective" or having a platonic embedding in transcendent ideas and for all these reasons, able to reach the truth. This is only the tool having all the disadvantages of its imperfections; above all one: it is shaped by human beings, so it is also limited by their current capabilities. Here, as in no other, reveals the extraordinary properties of humanistic management described earlier, which is able to include this assumption into its reflection. Humanistic management is not a "superscience" of course; it is a subject of the same restrictions as all other research disciplines, although it is capable to take a superior descriptive metaposition.

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<sup>2</sup> I try to describe it in the book *Towards the Civilization of the Internet. The Management as a Part of the Humanities* [Maciąg 2016]

Widely understood the environment that is actually the reality seen through its basic aspects: economical (macroeconomic paradigm shift in the 1970s caused by the crisis, the oil crisis), political and military (the period of the cold war, the emergence of the phenomenon of international terrorism in the 1970s, the exacerbation of the situation on the Arabian peninsula, the Vietnam war, May 68 in France), social (new models of the society like Bells, Tofflers etc., postmodernity), cultural (revolution in habits and norms in 60s, counterculture).

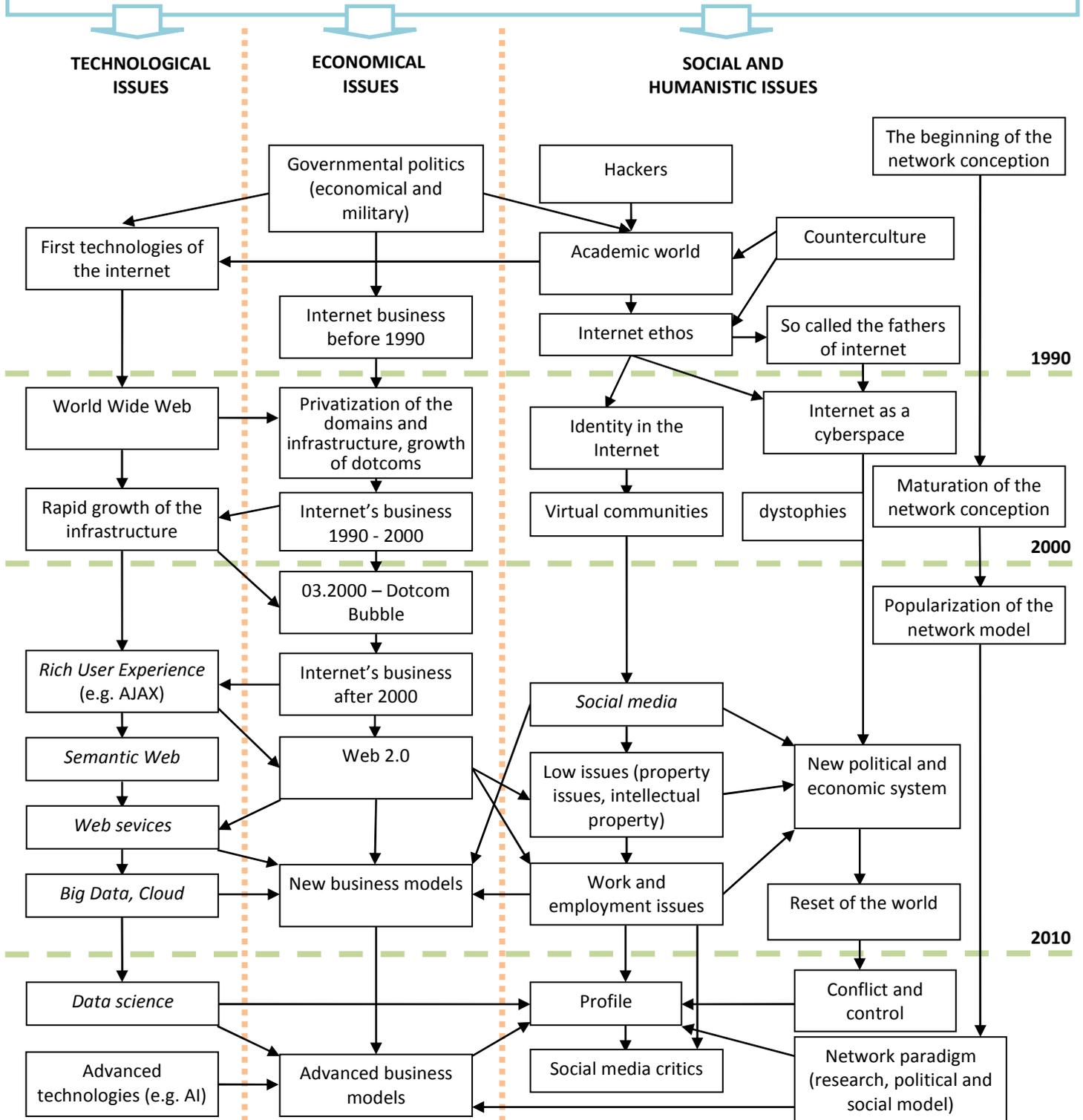


Diagram of the historical and conceptual Internet development.

Source: [Maciąg 2016]

Internet as a discursive entity is possible to describe with the same language tools, also carrying the same disadvantages, but the difference lies in the fact that this process is highly aware and has been used intentionally. A very traditional and simple assumption has been applied to provide it: Internet is presented as a historical process which runs simultaneously in three main areas, which are defined as fields of technology, business and socio-cultural issues. This choice of perspective refers to the tradition because repeats the attitude of Manuel Castells, one of the first authors introducing the holistic approach to the Internet. It is perceived as coming from the Marxist inspiration, that is to say in accordance with the principle of materialism and its conviction that circumstances such as economic system or technology shapes then social or cultural phenomena<sup>3</sup>. Such assumptions lead to the historic model of development of the Internet, which should be treated primarily also as their test realizing the self-reflection of the methodologic and cognitive type. Both interpretations: as a model and as a thought experiment in the field of scientific cognition however, accordingly to the intentions of the author, are the pragmatic proposals of the interpretation and analysis for management because they allows to capture phenomena, processes and their links, creating the appropriate basis for the decision of various kinds and for any subject involved in the Internet, actually all, including those belonging to the B&M sector [Combe 2006, 55]. This last sentence, which already has at least ten years, is confirmed by the latest report posted on the MIT Sloan Review website [Kane 2016] dedicated to the evaluation of the adoption of the trend called the digital transformation, which is driving a modern business, but relevant not only for him.

Diagram presented here is too big and contains too many phenomena to describe it in detail here. This information can be found in two books by the author of this text [Maciąg 2013, 2016]. Actually this is also one of the most important its advantages, which is the picture of complexity. This complexity is seen very well on the level of language, thanks to the analysis of the different discourses used to description of its various aspects. This level however is strictly associated with the epistemological reflection, as I mentioned before and could be understand as a line of analysis parallel to the way chosen in the sciences [Chen & Crilly 2016]. It can also allow to describe more specific paths of development of the Internet and shows their interconnections. Here in the form of examples, it is worth pointing out the two tendencies, perhaps the most important from today's point of view. First, which is reflected by the structure of the schema, is the permanent property of the Internet to be deeply

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<sup>3</sup> Though they appears insufficient for Castells to describe the newest phenomena, what is pointed out by Webster [Webster 2006, 99] and is wider described by Stalder [Stalder 2006]

nested in an ideological conflict, based on the difference of perception and the mode of the understanding of the reality, which can be broadly characterized as the difference between two main extremes: on the one hand, it is seen as a business area, subject of the economic description and the laws of economics, the free market for example. The other image of the internet is based on a specific political project: anarchic and strongly supported by the values such as freedom, equality, freedom of expression and creativity, and is deeply set historically and culturally. The conflict has its own dynamics, initially very dramatic, and it still lasts, adopting a variety of articulations. Among the most spectacular are for example, demonstrations against the ACTA in the year 2012, but shall also take the hidden, though permanent forms. Same question of copyright, which also need to be considered as the basis for these events in the year 2012, is still one of the most important areas in which reveal the basic processes for issues such as ownership, its legal protection or new forms. This conflict takes place also on the no less fundamental areas like the organization of social life or political issues. Topics such as labor issues, its provision and remuneration or privacy, protection against violations could serve as examples. Mentioned here conflict, the very old one, dating back to the 1960s has today a well formed reflection, which could be classified as a critical, led by authors such as Christian Fuchs, José van Dijck or Henry Jenkins [Fuchs 2014, van Dijck 2013, Jenkins 2013].

The next issue, strongly connected with the previous one, is the way of understanding, the formal theory and the practical business tool, less colorful in terms of historical development, but very important from the point of view of the present day – it is the network, very promising and popular descriptive and exploratory model. The territory of the research contexts associated with the latter concept is extensive. It is enough to mention its version that appears in the notion "network society" to remind the accompanying literature. Here, however, the main subject of the description is a formal model emerging in the field of social research as sociometry and then enriched by the intense research within physics in the 1990s [Freeman 2011]. As a result, at the end of the 20th century these processes led to emerge the mature and extremely promising tool that at the end of the first decade of the 21st century is also applied directly to analysis, description and business management of social networks that are created on the Internet. Although this kind of webpages like a Facebook is noticed at least in 2008 [boyd, Elisson 2008], a full awareness of the importance of this phenomenon and its description appears much later. Its direct formulation could be found in, for example, in 2013 in the book Jennifer Golbeck, where Ben Schneiderman (author of the introduction)

formulates the importance of a breakthrough: "for the first time in history, we have created the tools [...] that make patterns of social behavior visible" [Golbeck 2013, xxiv]. It returns attention to a fundamental fact, which is the recording of each user's behavior and the content he produced, which then become the subject to the sophisticated analysis made using increasingly complex tools. This property of the new technology can, however, be extended to almost any area of the Internet, or – widely – to the ICT, thus it becomes the source of perhaps essential today business trends existing under the name of data science, relating to the collection and processing of large data sets. The latter issue appears in the area of information technology already for a very long time and is a permanent cornerstone of business processes [Olszak 2007, 2014], however, today takes a different, much more advanced form.

## **THE INTERNET IN THE LIGHT OF THE INTERPRETATION OF THE HUMANISTIC MANAGEMENT**

The most important conclusion, however, coming from the schematic analysis imprinted in the presented model of the historical development of the Internet is a deep, mutual interconnection between the phenomena of an economic nature, in particular the business type, the technology, which is quite understandable though not obvious in detail, and above all with a wide range of social and cultural phenomena. The last field is essential for the functioning of the organizations, although it is often ignored, in contrary to the first one. David Baron presents its own interpretation to describe the functioning of the wide contexts of the organizations very informative in our context, however disregarded Internet as a main field of the interest. He puts management activities in two separate but closely related environments: market environment, including "interactions between companies, suppliers and customers that are managed by the markets and contracts" and nonmarket environment, which "is composed of the social, political, and legal arrangements that structure interactions outside of, but in conjunction with, markets and contracts" [Baron 2013, 2]. The second environment includes the entire universe of the different contexts of the functioning of the organization, and expanding the idea of Baron it also could contain cultural circumstances. The Internet in its historical development shows very strong combination of both of these extended environments although the presented above schema shows the situation quite differently. Such a holiness of the grounding the Internet is particularly important from the perspective of humanistic management and it inscribes perfectly into its original intuition: multi-threaded

and interlaced impacts of different processes and phenomena that make up the reality of the Internet become available only through the higher (metatheoretical) level of reflection, appropriately choosing different cognitive instruments to scrutinize particular details. For example, you can indicate the stream of the ethical prejudices, formulated first as a kind of political manifesto by the early hackers in 1950s and 1960s, whose ideas continued to develop in the form of a vision of the Internet as a sovereign political space, in large part inspired by the counterculture ideas of the 1960s and 1970s. [Turner 2006, Markoff 2006]. It led to such conceptual and cognitive design as the cyberspace, which worked strongly in the 1990s, and at the beginning of the 20th century become the basis of the specific construction of the user who took the position of the main axis of the processes of the network. This position has been symbolically launched by Tim O'Reilly and then become soon the act of birth of the new political construction of the society as stressed it Benkler [Benkler 2006] and even led to a re-evaluation of the human civilization and its social assessment seen from the philosophical perspective [Benkler 2012]. The last thread had, of course, the accompanying course of business processes, developing, for example, new organizational forms, the forms of employment and remuneration, and forms of property and its protection.

Mentioned before user creates by himself another significant thread that reveals itself as a historical process which can be studied within the framework of the approach that could be called subjective. With the development of the theory of the network, especially in the context of social networks the deep offset of the status of the user, to put it simply - the man, could be observed. A special kind of model of subjectivity emerges, which I called the network subjectivity [Maciąg 2016]. We could speak about three major divisions of it, in other words about three major ways of the interpretation of the human presence on the Internet, which, simply put, are the business type one, the management type and based on the cultural and science studies. Each of them is bind to the certain environment. The first refers to the direct circumstances of providing business based on the ICT technology. A perfect example of this trend is the attitude which is presented by the O'Reilly Media. The second is of a general and research nature, although it retains a strong link feedback with the reality of the business. The emblem may be a research programme of the Foundation for the digital transformation process CIGREF [Bounfour 2016] dedicated to the idea of the digital transformation. The third approach is humanistic in nature and places the same processes in the area of cultural, social and political phenomena, an example is a modern critical reflection based on the ideas of the Frankfurt School mentioned earlier.

These examples: of development of political ideas in the Internet and the history of shaping the subjectivity illustrate here the tensions and processes present in the reality of the management of each entity present in the Internet. These tensions and processes become visible only when one applies advanced analysis, comprehensive, holistic perspective, the big picture that is to say, which is possible only after taking into account the various approaches and finding the platform to reconcile them. This is the way how the multiparadigmaticity and metaperspective works; the approaches introduced by the humanistic management. One of the most important issues of this situation is the ability to recognize the needs of the organization and adapt appropriate solutions, however both of these activities should be carried out on the level proposed by the humanistic management.

Some approximation to the issues that are described here could be the idea of the process of the digital transformation, studied primarily as a type of set of the expectations and prejudices present in enterprises. The mentioned report by MIT Sloan Review shows that although almost 90% of the managers understands the need to introduce mechanisms of the so called digital transformation of enterprises, however, at the same time, evaluates the degree of their implementation in their enterprises on a slightly more than 40%. There are four basic areas of challenges for the digital transformation in accordance with this report: human talents, correct leadership, culture and strategy. The big gap between the expectations and the implementation is not provided by the lack of knowledge but a reluctance to change states Kane [Kane 2016]. All of these factors are "soft"; derive from the social, political and cultural circumstances and perfectly fit in the grid of dependencies illustrated by proposed earlier schema. It is also necessary to add that the whole image is complicated by continuous simultaneous progress of the ICT technologies developed by the Alphabet, Amazon, IBM, Microsoft etc. (deploying the solutions in the three main domains: artificial intelligence, analysis and processing of massive and constantly new types of data and so called Internet of things). In this situation the proposed insights of humanist management and resulting constructions such as the presented historical diagram the development of the Internet seem to be valuable and necessary.

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# **Alternative economics. Information and Communication Techniques in Teaching Economics**

by

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## **ABSTRACT**

This paper attempted to justify the need of ICTs in the effective teaching of economics. Since computer applications, like graphics software's, online videos, excel, PowerPoint, e learning material etc have important role in the economics teaching and learning processes but still most of the teachers are using the conventional methods.

Computers and the Internet are constantly transforming the economy and society. The role of information and communication technologies in promoting development is increasingly recognized. ICT is becoming a powerful tool for mobilizing civil society and unused human resources. E-Learning plays a key role in modern education systems. E-learning has revolutionized the education industry.

Information and communication technology is fast becoming today's educational requirement, because there is the need for increased in learning opportunities both for the teachers who implement the curriculum and students who are the recipients. This can only be effectively done through multiple and simultaneous actions: availability of computer facilities, computer classrooms will enhance e-learning. This implies that all stakeholders in education must work together to make ICT accessible to teachers and students in the teaching and learning of all school subjects.

The purpose of the study was to examine the use of information and communication technologies in the teaching of economics. The purpose of the study was to examine the use of information and communication technologies in the teaching of economics. ICTs are seen to be less effective when the goals for their use are not clear. While such a statement would appear to be self-evident, the specific goals for ICT use in education are, in practice, are often only very broadly defined. By specifying the purpose of the study, the following guiding questions were adopted:

1. How are ICTs actually being used in education?
2. What do we know about the impact of ICTs on student learning?
3. What do we know about the impact of ICTs on student motivation and engagement for learning?

Drawing upon international research studies of ICT in education, this paper identifies and discusses the cognitive opportunities and limitations of ICT in addressing the challenges in learning and teaching economics.

Research studies of information and communication technologies in economics education have shown that ICT facilitates the acquisition of important cognitive skills required for effective economic analysis and evaluation. It provides the cognitive scaffolding for students to acquire complex concepts and understand the connection between them, allows teachers and students to communicate both their thoughts and interests in the subject matter, and offers a better match to students' learning style. Moreover, it is a medium through which students can observe the real-life implications of economic theories. They also confirmed that information and communication technologies (ICTs) have impact on different levels of society, especially in terms of improving teaching and learning.

**Keywords:** Alternative Economics, Information and Communication Techniques, Teaching Economics, terms of improving teaching and learning

# The role of human capital in aspects of innovations for sustainable socio-economic development

by

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## ABSTRACT

Due to the progress in information and communication technologies (ICTs), globalisation and knowledge-intensification, human capital has become essential for productivity, competitiveness and sustainable socio-economic development. In the globalised world economy ICTs affect socio-economic development of countries through innovations. The “Club of Rome” founder Aurelio Peccei wrote in “The Human Quality” (1977) that world could be presented by interrelated but sufficiently stable elements: Nature, Man, Society, and science-based Technique. Today, sustainable socio-economic development can be defined wider by: Nature, Man, Society, Technology, Economy and Infrastructure. The author's model of sustainable socio-economic development is presented in the paper. Classification of indicators, taken from statistical data books (Russian Statistical Yearbook, Eurostat, IRI, R&D Magazine, International Monetary Fund, World Bank, CIA Factbook, OECD), according to the elements of a complex system of sustainable socio-economic development is proposed in the paper. Since innovations are a key mechanism for the concept of sustainable socio-economic development in the globalised world economy, the need for innovative development of all elements of the proposed integrated system is required.

**Keywords:** Sustainable socio-economic development, information and communication technologies, human capital, knowledge economy, globalised world economy, innovations, elements of a complex system.

## INTRODUCTION

The “Club of Rome” founder Aurelio Peccei stated in “The Human Quality” (1977) that the World could be presented by interrelated but sufficiently stable elements: Nature, Man, Society, and science-based Technique. In “The Information Society as Postindustrial Society”

(1981), Y. Masuda brought up the following concept: new information and communication technologies would lead to serious social changes in society. He also stated that the driving force for development would be the production of new knowledge and information (Okorokov and Kalchenko, 2015). The knowledge economy increasingly relies on the diffusion and use of knowledge, as well as its creation (Houghton and Sheehan, 2000). ICTs investments are complementary with investment in human resources and skills (Soete, 1997). Several knowledge management scholars have expected that the next generation of research will be characterized by an interest in the complicated, complex and chaotic nature of knowledge, management of risk and uncertainty, as well as capabilities for the creation of new knowledge and innovations (Pöyhönen and Blomqvist, 2006).

The goal of this paper is to show the relationship between human capital in aspects of innovations and sustainable socio-economic development on the basis of critical literature review and initial qualitative research. This paper is part of a large research project that examines different aspects of innovations for sustainable socio-economic development.

## LITERATURE REVIEW

The main selection criteria for the theories were a metasearch of literature by different combinations of keywords: *ICTs, knowledge economy, human capital, innovations*; and then separate search for *sustainable development (SD)* and *sustainable socio-economic development*.

**Human capital.** *Education* is to be considered as a key agent of development, either as a way of developing *human capacity*, increasing the skilled workforce for modernisation, or as a matter of personal freedom, *developing capability and empowerment* (Alam, 2009). Hallak (1990) argues that education is also linked to human resources development and that this has *an impact on more than just economic growth, but also an impact on the wider development of individuals and societies*. Participation in social, political and cultural activities and improvements in health as education goals are equally important. According to Fagerlind and Saha (1989), the concept of “human capital” suggests that education and training raises the productivity of workers and increases their earnings over their lifetime. If a new machine (man-made) replaces skilled workers, this may be an effective substitution regarding production and value creation, but in terms of resource consumption (environmental), income generation (social) and skills training (human), the outcome is definitively different, unless all impacts were reduced to a measurement in monetary terms. *Investing in human capital* thus

not only means offering education, but as well combating poverty and unemployment, giving people the opportunity not only to learn, but to apply their skills. It furthermore demands valuing experience (an important aspect given the demographic development) and skills on all levels, promoting self-esteem and permitting self-determination (Spangenberg, 2001). Investing in better education and lifelong learning is of course central to cultural change and shifting demand towards the use of more human capital (Ashford and Hall, 2011). Consciousness, knowledge and skills are *essential human capacities in the process of SD*. Education is one of the key factors in building these capacities (Thompson et al, 2001). *Universities*, the traditional providers of human resources and knowledge, are now *critical socio-economic development actors*. The institutional spheres still perform their traditional functions but increasingly assume the task of advancing innovation and development. *Sustainable knowledge-based development* is the objective of all societies in an *interdependent era characterized by resource constriction and efflorescence of science and technology* (Dzisah and Etzkowitz, 2008). The production of useful knowledge (Robinson, 1993) is what SD education must address (Dale and Newman 2005). The most fundamental resource in the modern economy is knowledge and, accordingly, the most important process is learning (Lundvall, 2010). Human capital is necessary as a basic input to all activities within the innovation system. For a specific technology, the allocation of sufficient resources is necessary to make knowledge production possible. R&D and knowledge development are prerequisites within the innovation system (Hekkert et al., 2007).

**ICTs.** ICTs are a very fast growing new technological area. ICTs, by their performance and potential, offer numerous options to drive SD. Literature provides many examples of initiatives to make the ICTs engine drive SD: improve ICTs across the 4C dimensions (computing, connectivity, content, (human) capacity); success of ICTs for SD requires integration, scalability, and sustainability; ICTs for SD must become a recognized and funded enterprise (Alam, 2009). Information systems research can make an important contribution to knowledge at the nexus of information, organizations, and the natural environment; to the development of innovative environmental strategies; to the creation and evaluation of systems that break new ground in environmental responsibility; and, ultimately, to the improvement of the natural environment (Melville, 2010).

**Innovations.** Literature provides many examples of human's necessity to innovate for survival. Technical ingenuity creates new technology, social ingenuity reforms old institutions and social arrangements into new ones (Homer-Dixon, 2000). Innovations are not predictable

and can happen at any time. *Innovation is critical to human health and welfare* (Newman, 2005). *Innovation is a key determinant for long term economic growth and development*. Increasing the innovation speed at a national level is a highly complicated process, yet influencing the innovation direction is even harder (Hekkert et al., 2007). Christensen argues that *both sustaining and disrupting innovation can be incremental, moderate, or radical* (Christensen, 1997). Unfortunately, the term ‘radical’ in the literature is used in these two different ways and is a source of confusion (Ashford and Hall, 2011). Many sustainability benefits may be obtained immediately through the use of currently available technologies. In the longer run, however, sustainability requires *transitions involving system innovation* (Kemp, Parto and Gibson, 2005). *System innovation* in the socio-technical realm constitutes change beyond the level of the technical components. System innovation requires transition management with elements of planning (Kemp and Loorbach, 2003). *Transition management* is a process approach directing innovation towards SD. A crucial aspect of transition management is that innovation is no longer driven by the past, but attracted by the future (Vollenbroek, 2002). Structural transformations or transitions require system innovations: organisation-exceeding, qualitative innovations, which are realised by a variety of participants within the system and which fundamentally change both the structure of the system and the relation between the participants (Weaver et al., 2000). In order to make technological change sustainable, technical change alone is not sufficient. On the one hand, technologies use resources and impose environmental stress. On the other hand, technologies can also lead to a more efficient use of resources, less stress on the environment and even cleaning of the environment (Hekkert et al., 2007). Sustainable innovation or eco-innovation has been broadly defined as the process of developing new ideas, behaviour, products and processes that contribute to a reduction in environmental burdens or to ecologically specified sustainability targets (Rennings, 2000). It is clear that *more knowledge is needed* about what characterizes and separates incremental and radical–architectural eco-innovation, in order to begin assessing the challenges ahead, and to create a realistic vision for how to eco-innovate (Hellstrom, 2007). *Policies to initiate innovation processes for SD* should recognise a double approach: *top–down and bottom–up* (Jansen, 2003).

The notion of innovations must be a key issue of sustainability. Alternative (or complementary) context of innovations shifts the weight from economic efficiency and short-term optimality to conditions fostering adaptive flexibility and long-term stability (Rammel, 2003). SD requires stimulating *revolutionary technological innovation* through

environmental, health, safety, economic, and labor market regulation (Ashford and Hall, 2011). A technology, or the knowledge it embodies, is hardly ever embedded in just the institutional infrastructure of a single nation or region, since—especially in modern society - *the relevant knowledge base for most technologies originates from various geographical areas all over the world* (Hekkert et al., 2007).

**Sustainable socio-economic development.** SD is one of the most important global challenges of the 21st century. The challenge of SD is now recognised worldwide (Jansen, 2003). The truth of Muir’s famous dictum, “Everything is connected to everything else in the universe”, is becoming ever more obvious as *economies merge into global interdependencies*, and for the first time in human history, our technologies and the ways people use them have the capacity to transform the biosphere itself (Alam, 2009).

Since being defined by the Brundtland Commission as behavior that “meets the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland, 1987), the concept of SD has continued to evolve. Economic strategies, such as reviving growth and conserving and enhancing the resource base, conflict with those which foster ecologically SD. Further, *strategies must be long term, such as decades, but action must occur now*. To achieve SD, ecologists, economists, and other social scientists must work together (Munn, 1989). There are numerous definitions of SD. “Fulfilling peoples needs of the present and future generations” requires actions that are of the short, medium and long term (Jansen, 2003). The critical global environmental problems resulted from both the *South’s enormous poverty* and the *North’s unsustainable consumption and production* (Kemp and Martens, 2007). There are moral and procedural challenges for defining the roles of science-based knowledge and innovations for poverty reduction, for governance of technological and environmental risks, for sustainable ecosystems management, and for effective communication of scientific information to achieve SD goals (Funtowicz, Ravetz and O'Connor, 1998). Our society is increasingly facing persistent problems, which cannot be solved by current policies based on traditional approaches alone (Loorbach and Rotmans, 2006). The persistent problems are complex, unstructured, involve many stakeholders, are surrounded by fundamental uncertainties, and are deeply rooted in our societal structures and institutions (Dirven et al., 2002). SD must be dynamic. It must be an ongoing process, not a goal. Numerous recent publications support the shift from a goal-oriented to a process-oriented SD. *SD models must be flexible enough* (Newman, 2005). *There always will be ‘problems’ and needs for change* (Rammel and van den Bergh, 2003; Sartorius, 2003).

Sustainability is not a fixed ideal, but an evolutionary process of improving the management of systems, through improved understanding and knowledge. Analogous to Darwin's species evolution, the process is non-deterministic with the end point not known in advance (Cary, 1998). Kemp et al. argue that *sustainability* is best viewed as a *socially instituted process* of adaptive change in which *innovation is a necessary element*. Pursuit of sustainability is a long-term, indeed never-ending process. A great deal of effort has already gone into the *identification and elaboration of sustainability indicators*. Taken as a set, these tools could provide a *well integrated, reasonably clear and yet flexible and locally adjustable foundation for sustainability-focused decision-making* (Kemp, Parto and Gibson, 2005). SD challenges societies to work in an interactive and cooperative way, instead of in categories defined by selfinterest. Science and technology (S&T) can take a more active role in that process (Alam, 2009).

On a national scale, experiences have been gained in general integrated foresight programs for economic development with time scales up to about 15 years. These programs teach how to organise co-operation between private parties, public parties and science (Jansen, 2003). The 'Sustainable Technology Development' program, launched by five Dutch ministries January 1993 - December 1997, produced a guiding manual with recommendations on *how to implement new research directions, knowledge and technologies based on integration of innovations in technology, culture and structure*. Systematic search and problem definition in long-term developments may deliver new and urgent challenges in research, innovation and development (Jansen et al., 1998). The innovation experiments suggest that: innovation processes scoping the development of technology for a sustainable (long-term) future can be initiated and managed (Jansen, 2003). A positive example is an adoption of *transition management by Dutch policy* in 2001 when five ministries started developing transition policies for mobility, agriculture, energy-supply and biodiversity. Transition management not only makes good sense but is also the only possible (and do-able) way of achieving true sustainability benefits in the long-term while maintaining short-term diversity (Loorbach and Rotmans, 2006). *Transition management* helps to work towards a sustainability transition even when no one knows what a sustainable society would actually look like and the very idea of achieving sustainability may be illusory (O'Riordan, 1996). It is not a way to manage cultural change, but rather *an approach for fostering innovation, especially system innovation* (Kemp and Martens, 2007).

*Triple helix interaction (university-industry-government)* represents the heart of *knowledge-based development* with circulation among and within the spheres acting as the arteries that stimulates ideas and policies across from one point to another. This makes it possible to stimulate knowledge-based strategy and speed the rate of socio-economic development by enhancing *the free flow of people, ideas and innovations*, the core elements of a triple helix circulatory system. Interaction among university, industry and government as relatively independent, yet interdependent, institutional spheres is *the key to improving the conditions for innovation and SD in a knowledge-based society* (Dzisah and Etzkowitz, 2008).

## METHODOLOGY

The presented research study was aimed to find answers to the following research questions (RQs):

- RQ1: What is the role of human capital in aspects of innovations for sustainable socio-economic development?
- RQ2: By what elements can be defined sustainable socio-economic development today?
- RQ3: How indicators can be classified according to the elements of a complex system of sustainable socio-economic development?
- RQ4: How partial indicators can be aggregated into an integrated indicator of sustainable socio-economic development?

## RESEARCH AND DISCUSSION

Today, sustainable socio-economic development can be defined by: Nature, Man, Society, Technology, Economy and Infrastructure (Figure 1). Classification of indicators, taken from statistical data books (Russian Statistical Yearbook, Eurostat, IRI, R&D Magazine, International Monetary Fund, World Bank, CIA Factbook, OECD), according to the elements of a complex system of sustainable socio-economic development can be presented as follows:

**Nature** (*ecological footprint and biocapacity*):

- 1) availability of natural resources reserves (renewable and traditional, real and potential) in terms of production,%;
- 2) grain harvest, tonnes;

- 3) emissions of pollutants into the air from stationary and mobile sources, tonnes;
- 4) water intake from natural water sources for use, m<sup>3</sup>;
- 5) discharge of polluted wastewater, m<sup>3</sup>;
- 6) volume of production and consumption waste, including dangerous to the environment and human, tonnes;
- 7) use and disposal of waste production and consumption, tonnes.

**Man** (*access to education, health, safety*):

- 1) average life expectancy (men and women), years;
- 2) total fertility rate (births per woman);
- 3) floor area per person, square metres;
- 4) average per capita income to subsistence minimum, times;
- 5) coverage of youth secondary vocational and higher education programmes, %;
- 6) number of receiving health care, people;
- 7) number of committed crimes, thousands.

**Society:**

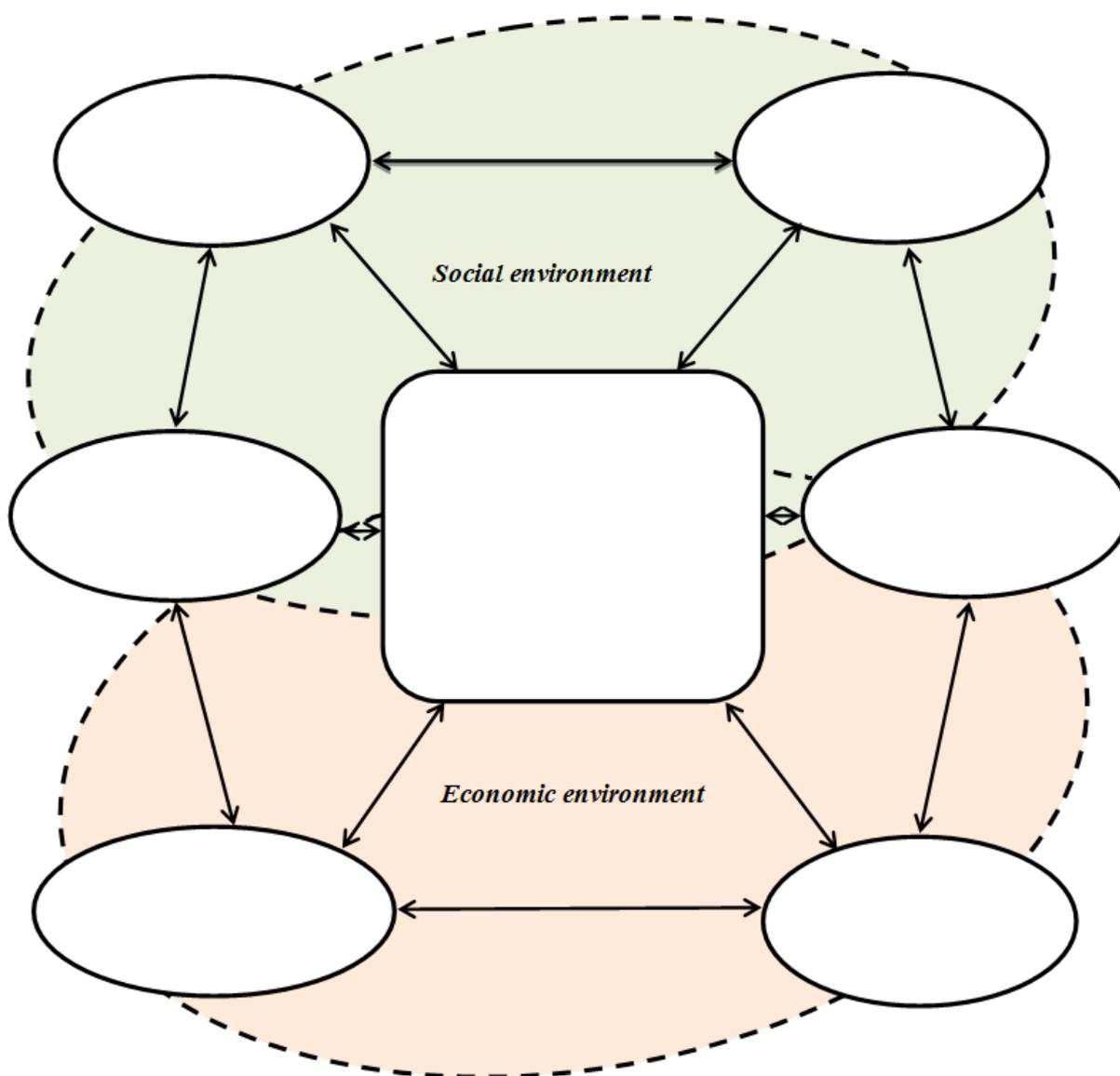
- 1) population with incomes below the subsistence minimum, %;
- 2) average income of the richest 10% to the poorest 10%, times;
- 3) unemployment rate according to ILO methodology, %;
- 4) health, education and culture costs, US dollars;
- 5) old-age support ratio, %;
- 6) benefit and social assistance payments, US dollars;
- 7) proportion of working age population, %.

**Technology** (*level, tenor of technology*):

- 1) total expenditures on R&D, US dollars;
- 2) equipment goods, % total goods;
- 3) innovative products, % total products;
- 4) export and import of ICT goods, US dollars;
- 5) developed advanced manufacturing technologies, units;
- 6) patent applications, units;
- 7) duration of advanced manufacturing technology use, years.

**Economy** (*GDP purchasing power parity level*):

- 1) GDP growth (annual), %;
- 2) investments in factors of production, US dollars;
- 3) annual inflation rate, %;
- 4) export and import, US dollars;
- 5) government deficit/surplus, US dollars;
- 6) loans, deposits and other funds extended to organizations, individuals and credit institutions, US dollars;
- 7) expenses and savings, US dollars.



**Figure 1.** The model of sustainable socio-economic development

**Infrastructure** (*development and extension*):

- 1) network length (transport), km;
- 2) freight turnover by type of transport, tonne-km;
- 3) freight transport, tonnes;
- 4) new networks in transport, km;
- 5) average vehicle lifetime, years;
- 6) average vehicle age by type, years;
- 7) investments into digital infrastructure development, US dollars.

The following classification of indicators into groups, according to the elements of a complex system of sustainable socio-economic development can be complemented and modified according to the internal and external environment.

According to systematic approach rule, the components number, subjecting to an upper level of management, depending on the complexity of the tasks should be in the range of 6 to 10. The increase of this parameter reduces the handling system and the weight of each individually. Therefore, the author has taken an average of 7 indicators for each group of elements of a complex system of sustainable socio-economic development.

**RESULTS**

The new model of sustainable socio-economic development, which includes more essential elements due to the progress in ICTs, globalisation and knowledge-intensification, is suggested. Since innovation is a key mechanism for the concept of sustainable socio-economic development in a new tenor of technology, the need for innovative development of all elements of the integrated system is required.

**LESSONS LEARNED AND LIMITATIONS**

Implementation aggregating partial indicators into an integrated indicator for each group and their population as a whole is needed. In future studies preferable is the application of optimal aggregation theory developed L. Hurwicz, E. Malinvaud, U. Fisher and J. Chipman and can reduce aggregation error, which is understood as the difference between the original problem and the aggregated tasks results. For each group integrated indicator is proposed to develop three levels of threshold values (acceptable, marginal and critical) for sustainable socio-economic development and security.

Our literature search is not exhaustive. A much greater body of literature relating to human capital, innovations and sustainable socio-economic development exists.

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# **Session:**

## **Innovation in intercultural communication**

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# Innovations in road traffic regulations in light of safety principles

by

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## ABSTRACT

The notional category of safety is deeply rooted in the consciousness of the general public, and the latter has paradoxically become overly familiar, if not callously indifferent, with the concept. The reason for the foregoing state of matters is the excess of information that clearly lacks specific amplification. This notion does not impress anyone anymore, and hence its faded semantic overtone. And yet with regard to road traffic, this is still a topical problem, since numbers of vehicles and drivers as well as pedestrians have been growing, which means that there are more and more users of roads. This group should also be expanded with stray dogs, wild forest animals and random obstacles, such as wind-felled trees or road pavement defects.

All these factors affect to a certain extent the condition of safety in Polish public roads. And since, as aforementioned, all of them are characterised by increase trends, safety in roads has been exposed to considerable risk.

This paper highlights specific conditions encountered in road traffic that threaten traffic safety. One might presume that the highway code is so tight and precise that there is no way to modify them, about which traffic police officers are particularly convinced, but it is not so at all. I personally believe that the code requires some innovations, and this is the main theme explored in this paper. My goal is to indicate specific areas the doors leading to which still remain ajar in epistemological terms.<sup>4</sup>

**Keywords:** safety, users of public roads, vehicles, pedestrians, animals, road obstacles.

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<sup>4</sup> J. Bańka, *Inscenizacja epistemologiczna w poznaniu naukowym*, University of Silesia, Katowice, 2000.

## **INTRODUCING THE OVERALL BODY OF PROBLEMS**

In this paper, I have emphasised individual problems that are often raised in everyday discussions about safety in road traffic. I also address those which have been disregarded by official publications. And they include such factors as:

- growing vehicle count,
- growing number of public road users,
- growing chaos in roads,
- declining public awareness of road users,
- widespread violation of road traffic regulations,
- growing number of drunk road users,
- growing number of road users intoxicated by narcotics,
- locally defective road pavement,
- locally poor road signage,
- incomplete legal regulations,
- locations of insufficient road illumination,
- speeding,
- dispute over age limitations for driving licence holders,
- dispute over the minimum age of driving licence candidates,
- driving licence examinations tests and requirements.

All the aforementioned problems must be immediately addressed in the public milieu, and they require dedicated legal arrangements if we are to seriously touch upon the issue of public road safety.

## **DETAILED ANALYSES**

If we wish to learn about the status of safety in public roads, we must refer to up-to-date communication or police reports that contain all the knowledge available in this respect. Nevertheless, since these data become outdated as time passes, they will be treated as irrelevant. We shall, however, address individual problems that are decisive of safety in public roads regardless of time or the regulations in force.<sup>5</sup>

I will discuss several factors which guarantee safety on roads, irrespective of the current

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<sup>5</sup> B. Śleziak, *Psychologiczne uwarunkowania kolizji drogowych*, 2015.

state of matters. They include some disputable matters or ones which have not been legally regulated yet, such as the following:

- there are legal disputes as to the age at which one is entitled to drive a car. Both the youngest and the oldest age are taken into consideration, and this problem still awaits to be legally fixed;
- certain public roads must certainly be improved in terms of their pavement, signage and lighting;
- elementary education about road traffic regulations should be a common practice;
- regulations concerning periodical driver examinations require improvement;
- one of new solutions to be introduced should be a driver's book, in which the traffic police would make entries in cases of violation of traffic regulations. It would function as drivers' records showing the history of their transgressions against road traffic regulations. On the one hand, it would provide courts with ready-to-access evidence material, and on the other hand, it would exert educational effect on drivers.

One should also revise the so-called "policy" of penalties for violations of road traffic regulations. The penalties currently in force are neither well thought-out nor adequate to individual cases of transgression. They seem to function as measures of revenge, rather than of adequate penalty. They are not properly graded. And although they are radical, they lack the educational dimension.<sup>6</sup>

One should consider the rationale behind a two-level penalty scheme, comprising both tickets and penalty points, where after exceeding a pre-defined threshold thereof one is deprived of the right to drive motor vehicles. In accordance with Roman law, an offender is punished only once for the given deed. While under the Polish traffic law, drivers are punished twice, which contravenes fundamental principles of western legal systems. Penalised drivers constitute a source of specific benefits for the state budget, which is obviously deplorable in civilisational terms. They are but forced to pay what may be compared to tribute, which has little in common with the rule of law. Under the pretence of ensuring safety, the state solves its financial issues by replenishing the treasury.

There should be a clear legal framework defining rules of distribution of the amounts collected on account of traffic offences. One should seriously wonder about the destination point of this stream of money, the purposes for which it is used as well as who controls it. All of the foregoing allegedly relies on the category of safety, which clearly harms only the less

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<sup>6</sup> A. Wardziński, *Korytarz ratunkowy*, Noizz.pl

affluent part of the society. The noble motto of “road safety” has become a pretence for the state to abuse its power. Road inspections should be transparent, i.e. subject to full disclosure to road users.

The state must not be a monopolist in such matters, as it contradicts the fundamentals of democracy. Penalty should primarily perform preventive, and not retaliatory role. Besides the penalty itself, there should be an element of humanism and dignity taken into account when penalising a driver. For the system of punishment has fallen into a trap. Ordinary drivers blame the policemen for the tickets they have received, while they should in fact turn to the members of the parliament who have passed respective laws. Such a procedure is political, and not educational in nature. Consequently, it does not fulfil its social role, while it only performs the repressive one.

Safety should be well prepared. But what does it mean? The answer boils down to claiming that education, and not penalties, should be the solution. Culture or safety in roads cannot be ensured by means of a system of penalties or tickets, but only through educational efforts initiated as early as in primary schools, as in times long gone. People should be taught road traffic regulations regardless of whether one owns or does not own a car. Such education should be widespread and common, and begin already in schools. The current system of training that precedes driving licence examination is very ossified, and it is high time it was modified. School education may be the answer in this respect, since teaching and learning in later periods of one’s life do not proceed under optimum conditions. Moreover, school education may raise the culture of using public roads to a higher level.

Another problem I have intended to address in this paper is referred to as emergency passage. It pertains to situations when an ambulance, a fire brigade or a police vehicle run with alarm signals on. It means that they are priority vehicles and must be allowed to pass in order to reach the accident, the injured person, the fire etc. as quickly as possible.<sup>4</sup> Whether such an unobstructed passage corridor is created does not depend on traffic regulations, but rather on the culture of drivers. Every obstruction of the emergency passage may delay the services in arriving at the destination on time, potentially causing irreparable damage.

The above examples are only illustrations of matters not yet settled in the legal or conventional sphere. They provide overview of the problems in question. And they are all in need of solving or regulating, for they represent considerably neglected areas which, however, still exert an impact on road safety.

One should also keep in mind that the strategic link connecting all these phenomena is ultimately the human being, or to be more precise, his or her proficiency, experience and status of social awareness. The mere regulations alone will not make up for personal driving culture or improve safety in public roads. What we need is education and personal culture.

The practice of driving under the influence of alcohol, psychotropics, designer drugs, narcotics or other intoxicants should be completely eliminated. In other words, there are still many corrections, adjustments or regulations to be done. They have already been mentioned in this article.

Automotive traffic has been growing in quantitative terms, but human mentality still lags behind. There are psychological divergences which should be adapted to match the life's needs. All my suggestions, indications or recommendations fall under the framework of innovation for the sake of uncompromised safety in public roads. It is also the reason why I have written this paper.

## CONCLUSIONS

Safety is a theme which emerges in nearly every discussion. It has become one of canons of the 21st century civilisation. In the world of contemporary transport, automotive industry and civilisational haste, safety in public roads is exposed to numerous risks.

The notion of road safety may also be interpreted otherwise, as it mobilises road users to behave with maximum social discipline and to follow higher collective awareness, not to mention its educational effect.

Police statistics make us realise that safety standards can still be improved. And this goal promotes well-being of all people.

Safety related problems will never disappear from our lives, since the entropy of events taking place in the world has been constantly growing in complexity. The relevance of the safety category will change in light of the dynamic worldwide development of automotive traffic.

If only one considered the rate of increase in the intensity of life in the 21st century, it would be easy to comprehend that the meaning of the notion in question will be changing.

Therefore, innovations seem to be indispensable in this respect, and the safety category itself has almost become a challenge for the contemporaries.

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# Deception and Communication: Sender Perceptions of Discomfort and Detectability

by

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## ABSTRACT

Much research examining deception and the process of detection it has concentrated on face-to-face communication, but currently the diversity and degree of novel communication media has altered the settings in which deception could occur. One can see that still not much studies have examined the frequency with which individuals lie via various media as well as the recognition of dishonesty in different communication media circumstances. This work explores the observations that both deceivers as well as those trying to recognize lies possess about communication media and how this corresponds to their behavior. Outcomes from questionnaire-based studies showed that both the features of deception and media affect individuals' apparent discomfort and credibility when deceiving and the media selections while preparing to deceive. Some significant factors seemed to be the significance of the deception process, who the senders are deceiving, and the overall occurrence with which they employ particular means to communicate.

**Keywords:** deception in communication, communication media, deception detection

## INTRODUCTION

This paper aims at reporting a questionnaire study which examined the perceptions that individuals have concerning communication media as well as deception. The examination concentrates on the beliefs that individuals hold concerning deception as well as communication media as they affect lying, that is, as possible senders. The examination offered participants many deceptive situations as narratives as well as they were asked to rate the narrative on numerous scales planned to evaluate their observations of credibility while employing a variety of communication media.

The objective of this examination was to define some realistic contexts to individuals in which they might envisage themselves being involved in deception and to determine: whether they experience some deceptions to be more solemn than others; whether it is important if they can be noticed or not; whether they could experience comfortable or credible to various levels if offering these imaginary lies by means of a variety of communication media, namely: email, chat, telephone, SMS, videoconferencing and face to face. Taking into account the fact that people take part in many interactions every day, one can expect different communicative behavior, especially when computer-mediated communication is involved (cf. Kowal & Paliwoda-Pękosz, 2017; Kowal et al. 2017). Many studies have examined the perceptions that individuals may have about their own as well as others' dishonesties (e.g. DePaulo et al., 1996; DePaulo, 2004, Kuzio, 2014) and the communication media selections which individuals make when making, or being involved in dishonesty (George & Carlson, 2005, Hancock et al., 2004). The paper intended to combine and extend the earlier research that has examined the beliefs individuals hold about deception via communication media. Before describing the present study design and outcomes, a review of some relevant previous research is offered.

## **THEORETICAL BACKGROUND**

Researchers have also become concerned whether people are more prone to lie when employing certain communication media types. Hancock et al. (2004) carried out a diary study which examined the lies a group of students provided with numerous communication media. Individuals used four media types, namely: face-to-face (FtF), chat, telephone and email. Co-operating with DePaulo and her team (1996), they claim that the proportions of interactions which comprised lies were the significant finding. It was also reported that telephone conversations involved the highest amounts of deceptions, more than FtF and chat, and email displayed smallest amounts of deceptions. There have been many explanations suggested for why the occurrence of deception may differ between communication media.

Furthermore, Hancock et al. (2004) states that the outcomes claim the three-factor model suggests that the recordability and appear to be are the most significant aspects. They claim that deceivers choose media which tend to be synchronous, distributed as well as missing records. Besides, George and Carlson (2005) recommended that the Hancock and his team (2004) outcomes can be better clarified by their model (cf. Carlson & George, 2004) which encompasses media richness theory (cf. Daft & Lengel, 1986). Richness seems to be

reliant on a medium's support for, namely language variety, feedback, personal focus and variety of social cues (Carlson & George, 2004). They expect that deceivers ought to choose media that have better levels of language tailorability, rehearsability and variety, (Carlson & George, 2004). They also foresee that deceivers should also favor media which provide lower cue multiplicity as well as reprocessability. In accordance with the model, individuals ought to choose to convey FtF if they are lying. Carlson and George (2004) state an examination where individuals were offered many misleading scenarios and were supposed to select their favorite medium with which to deceive. They observed no media alterations, yet when gathered into synchronous and asynchronous media it seemed that the synchronous media appeared to be favored.

Whitty and Carville (2008) requested participants to reply to imaginary scenarios representing self-serving, other-oriented deception as well as rate how probable they were to present the lie FtF, through email or by means of the telephone. For self-serving deception, it was observed the highest probability of lying via email, the least probable with FtF and an intermediate likelihood by means of the phone. Whitty and Carville (2008) offered the outcomes concerning self-serving lies provide some support for the social distance theory (cf. DePaulo et al., 1996). There seems to be a general anticipation in the population, in lie detectors and infrequently in the study community that dishonesty could be discovered by means of visual non-verbal behaviour (cf. Akehurst et al. 1996; Bond & DePaulo, 2006; Masip et al., 2005). Taking into consideration these results, one can propose that senders may believe that their dishonesties will be exposed by means of visual channels to a bigger degree than through some non-visual channels. It may thus be anticipated that individuals will feel more susceptible to recognition as soon as they are employing communication media which exploit visual cues. In some studies, individuals have selected the media conditions that could be anticipated to lie offered hypothetical deceptive scenarios. DePaulo et al. (1996) requested participants to state the media condition with which they deceived and to evaluate the lie on numerous measures of discomfort and believability. Yet, they did not state how the media condition connected with believability or discomfort.

This earlier research gives rise to the first research question: **RQ1**: Is the level of comfort individuals experience telling lies connected to how credible they feel they are? If the discomfort individuals are supposed to experience while lying is straight connected to how detectable they have confidence in themselves to be, then one may expect to get a direct correlation between the measures.

The next research question is consequently: **RQ2:** Does the concept of discomfort as well detectability that individuals assume to experience when telling lies have any connection with the features of the chosen communication media? If social distance theory is accurate, one will assume to discover that the discomfort individuals expect to feel while deceiving will be correlated with the distance of the medium. Even though DePaulo et al. (1996) do not define the media characteristics which convey the aspect of social distance; it was also specified that distance is smallest for FtF, medium for the phone and greatest for written communication. It can be surmised that prompt synchronicity, multiplicity as well as other elements which are linked to media richness in addition to social presence are also connected to the aspect of social distance. Yet, the feature-based theories (Carlson & George, 2005; Hancock et al, 2004;) recommend that individuals select media with which to cheat because of their precise elements. The theories do not clarify whether media selected for dishonesty are those in which sources can feel most contented and believable. If this seems to be true, then one may find that potentials of discomfort and how credible individuals believe themselves to vary between media because of specific structures of the communication media and not on the scopes of social distance or richness or. Moreover, Hancock et al. (2004) state that synchronicity is significant for media selection in part since most lies are unintended, and consequently may be less prone to rise in email and other media types in which communication planning can occur. For prearranged lies, this element may not have the identical influence as for unprompted deceptions. If Hancock et al. (2004) seem to be accurate, at that time one may find that the telephone ought to be favored over all other media as it appears to be less prone to be noted than text, SMS and email, but appears to be more dispersed than videoconferencing and FtF. If the embarrassment individuals expect to experience is linked to detectability and individuals are certain of deception to be noticed through visual non-verbal cues, then one would assume to find the embarrassment and detectability very high for videoconferencing, FtF and not as high in different media circumstances.

The aspect that should be taken into account is reflected in the following: **RQ3:** Does the bigger discomfort that is anticipated to be experienced by individuals telling serious lies cause diverse observations of believability in the scope of communication media? Assuming the media choice which individuals make for the process of deception is straight correlated with how uncomfortable they feel, then one could assume to discover media variances in

believability for solemn lies, but not for the unimportant lies which have been observed to not be conveyed by important pain (c.f. DePaulo. et al., 1996).

The fourth investigation inquiry is as follows: **RQ4:** Does the discomfort experienced by individuals offering self as well as other-oriented lies vary between media types? Assuming the outcomes of this examination sustain the discoveries of Whitty & Carville (2008), one can assume to discover the discomfort experienced by individuals offering self-serving lies to be associated with the social distance that was allowed by various media. It can be expected to find higher level of discomfort experienced for "close" and smallest level of discomfort for more "distant" media categories. For other-oriented deceptions, one may expect to observe lesser variances in discomfort between various media types. Many examinations have noticed differences in the preferences individuals have for communication media in general and exactly when telling deceptions.

The present study is interested in only with the observations and prospects individuals show. The study was intended to rely on preceding studies by offering extended the assortment of communication media that appear to comprise media kinds that are in common usage. So far, there was no study that has looked at six communication media that are used nowadays. Many practical studies of deception seem to be as realistic as possible, but lies incline to be self-serving and comparatively trivial. This study permits an examination into more solemn deceptions which individuals may direct to various targets. They address individuals' insights about self-serving as well as other-oriented lies with higher and smaller significances through the exploitation of narratives which define hypothetical deceptions. This study employed imaginary scenarios in common with preceding work which has claimed that this method "can reveal greater truths, especially when considering socially undesirable behaviours" (Whitty & Carville, 2008, p. 1030).

## **METHOD**

100 participants of roughly equal numbers of the Polish origin (including women and men) were engaged via email. The advertisement briefly clarified that a study examining deception and truth telling was taking place.

Eight short narratives (about 50-120 words each text) were created to exemplify a variety of lies that might be credibly told in everyday life. They were intended such that it was possible that they could be communicated by any gender, age, nationality, disregarding

religious or ethical aspects. They differed with the significance of the lie: four narratives aimed at telling small lies with not really serious consequences and four main dishonesties with solemn significances to both the target and the individual cheating. The second breadth was whether the dishonesty was self-serving or rather other oriented, 4 narrative showed self-serving dishonesties, and 4 designated different oriented lies. The objectives of the represented deceits were friends, partners and colleagues. They were informed that the research had specified that most individuals do not tell the truth constantly and that some instances of the types of lies that individuals tell are contained in the document they were offered. Participants were requested to carefully read each example of a fib, attempt and envisage they were offering this lie and judge how would they would behave and feel as if they had done so in everyday life.

After reading each narrative, the participants were asked to complete the series of nine-point Likert-type scales that was prepared based on the adapted rating scales employed offered by DePaulo et al. (1996). These scales were planned to assess: The significance of not being recognized to tell this lie, varying from very important (1) to very important (9). Yet, the significance of the lie ranging varying to a serious and important lie (9). The emotional states participants believed they would have lying was measured with 2 questions for each of 6 communication media sources, namely email, over telephone, chat, face-to-face and videoconference or employing a phone text (SMS) that checked how they felt by using these media types varying (very comfortable (1) -very uncomfortable (9)). The aspect of confidence (from 1 believed to very confident 9) was measured.

Before distributing the materials, it was confirmed that participants are familiar with all the media types exploited in the study. Some individuals were not acquainted with videoconferencing equipment, so they were revealed how to use a conferencing system with audio and video. All individuals were acquainted with the other media types therefore demonstrations were needless. Subsequently, individuals were given the resources, and trained that they were to familiarize themselves with the narratives and asked to complete the document including the rating scales using the apparatus in the rooms prepared for the experiment.

## **RESULTS OF MEDIA QUESTIONNAIRE**

To classify if there were apparent alterations between communication media deprived of taking any difference of narratives into consideration, the average values for the ration of how

uncomfortable, as well as also how noticeable individuals would feel lying with various media type was considered.

Repeated measures ANOVA designated significant alterations between media types in how contented individuals would experience telling the lies  $F(2.54, 129.36) = 67.95, P < .001$ . Post hoc tests specify that individuals feel most comfortable lying employing chat, SMS and email.

Contributors stated that they experienced more uncomfortable feelings cheating with text- chat rather than email. Participants feel least comfortable employing video or when FtF and there no important difference was recognized between these audio- visual media. Outcomes of sample t-tests presented that the analyses specify that individuals feel least detectable lying while employing chat, SMS and email and there appears to be no important changes between these media. Participants feel most detectable employing videoconferencing or communicating FtF and there seems to be no important difference recognized between these media.

Participants were requested to offer the answer to whether the level of discomfort they experience lying is connected to how credible individuals experience they are. Important correlations were recognized between two concepts, namely and detectability and discomfort: SMS,  $r = .64, p < .001$ ; phone,  $r = .86, P < .001$ ; email,  $r = .78, P < .001$ ; chat,  $r = .74, P < .001$ ; videoconferencing,  $r = .57, P < .001$ ; and for FtF,  $r = .81, P < .001$ . The results specify that there were important associations between the degree of discomfort individuals experienced offering the deceptions and the anticipated detectability for every type of media.

The results recommended there was a solid relation between the anticipated discomfort experienced by participants. The association was substantial for all media kinds. If contributors experienced some uncomfortable feeling telling a lie while employing a particular media, the outcomes recommended they could also feel extremely noticeable. The structure of variances between media types was comparable to the level of discomfort individuals experienced and the level to which their deceptions would be noticed. Only one examination varied between two measures, the discomfort experienced by individuals employing text-chat was meaningfully bigger than email.

To examine whether there are alterations between media dependent on the importance and significance of deceptions and whether the lie tends to be self-serving or other-oriented, one needs to understand if the narratives meaningfully differed from one another. The stories were

intended to differ in their significance and it would be anticipated that they would also differ in the level to which contributors would like to circumvent detection of their deception. Texts (1, 3, 5, 7) were envisioned to be insignificant, comparatively unimportant deceptions, while texts (2, 4, 6, 8) were solemn, significant deceptions.

A repeated measures ANOVA specified that the apparent importance of narratives was meaningfully diverse,  $F(4.67, 237.31) = 61.38, P < .001$ . ANOVA recognized a substantial alteration between the mean importance of narratives (1,3,5,7) with narratives (2,4,6, 8),  $F(1, 50) = 491.84, P < .001$ . The outcomes showed that the deceptions as designated varied in their apparent significance with narratives (1, 3, 5, 7) viewed as more unimportant and less significant than other narratives (2, 4, 6, 8). The texts were planned so that individuals would perceive some lies as solemn, others as unimportant and the outcomes seem to support the purpose. A repeated measures ANOVA specified that the alterations between narratives was substantial,  $F(4.67,2379.31) = 64.39, P < .001$ . Pearson correlations were conducted to regulate if the significance of the deception in every narrative was connected with the apparent significance of not being recognized.

Significant correlations were recognized between significance and importance to circumvent recognition for all the narratives (N) discussed (N 1:  $r = .48, P < .001$ / N2:  $r = .62, P < .001$ / N 3:  $r = .63, P < .001$ / N4:  $r = .70, P < .001$ / N 5:  $r = .47, P < .001$ /N6:  $r = .81, P < .001$ / N 7:  $r = .72, P < .001$ /N 8:  $r = .85, P < .001$ ). The outcomes specify that the more solemn a deception is evaluated to be, the more vital it appears not to be noticed.

The study also questioned whether variances in the level of discomfort experienced lying with various media types would differ between lies that are serious and trivial. For example, individuals may believe that for significant deceptions their higher levels of discomfort could become noticeable in specific types of media conditions, and unimportant lies they may feel unnoticeable in any media condition. ANOVA was carried out to show the mean discomfort experienced for various media types in serious ( $M = 5.97, SD = 1.45$ ) and unimportant ( $M = 3.55, SD = 1.60$ ) lies. A meaningfully greater discomfort was recognized for solemn lies,  $F(1, 50) = 153.26, p < .001$ . The only alteration between serious and unimportant deceptions in the paired contrasts is that the level of discomfort for trivial lies was judged to be meaningfully a smaller amount than for SMS; the alteration was not important for solemn lies. The outcomes specify while the level of discomfort that individuals judge themselves as probable to experience differs between the diverse narratives, and across the various media types. That is, though, they may feel less relaxed telling a serious related to an

unimportant lie, the relations between the media do not modify. Specifically, despite the significance of the deceptions, individuals experience most comfortable while telling lies when employing text-based media and the most uncomfortable with visual media types; the phone seems to be intermediate. Even though there seem to be some minor differences between narratives, the media seem to cluster into these 3 groups with greater modifications between.

The examination also investigated whether the level of discomfort experienced while employing numerous media types could differ consistent with whether deceptions were self-serving and other-oriented. Narratives 1-4 showed self-serving lies, while narratives 5-8 designated other-oriented dishonesties.

A research question enquired whether the discomfort experienced by individuals offering self-serving/other-oriented deceptions varied between various media types. ANOVA was completed to associate the mean discomfort experienced for various media types between self-serving ( $M = 4.88$ ,  $SD = 1.52$ ) and other-oriented ( $M = 4.67$ ,  $SD = 1.45$ ) lies. No important difference was recognized,  $F(1, 50) = 1.18$ ,  $P = .278$ . Repeated measures ANOVA were employed to classify any differences in discomfort experienced between media types. An important variance was recognized between media types used to convey the self-serving lies ( $F(2.86, 145.13) = 56.18$ ,  $P < .001$ ). A meaningful difference was also recognized between media types for the other-oriented deceptions,  $F(2.88, 145.46) = 48.05$ ,  $P < .001$ .

In this study only the other-oriented lies are reported as the results recognized the same substantial variances between media in all sets of lies. Furthermore, no important alterations were identified in email as compared to SMS ( $t(s1) = 1.12$ ,  $P = .276$ ); email compared to chat ( $t(s1) = 2.54$ ,  $P = .016$ ); SMS compared to chat, ( $t(s1) = 1.18$ ,  $P = .259$ ) and videoconferencing compared to FtF( $t(s1) = -0.68$ ,  $P = .514$ ). The results specified the level of discomfort was bigger for visual media than the phone. Moreover, it indicated that it was bigger than text-based media. Yet, there was no indication that the media type influenced the discomfort experienced by offering self-serving lies related to other-oriented lies. Moreover, there was small indication that the discomfort experienced by offering self-serving lies was diverse to other-oriented lies.

## DISCUSSION

A questionnaire examination was carried out to examine the observations that individuals had about lying by offering participants with many deceptive narratives which they could tell while employing a wide range of different communication media. The examination extended earlier research by rising the number of communication media under investigation, differing deceptive narratives by the significance and the goal of lies and whether the deceits were self-serving or rather other-oriented. Contributors evaluated the significance of lies, how significant it was not to be spotted, and how credible they would be offering the lies while employing various ways of communication. It was examined whether the degree of discomfort individuals experience telling lies connected with how credible they believe they are. Correlations specified one could find a strong connection between the anticipated discomfort experienced by contributors and detectability for all sort of media types. If contributors experienced uncomfortable when they like while exploiting a specific media, they would also be highly noticeable.

It was also examined whether the comfort as well as believability that individuals expect to feel was connected to the structures of communication media. Some important variances between some media types as well as the form of alterations were almost undistinguishable while considering the level of discomfort contributors experienced and the level to which their deceits would be noticed. The media types gathered into 3 groups showed that media were not evaluated to be meaningfully different from each other. Only one study recognized an alteration between two actions, the discomfort experienced by individuals by means of text-chat was meaningfully bigger than email. The contributors experienced less comfortable as well as believable with the interactive and visual videoconferencing and FtF media, and most relaxed and credible with text oriented media types. The outcomes generally supported the estimates of the social distance theory suggested by DePaulo et al., (1996). The discomfort individuals assume to experience deceiving was connected to the ostensible distance of the medium. Furthermore, the more communally reserved the media were, the lesser the uneasiness experienced while deceiving.

Little backing aimed at the feature-based theories (Carlson & George, 2005; Hancock et al., 2004;) was observed which propose that individuals select media with which to cheat on the base of their precise structures, namely synchronicity or recordability. If this was the instance, then it may have been expected to observe that the discomfort and/or believability individuals observe themselves to will vary between media because of specific elements of

the communication media and, though, not on the scopes of richness or social distance. Yet, the theories do not allow it to foresee whether media selected for deception seem to be also those in which contributors feel most comfortable and credible consequently outcomes must be treated with special carefulness.

Hancock et al. (2004) proposes that more distributed and least recordable media tend to be favored and the phone could be favored over all other media. These outcomes of the study did not offer some support for this prediction. George and Carlson (2004) point of view was of small importance as it was noticed and their understanding of the media richness theory that foresees that individuals should choose richer media for deception.

Narratives were intended to differ in their importance and it was anticipated that that the more solemn lies could also be those for which it could be most significant not to be revealed. Significant correlations were recognized for various media types between the importance and the significance not to be noticed. This could suggest that individuals pay attention to the fact that their deceptions are not detected. The examination also examined whether the bigger discomfort that was anticipated to be felt by individuals telling serious lies causes diverse perceptions of believability in the variety of communication media. Little evidence was found concerning this issue. Also examined was whether the discomfort experienced by individuals offering both other-oriented and self-serving lies varied between media types. Moreover, the study recognized little indication that the level of discomfort was different depending on who was the apparent recipient of the lie. The relations between media types persisted very similar, too.

Whitty and Carville (2008) noticed a variance in the probability of employing specific media for offering self-serving lies, but it was not observed for other-oriented deceptions. The outcomes did not find this alteration, but in this study, discomfort and detectability were examined not probability of employing a medium. The evaluation of outcomes may require taking this caution into account.

## **CONCLUSIONS**

The questionnaire study described observed evidence that media types differed in the level of discomfort and credibility which individuals experienced while telling lies. The outcomes specified that discomfort and detectability were linked and possibly equivalent. Discomfort and detectability were highest for visual media types, smallest for text-based

media and could be described as intermediate for the phone. If individuals choose to tell untruth with the media types with which they believed to be most distance as well as least discomfort, at that point outcomes support the hypothesis. No indication that media variances were influenced by the significance of lies or was observed. To address the issue of whether the media that are favored for deception seem to be the identical as those supposed to be smallest detectable the similar narratives could be employed in a supplementary examination. It tends to be that some media where individuals experience more discomfort and experience a greater danger of deception detection could be favored over media where the aspect of discomfort experienced while lying might be lesser and detection is less chancy (cf. Wawrzak-Chodaczek 2017). These kinds of counterintuitive predilections might occur where there are some expectations of the goal of a specific medium to be employed and any alteration might stimulate suspicion, or where specific features of media indicate that discovery in the future may be more probable.

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# **The self-esteem, leadership competencies and satisfaction of the lives of IT professionals. Exploratory study in Poland**

by

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## **ABSTRACT:**

The goal of our research is explore the levels of leadership competencies, self-esteem and life satisfaction of IT professionals in Poland, a transition economy. We constructed a model of relationships between leadership competencies self-esteem and life satisfaction. Our independent variable was a chosen set of leadership competencies: 1) effectiveness in project management, 2) leadership, 3) organizational visibility and 4) integration of IT knowledge in business. This variable was measured on the basis of an adapted tool – a questionnaire of Business Competencies by Baseller and Benbasat (2004). The dependent variable was the life satisfaction of IT professionals as measured by a Polish adaptation of the Questionnaire of Life Satisfaction LiSAT-9, elaborated first by Anke, and Fugl-Meyer (2003). Our study is innovative because, to the best of our knowledge, there is no research on the relationship between leadership competency, self-assessment and life satisfaction among IT professionals in transition economies. The study was conducted online via the LABSEE website in Olsztyn. Between October 2015 and May 2016, a survey of 391 IT professionals from small regional enterprises in Lower Silesia was conducted. The sample was selected by network-interpersonal random sampling, in combination with sequential drawing and passive experiment planning methods. The contact information for potential respondents was collected from two databases: the Center for Scientific Research of the School of Management "Education" and the data of the Lower Silesian Statistical Office. The databases contain several thousands representative addresses from companies throughout the region. The sample representation was controlled by variables such as age of respondent, sex, income level and firm size. The average age was 33.5 years. We employed the methods of descriptive and inductive statistics, correlation analyses and structural modeling (SEM). Our most

important findings have shown that IT professionals value their business skills positively, but at an average level above the midpoint. IT professionals subjectively declare a fairly high level of satisfaction in life, in obesity problems, satisfaction from family life and relationships, love and intimacy. The lowest scores were recorded in the areas of financial satisfaction, social life and fun. The highest correlation with self-esteem of leadership competencies concerned global life satisfaction, family life and relationships, love, intimacy and finances. The weaker positive correlations related to the satisfaction of professional life, leisure and ways of spending spare time. The data confirmed the impact of the self-assessment of leadership competencies on the level of life satisfaction of IT professionals. People who are sure of the high level of their own leadership competence seem to be more satisfied with their lives. Thus, professional development has a positive effect on employee life satisfaction. Our research can help to develop motivational systems, prepare training for employees and, in particular, shape the subjective aspects of human capital development. We observed the low level of correlation between professional life satisfaction and the assessment of leadership competence. We interpret this result in terms of utilitarianism and pragmatism. This means that in the research group, the important premise in action is that "we work to live" (Jeremy Bentham, 1961-79). Well-assessed family life is more correlated with the assessment of leadership competencies than well-judged professional life.

**Keywords:** competencies, IT professionals, leadership, life satisfaction, Poland, transition economy

**Session:**  
**Research in progress**

# Discursive space as a tool for analyzing knowledge from the perspective of humanistic management

by

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## ABSTRACT

The purpose of this paper is to present a tool for analyzing knowledge describing a selected phenomenon. This knowledge is understood in the constructivist sense, i.e. as the current effect of the beliefs. It is possible to use this condition when a certain level of ubiquity of this phenomenon is achieved, which manifests itself as the accumulation of various statements and utterances about it. These statements and utterances may be of any character and may be made by any means. The volume of these statements is presented as a discourse (or a bunch of discourses) about this phenomenon, which can be reconstructed by existing methods. This reconstruction takes place by creating a model that draws inspiration from the sciences, especially from physics, where a construction so-called space states, phases, etc. exists and is intended for multidimensional presentation of physical massive phenomena. In this work, the internet is a phenomenon that is undergoing such modeling. The internet is mature enough and possesses a great literature of the subject in which one can observe some historical tendencies. This makes it possible to portray the Internet dynamically and to include a time variable. The hypothesis which is presented by this model is a claim that it is a representation of certain knowledge about the phenomenon under investigation, assuming that the nature of this knowledge has a specific, discursive character.

To describe the concept of discursive space as well as the nature of its presence in the knowledge space, it is necessary to trace three separate theoretical constructs: knowledge, configuration space, state space, phase space, or space-time<sup>7</sup>, and discourse<sup>8</sup>. Each of them opens the extensive library of the publications. For this reason, only these threads that are relevant to the idea of discursive space are shown in this paper. This idea refers to a constructivist approach, claiming in general that knowledge is socially and culturally created,

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<sup>7</sup> The right to use such list is derived directly from the source of of such space (Nolte, 2015, p. 1)

<sup>8</sup> The ordered sequence also reflects the historical order. The term "phase space" appears in 1913(Nolte, 2010), discourse in 1952 (Paltridge, 2006). The concept of knowledge is as old as philosophy.

so it is local in a temporal and spatial sense. This knowledge is also variable, and remains in controversial relation to such a feature as truth. This controversy is manifested as skepticism and a pragmatic approach to the problem of truth<sup>9</sup>. It is therefore necessary to take into account the development and meaning of the three constructions.

**Keywords:** knowledge, humanistic management, management, discourse, complexity, configuration space

## PROBLEM OF KNOWLEDGE

The concept of knowledge is crucial in view of the presented tool, but the problematic aspects associated with this phenomenon has been present at least since the 1960s, and its significance has grown, which is directly caused by the development of digital technology. It is therefore necessary to properly interpret the knowledge that discursive space refers to in the context of the broader knowledge of today. This is a difficult task due to the extensive reflection of it. On the other hand, due to the maturity of this problem, this reflection is already of a synthetic nature (e.g. Pritchard, Nagel, Burgin), although the principle of initial association with reflection on the particular field of science, e.g. epistemology or sociology, is preserved. The reasoning presented in this text does not require the reconstruction of the concept of knowledge as such. This is very difficult (or even impossible) due to the size of the reflection reaching back to the ancient times. However, it is necessary to pay close attention to one aspect of this reflection and to the controversy that is involved, of fundamental importance. This aspect relates to the way in which knowledge is traditionally associated with the subject, i.e. a man who is a knowledge administrator. Controversy, however, arises at the moment when such an understanding of knowledge is rejected in favor of a certain ontological autonomy of knowledge. This approach appears in Burgin, and is a result of the development of the notion and idea of information that has a strictly mathematical and technical origin (Burgin, 2017).

For the first time as it is commonly accepted, the bonding of the knowledge of the subject was proposed by Plato and is written in the definition of knowledge as *justified true belief* (so called *tripartite*). This phrase is not the original formulation of the author, but the effect of the interpretation of his dialogue *Theatetus*. The nature of its creation is detailed and

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<sup>9</sup> E.g. William James wrote: „The true, to put it very briefly, is only the expedient in the way of our thinking, just as the right is only the expedient in the way of our behaving” (James, 1997, p. xi).

simply described by Appiah and Ebrary (2003, p. 43). This concise formulation opens up a powerful epistemological discussion that continues today and involves many philosophers. The history of this dispute is described in a simple manner by Pritchard (2006). He also has no doubts about the status of knowledge: “Whatever else we might want to say about knowledge, one thing that is clear is that knowledge is a cognitive achievement of some sort” (Pritchard, 2006, p. 62). This kind of conviction appears also valid in the case of scientific knowledge, which can be understood as a case of the existence of knowledge which is specific and particularly sensitive to the problems of its existence. Curd and Psillos write: “General philosophy of science strives to understand science as a cognitive activity that is uniquely capable of yielding justified beliefs about the world” (Psillos and Curd, 2008, xix).

Despite many accusations (among which one of the most famous and still important allegations made by Gettier (Gettier, 1963)), the most important from our point of view, the property of the *tripartite*, which is the bonding of knowledge with the subject, has been maintained and developed in this part, which is the social and cultural grounding of knowledge. This kind of perspective appeared very loudly in the 60s and 70s. It is formulated within the philosophy of science as a “historical turn” associated with such figures as Thomas Kuhn, Imre Lakatos, Paul Feyerabend (Bird, 2008). The development of such a perspective is also the sociology of knowledge, whose conscious beginnings date back to the 1920s (Adolf and Stehr, 2014, p. 5), although the social contexts of knowledge appear already in Plato. Adolf and Stern write that the idea of knowledge as a social construct is relatively new and its origins are sought by scholars such as Max Scheller, Karl Marks, Max Weber, Carl Mannheim and Georg Simmel (Adolf and Stehr, 2014, p. 8). The transfer of knowledge into the social context alters the subject matter of the research; not so much knowledge as such is examined, but the circumstances of its existence. Dancy et al. define the sociology of knowledge as follows: “The aim of the sociology of knowledge is to locate whatever body of belief a group accepts as a true account of reality, and then try to illuminate it by reference to social variables. In the first instance the questions are:

1. What exactly is believed?
2. How is that belief distributed, e.g. who believes and who doesn't?
3. What are the sources of its credibility?
4. How is it defended against doubt and anomaly?” (Dancy et al., 2010, p. 744)

You need to emphasize that this arrangement causes problems of knowledge that it becomes tangible methodologically in a different way than it happened in the case of

epistemological approaches (philosophical). Sociology incorporates the problem of knowledge, which becomes a phenomenon used to describe social reality, which of course at the same time also allows for the definition of knowledge itself from this perspective. A classic example of this approach is *The Social Construction of Reality. A Treatise in the Sociology of Knowledge* by Berger and Luckmann (Berger and Luckmann, 1966). Since the 1970s, the sociology of science has rapidly developed as a field of research on knowledge available for social research: institutionalized and organized. This process is described by Bruno Latour who points out many famous names such as Robert K. Merton, Gilles Deleuze and Pierre Bourdieu (Latour, 2007). Sociology as a field of study of knowledge also enters into important relationships with philosophy, and the encounter of these two worlds also results in fundamental works such as *La Condition Postmoderne. Rapport sur le savoir* by Jean-François Lyotard (Lyotard, 1979), which opened the historiosophical discussion on postmodernity. Adolf & Stehr refer to the book by Hans Blumenberg (Blumenberg, 1983), in which he draws attention to the central role of science in the development of modern society (Adolf and Stehr, 2014, p. 1) and they also mention Niklas Luhmann, who took up the subject (Luhmann, 1990)<sup>10</sup>. Jacques Derrida is also involved in the discussion about science and universities (Derrida, 2001).

Lyotard's book is especially worth remembering because it uses the type of narrative that already exists in the space of discourse devoted to knowledge, which refers to the "harder", closer reality of social attitudes such as the political context and the strongly connected with the first economic context. Lyotard explicitly refers to the notion of an information society and its location in the social space seen historically. This historical state is described as the effect of transformations present in the knowledge space, in which information technology emerges, colliding with deep processes of forming people's imaginations about the world. The last, undoubtedly philosophical aspect, is confronted with the development of technology and social transformations, leading to specific policy demands such as the release of access to information databases (Lyotard, 1989, p. 67). This type of "operational" treatment of knowledge appears earlier. Knowledge is for example perceived in the perspective of economics; Fritz Machlup introduces the concept of knowledge economy (Machlup, 1962). A little later, works by Bell (Bell, 1976) and

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<sup>10</sup> The chapter on this topic has been translated into English (Luhmann and Behnke, 1994)

Drucker<sup>11</sup> were published. They defined knowledge there as a new kind of resource and recognized its key role in business and social processes. For such defined processes, Bell proposed the notion of a post-industrial society, which Castells had tied closely with ICT and called the information society. Both these scholars remain clearly in the sphere of materialistic, Marxist inspirations, although in Castells case one may rather speak of post-Marxism, which is to imply his critical approach to the classic Marxist thought, which is unable to anticipate the development of civilization and certain new phenomena (Castells, 1996). This type of approach means quite a well-defined area of phenomena, among which the economic issues have the fundamental importance, and may even serve as a basis for political reflection, as is evident in Bell. Drucker has a similarly realistic and pragmatic perspective, although in his case it does not refer to the values of the Marxist political thought. Drucker is a keen proponent of economic liberalism, though he sees the world in a historical perspective and is dealing mostly with economic processes and their diverse, determinant factors and effects. The economic context imposes a realistic, materialistic, historical and pragmatic approach. This context also seems to be the most important dimension in the development of ICT or the Internet itself today (Maciąg 2016). This also means the emergence of a background for analyzing many phenomena, including the phenomenon of knowledge. In particular, knowledge is becoming an important focus of management.

A different way of perceiving knowledge sees it as an element of social and political construction. Knowledge is understood as a factor of development (economic context) and as a result of the actions of certain social institutions such as universities, enterprises or state institutions, which in collaboration create useful knowledge in various dimensions, including political ones. Specific utilitarianism in the understanding of knowledge belongs, of course, to the approach which treats knowledge instrumentally. This approach is also dominant in contemporary discourse devoted to scientific knowledge and to the university as its primary institution. It is born as the concept by Senator J. William Fulbright called the military-industrial-academic complex (Fulbright, 1970). As Leslie points out, it was an expression of the belief that “The “golden triangle” of military agencies, the high technology industry, and research universities created a new kind of postwar science, one that blurred traditional distinctions between theory and practice, science and engineering, civilian and military, and

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<sup>11</sup> Drucker has taken up the subject of knowledge as he writes himself (Drucker, 1993a, p. 23) in 1961 *The Technological Revolution; Notes on the Relationship of Technology, Science and Culture* (Drucker, 1961) reprinted in (Drucker, 1970) and (Drucker, 1993b).

classified and unclassified, one that owed its character as its contracts to the national security state” (Leslie, 1993, p. 2). A similar attitude: pragmatic and goal oriented is presented later by the very well-known today concept of the triple helix developed by Etzkowitz and Leyersdorf, which has been presented in a refined form in 1995 (dr. Etzkowitz and Leydesdorff, 1995). Among the many contexts that may appear in the interpretation of these constructs, is also the context of understanding knowledge as a utilitarian social and economic factor.

Management gives knowledge its own meaning, referring to the described perspectives, which takes the shape of a separate approach called knowledge management (KM). This is an area which is the subject of numerous literature and approaches. Dalkir in 2005 recorded more than a hundred definitions of KM, noting that most of them are meaningful. Their diversity is based on differences in the research perspective, revealing the inherent multidisciplinary character of KM, which includes fields such as organizational science, cognitive science, linguistics and computational linguistics, information technology, information and library science, technical writing and journalism, anthropology and sociology etc. (Dalkir, 2005, p. 6). His own definition is: “Knowledge management represents a deliberate and systematic approach to ensure the full utilization of the organization’s knowledge base, coupled with the potential of individual skills, competencies, thoughts, innovations, and ideas to create a more efficient and effective organization.” (Dalkir, 2005, p. 2). KM as an idea is considerably old, but in the sense which we attribute to KM now, it emerged in the 1980s, bringing a wealth of literature in the 1990s (Dalkir, 2005, p. 15)<sup>12</sup>. Among them is the first book devoted to KM, written by the creator of the concept KM, which was Dr. K. Wiig (Wiig, 1993), also a groundbreaking article by Ikuiro Nonaka from 1991 (Nonaka, 1991) and a book by Ikuiro Nonaka and Hirotaka Takeuchi which develops ideas from the article (Nonaka and Takeuchi, 1991). KM is certainly the furthest step towards a utilitarian and instrumental treatment of knowledge. It is also anchored in a declarative way in the social and cultural reality of the organization, which is understood as the product of that reality.

For Marek Burgin KM belongs, however, to areas that confirm a different kind of knowledge than that associated with the subject. It is characterized by pragmatism, which consists of abandoning the philosophical perspective but taking into account “structure, acquisition, behavior, relations, and utilization” (Burgin, 2017, p. 80). Burgin describes his approach by writing that “For a long time, it was assumed that knowledge is something that

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<sup>12</sup> Informal survey made by means of Worldcat from 1990 till today brings ca. 44 thousands of books dedicated to this subject.

exists only in the mentality of people. Some researchers believe that this is the crucial difference between knowledge and information, which exists in anything. However, the technological development changed the situation. Indeed, because knowledge is vital to the whole existence of people, various artificial tools have been invented for knowledge acquisition, storage, transmission, and transformation. [...] This brought an understanding that knowledge also existed not only in people's mentality but also in various physical things but not in all in contrast to information. As a result, researchers started to explore knowledge in artificial systems only after computers came into being and the research area called AI emerged." (Burgin, 2017, p. 91). The introduction by Burgin of the idea of an observer in place of the human subject also demonstrated the pragmatic character of his approach. This observer "characterizes and utilizes some epistemic structures as knowledge" (Burgin, 2017, p. 81). Adopting such an assumption makes it possible that each internally consistent system could fulfill the role of the observer, including a technical system<sup>13</sup>. Consequently, the problem of the existence of false beliefs in knowledge is also clearly explained. An example of such a misconception is the historical view that the sun is circling the Earth. For Burgin, such conviction is only "a temporal subjective knowledge about the Sun" (Burgin, 2017, p. 83).

## KNOWLEDGE AND DISCOURSE

The presented development of the idea of knowledge confirms the validity of the idea of knowledge bonding with its possessor, which was traditionally a man, possibly replaced by any system which acts as a coherent internal observer of reality as in Burgin's conception. The disposer; a person or other system, acquires and possesses knowledge, but undergoes certain influences which determine those processes, even though this disposer tries to circumvent these obstacles by verifying his or her findings. This approach is already present in the concept of Plato's *tripartite*, which is based on the idea of belief. The introduction of the social context allows us to define the essential problems of acquiring and possessing knowledge which loses the quality of truth understood as in the Aristotelian definition as the appropriateness of thing and mind, but turns out to be a social construct fulfilling certain social objectives. This approach understood usually as connected with the postmodern approach e.g. (Crane, 2016, p. 66) appears also as one of the basic directions in the theory of

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<sup>13</sup> The similar approach I proposed in the book *The Internet civilization in the proposed there so called pragmatic management concept*, which also led to the rejection of the instance of the human subject as a necessary management component, opening the field for non-human agents (Maciąg, 2016, p. 116)

organization management (Hatch and Cunliffe, 2013).

This approach is a result of intense philosophical discussion, whose most important author is Michel Foucault (Foucault, 1966), (Foucault, 1969), whose concept is followed by most of contemporary thought devoted to discourse research (Jørgensen and Phillips, 2002, p. 13), (Fairclough, 2003, p. 2). In his books Foucault develops the concept of discourse as the product of language used in communication processes. Such a discourse is a knowledge repository. This idea, supported by the thoughts of Nietzsche, Wittgenstein and Marx, which refers to language as a necessary and predominant medium of knowledge, explains the role of the social and cultural context in the creation of beliefs that become knowledge. The process is so intense that discourse becomes more than just a reservoir; it reaches also the power of authority (Foucault, 1981). Knowledge becomes a localized historical and cultural context which is possible to reach by the discourse as its largest and most common emanation. Van Dijk, one of his most important theorists of discourse writes: “the role of context in the production and understanding of discourse is fundamental. Since knowledge is part of the context, each level of discourse structure depends on the knowledge of the participants” (Dijk, 2014, p. 592). This view is commonly accepted: “Discourse theory often revolves around the nexus of power, knowledge and subjectivity” (Angermüller et al., 2014, p. 6), “Discourse is socially constitutive as well as socially shaped: it constitutes situations, objects of knowledge and the social identities of and relationships between people and groups of people” (Hyland and Paltridge, 2011, p. 39), “The struggle between different knowledge claims could be understood and empirically explored as a struggle between different discourses which represent different ways of understanding aspects of the world and construct different identities for speakers” (Jørgensen and Phillips, 2002, p. 2).

Similar assumptions must also reflect the contemporary social situation and deal with important issues of distribution of power today. Norman Fairclough, among others, is the representative of this critical thread. He makes the subject of his study the social changes in modern capitalism, which “are variously identified as ‘globalization’, post- or late-‘modernity’, ‘information society’, ‘knowledge economy’, ‘new capitalism’, ‘consumer culture’, and so forth” (Fairclough, 2003, p. 4). A critical approach to social and political circumstances is accompanied by a pragmatic and detailed trend that addresses the organization as the subject of the study. This is a field with extensive literature of the subject and many variations (Grant, 2004). Among them is a thread that refers directly to Foucault, Lyotarda Bourdieu or Derrida, which “mediates the connection between language and social

context, and facilitates more satisfactory bridging of the gap between texts and contexts”. This sentence is the citation from the Fairclough (Grant, 2004, p. 12).

Context revealing by the discourse is essential and is a direct expression of some knowledge that does not aspire to truth, but is a real foundation of human and community functioning: “Discourse presupposes (semantic) situation models of events talked about, as well as (pragmatic) context models of the communicative situation, both construed by the application of general, socially shared knowledge of the epistemic community” (Dijk, 2014, p. 601). Therefore, it can be assumed that the reconstruction of discourse is a reconstruction of pragmatically understood knowledge, which can then be used, for example, in the process of knowledge management. Crane, referring to the role of discourse, cites the concept of Ikuiro Nonaka, one of the precursors of KM, who, taking the inspiration from the idea of Michael Polanyi, introduces a tacit-explicit distinction in knowledge. For Crane “this view approaches knowledge as a phenomenon (practice, accomplishment, action, behavior, and so on) either as embedded in or as constituting social interaction. This view particularly emphasizes the importance of language and communications in doing knowledge work” (Crane, 2016, p. 4).

## **THE CONCEPTION OF DISCURSIVE SPACE**

A review of knowledge that is limited to the role of a context and placing discourse in the role of that context leads to the possibility of discourse as a tool for exploring this knowledge. Crane writes directly: “the thesis of “knowledge as social action” invokes an understanding of “social action” as discourse (talk and text) in interaction” (Crane, 2016, p. 77). The problem which needs the solution is the way to reconcile such knowledge, giving the possibility of understanding and predicting its exploitation in all fields, both in the management of the organization as in the broader social field. Crane refers, for example, to the field of psychology, especially to discourse psychology (DP), which is probably the result of the inspiration provided by Polanyi. Fairclough uses, as he writes "a social analysis of spoken and written language," which is the result of his perception of discourse: “I see discourse analysis as ‘oscillating’ between a focus on specific texts and a focus on what I call the ‘order of discourse’, the relatively durable social structuring of language which is itself one element of the relatively durable structuring and networking of social practices” (Fairclough, 2003, p. 3). A comprehensive description of possible approaches is provided in (Grant, 2004), (Schiffrin et al., 2001), (Jørgensen and Phillips, 2002) and others. Discourse

analysis is a concept introduced by Zellig Harris in 1952, and since then has evolved into many approaches that “range from textually-oriented views of discourse analysis which concentrate mostly on language features of texts, to more socially- oriented views of discourse analysis which consider what text is doing in the social and cultural setting in which it occurs”(Paltridge, 2006, p. 1).

In this text, we propose a method derived from the presented approaches, referring to the idea of discourse and locating within the texts according to the Paltridge classification, but with another way of using it. The idea of the so-called configuration space, state space, phase space, or space-time, which comes from the field of physics, is a structure that organizes the whole and imposes an approach to discourse. It serves to model mass phenomena in which the state is described not as a direct location in the physical space, where dimensions also have a physical character (a position in a geometric coordinate system) but as a location in an abstract space whose dimensions are arbitrary. In this way, this space allows to model dynamics of very different, not necessarily physical phenomena: “Modern dynamics, like classical dynamics, is concerned with trajectories through space—the descriptions of trajectories (kinematics) and the causes of trajectories (dynamics). However, unlike classical mechanics that emphasizes motions of physical masses and the forces acting on them, modern dynamics generalizes the notion of trajectories to encompass a broad range of time-varying behavior that goes beyond material particles to include animal species in ecosystems, market prices in economies, and virus spread on connected networks. The spaces that these trajectories inhabit are abstract, and can have a high number of dimensions. These generalized spaces may not have Euclidean geometry, and may be curved like the surface of a sphere or warped space-time in gravitation.” (Nolte, 2015, p. 3).

The use of this space also appears in sociology. An example is the theory by Byrne & Callagan (Byrne and Callaghan, 2014). However, state space is built by creating narratives, based on observed and reconstructed trends. Byrne & Callaghan propose methodological tool, which they call the trending: “Trending requires a description of how entities change through space and/or time. We are using the word here for the process of the scientific description of change or stability. Trending is what we do when we map the trajectories of complex systems. When we trend we construct narratives. We tell the stories of how things have come to be what they are, how they stay as they are, and – projecting into the future – how they might come to be different from what they are” (Byrne and Callaghan, 2014, p. 154). The approach proposed here uses for this purpose the tool of discourse analysis, which is the analysis of

widely understood texts. It is intended to determine historical detailed discourses (which can be considered as counterparts of the trends described by Byrne & Callaghan), which then become dimensions of the constructed thanks to them space. For Byrne & Callaghan this description of the phenomenon is based on the concept of complexity as a relatively new description of reality, which is paradigmatically different from the traditional, mechanistic, causal approach. (Byrne and Callaghan, 2014, p. 28)

The research material on which the idea of a discursive space is based is the internet, which is the subject of a detailed study by the author (Maciąg, 2016; Maciąg et al., 2013). He proposed a synthetic model of Internet development (fig. 1), which was the result of an analysis of the various discourses in which the Internet is emerging. This material was then used to conceptualize the Internet at a higher level of abstraction, which took the shape of a discursive space.

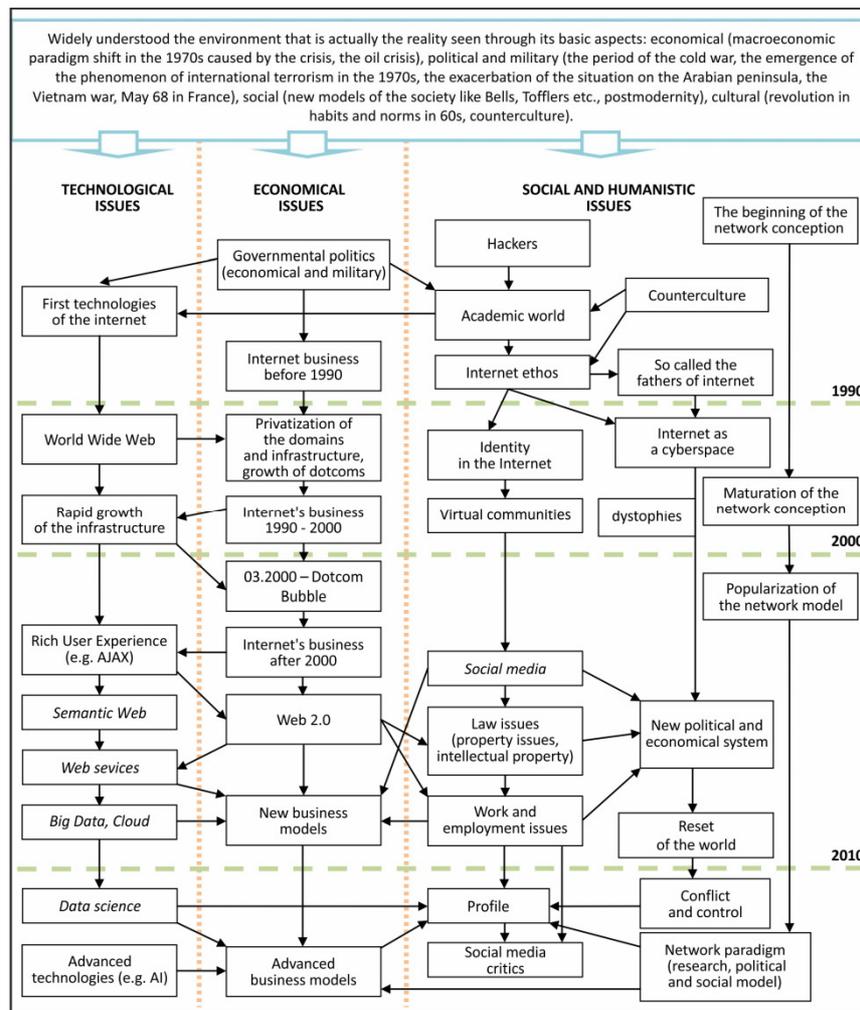


Fig. 1 Internet historical development scheme (Maciąg, 2016, p. 131)

The analysis of the historical development of the Internet has been based on a rational scheme based on three fundamental issues: technological, economical, and social and humanistic.

After its construction, some regularities have emerged that have subsequently helped to identify some of the major discursive trends in which the internet is seen in a wide variety of reflections. They were defined by the design: "Internet as ...". Among them were the following streams:

- Internet as an ideology
- Internet as an ethical space
- Internet as a Being
- Internet as a market
- Internet as a new social form
- Internet as an economic space
- Internet as a community
- Internet as a social network and other types of networks
- Internet as a technology
- Internet as an area of automated services
- Internet as a field of definition of the subject, or human
- Internet as a threat
- Internet as a future
- Internet as art. (Maciąg, 2016, p. 123 passim).

This list is of course incomplete, and the items presented are of a proposition whose correctness and credibility require justification<sup>14</sup>.

On the basis of extracted discourses, there were arbitrarily separated certain terms identifying those streams that served as discursive dimensions. Discursive dimensions have non parametrical, deliberative, “non-monotonic” (accidental, local, modular) and qualitative character, which makes them a serious problem from the physical point of view. However it does not have to be an impossible to conquer. For Byrne & Callaghan a solution is the topological space, which is the construction coming from the extended analysis of the complexity as a sociological field: “For us one of the great promises of complexity science, of complexity as an ontology or frame of reference, is that it offers the possibility of a

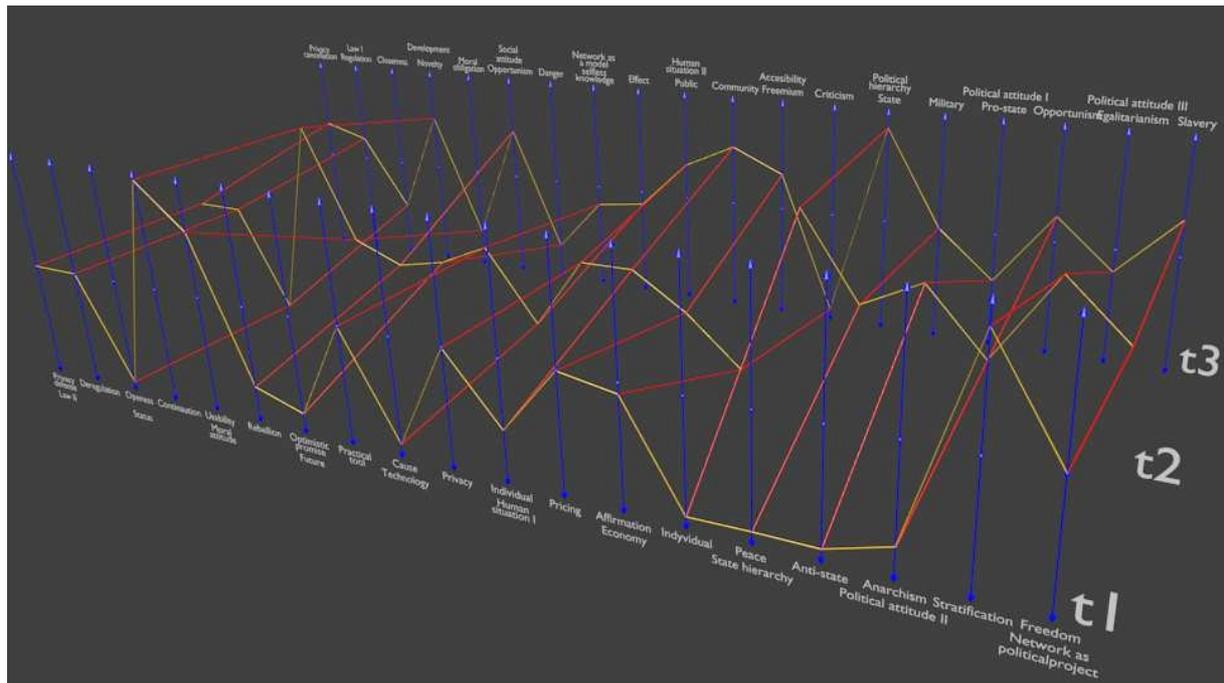
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<sup>14</sup> This work was done in (Maciąg, 2016)

transcending of the sterile arguments between quantity and quality, between the 'hard' and the 'human' sciences and opens up the possibility of a unified approach to understanding" (Byrne and Callaghan, 2014, p. 38). The list of these terms consists of the following items:

- Political hierarchy: individual vs. state
- State hierarchy: peace vs. military
- Political attitude I: pro-state vs. anti-state
- Political attitude II: anarchism vs. opportunism
- Political attitude III: egalitarianism vs. stratification
- Economy: affirmation vs. criticism
- Accessibility: freemium vs. pricing
- Network as a political project: freedom vs. slavery
- Human situation: individual vs. community
- Technology as a dominant: cause vs. effect
- Network as a model: selfless knowledge vs. practical tool
- The future: optimistic promise vs. danger
- Social attitude: opportunism vs. rebellion
- Development: novelty vs. continuation
- Attitude: usability vs. moral obligation
- Status: openness vs. closeness
- Law: regulation vs. deregulation

The parallel coordinates system (Inselberg and Shneiderman, 2009) has been built using this dimensions, which describes the state of intensity, the significance of each type of discourse over time. Evaluation of this intensity and significance is arbitrary and needs to be supplemented and developed. However, these dimensions let build the model is shown in the figure (Fig. 2). It attempts to use the multidimensional visualization tool to present the reality of a qualitative nature, although it maintains in the Author's opinion the main advantages of this tool (Inselberg and Shneiderman, 2009, p. 1) which creates an abstract model of the development of the Internet in the space of discourses.



**Fig. 2 Internet discourses as dimensions in parallel coordinate system**

This model can also be understood as a model for the dynamic development of knowledge about the Internet, according to the presented reasoning about the assumed way in which knowledge exists. It is understood here, as a local construct and reflects the system of beliefs, which is a kind of reconstruction of the Platonic *tripartite*. These beliefs are available in discourse; the analysis of this discourse makes possible the access to these beliefs thanks, for example, to the analysis of texts. This model is also the first synthetic image of the Internet created by the tool of visualization by the parallel coordinates system.

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# **A Research project on reducing call drops: An Empirical National Investigation Introduction**

by

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## **INTRODUCTION**

India is currently the world's second-largest telecommunications market and has registered strong growth in the past decade and half. The Indian mobile economy is growing rapidly and is expected to contribute substantially to India's Gross Domestic Product (GDP).

The liberal and reformist policies of the Government of India have been instrumental along with strong consumer demand in the rapid growth in the Indian telecom sector. The government has enabled easy market access to telecom equipment and a fair and proactive regulatory framework that has ensured availability of telecom services to consumer at affordable prices. The deregulation of Foreign Direct Investment (FDI) norms has made the sector one of the fastest growing and a top five employment opportunity generator in the country.

The blemish in India's much-lauded telecom revolution is a curious, widely recurring phenomenon called "call drops." In a country that is the world's second-largest mobile user market after China, fast-paced expansion coupled with inadequate infrastructure and overloaded networks is leading to many callers being cut off mid-sentence.

A call drop, technically speaking, represents the service provider's inability to maintain a call, either incoming or outgoing, once it has been correctly established. In India, call drops are a performance indicator for the country's telecom networks. In many cities, mobile users have to rush from one room to another or drive around neighborhoods to find better signals (and better voice quality).

## **MARKET SIZE**

The Indian telecommunication services market will likely grow by 10.3 per cent year-on-year to reach US\$ 103.9 billion by 2020.

Driven by strong adoption of data consumption on handheld devices, the total mobile services market revenue in India is expected to touch US\$ 37 billion in 2017<sup>^</sup>.

Smartphone subscription in India is expected to increase four-fold to 810 million users by 2021, while the total smartphone traffic is expected to grow 15-fold to 4.5 exabytes (EB) per month by 2021.

India has the second largest mobile subscriber base in the world. According to Telecom Regulatory Authority of India (TRAI), the total telecom subscriber base in December 2015 stood at 1.04 billion, out of which 1.01 billion were mobile subscribers and 25.52 million were wireline subscribers.

According to a study by GSMA, smartphones are expected to account for two out of every three mobile connections globally by 2020 making India the fourth largest smartphone market. Total number of Fourth-Generation (4G) enabled smartphone shipments in India stood at 13.9 million units in the quarter ending December 2015, which was more than 50 per cent of total shipments, thereby surpassing number of Third-Generation (3G) enabled smartphone shipments for the first time.

The broadband services user-base in India is expected to grow to 250 million connections by 2017, according to GSMA.

India added the highest number of net mobile phone subscriptions of 21 million during the fourth quarter of 2015.

International Data Corporation (IDC) predicts India to overtake US as the second-largest smartphone market globally by 2017 and to maintain high growth rate over the next few years as people switch to smartphones and gradually upgrade to 4G.

In spite of only 5 per cent increase in mobile connections in 2015, overall expenditure on mobile services in India is expected to increase to US\$ 21.4 billion in 2015, led by 15 per cent growth in data services expenditure.

The Indian telecom sector is expected to generate four million direct and indirect jobs over the next five years according to estimates by Randstad India. The employment opportunities are expected to be created due to combination of government's efforts to increase penetration in rural areas and the rapid increase in smartphone sales and rising internet usage.

## INVESTMENT

With daily increasing subscriber base, there have been a lot of investments and developments in the sector.

The industry has attracted FDI worth US\$ 18.38 billion during the period April 2000 to March 2016, according to the data released by Department of Industrial Policy and Promotion (DIPP).<sup>15</sup>

Some of the major developments in the recent past are:

- Xiaomi, world's third largest smartphone maker, has approached state governments in India to set up handset plants in collaboration with Chinese contract manufacturer Foxconn, in order to boost their production to keep pace with the rising demand.
- Axiata Digital, a subsidiary of Malaysia's largest telecom firm Axiata Group Berhad, has made its entry into Indian e-commerce market by investing Rs 100 crores (US\$ 14.82 million) in Bengaluru-based StoreKing.
- Sterlite Technologies, one of India's leading optic fibre and telecommunication cable manufacturers, plans to collaborate with telecommunication carriers to deploy smart communication networks in India, which are expected to have a lifespan of up to 25 years as against the normal lifespan of seven to eight years.
- India's largest telecom operator Bharti Airtel Limited plans to buy entire spectrum of Videocon Telecommunications Limited for Rs 4,428 crore (US\$ 656.4 million) which will give the telecom operator additional spectrum in the 1,800 MHz band in six licence areas namely Bihar, Haryana, Madhya Pradesh, Eastern Uttar Pradesh, Western Uttar Pradesh, and Gujarat.
- Chinese smartphone manufacturer OnePlus has partnered with Foxconn to start manufacturing its products in India as part of its plan to have 90 per cent of the devices sold in India to be locally manufactured by the end of 2017.
- Government of India to make a windfall gain from sale of spectrum in 2016-17 and achieve its fiscal deficit target of 3.5 per cent of Gross Domestic Product (GDP) for the year.

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<sup>15</sup> Media Reports and Press Releases, Cellular Operators Authority of India (COAI), Telecom Regulatory Authority of India (TRAI), Department of Telecommunication (DoT), Department of Industrial Policy and Promotion (DIPP)

- Mr Paolo Colella, Managing Director, Ericsson India has identified India to be one of the fastest growth regions for Ericsson globally and has announced setting up of its second manufacturing plant in Pune, Maharashtra.
- Walmart India Private Limited's president has shown interest in opening its chain of stores in Haryana, while Micromax has also offered to set up a mobile handset manufacturing unit in the National Capital Region (NCR).
- Vodacom SA, a subsidiary of Vodafone Plc, has entered into an agreement with Tata Communications Ltd to buy the fixed-line assets of TataComm's South African telecom subsidiary Neotel Pty Ltd.
- Bharti Airtel has planned to invest Rs 60,000 crore (US\$ 8.89 billion) over a period of three years with a view to boost its telecom network capacity thereby improving the quality of voice and data services to its customers.
- Reliance Communications Ltd, India's fourth largest mobile services provider, has agreed to acquire Sistema Shyam TeleServices Ltd (SSTL), the local unit of Russian company Sistema JSFC, in a deal valued at Rs 4,500 crore (US\$ 667.08 million), which includes payments to the government for spectrum allotted to Sistema.
- Videocon Industries Ltd plans to set up a mobile handset assembly plant along with manufacturing set top boxes in Punjab for an investment of Rs 500 crore (US\$ 74 million) over three years.
- American Tower Corporation, a New York Stock Exchange-listed mobile infrastructure firm, has acquired 51 per cent stake in telecom tower company Viom Networks in a deal worth Rs 7,635 crore (US\$ 1.13 billion).
- Chinese smartphone maker OnePlus has announced its partnership with Foxconn, a Taiwanese company, for assembling its phones in Foxconn's factory in Andhra Pradesh.
- Swedish telecom equipment maker Ericsson has announced the introduction of a new radio system in the Indian market, which will provide the necessary infrastructure required by mobile companies in order to provide Fifth-Generation (5G) services in future.
- Global telecom equipment makers like Ericsson, Nokia Networks and Huawei are looking forward to over US\$ 1 billion revenue opportunity as mobile phone operators in India roll out high-speed broadband services on the 4G LTE technology across the country.

- Lenovo Group of China has commenced manufacturing its smartphones in India, through its contract manufacturer Flex's facility near Chennai, thus becoming the largest Chinese company to follow 'Make in India' strategy.
- Foxconn, the world's largest contract-manufacturing firm for consumer electronics and manufacturer for Apple products, has signed a Memorandum of Understanding (MoU) with Maharashtra state government to invest US\$ 5 billion over the next three years for setting up a manufacturing unit between Mumbai and Pune.

## **GOVERNMENT INITIATIVES**

The government has fast-tracked reforms in the telecom sector and continues to be proactive in providing room for growth for telecom companies. Some of the other major initiatives taken by the government are as follows:

- The Government of India has cleared India's biggest spectrum auction across seven bands, which is expected to generate revenue of Rs 5.66 trillion (US\$ 83.9 billion), expand the bandwidth and the ability of telecom companies to service consumers and address the problem of call drops.
- The Telecom Regulatory Authority of India (TRAI) has released a consultation paper which aims to offer consumers free Internet services within the net neutrality framework and has proposed three models for free data delivery to customers without violating the regulations.
- The Government of India has liberalised the payment terms for spectrum auctions by allowing two options of payments to telecom companies for acquiring the right to use spectrum, which include upfront payment and payment in instalments.
- The Department of Telecommunications (DoT) has amended the Unified Licence for telecom operations which will allow sharing of active telecom infrastructure like antenna, feeder cable and transmission systems between operators, thereby lowering the costs of operations and leading to faster rollout of networks.
- The Telecom Regulatory Authority of India (TRAI) has recommended amendments in the Unified Licence in order to facilitate interconnection at Internet Protocol (IP) level among licenced operators.
- The Telecom Regulatory Authority of India (TRAI) has recommended a Public-Private Partnership (PPP) model for BharatNet, the central government's ambitious

project to set up a broadband network in rural India, and has also envisaged central and state governments to become the main clients in this project.

- The Ministry of Skill Development and Entrepreneurship (MSDE) signed a Memorandum of Understanding (MoU) with Department of Telecommunication (DoT) to develop and implement National Action Plan for Skill Development in Telecom Sector, with an objective of fulfilling skilled manpower requirement and providing employment and entrepreneurship opportunities in the sector.
- The Telecom Regulatory Authority of India (TRAI) has directed the telecom companies or mobile operators to compensate the consumers in the event of dropped calls with a view to reduce the increasing number of dropped calls.
- The Central Government's several initiatives to promote manufacturing in the country, such as 'Make in India' campaign appears to have had a positive impact on mobile handsets manufacturing in the country. Companies like Samsung, Microma and Spice had been assembling handsets in the country already. Xiaomi and Motorola, along with Lenovo have also started assembly of smartphones in India. Firms like HTC, Asus and Gionee too have shown interest in setting up a manufacturing base in the country.
- The Government of India plans to roll out free high-speed wi-fi in 2,500 cities and towns across the country over the next three years. The program entails an investment of up to Rs 7,000 crore (US\$ 1.04 billion) and will be implemented by state-owned Bharat Sanchar Nigam Ltd (BSNL).

## **ROAD AHEAD**

India will emerge as a leading player in the virtual world by having 700 million internet users of the 4.7 billion global users by 2025, as per a Microsoft report. With the government's favorable regulation policies and 4G services hitting the market, the Indian telecommunication sector is expected to witness fast growth in the next few years.

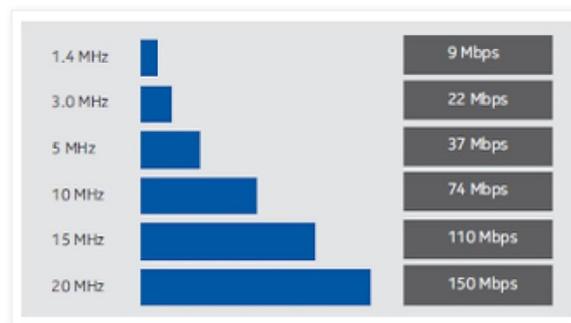
## **CONTRAST WITH CHINA**

Comparing the approaches taken by China and India, there's little doubt of the need for a change in our approach. China provided operators with low-priced spectrum to scale up and drive economic growth, among other forms of support. Despite foreign holdings, it hasn't imposed substantial fees. India brought in more operators than other markets, didn't provide

as much commercial spectrum, fragmented what it had, and priced it out of sight. Consequently, substantial spectrum is idle with the government, while large operators with very little spectrum and the legacy of underdeveloped fixed networks have over 100 million customers each, with high voice and growing data usage. This situation is likely to worsen as more spectrum holdings come up for renewal.

Efficient data transmission requires even broader bands. The charts below show how capacity increases per MHz with broader bands, and the bandwidth in terms of megabits per second (Mbps) needed for services.

### Capacity Increases with Broader Bands



### OBJECTIVES OF THE RESEARCH:

1. To analyse the factors responsible of increasing call drop in Urban and Rural areas.
2. To analyse the effects of carried traffic intensity and utilization factor of the network on the call drop rate.
3. To determine several measures which could be deployed by the Telecom Service Providers (TSPs) to reduce call drops.

### SIGNIFICANCE OF THE WORK:

The proposed work is designed to when the whole country is suffering with an epidemic of call drop, Govt. is clueless about the actual call drop rate and the exact reasons for the same. Current methods of call drop analysis and network analysis is not transparent and representative of actual status. We even don't know what the actual Current Call Drop Rate across the country or in different geographic areas including rural and urban. So the study to be undertaken to analyze call drop rate, patterns and reasons behind it by the TSPs in Odisha, Bihar and West Bengal.

**RESEARCH METHODOLOGY:**

The survey research method will be employed in the proposed study. An electronic survey instrument will be developed and distributed to customer contact personnel employed by telecommunications firms in Odisha, Bihar and West Bengal across different districts. Prior to distribution of the survey instrument, e-mail and social media will be used to communicate with customer service personnel employed by the participating firms. These communications will serve to inform these employees of the nature of the research and to provide periodic reminders to complete the questionnaire. E-mail and/or social media will also be used to administer the survey instrument. The anonymity of all respondents will be protected throughout the research program.

**Details of Work in the Area by Principal Investigators:**

**Prof.Dr.P.C Tripathy, presently associated as Head of Department at Sambalpur University at the Department of Management.**

Prof.Dr.Saikat Gochhait core research in the area of marketing and IT. Researcher collaborator at the GEITEC – GRUPO DE PESQUISA EM GESTÃO DA INOVAÇÃO E TECNOLOGIA / RESEARCH GROUP ON MANAGEMENT OF INNOVATION AND TECHNOLOGY at the Federal University of Rondônia, Brazil, with important contributions as co-author in works published on proceedings of international conferences, indexed in books and scientific journals related to technology.

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# Pedagogical Humanism and Creativity in ICT-oriented Elementary Schools

by

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## ABSTRACT

In our research we focused on pedagogical humanism and creativity in elementary school teachers (N = 20) in schools that focus on cultivating ICT skills. The control group consisted of teachers in standard elementary schools (N = 21). The research was conducted using questionnaire methods. Although no statistically significant differences were found between the two groups with respect to the measured variables, our research has shown that elementary school teachers in general prefer the humanistic conception of teaching and the creative approach in teaching over the traditional one. The study revealed a strong relationship between the humanistic approach and pedagogical creativity ( $r = 0.69$ ;  $p \leq 0.00$ ).

**Keywords:** teacher, humanistic concept of teaching, pedagogical creativity, ICT

## INTRODUCTION

There has been a marked and noticeable development in Information and Communication Technologies (ICT) and a steady increase in their implementation in everyday life. Well-aware of the importance of ICT skills, the Organisation for Economic Co-operation and Development (OECD) has issued a list of skills needed for the 21<sup>st</sup> century. Among other skills these include information processing in an informationally-communicative environment (OECD, 2013). In reaction to the above tendencies and trends, the Slovak Ministry of Education, Science, Research and Sport approved a document entitled The Concept of Informatization and Digitalization of the Education Sector with a view to the year 2020; the document was passed in November, 2014. The process of digitalization was to rest on three core pillars: 1) digitalization of the educational content at the regional level, 2) infrastructure modernization in the form of high-speed Internet and modern teaching

practices, 3) enhancing ICT skills of the teachers (Digipedia, n.d.). According to L. Šimášek (2013), teachers are now better prepared for ICT in schools because nearly all of them use computers themselves. In 2012, 43% of teachers were regularly using computers in classes, which is but a mild increase compared to the 38% in 2009. This is in line with the relatively low numbers of teachers who have advanced ICT capabilities. Although over 90% of teachers received ICT training, only slightly above 20% of these have acquired advanced competencies.

M. Narita et al. (2001) discuss the process of digitalization at a Japanese elementary school, describing the changes the process has introduced. In addition to technological innovations, the school adapted a more humanistic approach to education. Having joined a project entitled “Open school, Open mind”, whose aim was to break down classroom barriers and use learner-centered approaches, the school implemented “open-space” adjustments so that there were no walls between classrooms and corridors. The school’s management supported a “group teaching” format, both at an intra-grade and an inter-grade level (in the latter case, several teachers were collaboratively attending to several grades of students). Teaching became more learner-centered, with emphasis being placed on independent learning. According to the authors of the above study, the teachers played a crucial role in the students’ acquisition of ICT skills. The school’s management laid great importance on deepening the teachers’ ICT competencies, which facilitated the implementation of ICT in teaching. Although the above model has yet to be applied to and researched with respect to the Czech and Slovak environment, it has already received scholarly attention elsewhere in the world.

It is clear that teachers are essential in introducing ICT-related changes because new technologies by themselves are insufficient in enhancing the learner’s ICT capabilities. Zounek and K. Šedřová (2009) investigated the role and position of the teacher after the implementation of ICT in elementary schools. According to them, many teachers feel that the introduction of ICT stimulates a change in the teacher’s role. Instead of a knowledge provider, the teacher becomes more of an instructor in the learning process. The authors further report that ICT makes it possible for the teachers to be more autonomous when building their lesson plans. The teachers can use the “jigsaw puzzle method”, which consists of assembling varying materials and resources (both technological and non-technological) into new meaningful wholes. Numerous authors (Zounek & Šedřová, 2009; Hartnell-Young, 2003, among others) have observed the transformation of the teacher’s position from the sole knowledge owner

and knowledge distributor (as the traditional teaching paradigm holds) into a facilitator in the learning process, one who inspires and encourages the learners to discover knowledge by themselves. Likewise, many authors agree that the teacher's attitude to ICT is an essential factor in the implementation of ICT into education (Mumtaz, 2000; Cope & Ward, 2002). Thus, it is important for the teacher to be aware that his/her attitude to innovations and their place in education will affect the quality of the teaching.

As has already been mentioned, the implementation of ICT into education gives more scope for humanistic education and pedagogical creativity. In the Czech Republic and Slovakia, these conceptions started to receive some attention after the regime change in the 1990s when emphasis began to be placed on individuality and on the development of cognitive abilities (Kosová & Porubský, 2011). Yet, although the autonomy of the individual was formally protected by the law, in reality the transformation was much more problematic (Kosová, 2011) and if it did take place, it was on the teachers' own initiative. The question of the application of the concepts of humanistic education and creativity was addressed by a range of authors. According to I. Lokšová and J. Lokša (2003), values such as personal responsibility and the ethics principles should be part of the education. These values are an essential part of humanistic teaching principles as overviewed for instance by Š. Švec (1997). Humanistic teaching and the implementation of creativity into education were studied by M. Zelina (1996). With his colleagues (Zelina a kol., 1996), Zelina developed a model of creatively-humanistic education. The model represents a systemic approach to education which goes beyond the traditional emphasis on the learner's performance. One of the principal ideas of humanistic education is that "the formation of the personality from the outside should be replaced by personality self-formation" (Zelinová, 2011, p. 14). According to G. B. Esquivel (1995), teachers adhering to humanistic education principles tend to be creative as well. A study done by G. Bramwell et al. (2011) suggests that creative teachers are, among other things, attentive to the feelings of others as well as their own, value relationships and find it important to listen to others with understanding (and to be open to improve this ability).

## **RESEARCH QUESTIONS AND HYPOTHESES**

Our research focused on pedagogical humanism and creativity in ICT-oriented elementary schools as opposed to standard elementary schools. Based on the above theoretical framework we formulated the following research hypotheses:

### ***Pedagogical Humanism***

**H1:** Teachers in ICT-oriented schools show a significantly higher use of humanistic approaches to teaching than teachers in standard elementary schools.

**H2:** Teachers in ICT-oriented schools are significantly less likely to employ the traditional approach to teaching than teachers in standard elementary schools.

**H3:** Teachers from both groups exhibit a significant preference for the humanistic approach to teaching over the traditional one.

### ***Pedagogical Creativity***

**H4:** Teachers in ICT-oriented schools are significantly more creativity-supportive than teachers in standard elementary schools.

**H5:** Teachers in ICT-oriented schools are significantly less creativity-suppressive than teachers in standard elementary schools.

**H6:** Teachers from both groups exhibit a significant preference for creativity-supportive methods over the creativity-suppressive ones.

### ***Relationship between Pedagogical Humanism and Creativity***

**H7:** There is a correlation between creativity and a humanistic approach among the investigated sample.

## **RESEARCH METHODS**

1. ***Introductory Questionnaire*** included items regarding general information about each of the participants (gender, age, education, teaching experience) and ICT-related items.
2. ***“Humanistic Conception of Teaching” Questionnaire*** was adapted from I. Turek, 2010 (pp. 531–532). It is a self-assessment measure aimed to assess the degree of the respondent’s humanistic versus traditional approaches. The items are based on humanistically-oriented pedagogical theories by Czech and Slovak authors (M. Zelinová, Š. Švec and M. Zelina, to name a few examples). The questionnaire employs two scales.

The “Humanistic Conception of Teaching” scale measures the following variables: teacher’s empathy and understanding; openness (to new experience, own feelings and the feelings of others, learner’s behaviour in class); personal development, a willingness to

work on oneself; authenticity; trust (on the part of the teacher as well as on the part of the learners); facilitation of and emphasis on learner independence, activity and creativity; support and encouragement; creation of a relaxing and dynamic atmosphere (bringing enthusiasm and vigour and reducing tension); use of cooperation-supportive methods; transferring some of the responsibility to the learners.

The “Traditional Conception of Teaching” scale measures the following variables: distrust (on the part of the teacher, using “informants”); directive teaching methods (the teacher decides on the lesson content, teacher infallibility); adherence to the curriculum (even at the expense of the learners’ interests); reluctance to encourage learner activity and independence, insistence on discipline even at the expense of the learner’ needs; grade-centered assessment; use of monologue to explain new topics; ignorance of emotional education methods and methods of prosocial behaviour encouragement; non-acceptance of open expression of emotions.

3. **“Creativity in Teaching” Questionnaire** was designed to assess the respondent’s creativity-supportive attitudes, opinions and self-declared behaviour (Turek, 2010, pp. 533– 534). The questionnaire comprises two subscales entitled “Creativity-Supportive Teacher” and “Creativity-Suppressive Teacher”.

The “Creativity-Supportive Teacher” scale measured the following variables: creation of an atmosphere of openness, trust and justice; encouragement of learner curiosity and activity; support of innovative ideas; knowledge and use of creativity-supportive methods; teaching of effective learning, information processing and problem-solving methods; guide and facilitator instead of “knowledge owner”; willingness to learn and discover new things; willingness to take risks for things that are seen as important and right; partial transference of assessment to the learners; use of creative and stimulating teaching methods; learners are encouraged to use multiple information sources and to form their own opinion.

The “Creativity-Suppressive Teacher” scale measured the following variables: prevalence of monologue in explaining new topics; importance of discipline and order (“the teacher’s word is law”); directive teaching (discouragement of question-asking and preference for monologue, learners have no say into lesson management); strong adherence to the curriculum and textbooks (the teacher is not willing to teach outside the textbooks); unwillingness to learn new things and methods, low curiosity, ignorance of creativity-supportive methods; acceptance of the management’s decisions despite having a different

opinion, attitude of resignation with respect to expressing own opinion.

## RESEARCH SAMPLE

The research was conducted at three elementary schools in northern Slovakia. The research sample (N = 41) comprised 21 teachers from an ICT-oriented elementary school and 20 teachers from two standard elementary schools. The teachers were given questionnaires complete with instructions. Filled-in questionnaires were personally collected by the authors of this study after one to two weeks. The questionnaires were anonymous.

There was a predominance of women in the research sample (90.2%). The participants ranged in age from 26 to 60 years. The overall average age was 41.6 years (SD = 10.6), with the average ages for the “standard” and ICT-oriented groups being 44.1 years (SD

= 10.5) and 39.1 years (SD = 10.4), respectively. The overall average duration of teaching experience was 15 years (SD = 11). The standard elementary school teachers had an average of 16.5 years of teaching experience (SD = 11.4); teachers from the ICT-oriented school had an average of 13.7 years of teaching experience (SD = 10.7), which makes both groups comparable in this respect. As regards ICT-oriented teaching experience, the average duration was 1.1 years (SD = 1.4).

## RESULTS

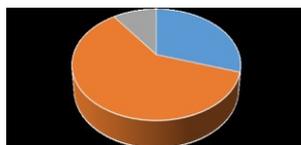
### *Descriptive Statistics: Perceived Effectiveness of ICT in Education and Perceived ICT Equipment Quality*

The ICT-related part of the introductory questionnaire was designed to find out to what extent ICT are perceived as effective and how well the respondent’s school is equipped with ICT facilities. The question of whether they use computers during their lessons was answered in the positive by 98% of the teachers. As regards the effectiveness of ICT in teaching, 30% of the standard elementary school teachers view ICT as decidedly effective, 60% as effective rather than ineffective, and 10% as rather ineffective. For the ICT-oriented school the numbers are 58%, 42% and 0%, respectively. Quite understandably, while both groups tend to perceive ICT as an effective tool, teachers in the ICT-oriented school are more optimistic in this respect.

As regards the quality of ICT equipment, 55% of the standard school teachers view it as sufficient, 30% as rather sufficient and 15% as rather insufficient. The perception of the

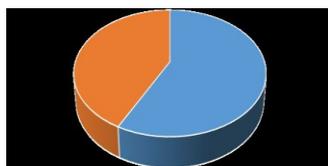
teachers in the ICT-oriented group differs only mildly: 38% view their school's equipment as absolutely sufficient, 52% as rather sufficient and 10% as rather insufficient. The results are plotted in pie charts in Figures 1 – 4.

**Fig. 1:** Effectiveness of ICT as perceived by standard elementary school teachers



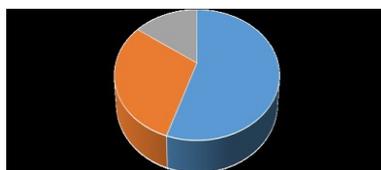
- ICT are absolutely effective
- ICT are rather effective
- ICT are rather ineffective

**Fig. 2:** Effectiveness of ICT as perceived by ICT-oriented elementary school teachers



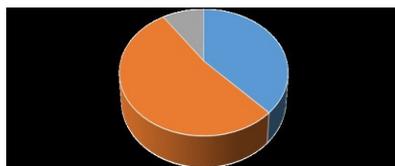
- ICT are absolutely effective
- IKT are rather efefctive

**Fig. 3:** ICT equipment quality as perceived by standard elementary school teachers



- Absolutely sufficient
- Rather sufficient
- Rather insufficient

**Fig. 4:** ICT equipment quality as perceived by ICT-oriented elementary school teachers



- Absolutely sufficient
- Rather sufficient
- Rather insufficient

## HYPOTHESIS VERIFICATION

The first step of hypothesis verification consisted of normality verification using the Shapiro-Wilk test. It was revealed that the “Creativity-Suppressive Teacher” scale did not meet the criteria of “normal distribution” ( $p < 0.05$ ). Thus, non-parametric statistical methods were used to analyse the respective data.

## HUMANISTIC CONCEPTION OF TEACHING

A t-test for independent samples was used to test the significance of the differences between the means pertaining to the “Humanistic Conception of Teaching” scale for both groups of teachers, and also the means pertaining to the “Traditional Conception of Teaching” scale for both groups of teachers. Tables 1 and 2 show that the two research groups do not significantly differ with respect to either the “Humanistic Conception of Teaching” scale ( $p = 0.06$ ) or the “Traditional Conception of Teaching” scale ( $p = 0.22$ ). Thus, the **H1 and H2 hypotheses were not confirmed.**

Then the two groups of respondents were merged into one to test the H3 hypothesis. The aim was to find out whether there is a difference between the overall mean scores for the “Humanistic Conception of Teaching” and the “Traditional Conception of Teaching” scales. The two variables were compared using confidence intervals. Humanistic teaching methods were found to strongly prevail over the traditional approaches (see Table 3). Thus, the **H3 hypothesis was confirmed.**

**Table 1:** Humanistic Conception of Teaching – mean scores for both groups (standard and ICT-oriented elementary schools)

School type	N	Mean	SD	t	df	p
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Standard elementary schools	20	25.65	4.83	1.95	39	0.06
ICT-oriented elementary schools	21	22.43	5.69			

**Table 2:** Traditional Conception of Teaching – mean scores for both groups (standard and ICT-oriented elementary schools)

School type	N	Mean	SD	t	df	p
Standard elementary schools	20	3.50	2.71	-1.25	39	0,22
ICT-oriented elementary schools	21	4.62	3.01			

**Table 3:** Confidence intervals of the overall means for the “Humanistic Conception of Teaching” and “Traditional Conception of Teaching” scales

Teaching conception	Mean	SD	Lower limit	Upper limit
Humanistic	24.00	5.47	22.27	25.73
Traditional	4.07	2.88	3.16	4.98

## PEDAGOGICAL CREATIVITY

Another t-test was employed to test the significance of the differences between the means related to the “Creativity-Supportive Teacher” scale for both groups of teachers, and also the means related to the “Creativity-Suppressive Teacher” scale for both groups of teachers. Because the “Creativity-Suppressive Teacher” scale did not meet the criteria of “normal distribution” we used a non-parametric test (Mann-Whitney U-test). It is clear from Tables 4 and 5 that teachers in ICT-oriented schools show no significant differences compared to their standard school counterparts with respect to the “Creativity-Supportive Teacher” ( $p = 0.23$ ) and “Creativity-Suppressive Teacher” ( $p = 0.45$ ) scales. Thus, the **H4 and H5 hypotheses were not confirmed.**

Then the two groups of respondents were merged into one to test the H6 hypothesis. We were interested in whether there is a difference between the overall mean scores for the “Creativity-Supportive Teacher” and the “Creativity-Suppressive Teacher” scales. The method of confidence intervals was used to compare the two variables. Teachers from both

groups were found to exhibit a significant preference for creativity-supportive methods over the creativity-suppressive ones (see Table 6). Thus, the **H6 hypothesis** was **confirmed**.

**Table 4:** “Creativity-Supportive Teacher” – mean scores for both groups (standard and ICT-oriented elementary schools)

School type	N	Mean	SD	t	df	p
Standard elementary schools	20	28.80	6.57	1.23	39	0.23
ICT-oriented elementary schools	21	26.38	6.00			

**Table 5:** “Creativity-Suppressive Teacher” – results of the Mann-Whitney U test for both groups (standard and ICT-oriented elementary schools)

School type	N	Average position	Mann-Whitney U	p
Standard elementary schools	20	19.58	181.50	0.45
ICT-oriented elementary schools	21	22.36		

**Table 6:** Confidence intervals of the overall means for the “Creativity-Supportive Teacher” and “Creativity-Suppressive Teacher” scales

Teaching conception	Mean	SD	Lower limit	Upper limit
Humanistic	27.56	6.33	25.56	29.56
Traditional	3.71	2.95	2.78	4.64

## RELATIONSHIP BETWEEN PEDAGOGICAL HUMANISM AND CREATIVITY

Using Spearman’s correlation coefficient we found a strong, statistically significant positive correlation between the overall scores for the “Creativity-Supportive Teacher” and “Humanistic Teaching Conception“ ( $r = 0.69$ ,  $p = 0.00$ ). Thus, the two variables are strongly

connected.

## DISCUSSION AND CONCLUSION

Contrary to our expectations, the teachers from ICT-oriented schools were not found to exhibit statistically significant differences compared to the teachers from standard elementary schools with respect to any of the investigated variables (humanistic conception of teaching, traditional conception of teaching, creativity-supportive teacher, creativity-suppressive teacher). A possible explanation may be that the ICT-oriented elementary school had only been in existence for three years before the research was conducted, which seems to be a too short period of time for any differences to show up. As regards the use of ICT, 98% of the teachers reported using computers in their lessons; that is a marked increase compared to the 38% in 2009 (Šimášek, 2013). Most respondents viewed ICT as an effective educational tool, which, given the crucial role of the teacher in this respect, is a favourable condition for large-scale implementation of ICT into elementary education (Mumtaz, 2000; Cope & Ward, 2002).

Numerous authors observe that the school system is not so quick to adopt the planned innovations as would be desirable. Traditional teaching methods are still predominant, with teacher monologue and memorization as the main teaching methods, and with the teacher as the all-knowing authority (Dewey, 1998; Kosová, 2011; Novák, 2002). We do not wish to deny the above authors' assertions because our own research was limited by the self-assessment method employed; thus, the established levels of pedagogical humanism and creativity-supportiveness can only be viewed as subjective (perceived). Another limitation of the self-report research method consists in the social desirability bias, which could explain our striking results. There is an absence of standardized tools for this purpose, which is mentioned for instance by Soh (2000). The questionnaires used in our research met the necessary reliability requirements; Cronbach's alpha was at least 0.6 for both scales. The content of these scales is based on the theoretical conceptions of pedagogical humanism and creativity applicable to the Czech and Slovak environment (as overviewed by I. Turek, 2010).

Our findings suggest that teachers in ICT-oriented schools do not significantly differ from teachers in standard elementary schools with respect to their teaching methods. Teachers from both groups preferred humanistic and creativity-supportive teaching methods over the traditional and creativity-suppressive ones. Given the teachers' good knowledge of the theoretical concepts, it might be useful to conduct practical sessions that would combine the theory with practical methods. The aim of these sessions should be to cultivate the skills of

practical application of pedagogical humanism and creativity in teaching.

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# Spiritual Sensitivity of leaders and their quality of life

by

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## ABSTRACT

In this paper we describe the research project regarding the relationship between the level of spiritual sensitivity, its components (Holism and Harmony, Wisdom, Consciousness, Meaning, Religiosity and Faith, Ethics and Moral Sensitivity / Conscience, Openness to the Other; Spiritual Commitment; Aesthetic Sensitivity) and quality of life. The subjects were business leaders. We assume that a high level of spiritual sensitivity will correlate with a higher sense of quality of life – global, and in realms (psychophysical, psychosocial, subjective and spiritual) (Straś-Romanowska, 1992). The importance of not only traditional but also spiritual abilities for effective, creative and holistic leadership or company management becomes more and more obvious for researchers and practitioners psychologist, the interest in raising these competences has increased fast, and many training programs or workshops for leaders and staff nowadays are created (Wingrove and Rock 1997; Delbecq, 1994, 2000; Reave 2005; Katz 2006; Bradbery, 2011; Van Hauen, 2011). In the article we propose our original approach to the phenomenon of spirituality, which we understand as a kind of sensitivity, composed of abilities related to everyday, observable human activity, serving adaptive problems solving and attaining goals, principally in the moral field. Also, we planning the test procedure, and describe the psychological tools, which serve measuring spiritual sensitivity (Spiritual Sensitivity Inventory - SSI), quality of life (Quality of Life Questionnaire) and we shows methodological process of creating them. Both are new, shorter adaptation of original version.

**Keywords:** spiritual sensitivity and its components, quality of life, leadership, new adaptation of Spiritual Sensitivity Inventory, and Quality of Life Questionnaire

# Factors influencing the acceptance of mobile learning by employees

by

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## ABSTRACT

The use of mobile devices has become ubiquitous, also among employees. Mobile learning has started to be an approach used for competence development, but still not widespread on the desired level. Therefore, it is important to understand which factors influence the acceptance of m-learning by employees. The study presents a proposed conceptual model that is based on the Unified Theory of Technology Acceptance (UTAUT), to examine which determinants influence the acceptance by working adults of using mobile technologies for learning. A Structural Equation Modelling (SEM) approach was utilized to validate the proposed model on the basis of data collected via a survey from 411 employees from 21 sectors, both private and public. Use of SEM allowed to measure both the existence, and the level of influence of particular variables on employees' acceptance of m-learning. The findings showed that performance expectancy, social influence and facilitating conditions are the factors that directly affect working adults' acceptance of using mobile learning for competence development. Effort expectancy occurred to have only indirect impact on the acceptance of using m-learning by employees for increasing skills and knowledge. More specifically, the study proved that facilitating conditions influence on technology acceptance and the perceived effort required to use it. Such relationships do not exist in UTAUT. Therefore, the obtained study results not only explain factors influencing the acceptance of employees using m-learning but also highlight valuable implications for the general technology acceptance research field.

**Keywords:** mobile learning, m-learning, mobile technologies, employees, competences development, technology acceptance, UTAUT

## INTRODUCTION

Modern economies require a continuous growth in employees' competencies. This means that working adults have to update their knowledge and skills to keep up with labor market requirements. In this context they need to have access to solutions that will give them fast, flexible and convenient means of acquiring and transferring knowledge and skills. Improving competencies involves both participation in specialist courses as well as social communication with other employees with the use of Web 2.0 technologies that offer high interaction (Wang et al., 2008).

Providing fast and constant access to professional knowledge necessitates the use of mobile devices and software. Such a form of learning is called mobile learning (m-learning), and can be defined as 'the acquisition of any knowledge and skills through the use of mobile technologies, anywhere, and anytime' (Geddes, 2004). Thus m-learning is unique in terms of time flexibility and location (Peters, 2007) and is treated as a new and independent part of e-learning (Cho, 2007).

In the mobile learning approach, knowledge sharing is highly associated with the use of mobile systems which are extremely beneficial to learners' competency development (Chen et al., 2007). The purpose of such systems is to build m-learning solutions that could assist learners in: searching for, retrieving, creating their own and sharing knowledge (Shu-Sheng et al., 2010). Mobile technologies significantly contribute to improving the accessibility and reusability of educational resources, and to enhancing the flexibility of learning at convenient times and places (Murphy, 2006). Employees, in particular mobile ones, can develop their job skills in a more convenient way. Compared with traditional instruction or studying textbooks, mobile learning seems to be a more attractive way of learning that can trigger the interest and motivation of the learners (Hwang et al., 2011).

Unfortunately, using mobile devices and software for learning has many barriers which stand in the way of their convenient use. These are connected with technical, psychological, pedagogical and financial issues. Technical issues include small screens with a low resolution, inadequate memory, slow network speeds, and lack of standardization and compatibility (Lowenthal, 2010); (Park, 2011). Psychological limitation refers to the habit of people using mobile devices for personal activities such as listening to the music or using social network services, rather than for instructional purposes (Simonson et al., 2014). Pedagogical problems concern the distraction by other mobile services during studying process (Wood et al., 2016) as well as not being accustomed to developing skills with the use of m-learning (Yueh et al.,

2015). The financial issues of using m-learning relate to the costs of an internet connection, in particular while abroad. Moreover, particularly in less developed countries, broadband networks are not so common and this seriously limits the use of mobile devices for m-learning. This indicates that the acceptance and adoption of mobile technologies for learning is not the same everywhere, and researchers should investigate specific circumstances (Nassuora, 2013).

The highlighted issues indicate the need to study factors influencing the acceptance of m-learning by employees for competence development, that is the aim of the paper. The study results will broaden the knowledge about mobile technology acceptance in this context as most of the studies were conducted among target groups of students or faculties. The second point of the paper presents a proposed model. The research methodology and stated hypotheses are explained in the third part of the paper. The fourth part of the article contains the research results. The article closes with a discussion and conclusion.

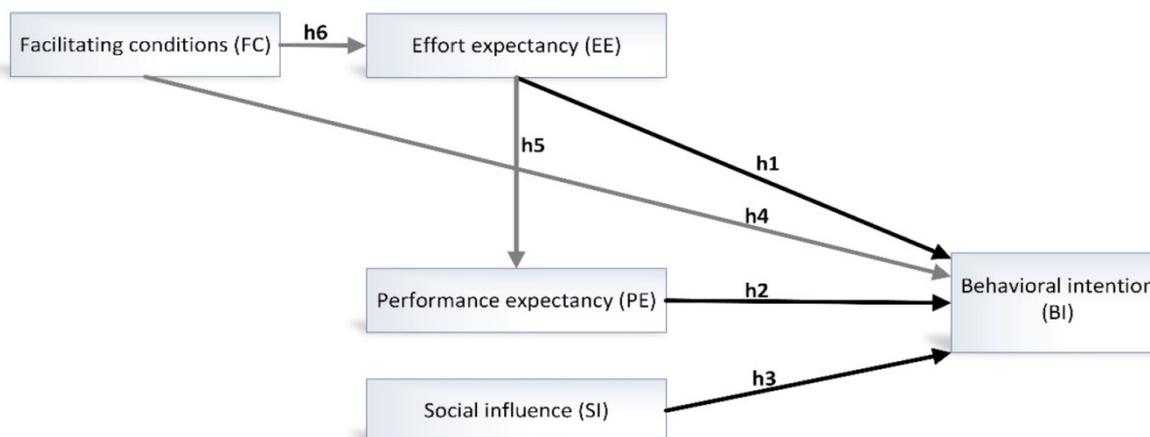
## **RESEARCH MODEL**

UTAUT was chosen as a basis model to validate determinants that impact on the expected performance gained by using technology, as it capable of predicting technology acceptance factors with a far higher rate than TAM and TAM2 (Oye et al., 2012). UTAUT2 and TAM3 have not been chosen as perceived as too much complicated and giving a similar level of prediction as UTAUT.

Several premises were the basis for extending the role of UTAUT's facilitating conditions (FC) variable. Nassuora in his study (Nassuora, 2013) confirms that UTUAT's FC variable has a direct impact on the behavioral intention (BI) to use mobile technologies. The result is contrary to the UTAUT model where FC is connected with use behavior (UB) and not BI (Venkatesh et al., 2003). Similarly to (Nassuora, 2013) FC variable's impact on BI was included in proposed model. Park et al. in (Park et al., 2014) highlighted that that perceived control & skill (PCS) influence on the performance expectancy. PCS is explained as "during mobile-social network games (M-SNGs), I am intensely absorbed in the games and I fully control the games" (Park et al., 2014). This points out that technical conditions available for technology use might impact the expected effort (EE) required for technology utilization. This is consistent with a study of Koivumäki et al. (Koivimäki et al., 2008) who proved that familiarity of the devices and user skills have an impact on the perceptions and preferences to use the services. Accordingly to the study results of Park et al. (Park et al., 2014) and

Koivumäki et al. (Koivimäki et al., 2008) FC impact on EE was and integral part in elaborated model.

Proposed model contains all other variables and connections existing in UTAUT. Analogically to the most of the studies that apply UTAUT as a basis, it omits moderators included in this theory: age, gender, experience and willingness to use. The elaborated model that takes into account assumptions indicated in the current point is presented in fig. 1.



**Fig. 1.** Model of mobile learning acceptance by employees for competences development

Accordingly to fig. 1 model contains independent variables as: performance expectancy (PE), effort expectancy (EE) and social influence (SI); and dependent variable of behavioral intention to use (BI). PE included in model and existing in UTAUT measures the degree to which an individual believes that using the m-learning will help him or her to attain gains in competences development. EE included in model indicates that employees perceive ease of utilizing mobile technologies for professional development as an important factor affecting on the willingness to use m-learning. SI measures the degree to which an individual perceives that important ones like supervisors or other employees believe he or she should use the m-learning solutions for developing knowledge and skills. FC in model points out perceived by employees required support from the parent organization or developer of m-learning solution, in order to apply mobile learning successfully during competences development process. According to the model in fig. 1 six hypotheses were formulated and presented in table 1. They are all related to the assumed relationships between the variables.

**Table 1.** Research hypotheses

Hypothesis number	Connection	Description
H1	EE $\bullet \xrightarrow{+}$ BI	Effort expectancy has a direct effect on the perceived behavioral intention to use mobile learning for competences development.
H2	PE $\bullet \xrightarrow{+}$ BI	Performance expectancy has a direct effect on the perceived behavioral intention to use mobile learning for competences development.
H3	SI $\bullet \xrightarrow{+}$ BI	Social influence has a direct effect on the perceived behavioral intention to use mobile learning for competences development.
H4	FC $\bullet \xrightarrow{+}$ BI	Facilitating conditions have a direct effect on the perceived effort expectancy of using mobile learning during competences development.
H5	EE $\bullet \xrightarrow{+}$ PE	Effort expectancy has a direct effect on the perceived performance gained by using mobile learning during competences development.
H6	FC $\bullet \xrightarrow{+}$ EE	Facilitating conditions have a direct effect on the perceived effort required to use mobile learning during competences development.

Research methods used for hypotheses (table 1) verification are presented in next point of the paper.

## MODEL VALIDATION METHODOLOGY

The research data was collected via a survey in a seven months period starting from May 2015. Eventually, 411 employees filled in the questionnaire, giving a response rate of 87%. To be able to generalize the results, the survey data was collected from many organizations from both public and private sectors and with a diverse number of employees. The first section of the questionnaire consisted of classification data and is presented in table 2.

**Table 2.** Survey participants' classification

Moderator	Values	Number	Percentage
Age	≤20	17	4%
	21-30	254	62%
	31-40	93	23%
	41-50	37	9%
	> 50	10	2%
Job internship	< 3	154	37%
	3-5	109	27%
	6-10	71	17%
	11-20	58	14%
	> 20	19	5%
Frequency of using mobile devices within a week	Never	0	0%
	1-5	111	26%
	6-10	37	8%
	> 10	263	66%

The survey included responses from participants of various characteristics (table 2). Importantly, the questionnaire participants represented a wide spectrum of job internship and frequency of using mobile devices. This allows to generalize the survey results.

The crucial second part of the survey included 15 assertion statements formulated in accordance with technology acceptance questionnaires' rules – 3 statements for each variable presented in fig. 1. Each question was measured using the 7-point Likert scale. For all variables standard UTAUT's assertion statements have been used along with taking into account mobile learning and competences development context.

The study used Structural Equation Modelling (SEM) for data collected via the survey, to validate the model of mobile learning acceptance for knowledge and skills development by employees. Important feature of SEM approach is that it considers both the evaluation of the measurement model and the estimation of the structural coefficient at the same time, supported by a two-step modelling approach, recommended by Anderson and Gerbing (Anderson et al., 1988). Confirmatory factor analysis (CFA) was carried out first to provide an assessment of convergent and discriminant validity. Then SEM was carried out to provide the path coefficients with significance tests allowing for verification of the stated hypotheses. Such research methodology ensures the correctness of a given model.

The data validity test was performed to reduce the possibility of receiving incorrect answers during the data collection period (Sekaran, 2003). It showed that all 411 questionnaire responses were valid. Inter-construct correlation coefficient estimates were examined along with a particular item's internal consistency reliability, by using Cronbach's alpha coefficient estimates (Cronbach et al., 2004). Table 3 presents the relevant results.

**Table 3.** Data reliability

Variable	Cronbach's Alpha based on standardized items
PE	0.929
EE	0.826
SI	0.880
FC	0.824
BI	0.890

Reliability values greater than 0.6 are considered acceptable in technology acceptance literature (Zhang et al., 2006). All items significantly exceeded the recommended level (table 3). Cronbach's Alpha based on standardized items confirmed that the data is internally consistent and acceptable, with a total reliability equal to 0.872.

The validity of elaborated model of m-learning acceptance by working adults was checked through Confirmatory Factor Analysis (CFA), part of the SEM approach. Fit measures results are presented in table 4.

**Table 4.** Fit indices of model

Fit indices	Recommended value	Result
$\chi^2/d.f.$	<3	2,936
Root Mean Square Error of Approximation (RMSEA)	< 0,08	0,079
Comparative Fit Index (CFI)	> 0,9	0,927
Goodness of Fit Index (GFI)	> 0,8	0,883
Adjusted Goodness of Fit Index (AGFI)	> 0,8	0,833
Normed fit index (NFI)	> 0,8	0,909

Consequently, the model meets accuracy requirements of the fit measures presented in table 4. As all six fit indices are satisfied it is possible to verify stated hypotheses (table 1) through regression analysis. Obtained study results are presented in next point of the paper.

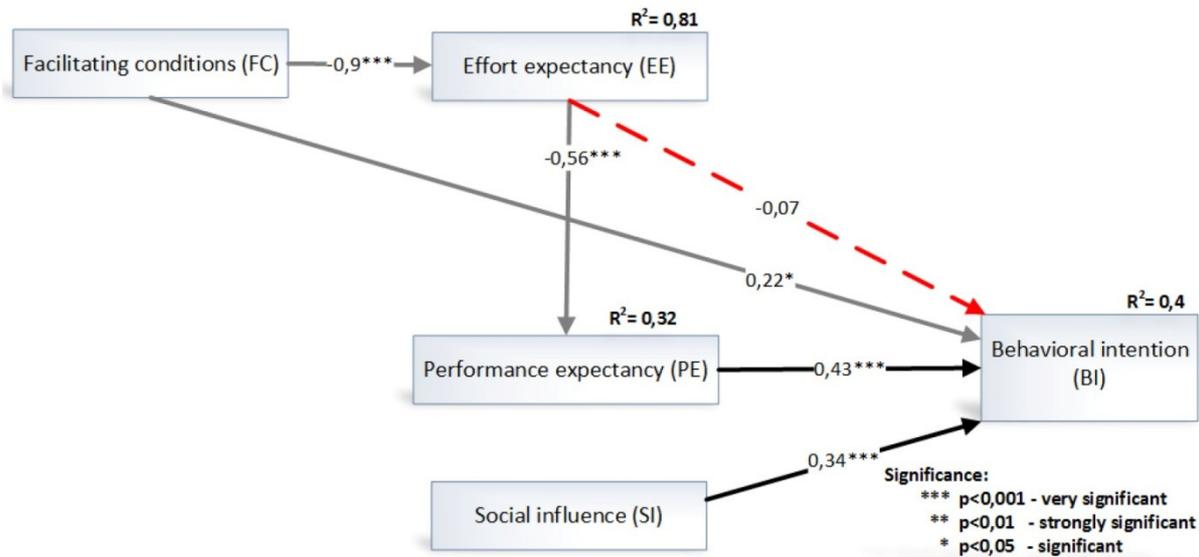
## RESEARCH RESULTS

The confirmation of the stated hypotheses was examined through significance levels. In accordance with statistics rules, paths with  $p < 0.05$  were accepted. Table 5 shows the overall results of the hypotheses' verification.

**Table 5.** Hypotheses verification results

Hypothesis number	Path	Standardized $\beta$ -coefficient	Significance (p)	Verification result
H1	EE $\bullet \dashrightarrow$ BI	-0,066	0,720	REJECTED
H2	PE $\bullet \rightarrow$ BI	0,433	< 0,001	Accepted
H3	SI $\bullet \rightarrow$ BI	0,342	< 0,001	Accepted
H4	FC $\bullet \rightarrow$ BI	0,221	0,01	Accepted
H5	EE $\bullet \rightarrow$ PE	-0,565	< 0,001	Accepted
H6	FC $\bullet \rightarrow$ EE	-0,900	< 0,001	Accepted

All hypotheses except for the first one ( $p > 0.05$ ) were accepted (table 5). Standardized  $\beta$ -coefficient shows the direction and the strength of the relationship between the variables. Fig. 2 presents elaborated model of mobile learning acceptance by employees for competences development with path coefficients ( $\beta$ ), significance (p) and the adjusted coefficients of determination ( $R^2$ ) accordingly to the data included in table 5. Relations between variables not confirmed with stated hypotheses verification are indicated by a dotted line.



**Fig. 2.** Model of mobile learning acceptance by employees for competences development - verification results

Effort expectancy indirectly influences the behavioral intention to use m-learning for competences development through performance expectancy (fig. 2). Same situation exist for facilitating conditions variable that influences BI both directly and indirectly through effort expectancy. Therefore total standardized effect on BI variable was calculated and results are presented in table 6.

**Table 6.** Total standardized effect on behavioral intention to use mobile learning for competences development by employees

Variable	PE	FC	SN	EE
Total impact on BI	0.433	0.382 (0.161 indirect)	0.342	-0.179 (only indirect)

Total standardized effect between variables includes both direct and indirect impact of particular variable on BI (table 6). Interpretation and discussion about research results included in tables 5 and 6 is included in next point of the paper.

## DISCUSSION

The study results contained in tables 5 and 6, and presented in fig. 2 lead to a few conclusions from theoretical and practical perspectives. Starting with theoretical perspective all acceptance variables from UTAUT except EE, directly impact on BI (fig. 2) as the significance level (p-value) for them is lower than 0.05 (table 5). EE occurred to only

indirectly impact BI through PE. In contrary to UTAUT direct and indirect impact of FC on BI has been confirmed. Therefore UTAUT is a proper basis for the development of technology acceptance models, but new connections between some of its variables should be included:

- between FC and BI, that has been also confirmed in the study of Nassuora (Nassuora, 2013);
- between EE and PE proven in the studies of Sumak et al. (Sumak et al., 2010) and (Alrawashdeh, et al., 2012);
- between FC and EE, that has been positively verified in study of Kuciapski (Kuciapski, 2016).

Performance expectancy even it is only directly connected with BI, has the highest impact on behavioral intention of employees to use mobile learning for competences development (table 6). As p-value for this variable is less than 0.001 and  $\beta$ -coefficient has a value of 0.433, there exists a very significant and strong impact of PE on BI. It means that perceived performance gained by the use of mobile technologies for knowledge and skills development has a great deal of influence on the intention to use m-learning.

Also another UTAUT variable, that is social influence has been confirmed to have a direct impact on BI, hence the third hypothesis (H3) was supported (table 5). As p-value for this variable is less than 0.001 there exists a very significant impact of SI on BI.  $\beta$ -coefficient of 0.342 is lower than for PE variable, but is still high. It means that the opinion of other co-workers and superiors about the importance of m-learning use for competences development strongly influences on the intention to use mobile devices and software for this purpose.

Effort expectancy direct impact on BI was not confirmed as first (H1) hypothesis has not been supported because of  $p > 0.05$  (table 3). It cannot be interpreted that EE does not influences BI. Interestingly it occurred that EE has a very significant and strong impact on PE ( $\beta=-0.565***$ ) with confirmed fifth hypothesis (H5). This highlights that the effort, as perceived by employees, needed to use mobile learning affects the expected increase in the efficiency of increasing knowledge and skills via mobile technologies. The minus sign for the  $\beta$ -coefficient points out that the higher the level of effort required, the lower perceived gained performance. As PE highly influences BI, EE occurred to have moderate ( $\beta=-0.179$ ) indirect impact on the behavioral intention to use mobile technologies for competences development. Negative value has to be interpreted that the lower perceived by employees effort required to use mobile devices and software for m-learning the higher intention to use them for such

purpose.  $\beta$ -coefficient is significantly lower than for PE and SI, and the influence of EE on BI is only indirect. Therefore it is not an essential factor for m-learning acceptance by employees.

FC moderate ( $\beta=0.22^*$ ) impact on BI was confirmed with supported fourth hypothesis (H4). With confirmed ( $\beta=-0.9^{***}$ ) last stated hypothesis (H6) FC occurred to be the only variable in model that has both direct and indirect impact on BI (table 6). Total standardized  $\beta$ -coefficient value of 0.382 points out that perceived facilitating conditions available for use of m-learning for competences development, strongly influence on behavioral intention of employees to use mobile technologies for this purpose. Inclusion of connection between FC and EE with measuring indirect impact on BI, allowed to notice existence of high rather than average influence from FC on BI. Very high and significant FC impact on EE (table 5) points out that the conditions and the level of support provided for m-learning use very strongly affects the effort, as perceived by employees, needed to use mobile devices and software for this purpose. The minus sign means that the better facilitating conditions the lower perceived by employees effort required to use mobile learning for improving knowledge and skills.

The study results have important implications for practitioners. As PE occurred to be the most important variable influencing on BI ( $\beta=0.433^{***}$ ), efficiency of realization of activities connected with competences development with the use m-learning is crucial. Employees expect to have a significant increase in performance of gaining new knowledge and skills thanks to the use of mobile learning. This has to be taken into account by both decision-makers in companies and m-learning solutions' designers.

Facilitating conditions and social influence have similar, high total impact on BI, with  $\beta$ -coefficient values of 0.382 and 0.342 respectively (table 6).  $\beta$ -coefficient value for FC variable highlights that organizations should provide convenient environments for m-learning use. Such solutions connected with the use of devices and software are: helpdesk, tutorials, training, creation of communities of practice, access to FAQ and high quality documentation. High  $\beta$ -coefficient value for social influence means that producers or even companies should build communities of practice that use m-learning applications for competencies development. Popular, global social services seem to be an appropriate place to establish communities of professionals that share experiences about using various mobile learning solutions. Also decision makers before choosing a particular mobile learning system should analyze whether there exists an appreciable community of practice of it.

Effort expectancy occurred to have the lowest, moderate impact on BI. It means that it is desirable that m-learning tools are intuitive and easy to learn, and take into account habits of several groups of potential users. But as  $\beta$ -coefficient value of EE is only 0.179 this should not be of much importance. It is crucial as already mentioned to choose mobile learning solutions that increase performance of competences development by employees with broad communities of practitioners.

Elaborated and validated model (fig. 2) is a valuable solution with practical implications for increasing mobile technologies acceptance by employees for mobile learning utilization. Its limitation is that it explains the 40% ( $R^2$ ) of behavioral intention of employees to use mobile technologies for m-learning. Although the  $R^2$  value is quite high in accordance with acceptance theories it highlights that there is still a need to explore for new variables and connections that will further explain factors influencing intention to use m-learning for gaining new knowledge and skills by working adults.

## CONCLUSION

The paper investigated with the support of the Unified Theory of Technology Acceptance (UTAUT) factors influencing the intention of employees to use mobile learning for competences development. Elaborated model explains in 40% ( $R^2$  coefficient) behavioral intention to use m-learning by employees. As a result, the study contributes both to mobile technologies acceptance and general acceptance theories.

The study confirmed the existence of new connections between variables that exist in UTAUT. Facilitating conditions (FC) occurred to directly impact behavioral intention to use technology (BI). Also relations between external variables - facilitating conditions and effort expectancy (EE), and effort expectancy and performance expectancy (PE) - have been proven. As there are other authors that highlight connections between FC and BI and EE and PE, UTAUT has to be treated as an important basis for the creation of technology acceptance models, but itself it should be also extended with highlighted connections between variables.

Performance expectancy with  $\beta$ -coefficient value of 0.433 is the most important factor influencing behavioral intention of employees to use mobile technologies for competences development. Facilitating conditions and social influence have similar, high total impact on BI, with  $\beta$ -coefficient values of 0.382 and 0.342 respectively. Perceived facilitating conditions available for the use of m-learning for knowledge and skills development strongly influence

on behavioral intention of employees to use mobile technologies for this purpose. Also the opinion of other co-workers and superiors about the importance of mobile learning use for professional development, strongly influences on the intention to use mobile devices and software for this purpose. Effort expectancy occurred to have only moderate and indirect impact on BI. Providing a low effort required to use m-learning solutions is desirable but not of high importance for the acceptance of mobile learning.

The study results have important implications for practitioners. As PE occurred to be the most important variable impacting BI, efficiency of realization of activities connected with competences development with the use m-learning is crucial. Employees expect to have significant increase in performance of gaining new knowledge and skills thanks to the use of mobile learning. High  $\beta$ -coefficient value for FC highlights that organizations should provide convenient environments for m-learning use, such as: helpdesk, tutorials or access to high quality documentation. SI influence on BI means that decision-makers should choose mobile learning solutions that have broad communities of practice with possibility to exchange experiences in using particular m-learning devices and software. Also proper informal marketing actions to encourage mobile learning systems use should be conducted within organizations. EE moderate impact on BI means that it is desirable that m-learning tools are intuitive during use, easy to learn and customized to particular groups of users' habits. But EE is not a factor on which decision-makers and mobile learning systems designers should concentrate on.

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# A proposition for using Intelligent Content and ECM technology in Quality Management Systems – Design Science Research Methodology<sup>16</sup>

by

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## ABSTRACT

Content management, in its methodological and technological dimension, has become a strategic direction of development in IT enterprise environments. The area is now occupied by well-established strategies like Enterprise Content Management (ECM) or Unified Content Strategy. Quality management systems as enterprises' operating areas are criticized for the profusion of documents which are costly to prepare and maintain as well as difficult to be accessed by employees. The aim of the paper is to present the prototype of an intelligent quality management system (iQMS) which thanks to employing the concept of intelligent content and ECM technology would solve the addressed problems. The process, based on Design Science Research Methodology has been entirely set in the context of a big enterprise operating in the medical field.

**Keywords:** Unified Content Strategy, Intelligent Content, Enterprise Content Management (ECM), Quality Management Support Systems (QMSS)

## INTRODUCTION

Observing the dynamically increasing amount of data processed in enterprises – a 50-fold increase in the years 2010-2020 (Gantz & Reiznel, 2012), 90% of which is unstructured (Mancini, 2004), one can see a great interest in the concepts and technologies embraced by the term of Enterprise Content Management (ECM). Strategically, ECM was defined by

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AIIM as follows – *“it is a dynamic combination of strategies, methods, and tools used to capture, manage, store, preserve, and deliver information supporting key organizational processes through its entire lifecycle”* (Association for Information and Image Management,

2016). Authors researching this relatively new area highlight that due to the great interest on the part of enterprises which manifests itself in the ECM market’s dynamics, outrivaling traditional systems like ERP or CRM, the ECM concept should be an equally dynamically developing field of information systems (IS) science (Päivärinta & Munkvold, 2005). Apart from the necessary methodological development of the ECM area, Simons and vom Brocke (2014) indicate the need to describe good and innovative practices connected with the implementation of ECM technology components in enterprise’s various functional areas. This shall be the article’s research objective. Methodologically, one of the most vital ECM concepts is the Unified Content Strategy by Rockley and Cooper (2012). It is based on the Intelligent Content (IC) notion which consists in strongly categorized content displaying complex semantic structure in order to be easily and automatically searched, repeatedly used, reconfigurable and easily adaptive.

The article presents standardized Quality Management Systems (QMSs) as a space to use the IC concept and ECM technologies. One of the basic issues related to QMS use is the fact they fail to keep quality documentation available, distributable and up-to-date (Trąbka, 2015). Keeping it up-to-date is understood as a time-consuming process of preparing quality documents which later need to be maintained over a long period. Standardized QMSs are criticized and compared to creating a countless number of paper documents (quality procedures, manuals, etc.) which fill filing cabinets and storerooms. Paradoxically, the documentation is used only during audits (inspections) and not by employees to whom it is frequently inaccessible. Such a quality system is simply inoperative and employees continue realizing their work basing on their colleagues’ methods or developing ones from their own experiences in a generally inconsistent and uncontrolled manner. The effectiveness of IT tools supporting the area, called Quality Management Support Systems (QMSS), is not satisfactory even though they are still being developed (Trąbka, 2015).

Taking into account the opportunities resulting from using the IC concept supported by ECM technologies for increasing the QMSS effectiveness the paper’s author asks two questions:

1. how to design a QMSS using the IC concept and ECM technologies?
2. how can IC supported by ECM technologies change the effectiveness of content management systems?

The research method employed in the paper is the Design Science Research Methodology (DSRM) based on the following stages: problem identification and definition of objectives, design and development of prototype, and the solution's demonstration and evaluation. The most vital and difficult stage of the adopted research attitude consists of creating an applicable prototype of the intelligent content concept to create an alternative to the classic QMSS. The solution developed was named the prototype of intelligent quality management system (iQMS). The prototype was created for a big enterprise operating in the medical field where it was also verified.

The first two parts of the article present a review of the concepts and technologies connected with IC and ECM technologies. Chapter 3 describes the assumptions and stages of the researching process in line with the DSRM approach adopted in the paper. The next chapters show the stages of defining the problem and collecting the requirements (chapter 4), designing and creating the iQMS prototype (chapter 5), as well as its presentation and evaluation (chapter 6). The last chapter summarizes the iQMS's advantages and indicates the barriers to its implementation in the production environment.

## **LITERATURE OVERVIEW**

### **Unified Content Strategy (UCS)**

**UCS** is a method of constant requirement identification and creation of systematically structured content so that it can be repeatedly used and managed in defined unified sources and delivered at the clients' requests according to their needs (Rockley & Cooper, 2012). UCS's main aims are silo trap elimination and a reduction of the preparation, management and content distribution's costs while effectively meeting an organization's and its clients' needs. Silo traps appear on the connections of organizational units and manifest themselves in the lack of information flow between the units and many inconsistent sources of the same data functioning in an organization. The silo trap phenomenon has been known in IS and in management for many years. Currently, in the age of Internet and management directed to unstructured data, silo traps are becoming more dangerous and costly. Thanks to the web and mobile technologies, clients can gain a wider access to company information sources

than in the 1990s. Clients expect to get up-to-date and complete data about the offered products, services or trading conditions. The presence of silo traps, which here are the inconsistent and outdated sources of unstructured data, results in situations when client contacting an organization through different communication channels receives different, often contradictory data about a product, trading conditions, etc. From the client's perspective, this misinformation is often treated as fraudulent and may lead to a loss of trust and consequently the client's departure, irrespective of the offered products' quality or prices. In order to prevent this from happening, UCS proposes a solution relying on Intelligent Content. IC is a strongly structured and semantically categorized content so that it can be easily and automatically discoverable, reusable, reconfigurable and adaptive (Rockley & Cooper, 2012). The IC's basic assumption is to drop the concept of document as basic data carrier. Intelligent Content is understood to be a set of textual data in an ordered semantic form and metadata used to categorize individual parts of a chunked document. UCS's creators replace document with the idea of Information Product (IP) in order to clearly separate between the two kinds of content recording. Each of the semantically distinguished parts of an information product is called a component. Separation into components makes them easily searchable (irrespective of the information product they are in) and reusable (in different IPs). The already existing components will be easily accessible to authors creating new IP's, who could later incorporate them in their own products. The solution is supposed to ensure the components are up-to-date and the sources are consistent. Adaptive content is format-free, device-independent, scalable, and filterable content that is transformable for display in different environments and on different devices in an automated or dynamic fashion (Rockley & Cooper, 2012).

### **Technologies used to create and process intelligent content – XML and ECM**

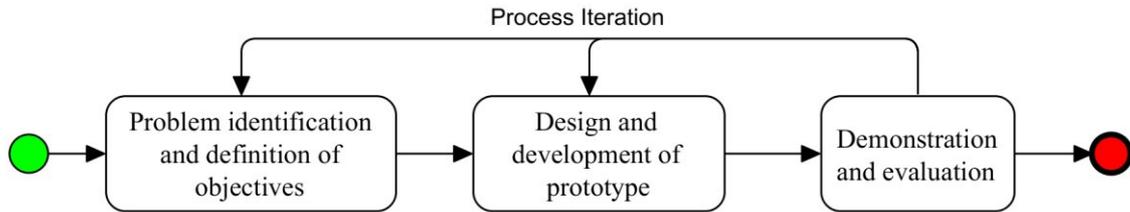
XML technologies are considered to be the most suitable for the process of IC creation. XML (Extensible Markup Language) is a universal language dedicated to structural representation of different data (Bray, Paoli, Sperberg-McQueen, Maler, & Yergeau, 2008). In IC context, XML allows us to contain directly inside an electronic document a description of its structure and semantics of individual pieces of information. XML tags refer to the description of a document's content (semantic tags and attribute names) and its structure (node tree), they also point to the format of particular data. XML documents do not contain formatting or the document's appearance styling elements (Rockley & Cooper, 2012). Other XML technologies used in the article in the IC context are DTD, XML schemas and

transformation schemas (Fryźlewicz i Salamon, 2008). Storing XML documents in dedicated databases is also a vital issue already described by Graves (2002). Enterprise Content Management Systems, often called ECM platforms, are sets of components and technologies used for storing and gradual processing of content, particularly the unstructured one. Gartner's analysts mention the following: Document Management, Content Workflow, Social Content, Image-processing Application, Web Content Management and Extended Components (Koehler-Kruener, Chin, & Hob, 2015). The functional and technological characteristics of the individual components, illustrated with an Alfresco-based example, was discussed by Trąbka (2013).

## **RESEARCH METHODOLOGY**

To diagnose and create the iQMS prototype, the author used a research process based on Design Science Research Methodology (DSRM) for Information Systems Research (Peppers, Tuunanen, Rothenberger, & Chatterjee, 2007). The general idea of the DRSM approach was presented by (Markus, Majchrzak, & Gasser, 2002). According to them, "creating new artifacts is based on existing kernel theories that are applied, tested, modified, and extended through the experience, creativity, intuition, and problem-solving capabilities of the researcher". Peffer et al. (2007) offered a DSRM process model that includes six main phases: problem identification and motivation, objective of a solution, design and development, demonstration, evaluation, and communication. The here presented research process aiming at creating an iQMS prototype will be based on the assumptions and phases described by Peffer et al. (2007), however, it will contain two modifications. The modifications result from the use of supporting case study methodology (Yin, 2003) and the fact the prototyping takes place on the stage of design and development. Havner et al. (2004) point to case study as a tool used in DSRM to evaluate the created solution. In this research, the case study is also a place of problem identification and definition of objectives and requirements, since it appears already in the first phase of the DSRM process. Creating the prototype on the design and development stage stems from the fact the proposed technological solutions may cause a drastic change in a big organization's (subject to the case study) methods of operations. An overly rapid and radical implementation of such changes could lead to fear and great resistance on the part of the to-date IT solutions users. For this reason, the company's board (as the side defining the problem) suggested preparing a prototype which would show the iQMS's full and objective abilities. The system's implementation

procedure in the organization is very likely to be a multi-stage process extended over a few years. Fig. 1 presents the DSRM-based research process realized in the paper.



**Figure 1.** Research process based on DSRM.

Source: Own research

## PROBLEM IDENTIFICATION AND DEFINITION OF OBJECTIVES

The company which initiated and verified the prototype of intelligent Quality Management System (iQMS) is a big network of medical diagnostic laboratories operating across Poland. It consists of over 100 laboratories and 500 collection stations. The enterprise employs over 4000 employees. The company has a certified quality system PN-EN ISO

9001:2008, medical industry standards PN-EN ISO 15189:2008 and PN-EN ISO/IEC 17025:2005 and Information Security Management standard PN-ISO/IEC

27001:2014. At the moment, the quality documents management repository for all of the abovementioned standards holds over 150,000 documents. The number results not only from the numerous standards but mainly from the fact the documents are in paper form and stored at different locations. Each of the organizational units in its physical location has its own paper document repositories. Source quality documents are created in electronic form (MS Word files) by quality specialists, however due to the lack of a generally available repository and the users and auditors' habits, paper copies are made, stored in individual laboratories. Such a mechanism increases the workload and costs of document distribution and updating, and raises the risk of outdated documents appearing in circulation. Quality systems documentation means not only the procedures and instructions created centrally but also the numerous documents created locally in the laboratory units (quality records, charts of corrective and preventive actions, etc.). Consequently, the present form of document storage does not allow the central quality specialists to easily check the documents.

The company's board decided to implement an ECM platform for economic and financial documents area as well as documentation belonging to the quality management system. The selected ECM platform was provided by Alfresco Software Ltd. (Alfresco

Sotware Ltd., 2017). As far as quality is concerned, the platform is meant to be the central documents and quality processes repository available to all employees. The documents stored electronically will still be treated as the black box which poses the following problems:

- the users will not be able to search for documents by their content (full-text search is not an ergonomic solution here);
- authors, when creating new document versions, will not be able to systemically use the already created documents or their fragments – no multiple use option;
- it will be more difficult to centrally check whether the created documents comply with the accepted standards;
- it will not be possible to define processes which control multi-stage creation and acceptance of individual fragments of quality documents' content;
- documents stored in text editor format cannot be easily adjusted to be displayed on web and mobile sites or other hardware platforms.

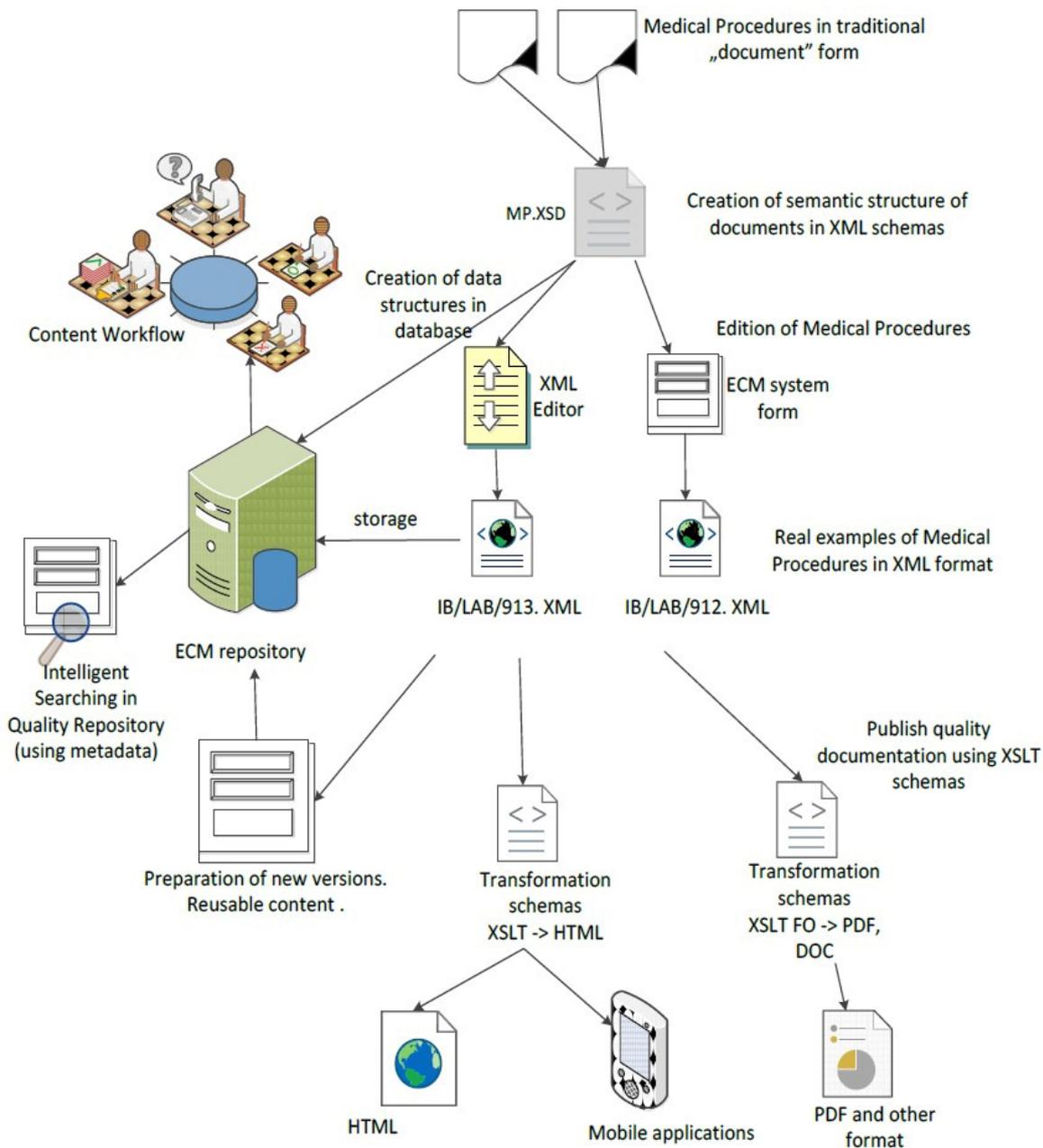
The objective of the iQMS proposed in this paper is to use the intelligent content concept to create a quality management system “bereft of paper or electronic documents” based on information products stored in and distributed by XML technologies.

The iQMS prototype presented here was built on the basis of the ECM Alfresco platform. This will allow us to present the solution to the company's board and, when evaluated positively, concurrently use the to-date “document” and the proposed “intelligent” approach. Such a production comparison of the two approaches will enable us to collect users' feedback and calculate the speed parameters as well as effectiveness of the quality processes and real costs and savings made resulting from iQMS implementation. The quality and parametric verification will be the subjects of the author's prospective articles.

## **DESIGN AND DEVELOPMENT OF THE PROTOTYPE**

The iQMS logical project (Fig. 2) was created basing on the Unified Content Strategy assumptions and the author's knowledge of ECM platforms' structure and function. The fundamental difference between the to-date “document” approach based on paper and electronic documents quality processing (MS-Word or PDF format) and the “intelligent” approach is extraction and semantic structuring of the quality document's content and storing it in the form of structured XML collections called information products (IP). In order for the IPs to replace their document equivalents, they need to be provided with suitable schemas

defining their structure and semantics. The schemas are created according to XML technologies. From now, IPs can be stored in the ECM platform’s repositories and consequently edited with the platform’s interface (appropriately created forms) or an external text editor recognizing XML tags. IPs filled with content can be intelligently searched for by category, structure and semantics tags that have been placed inside them. Because of the fact an IP is not confined to any form of presentation it can be presented on many system and hardware platforms due to transformation schemas (XSLT Transformations, Extensible Stylesheet Language Transformations – an XML-based document transformation language transforming XML documents to various presentation formats).



**Figure 2.** The concept of intelligent quality management system (iQMS).  
Source: Own research

The first stage of the iQMS prototype building was to create an XML model representing the structure and content categorization of the selected type of quality document – documents of the Medical Procedures (MPs for short) type were selected for the needs of the prototype. The example below (Fig. 3) presents a completed MP in XML format, whose structure, categorization and semantics have been described with XML tags without any tags for the document's presentation form.

```
<Medical Procedure >
  Header Number="IB/LAB/913" Author="John M." Title="CAE levels measurement with COBAS 600" Version="I"
  Entry_date="2012-02-06"/>
  <Objective_of_the_manual>The manual describes how to perform a quantitative measure of carcinoembryonic antigen
  concentration in blood serum </Objective_of_the_manual >
  <Manual_description>
  <Test_requirements>
    <Reagents>R1 biotin-labeled anti-CEA antibodies an 18 ml container</Reagents>
    <Calibrators> CEA CalSet II </Calibrators>
  </Test_requirements>
  <Procedure>
    <Step Name="Specimen preparation" Parameter stability in the whole blood – 20-25 C - 7 days Specimen type: blood
    serum Specimen stability: 7 days at 2-8 °C </Step Name>
```

**Figure 3.** A fragment of an XML file containing an example of Medical Procedure.

Source: Own research

MP documents describe complete procedures for performing laboratory tests from a particular biological material, using the appropriate methods and equipment, i.e. analyzer. An MP contains complete information required to perform a test properly, i.e. required competency of staff, patient and analyzer preparation, individual steps of the test procedure and interpretation of the test results.

The model of an MP type information product was built directly in an XML file consistent with the Alfresco Content Model's syntax (ideologically compliant with XML schema, however taking into account some technical aspects of the platform's construction). Alfresco platform comprises the function of importing defined content models which serve as a basis for creating an appropriate database structure. Therefore, it was possible to store MP type information products in the Alfresco repository. Next, by means of the platform's inbuilt development mechanisms forms were built which allowed users to enter and modify medical procedures (an example form will be presented in the next chapter). Referring this solution to the to-date "document" method, it consists in replacing text editor with a formalized form inside an ECM platform. The next step of creating the prototype was to create a presentation model for the stored quality information products. The prototype was provided

with a schema defining the printed document's layout. The schema processed the information product's structure and data into a PDF file. The Alfresco transformation schema is also an XML collection based on XSLT-FO transformation (Holman, 2002). The last stage of the iQMS prototype making was to build a search engine operating on all of the available metadata (described with tags) of our information product (the intelligent search engine will be presented in the next chapter).

## DEMONSTRATION AND EVALUATION

Technically the iQMS prototype consists of many java scripts, XML files and forms which were used for the Alfresco ECM platform configuration. Due to the “non-spectacular” character of the prototype's programming elements as well as limits regarding the length of the paper the author presents only the most important elements of the iQMS user interface. The first element is a form dedicated to handle the selected type of information product, in our case Medical Procedure (Fig. 4).

Information Product - Procedure Manual		
Header: Number: IB/LAB/914/E	Subject Matter Consultant: Jan Kowalski	Instrument: COBAS 6000; COBAS 6005
Project Author: Krystyna Nowak	Methods: CEA	Reagent: R1 biotin-labeled anti-CEA antibodies
Title: CAE levels measurement with COBAS 6000	Version: 2.0	Entry Date: 2012-02-06
Additional Information: Responsibility Qualifications: The test may be performed by: a medical lab technician, a diagnostician, after completing a basic 4-week on-the-job training. The test result approval: an authorized diagnostician.		Manual Scope: The manual applies to DiagABC, a limited liability company, in its units where CEA levels are measured with Cobas 6000 analyzers
		Test Purpose: The main indication for measuring CEA levels is to monitor the treatment of colorectal cancer. CEA is not recommended for screening. CEA concentrations within the normal range do not exclude the possible
Manual Description:		
Rules Of Test:		
Reagents	Calibrators	
Phosphate buffer 100 mmol/l	CEA CalSet I	
R1 biotin-labeled anti-CEA antibodies an 18 ml container	CEA CalSet II	
Steps Of Procedure:		
Name Of Step	Step Description	
Calculation	Cobas 6000 analyzers automatically calculate concentration of the substance measured for each specimen. 1 ng/ml of CEA is equal to 16.9 mIU/ml	
Description of the analytical parameters	Manufacturer's data in the leaflet, user's data in the validation protocol	
Performing the test	The instructions on how to perform the measurement with a particular analyzer for specimen types can be found in the analyzer's appropriate manual and methodical instructions.	
Reagent preparation	Reagent packs are ready-to-use and cannot be separated. Storage and stability When unopened store at 2-8 °C - until the expiration date. Once opened, store at 2-8 - up to 12 weeks	
Description of the analytical proceedings	Measuring instructions for the particular analyzer according to the application. Performing the measurement requires loading the R1 and R2 reagents cassette into the apparatus. Each new reagents lot needs to be calibrated. Once the calibration process is completed one should perform the control procedure. Following the procedures regarding equipment maintenance as described in the analyzer's manual improves the characteristics of obtaining the results.	
Specimen preparation	Parameter stability in the whole blood – 20-25 °C - 7 days Specimen type: blood serum Specimen stability: 7 days at 2-8 °C	
Print Document: Create PDF		

**Figure 4.** A form for creating and modifying a Medical Procedure.

Source: Own research

The form is used to create and modify information products of the medical procedure type. The form presented above contains the whole contents of a procedure (which now is

prepared in a text editor and stored in files on discs). This is the place where a user can start the the transformation – the displayed content will be given a layout and saved in a PDF document. “Intelligently” prepared IPs can be searched by any category, structure or semantics criterion. The example of an intelligent search engine presented in Fig. 5 shows the search result for the description of a specific step of a medical procedure. The initial parameters entered by the user were the test method, instrument model and name of the step whose description the user would like to find.

The screenshot displays the iQMS Search interface. At the top, there is a search criteria form with the following fields:

- Quality Information Product Type: Procedure Manual
- Header:
  - Number: [Empty]
  - Project Author: [Empty]
  - Title: [Empty]
  - Component Type: Manual Description
- Subject Matter Consultant: [Empty]
- Methods: CEA
- Version: [Empty]
- Instrument: COBAS 6000
- Reagent: [Empty]
- Entry Date: [Empty]

Below the search criteria, a table lists search results. The first result is expanded, showing the following details:

**Search result: Product Type - Procedure Manual**

Header:

- Number: IB/LAB/914/E
- Subject Matter Consultant: Jan Kowalski
- Instrument: COBAS 6000; COBAS 6005
- Project Author: Krystyna Nowak
- Methods: CEA
- Reagent: R1 biotin-labeled anti-CEA antibodies
- Title: CAE levels measurement with COBAS 6000
- Version: 2.0
- Entry Date: 2012-02-06

Steps Of Procedure:

Name Of Step	Step Description
Calculation	Cobas 6000 analyzers automatically calculate concentration of the substance measured for each specimen. 1 ng/ml of CEA is equal to 16.9 mIU/ml
Description of the analytical parameters	Manufacturer's data in the leaflet, user's data in the validation protocol
Performing the test	The instructions on how to perform the measurement with a particular analyzer for specimen types can be found in the analyzer's appropriate manual and methodical instructions.
Reagent preparation	Reagent packs are ready-to-use and cannot be separated. Storage and stability When unopened store at 2-8 °C - until the expiration date. Once opened, store at 2-8 - up to 12 weeks
Description of the analytical proceedings	Measuring instructions for the particular analyzer according to the application. Performing the measurement requires loading the R1 and R2 reagents cassette into the apparatus. Each new reagents lot needs to be calibrated. Once the calibration process is completed one should perform the control procedure. Following the procedures regarding equipment maintenance as described in the analyzer's manual improves the characteristics of obtaining the results.
Specimen preparation	Parameter stability in the whole blood – 20-25 C - 7 days Specimen type: blood serum Specimen stability: 7 days at 2-8 °C

**Figure 5.** Intelligent search engine for iQMS content.

Source: Own research

It should be noted that in the “document” mode of work the user would have to find the appropriate procedure (of a few hundred), enter its content and then search for the description of the procedure’s specific step. The authors believe that the speed and effectiveness of the intelligent searching can definitely change the operational users’ attitude to quality management systems and that they will realistically start using quality documentation in daily realized processes.

## CONCLUSIONS AND LIMITATIONS

The iQMS prototype presented just a few of the opportunities offered by the use of Intelligent content and full Unified Content Strategy, additionally supported by ECM technologies. It has been demonstrated that certified quality system can function in isolation from paper or even electronic documents – a Quality Management System without traditional documentation. Defined information products, which are unstructured data collections stored in IT databases, will serve as quality knowledge carriers.

Consequently, iQMSs will enable:

- formalized and process directed path for creating quality content;
- uniform sources of quality content and its repeated usage in updating processes;
- easy access to content through searching by category and semantic structure;
- presenting quality content in all of the available communication channels.

While presenting the iQMS prototype quality managers from the researched organization pointed to a great barrier to implementing this technology, namely the external organizations performing quality audits, especially the ones engaged in certification and accreditation of normalized quality systems. In Poland, the vast majority of audit and accreditation procedures is based on scrutinizing and verifying the contents of original paper documents (formalisms, stamps and signatures). Most organizations do not have legislation, procedures and practices prepared for quality management intelligent systems even though these are more credible and controllable than any “paper” systems. To conclude, we may state that iQMSs are more efficient, cheaper, less time-consuming, more available and ergonomic for users and people responsible for quality in organization. However, the time of their implementation is hard to define since the whole quality management community needs time to adapt itself to new and innovative IT solutions.

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# Intercultural communication as a key to successful integration

by

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## ABSTRACT

Globalization is not a novel phenomenon, but the continuing process generates novel states with numerous requirements. One of the most important faces of globalization seems to be migration. People migrate to various countries and with various objectives and reasons and under various circumstances (Oetzel, 2008; Kowal & Paliwoda-Pękosz, 2017). Most individuals in the world are currently linked with each other through various means of communication which has crossed borders as well as cultures in a more extended level. It is now difficult to find culturally homogenous civilizations currently which beside the captivating picture of diversity, generates problems to help everyday life in such conditions effortless as well as effective. Taking that into account, one can conclude that there are two main subjects that are related to migration which is under deliberation in many multicultural civilizations, namely integration and intercultural communication. One should consider the fact that what makes the process of integration probable and seems to be of great importance in enabling the difficult process of integration appears to be ‘communication’ that is crucial in the integration process.

The main objective of this study is to find how intercultural communication can enable integration of foreigners, with concentrate on international students in Polish universities. Moreover, the aim of this paper is to contribute to increase the level of consciousness among students with various cultural backgrounds. This paper aims at studying the importance of intercultural communication and its significances on the integration of foreign students (Erasmus Exchange Program) in some Polish universities. This study tries to exemplify the importance of intercultural communication between foreign students as well as other students within Polish universities. Looking for the relation between intercultural communication as well as integration, the paper is divided into two main parts. The first part introduces the background knowledge concerning the theoretical aspects of the aforementioned issue. The

second part discusses how intercultural communication is perceived within a culturally varied environment as Polish universities providing some examples and analysis.

**Keywords:** intercultural communication, integration, foreign students

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# **The role of computer-mediated communication on shaping the process of negotiation and the concept of power and relationships in communication**

by

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## **ABSTRACT**

This paper aims at examining Social Information Processing (SIP) (Walther, 1996; Walther, Anderson, & Park, 1994; Walther & Parks, 2002) approaches to relationship development in intra-organizational dyadic negotiations by analyzing the use of face-to-face (FTF) and e-mail channels. The study further studied the effect of power alteration on dimensions of relationship development such as dominance, trust, effect, depth, formality, and task/social orientation. People in organizations exploit technology-based tools such as e-mail to complete a variety of communication tasks. The paper offers a test and expansion of SIP regarding the effects of time on relationship development by verifying the theory within a highly social process like organizational negotiation where there is mixed-channel exploitation. This paper also offers a test of e-mail's unique characteristics and its effects on the growth of relationships in an intra-organizational environment. The hypotheses were verified by means of a dyadic data analysis technique known as the Actor-Partner Independence Model (APIM) (Cook & Kenny, 2005; Kenny et al., 2006). One hundred participants (75 dyads) contributed to the study and negotiated three times. For the first negotiation, all participants employed FTF to create a baseline relationship measure and for the next two negotiations half of the participants employed e-mail and the other half FTF. For the last two negotiations, a power difference was also presented so that in half of the dyads in each group, the seller had greater power than the buyer. The study described the results in three main areas regarding negotiation and computer-mediated communication, namely: (1) interpersonal relationships progress over lean media like e-mail; (2) the features of e-mail influence relationship development when likened to FTF; and (3) the preference of exploiting e-mail for future negotiations is shaped by former e-mail negotiation experience with one's partner, computer-mediated communication comfort, and the level of supremacy

one's partner displays in e-mail negotiations. Regarding interpersonal relationships and negotiation, the study recommends that people should study how to manage their interpersonal relationships via email since it can be a valuable tool for managing one's persona. Bargaining power and bargaining roles were only of restricted influence on the expansion of interpersonal relationships when e-mail was employed to negotiate.

**Keywords:** CMC, negotiation in CMC, relationship in communication

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# Quality of life and satisfaction of work among IT users in Poland

by

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## Research in progress

### ABSTRACT

The aim of this research is to build a model of the relationship between the following issues job satisfaction and satisfaction with life and quality of life of IT users in Poland. To test these hypotheses, an online survey was used.

The dependent variables related to the quality of life (QL) were measured by our adaptation (Appendix 1) of the original version of the questionnaire QL by Maria Straś-Romanowska, Anna Oleszkowicz, Tomasz Frąckowiak (2012)

For comparison and external quality assurance, quality of life was correlated with the life satisfaction measured by the Questionnaire of Life Satisfaction (LS), in a similar research context, adapted by Kowal, Maekioe, and Gochhait (2017) from Anke and Fugl-Meyer (2003) (Appendix 2).

In order to measure the independent variables of job satisfaction, the adaptation of the Job Satisfaction Questionnaire was used (Kowal and Roztocki 2015, based on the Vitell and Davis questionnaire, 1990) (Appendix 3).

The questionnaire has been translated from English into Polish and adapted to Polish cultural conditions (Kowal and Keplinger, 2015; Peneva, Yordzhev, and Ali, 2013).

Statistical methods included descriptive statistics, point estimation, interval estimation, statistical hypothesis verification, and multivariate analysis.

For multivariate analysis such as multiple regression analysis, factor analysis and modeling of the structural equation's variables were standardized (Bagozzi, 2012).

The analyzes were performed using statistical software STATISTICA 12.

From December 2015 to May 2017, a survey of 420 IT users from regional small enterprises in Lower Silesia was conducted.

The sample was selected by a network-interpersonal random sampling, in combination with sequential random sampling and passive experiment planning methods (Kowal, 2002, 2003; Kowal and Węglowska-Rzepa, 2006).

Our main findings in this preliminary study are as follows that satisfaction from work has an impact on the quality of life of IT users. Dimensions of job satisfaction affect the quality of life of IT users. The results of the adaptation of the quality of life questionnaire correlate with the results for the original tool and with the adapted version of the satisfaction questionnaire from the living areas (Anke and Fugl-Meyer, 2003).

Job satisfaction seems to be related to the overall life satisfaction of IT users in transition economies, but especially with job satisfaction (Kowal and Roztocki, 2015).

However, employees are more happy, more satisfied with the internal quality of life than with a job.

Many IT users feel that their compensation level and promotion opportunities are inadequate for competency they possess.

A possible explanation could be seen in the existing compensation structures in many Polish companies. Frequently, in Polish companies, it may be difficult to offer competitive compensations for a small group of talented IT users.

Sometimes the lack of life satisfaction may be due substantial differentials in income between Poland and more mature economies in the EU (Kowal and Roztocki, 2015). For example, in 2017, the average monthly salary in Poland in the end of 2017 was about Polish 4255,59 PLN (Central Statistical Office of Poland (GUS) 2017), which is approximately 1019, 30 EURO, while the average salary in EU as of 2017 stands at EUR 1,520 monthly (<https://www.reinisfischer.com/average-salary-european-union-2017> much).

Moreover, a large number of newly-graduated IT users seeking jobs may depress the salary level for the whole group. This imbalance between a large number of IT professionals seeking jobs and relatively small number of job openings is typical for the job markets of

many transition economies. The results of our research in progress contribute to the development of human capital in the sector of IT, especially in creating new motivation systems including IT users needs. The special meaning has novel Polish adaptations of tools like LS and QL useful not only for Polish labor market but for individual and social life.

**Keywords:** Quality of life, job satisfaction, IT users, in Poland, life satisfaction

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**Appendix 1a.** Items for Quality of Life (QL) (Adapted by Straś-Romanowska, Kowal and Oleszkowicz, 2017 from Straś-Romanowska et al. 2004)

Dimension	Variable Code	Item
PODM	PODM1	I have a feeling that I have found my place in my life.
	PODM2*	I do not have specific plans for the future.
	PODM3	I have a clear life goal in which I am committed.
	PODM4	I often do something against myself and later I feel bad about it.
SPOL	SPOL1	My family life is satisfying.
	SPOL2*	In case of troubles, I can only count on myself.
	SPOL3	There are people with whom I have deep bonds.
	SPOL4	I mean a lot of people who surround me.
FIZ	FIZ1	In my spare time, I can relax easily, I can rest.
	FIZ2*	I generally feel tired, exhausted, I lack energy.
	FIZ3*	I often stay in a hospital (I am hospitalized).
	FIZ4	I am happy about good health.
MET	MET1	I would like to have something good for me.
	MET2	Although there is much evil in the world, there is a lot of good.
	MET3	Despite the adversities, I think that my life has a deep meaning.
	MET4	The willingness to reflect helps me to live.

All items are measured on 4-point Likert-type scale: I completely disagree - 1, I rather disagree - 2, I rather agree - 3, I completely agree.

**Appendix 1b.** Itemy Kwestionariusza for Jakości Życia (JŻ) (Adapted by Straś-Romanowska, Kowal and Oleszkowicz, 2017 from Straś-Romanowska et al. 2004). Polish Version

Dimension	Variable Code	Item Treść (+ dawny numer pytania)
PODM	PODM1	11. Mam poczucie, że odnalazłem/am swoje miejsce w życiu.
	PODM2*	35. Nie mam sprecyzowanych planów na przyszłość.
	PODM3	43. Mam jasny cel życiowy, w którego realizację jestem zaangażowany/a.
	PODM4	59. Często robię coś wbrew sobie i później źle się z tym czuję.
SPOL	SPOL1	22. Moje życie rodzinne jest satysfakcjonujące.
	SPOL2*	38. W razie kłopotów mogę liczyć tylko na siebie.
	SPOL3	2. Są osoby, z którymi łączą mnie głębokie więzi.
	SPOL4	34. Wiele znaczą wśród ludzi, którzy mnie otaczają.
FIZ	FIZ1	17. W wolnych chwilach łatwo się odprężam, potrafię odpoczywać.
	FIZ2*	29. Na ogół czuję się zmęczony/a, wyczerpany/a, brak mi energii.
	FIZ3*	33. Często przebywam w szpitalu (jestem hospitalizowany/a).
	FIZ4	49. Cieszę się dobrym zdrowiem.
MET	MET1	28. Chciałbym/abym, aby zostało po mnie coś dobrego.
	MET2	32. Mimo że na świecie jest wiele zła, jest też dużo dobra.
	MET3	52. Mimo przeciwności losu uważam, że moje życie ma głęboki sens.
	MET4	56. Skłonność do refleksji pomaga mi żyć.

Wszystkie przedmioty są mierzone w 4-punktowej skali typu Likerta: całkowicie się nie zgadzam - 1, raczej się nie zgadzam - 2, raczej się zgadzam - 3, całkowicie się zgadzam.

**Appendix 2a.** Items for Life Satisfaction (LS) (Adapted by Kowal, Mäkiö, and Gochhait (2017) from Anke, and Fugl-Meyer (2003) and from Diener, Emmons, Larsen, & Griffin (1985)). English Version

Code	Variables	Answers
Dimension SAT (Sum of items)	General satisfaction with life	
	Items	
SAT1	Satisfaction with the physical environment at work	
SAT2	Work, career	
SAT3	Finances	
SAT4	Family and friends (community)	
SAT5	Relationships, love, intimacy	
SAT6	Health, taking care of yourself	
SAT7	Personal/ spiritual development	
SAT8	Social life, fun, free time	

All items are measured on 5-point Likert-type scale: Dissatisfying - 1, Rather Dissatisfying - 2, Medium -3, Satisfying - 4, Very Satisfying - 5

**Appendix 2b.** Itemy Kwestionariusza Satysfakcji z Życia (LS) (Adapted by Kowal, Mäkiö, and Gochhait (2017) from Anke, and Fugl-Meyer (2003) and from Diener, Emmons, Larsen, & Griffin (1985)). Polish Version

Kod	Zmienna	Odpowiedź
Wymiary SAT (Suma punktów z itemów)	Ogólna satysfakcja z życia	
	Itemy	
SAT1	Satysfakcja z fizycznego środowiska w pracy	
SAT2	Praca, kariera	
SAT3	Finanse	
SAT4	Rodzina i przyjaciele (społeczność)	
SAT5	Relacje, miłość, intymność	
SAT6	Zdrowie, dbanie o siebie	
SAT7	Rozwój osobisty / duchowy	
SAT8	Życie towarzyskie, zabawa, czas wolny	

Wszystkie odpowiedzi są mierzone w 5-punktowej skali typu Likerta: Niezadowolony/a - 1, Raczej Niezadowolony/a - 2, Średnio -3, Satysfakcja - 4, Bardzo satysfakcjonujące - 5

**Appendix 3a.** Items for job satisfaction (Adapted by Kowal and Roztocki (2015) from Vitell and Davis (1990)). English Version

Answer every question on a scale of 1 to 5, where 1 means the lowest level of identification with the issue, and 5 - the highest.

**A. Scale of job satisfaction**

I. Satisfaction with pay

AI1	My organization pays better than competitors.	
AI2	My pay is adequate, considering the responsibilities I have.	
AI3	I am underpaid for what I do. *	
AI4	My fringe benefits are generous.	

II. Satisfaction with promotion

AII1	I do not like the basis on which my organization promotes people. *	
AII2	Promotions are infrequent in my organization.*	
AII3	If I do a good job, I am likely to get promoted.	
AII4	I am satisfied with my rate of advancements.	

III. Satisfaction with co-workers

AIII1	The people I work with do not give me enough support. *	
AIII2	When I ask people to do things, the job gets done.	
AIII3	I enjoy working with the people here.	
AIII4	I work with responsible people.	

IV. Satisfaction with supervisor

AIV1	The manager I work for back me up.	
AIV2	The managers I work for are “top notch”.	
AIV3	My superiors don’t listen to me. *	
AIV4	My management doesn’t treat me fairly. *	

V. Satisfaction with work itself

AV1	My job is interesting.	
AV2	I feel good about the amount of responsibility in my job.	
AV3	I would rather be doing another job. *	
AV4	I get little sense of accomplishment from doing my job. *	

**Note:** All items are measured on a 5-point scale: strongly disagree (1), disagree (2), neutral (3), agree (4), strongly agree (5); \* Reverse scale items

**Appendix 3b.** Items for job satisfaction (Adapted by Kowal and Roztocki (2015) from Vitell and Davis (1990)). Polish Version

Odpowiedz na każde pytanie w skali od 1 do 5, gdzie 1 oznacza najniższy poziom identyfikacji z zagadnieniem, a 5 – najwyższy.

**A. Skala satysfakcji zawodowej**

II. Skala satysfakcji z wynagrodzenia

AI1	1. Moja organizacja płaci lepiej niż konkurenci.	
AI2	2. Moje wynagrodzenie jest adekwatne, uwzględniając obowiązki, które mam.	
AI3	1. Moje wynagrodzenie jest nieadekwatne (za niskie) do wykonywanej przeze mnie pracy. <sup>R</sup>	
AI4	4. Moje dodatkowe świadczenia są wysokie.	

II. Skala zadowolenia z awansowania

AII1	1. Nie lubię zasad, na podstawie których moja organizacja awansuje pracowników. <sup>R</sup>	
AII2	2. Awans zdarza się rzadko w mojej organizacji. <sup>R</sup>	
AII3	3. Jeżeli dobrze wykonuję pracę, jest prawdopodobne, że dostane awans.	
AII4	4. Jestem zadowolony/a z tempa mojego rozwoju.	

III. Skala zadowolenia ze współpracowników

AIII1	1. Nie mam dostatecznego wsparcia ze strony osób, a którymi pracuję. <sup>R</sup>	
AIII2	2. Kiedy proszę współpracowników o zrobienie jakichś rzeczy, zwykle praca jest wykonana.	
AIII3	3. Jestem zadowolony/a z osób, z którymi tutaj pracuję.	
AIII4	4. Pracuję z odpowiedzialnymi ludźmi.	

IV. Skala zadowolenia z przełożonych

AIV1	1. Kadra zarządzająca, z którą pracuję wspiera mnie.	
AIV2	2. Kadra zarządzająca, z którą pracuję ma wysokie kompetencje.	
AIV3	3. Moi przełożeni nie biorą pod uwagę mojego zdania. <sup>R</sup>	
AIV4	4. Moi przełożeni nie traktują mnie fair. <sup>R</sup>	

V. Skala satysfakcji z samej pracy

AV1	1. Moja praca jest interesująca.	
AV2	2. Czuję się dobrze z zakresem odpowiedzialności w mojej pracy.	
AV3	3. Wolałbym/wolałabym raczej wykonywać inną pracę. <sup>R</sup>	
AV4	4. Nie widzę sensu w wypełnianiu moich służbowych obowiązków. <sup>R</sup>	

R- oznacza kodowanie odwrotne