



Department of System Analysis  
University of Economics, Prague

and

Department of Systems Engineering  
Czech University of Life Sciences



System approaches '17

Can the system approach be useful in solving  
current problems of modern technologies?

*[systemsapproaches.vse.cz](http://systemsapproaches.vse.cz)*

23<sup>RD</sup> International Conference  
Prague, November 23, 2017



Proceedings of the conference

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Faculty of Informatics and Statistics  
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## **PREFACE - RESPONSIBLE DEVELOPMENT OF SYSTEMS**

The system thinking stresses interactivity, interdependence and emergent character of reality. It combines many elements together in an organised way to produce a meaningful whole. There are many types of systems. We can think of a mechanical system like a clock, where parts fit together to produce an external goal. Another example may be the organic system which has an internal aim, is open and can accommodate to its environment. Man is also a system which can set its own goals and organize instruments to achieve them. An information system collects, processes and distributes information in such a way that the system can adapt to its environment, but still remains a whole, i.e. follows a certain pattern of behaviour. The information system deals with different varieties of its elements and the environment. Society is a system, too, which transcends its elements on the one hand, but is influenced by them on the other hand. For many systems the feedback loop is very important as it allows the possibility of learning.

Current reality is composed of many parts that have a lot of various changing interactions. From that it follows reality is very complex, unstable and behaving in not repeating patterns. Its elements are very often people whose actions are only poorly predictable. Solving such a situation may favour soft system methodologies, but their hope in reaching a consensus may not be overestimated.

As reality is so complex the system approach respecting the holistic and pluralistic nature of reality seems to be promising. However, it is not clear what type of system thinking should be used and there is also a doubt that man will be able to understand the complex nature of reality as its complexity may transcend his understanding. The popularity of simple populist solutions may support such a claim.

Current problems with modern technologies comprise non-transparency of their functioning, substitution of amusement to responsibility, distraction of attention from current problems to a virtual environment, loss of privacy etc.

# INFLUENCE OF SOCIAL MEDIA IN 2017 GERMAN ELECTIONS

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## ABSTRACT

*This article analyses the use of social media in the German Federal elections in 2017. It focuses on individual political parties CDU/CSU, SPD, Green party, Left party and Alternative for Germany and indicates prevailing trends. It turns out, that especially Facebook has proven to be very useful in the election campaigns to gain new voters. However, there is a huge potential for all the parties to improve their online presence, as discussed in the paper.*

## KEY WORDS

*Social media, Germany, Elections 2017*

## INTRODUCTION

The 21st century is the time of digitalization and social media. A current survey (August 2017) from German company Statista published figures about social networks and the amount of their monthly active users. Facebook is leading this table with 2,04 billion users a month which is an incredibly high number. But it is not only Facebook all these people are using, YouTube (1,5 billion users) and Whatsapp (1,2 billion) also show tremendous usage figures. Instagram and Twitter also are part of the top ten. Knowing these numbers, social media in general reaches by far more people than most traditional communication tools hence more and more companies include it in their communication strategies in order to address their target audience. Not only businesses use this high potential. The public sector also becomes aware about social media importance and also the politics use it in their election campaigns. (Sigmund, 2013) Therefore, the next pages will take especially the German federal elections of September 2017 into account and how social media influenced the campaigns of the parties as well as the final election results.

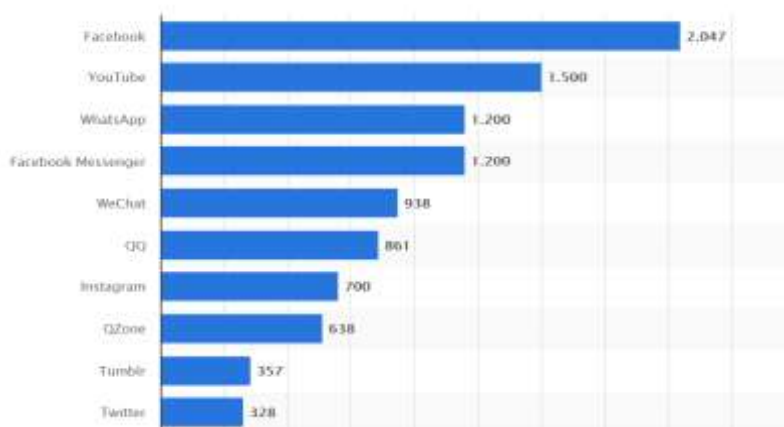


Figure 1 – Ranking of global social networks and their monthly active users (Statista.com, 2017)

## **HOW IMPORTANT IS SOCIAL MEDIA IN GENERAL IN ELECTION CAMPAIGNS?**

Compared to previous federal elections, the importance of social networks increased dramatically. All the parties have their own online teams which are becoming bigger and more competent year after year. Some of them also consult external experts in order to run a successful online campaign. Proof of how important the online campaign is exactly for German parties gives the budget of the party “Die Grünen” (environmental orientated). Roundabout 50 percent of their five million euros budget goes into the online strategy for the elections. The “SPD” (social democrats) spend almost as much but having a higher total budget what makes their relative online budget a bit less. But apparently it is not that easy to divide the election campaigns in online and offline.

The German political advisor Martin Fuchs who has been consulted by almost all big parties in Germany in the past few years mentions, that campaign ads still go from door to door as always. The difference now is that in the evening he should share their insights online. But it is not only posting something on Facebook, first the parties think about their target audience and whom they want to reach. In the next step, they decide for a suitable media to reach them. In Germany, there are for example more than 30 million Facebook users hence it is easy to communicate with a mass of people (Roth, 2017).

Twitter in comparison is rather used by journalists which can also be very effective to spread messages. However, for choosing the appropriate medium the respective target group is decisive. Economic politicians for example should be registered on Xing or LinkedIn. If you want to advocate gay rights there are also several separate portals and Facebook might not be the most important choice. Nevertheless, for the election campaigns Facebook is the overall most used and most important medium followed by Instagram, YouTube, Twitter and also Snapchat for the very young audience (Handrack, 2017).

## **WHO CAN BENEFIT FROM SOCIAL MEDIA?**

If voters like the social media presence and communication of certain politicians is dependent on the voters' personal attitudes. However, several statistics proof that certain strategies are more popular than others. For example, communications agency “Territory” evaluated the Facebook performances of top-level politicians between august 2016 and July 2017. According to this, Sarah Wagenknecht of “Die Linke” (left-hand wing) presented herself better than her competitors. Her posts have a very high reach due to her very interactive community. Also, Christian Lindner from the “FDP” did pretty well and he also was the one of all politicians with the most own posts during this time period. Even Cem Özdemir from “Die Grünen” (environmental friendly party) performed well as he and his party want to foster the digitalization in Germany. The lowest rating according to Territory has chancellor Angela Merkel. Even though she has a high reach on Facebook, she rarely creates buzz online because her accounts are managed by her team and hence address less user due to less credibility. Especially emphasized can be the strategy of “FDP” for the last election as they defined a clear target group and adjusted their campaign respectively. They want to address young, ambitious people you are into digitalization. Online phenomena like memes of Christian Lindner as a Thermomix “representative” help them a lot in their strategy. It is the best thing that could happen in that time for a party. The community spends time and creativity and the hype is for free. They get further attention which would be out of their media coverage. (Handrack, 2017) People also created a hashtag called #ThermiLindner.

Some opponents of him wanted to make fun of him but it turned in another direction and really helped him getting attention. Figure 2 says that a “Thermomix” might have a maximum quantity you can fill into it, but pleasure has no limits. It is very ambiguous as the limit of refugees was one of the most discussed topics in the last election campaigns. Same procedure for figure 2. It means “Hands off! Let the Thermomix do the job for you – that’s the easiest way”. That was offensive about letting others do the job for you. Therefore you have to know that a “Thermomix” is a multi-cooking-tool which can basically do anything you need in the kitchen.



Figure 2: Meme Christian Lindner



Figure 3: Meme 2 Christian Lindner

## HOW DO SOCIAL MEDIA USER INTERACT WITH POLITICIANS?

To evaluate this, an Austrian media monitoring company called “Storyclash” examined the different interactions between politicians and social media users. They define social media interactions as likes, comments, shares or other reactions to posts on Facebook, Instagram or twitter. Also, here it was very remarkable that the biggest party in Germany (CDU) had a big decrease of their interactions from end of July 2017 to August 2017. They explain that especially due to the holiday of chancellor Angela Merkel who was absent of social media during that time. They are nevertheless leading the interactions (114.00), followed by SPD with 110.000 interactions. Very surprising is, that the right-wing party “AFD” (alternative for Germany) creates a lot of buzz online (compare figure 4). In terms of social media fans it is more or less the same. CDU and the chancellor Angela Merkel have by far more followers on Facebook, Instagram and Twitter than the other competitive parties (Rentz, 2017).



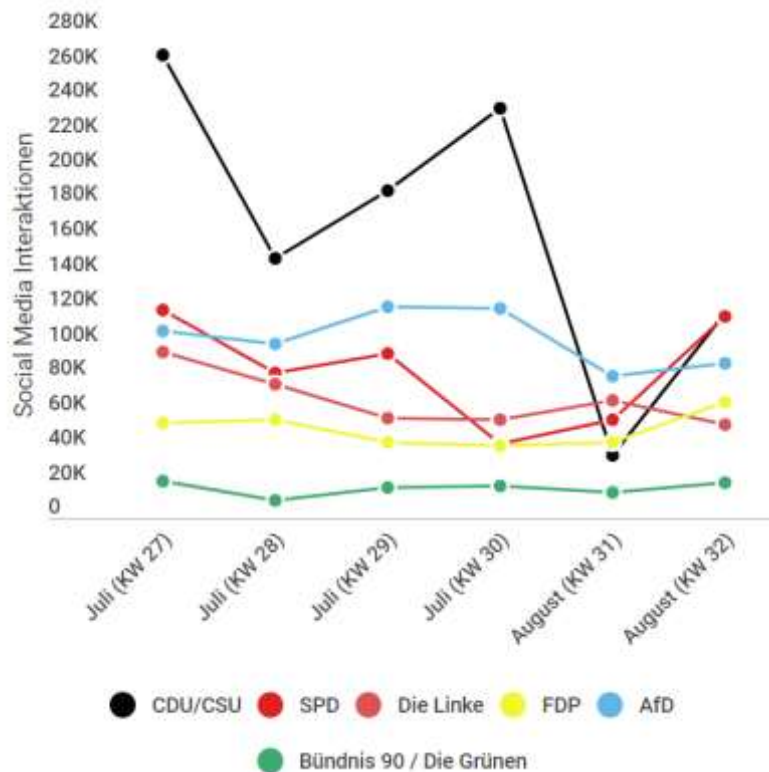


Figure 4: time course of social media interactions

## THE PARTIES AND THEIR SOCIAL MEDIA APPROACH

The **SPD** has more than 150.000 Facebook followers what ranks them in the mid. They were posting between one and four posts during the election campaign. Their posts varied from regular text postings to pictures with slogans and messages to some live videos. Their content was rather focused on their leading candidate Martin Schulz and so they avoided clear statements and published more comparisons to Angela Merkel and the CDU who were the biggest competitor. They are more active on twitter having 300.000 followers. They are also using Instagram to share pictures and videos of election meetings. However, their uploaded Instagram content is very confusing sometimes and they lack a clear strategy there.

In terms of Facebook, the **CDU** is focusing rather on their content than on their leading candidate Angela Merkel. They publish three to seven posts about current trends and media appearances of the party. Their page is also pretty good structured as you can directly spend money for them, become a member or get some insights. Same for twitter where they also focus on their election program instead of showing-off by using the current chancellor Angela Merkel. Whereas on Instagram, they show especially Ms. Merkel but also lack a clear imagery.

The environmental-friendly party "**Die Grünen**" use a lot of graphics on their Facebook page with slogans. This offers a quick overview about their values and ideas. They want to be perceived as a party that cares a lot about the population. However, their way of communicating online is kind of provocative. They are also very active on twitter and Instagram where they post especially videos to attract the young generation.

With more than 200.000 Facebook followers, the left-wing party "**Die Linke**" is one of the strongest. They avoid blank text posts and publish more pictures and videos. Though, one to three posts a day is lacking regularity but they interact a lot with their followers and reply to almost all questions online.

The same procedure can be seen on their Instagram and Twitter accounts where they also focus on pictures and videos.

The **FDP** is using a video cover picture on Facebook to present their ideas and plans rather than introducing their top candidates. They are posting on a very unregular base. They like sharing live-videos and updates presented by their top candidate Christian Lindner. A unique extra is their FDP-podcast which can be listened to on soundcloud and iTunes. Therefore, they also use their own hashtag #FDPod. On twitter, they focus more on short text messages about their party. On Instagram, they are also doing a good job using their striking colors. They present their plans using short videos or pictures with short text messages.

Last but not least, the right-wing party "**AfD**". On their Facebook page they use videos introducing their members instead of pictures and graphics. They are communicating in a very confrontational way. Publishing at least five posts a day, they often use references to Donald Trump, rushing against Angela Merkel and also asking people to share their posts. By criticizing different parties in their videos, they also get a lot of harsh feedback and comments to their videos. They focus mainly on criticizing others so it's not really obvious what their strategy and plans are. They are not very active on twitter as they focus more on pictures. On Instagram, their pictures look like their actual election posters using many citations. (Dobs, 2017)

## CONCLUSION

To sum the social-media usage from the different parties up, they all discovered this online way of communication. Especially Facebook is very popular in the election campaigns to gain new voters. However, there is a huge potential for all the parties to improve their online presence. Posting on a regular base is very important as well as multimedia content to decrease monotonous posts. Furthermore, it is important for them to create a consistent way of social media appearance.

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## SYSTEMS APPROACH IN MODERN MANAGERIAL METHODOLOGIES

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### **ABSTRAKT**

*Současná moderní doba a poptávka ze strany obchodu způsobily, že se společnosti s výrobní specializací zasekly v cyklu neustálého zlepšování. Tento cyklus je nutí konstantně inovovat a rozvíjet současné metody a technologie k dosažení konkurenční výhody na trhu. Podniky by měly být mnohem flexibilnější a přizpůsobovat se požadavkům zákazníka. Nátlak ze strany konkurence je nutí k strategickému rozhodování, které může mít vliv na celý vývoj podniku a efektivitu. Konečné rozhodnutí by mělo být komplexně a systémově účinné, založené na systémovém přístupu.*

*V současné době existuje řada metod, které dokážou podnikové procesy zlepšit a které jsou transparentní a použitelné na každé úrovni v podniku v různých situacích. Tento článek je zaměřený na porovnání kroků systémového přístupu a vybraných moderních manažerských metod/metodologií používaných při řízení systémů různých druhů. Výzkum porovnává kroky těchto metodik, jejich nástroje a navrhuje některá nezbytná rozšíření.*

### **ABSTRACT**

*Current modern period and demand from the business side caused that the companies with manufacturing specialization stuck in the cycle of the constantly improvements. This cycle pushes them into perpetually process innovation and evolves present methods and technologies to reach the competitive advantage on the market. Companies should be much more flexible and adaptable to customer's criteria. The pressure from the competition forced them to strategical decision-making, which may influence the whole enterprise development and effectiveness. The final decision should be comprehensively and systemically efficient based on the systems approach.*

*There is currently number of methods that can improve business processes; they are transparent and applicable at every level in the enterprise and in different situations. This article is aimed at comparing system approach steps and selected advanced managerial methods / methodologies used to manage systems of different types. The research compares the steps of these methodologies, their tools and suggests some necessary extensions.*

### **KLÍČOVÁ SLOVA**

*Lean management, PDCA cyklus, Projektové řízení, Six Sigma, Strategický cyklus, Systémový přístup.*

### **KEY WORDS**

*Lean Management, PDCA cycle, Project management, Six Sigma, Strategic cycle, Systems Approach.*

## INTRODUCTION

In the past, system thinking evolved in the different areas in the comparatively same time. Interest in the system thinking grew in biology, physics, and social sciences. Development of systems thinking can be also documented since antiquity, when Aristoteles had said, "The whole is more than a collection of parts." Subsequently, the basic concept of system thinking became the word *system* (Votruba, Klečáková, Kalika, 2004, pp. 6-7).

As the interest in Systems Science was growing the main milestone word "system" is used on the daily basis till nowadays. The system in different forms is researched. The system must be seen from different purposes. The system consists of its own elements with their relations. The system is characterized by its own behaviour. Von Bertalanffy (1974) believed that Systems Theory should be an important tool in science and practice. It should serve as a management tool. According this idea, every system can be built successfully. That is so called "hard system methodology". The Checkland's philosophy adds a social point of view and this methodology is called "soft system methodology" (Checkland, Scholes, 1999). His research and methodology is based on the fact that during examining a problematic system behaviour there is a number of possible solutions to be confirmed from human perspectives.

Both systems methodologies support rational decision-making in contemporary complex problems. As modern managerial methods help to improve business processes, they can be seen as decision methods. They have to be transparent and applicable at every level in the enterprise and in different situations. Therefore comparing system approach steps and steps of the selected advanced managerial methods / methodologies used to manage systems of different types is important for a good understanding of their meaning and content. This research compares the steps of these methodologies, their tools and suggests some necessary extensions.

## SYSTEMS APPROACHES

Systems approach represents consistent and comprehensive approach for solving problems in which the phenomena and processes are considered as integrated with their internal and external relationships. To make a system working does not mean only to see its main components but also to understand its relations and other impacts that could affect and change the system (Vytlačil, 2007, Získal, Švasta, Brožová, 2000). The Table 1 describes the main steps of two types of systems approach – hard and soft systems methodology.

<b>Hard Systems Approach</b>	<b>Soft Systems Approach</b>
Analysis and symbolic description of the problem	Rich picture
Definition of system elements and relations	CATWOE
Creation of system model OR/MS	Conceptual models of solution
Selection of solution after model experiments	Selected solution after evaluation by interviews and other discussions
Implementation of technically optimal solution	Implementation of socially acceptable solutions

**Table 2 – Hard and Soft Systems Approaches**

### ***Hard Systems Methodology***

Hard systems thinking is a natural way of thinking, especially for engineers whose role is ensuring effective achievement of defined needs. The essential is to know all what is needed and how it can be achievable. This type of methodology is mostly applicable for well-structured problems (Daellenbach, McNickle, Dye, 2012).

Hard methodologies are classical instruments of Systems Engineering. They are designed for solving real-world problems which may be a task or goal you want to achieve. The system is then assembled to

achieve the objectives. It has an extensive and proven apparatus based on a System Theory, Operational Research, Computer Sciences, and Systems Analysis. The advantages of these methodologies are portability, relative (and conditional) objectivity, algorithms-based and automated-based solutions.

The disadvantage of these methodologies is endangering deformation of the task content. It lies in the fact that "hard" resources are somewhat aggressive and do not design accurately state of a real object because "hard" view of the problem is subordinated to the syntax of used formalized means. Another disadvantage is high complexity and uncertainty (Votruba, Klečáková, Kalika, 2004, p. 170).

### ***Soft Systems Methodology***

Soft systems methodology emphasizes need of full recognition and capturing objects together with their properties although at the cost of formal precision and rigoristic view. The aim of soft methodology represents improvement in social orientation by activating a learning cycle for people who need to deal with some situation (Checkland, Scholes, 1999).

Portability of methods is possible only at the level of examples (they cannot be used as a direct instrument for any solution but only as examples). The disadvantage of this methodology consists in its inhomogeneity making it impossible to determine neither a degree of fulfillment of the criteria due to indemonstrable achievement of effects in a quantitative way and nor even formal methods to control the process solution (Votruba, Kalika, Klečáková, 2004, p. 171).

According to Votruba, Klečáková, Kalika (2004 s.174-177), the soft system methodologies are inherently recommendations and procedures for generalizing of the experience with soft systems solutions in practice.

## **SELECTED MANAGERIAL METHODOLOGIES**

### ***Lean Six Sigma***

Lean Management is a very wide control method. Lean is based on several basic principles. Primarily, it is an effort of the whole organization to continuously improve in all areas and to avoid unnecessary wastage. The second principle means to best meet customer's needs regardless the way how to reach them. Lean approach is often used with different attributes depending on the particular applied area of this philosophy. Lean management is often combined with Six Sigma tools. (Frajtová, 2016, p. 36).

The Lean Six Sigma concepts were first published by George (2002), and later by Töpfer, (2008). Lean Six Sigma projects comprise aspects of Lean focus on waste elimination and the Six Sigma focus on reducing defects based on the qualitative (CTQ) characteristics.

There are two common models used by the Six Sigma's business executives and professionals for process improvement and quality level within the company. The DMAIC method or model is more common. Every phase in this model has an important purpose and different procedures that are used to secure the correct results. The abbreviation DMAIC means **D**efine, **M**easure, **A**nalyze, **I**mprove, and **C**ontrol (Pande, Neuman, Cavanagh, 2002).

### ***Deming's PDCA cycle***

The PDCA Cycle (**P**lan-**D**o-**C**heck-**A**ct) is a systematic series of steps for gaining valuable learning and knowledge for the continual improvement of a product or process. It is also known as Deming Cycle (Deming, 2016). The cycle begins with the Plan step. This involves identifying a goal or purpose, formulating a theory, defining success metrics and putting a plan into action. These activities are followed by the Do step, in which the components of the plan are implemented, such as making a product. Next comes the Study or Check step, where outcomes are monitored to test the validity of the plan for signs of progress and success, or problems and areas for improvement. The Act step closes the cycle, integrating the learning generated by the entire process, which can be used to adjust the goal, change methods or even reformulate a theory altogether. These four steps are repeated over and over as part of a never-ending cycle of continual improvement. (Deming, 2016)

The PDCA cycle is one of the key management principles. It describes the forces that spin the innovation cycle, which is the driving force of continuous improvement. Basically, the Deming cycle is the same as the principles of TQM, Kaizen, and similar methods. It is used as a precisely defined and cyclically repeating sequence of steps and activities in introducing innovation and improving quality, especially in production. (Saier, 2017). Deming's message to all managers was brief: *"Improving quality will reduce costs on the one hand, on the other hand it will increase productivity and bring success to the market."*

### ***Strategic cycle***

Strategic management is focused on long-term planning and direction of the organization. It is one of the key pillars of management and creates a framework for the overall management of each organization. It formulates the rules of operations, priorities and direction that the organization wants to take in the long run. The whole process of strategic management takes place in 4 basic continuously-repeating phases (so-called **Strategic Cycle**):

- Strategy formulation (organization mission, vision and strategic goals)
- Strategic planning (creation of a strategic plan and timetable for implementation)
- Strategy implementation (allocation of resources, implementation of projects, activities and measures to achieve strategic goals)
- Strategy review, status monitoring and strategy evaluation (evaluation and eventual strategy update).

Strategic management is art, science and skill in formulation, complex decision making and subsequent fulfillment of everything that will allow the organization to achieve the intended goals, including a sense of change of direction. Strategic management is the whole process of specifying the organization's mission, its vision and objectives, various policies and plans, the definition of programs, projects, or various measures that help achieve the goals. There must be a certain timetable that tells when the goals will be achieved. There must be metrics to measure whether the goals have been achieved. (Tichá, Hron, 2013)

### ***Project approach***

Project Management (Project-Based Management) is a designation for a management style that is based on the fact that work assignments are distributed to projects and teams and are comprehensively managed in unique time and task units (Srividhya, 2009). Typical example of this methodology is PRINCE 2 (Hinde, 2009).

Project management in some ways is the opposite of process management that focuses on repeatable sets of tasks. Project management applies to unique (content and scope) actions and focuses on achieving a result in a project team. It is not typical of repeated and routine processes. Project management style is applied in virtually all sectors and in all situations where high productivity and concentration of the work team are required for a particular goal.

Project-driven management is used, for example, in piece production. It is typical for managing large investment projects, often investment and development events in organizations (for example, implementing a strategic goal, introducing some change in an organization), but it can also be used in serial production where concrete teams of individual components can work on a project basis.

Although each project is unique, all projects share certain features in terms of project management. In particular, these are identical project phases, which are similarly defined in all standards and standards in project management. Although they may differ in detail, they agree on the distribution of the 5 basic phases of each project, namely: Planning, Organizing, Implementing, Monitoring & Controlling and Evaluating.

## COMPARISON OF THE STEPS OF METHODOLOGIES

Comparison of the steps of the systems approach and chosen methodologies is described in the Table 2. Description or definition of the problem is different for all chosen methodologies. The definition in hard or soft system methodologies describes the system elements inputs, outputs, environment, behaviour, and subsystems. Consequently, the system is graphically displayed. The DMAIC's and PDCA's definition consists of generic description of some system without any definition of elements or their graphical depicting. The last two methods offer the detailed view including all elements and graphics as mentioned in Systems Approach as well as the roadmaps and suggestions of possible approaches to achieve the wanted result.

In the second phase, the defined system is analysed and designed. Soft system models and approaches are often used for improvement of human activity. There is not used any specific tool of Lean Six Sigma for selection of an appropriate or optimal solution. The used tools tend to measure and analyse problems, only. The approach of the model and solution for the last two methods is more complex than for the first three. They describe the model using architecture view with much more complex analysis than the other used methods described above. For instance feasibility and impact analysis of the system are provided. The PDCA comprise the small analysis that offers only the simple view on the system.

	<b>Systems Approach</b>	<b>Six Sigma DMAIC</b>	<b>PDCA cycle</b>	<b>Strategic cycle</b>	<b>Project approach</b>
<b>Problem</b>	Defining problem using systems methodologies	Defining of problem	Plan	Formulating & Planning of the strategy	Planning
<b>Model and solution</b>	Analysis using systems methodologies	Measuring and Analysis using Lean tools	Do and Check	Analysis of strategy using specific tools	Analyzing and Organizing
<b>Final decision</b>	Proposed solution using systems model	-	-	Proposed solution using systems model	Proposed solution using systems model
<b>Implementation</b>	Implementation of proposed solution	Implementation of selected targets based on analysis	Act	Implementation of proposed solution	Implementation of proposed solution
<b>Control</b>	-	Control and monitoring	-	Review & Monitoring	Monitoring & Controlling
<b>Evaluation</b>	-	-	-	Evaluating of the approach	Evaluating of the approach

**Table 3 – Comparison of systems approach and chosen managerial methodologies**

The third phase, the selection of socially acceptable and technically optimal solution, is based on modelling, and quantitative and qualitative analysis. Obviously, there is a need to solve the problem and to select the best solution. Lean Six Sigma and PDCA cycle miss this step. The necessity of this decision step is obvious.

Implementation of the solution is an essential final step in problem-solving situations. Every excellent solution would be inefficient without any implementation. For the strategic cycle and project approach, it includes within the implementation also the other analysis and test of feasibility to ensure system is working.

The almost last step is a control process. This step is not applied in systems approach and PDCA cycle. It could be perceived as another decision-making process or problem to be solved. In the DMAIC process, control and monitoring represents the last step of checking whether the objectives were achieved or solution has not been successful.



The last step that appear during the analysis of the methods is evaluation. Most of the current companies has started to evaluate the approach they used to implement the final decision from the planning to the controlling and monitoring. All processes and elements that were part of the system are evaluated.

## CONCLUSION

Based on the analysis provided to compare five methods, our conclusion is that methods Strategic cycle and Project approach have all steps that every method should have. Although the practices of these five approaches are very similar, one important step is missing in the first three of them – “Control“ and “Evaluation” in the System Approach; “Final decision” and “Evaluation” step in Lean Six Sigma; “Final decision”, “Control and “Evaluation” step in PDCA cycle. Therefore, we propose to include missing steps into the System Approach, PDCA cycle and Lean Six Sigma method.

## ACKNOWLEDGEMENTS

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# CONTRIBUTION OF INNOVATION SYSTEMS IN ICT – CZECH REPUBLIC VS. ISRAEL

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## **ABSTRACT**

*The following work should briefly outline environmental conditions for innovative entrepreneurs and start-ups in an area of information and telecommunication technologies, conditions in the Czech Republic and comparison with Israel as one of the world innovation leaders. In general, studies yield evidence of strong positive correlations between ICT areas and economic growth in modern economies as it participates in the reduction of transaction costs, increases production factors productivity and creates completely new solutions for current problems.*

## **KEY WORDS**

*Innovation, Information and communication technologies, Productivity*

## **INTRODUCTION**

### **Importance of ICT for economy**

Information and communication technologies can be considered from two sides; from production of ICT as supply side and consumption of ICT as demand side. Production of ICT can be very important for its creation of a substantial part of an economy and can be preferable in some phase of economy development to be supported by state authorities. Considered supply side then must be diversified of quality of production and its size of added value. Also consumption side is important as it responsible for effective functions and elements used by people e.g. E-government applications, internet connectivity and coverage etc. There are many synergy co-effects and correlations between both sides and which are important to raise with ICT a sustainable economic growth.

Initial studies that bring together ICT, economy and productivity growth were done by Oliner and Sichel (Oliner et al., 2001) on a global level, followed by series of studies other authors Jorgenson and Stiroh (Jorgenson et al., 1999) with the study of U.S. economy, Oulton (Oulton, 2002) with the study of ICT influence on the economy in the United Kingdom. Majority of authors agree with the correlation between investments to ICT and economic growth (Indjikian et al., 2015).

For illustration we can specify following:

- increasing penetration of 10% will increase GDP by 1,21 % in developed countries, by 1,38 % in developing countries (MIT, 2017),
- ICT participate on GDP by 5 % in USA, in EU by 3,5 %, in Israel 17 % and in Czech Republic by 4,5 % (UNESCO, 2017),
- area of ICT participate on increase of overall productivity by 20 % and 30 % by investments in ICT (OECD, 2015),

- globally ICT account 6 % of world's economy, 20% of the economic value of ICT come from ICT industry, developing hardware and goods and 80% of benefits comes from using ICT (Pilat, 2004).

As the area is complex with global links and under turbulent development there are also studies indicating a neutral correlation between ICT and economic growth in some sectors (Machková, 2015). Nevertheless, generally can be stressed out that slow accepting of new information and communication technologies innovations is the reason for the backwardness of European countries in contrast with Asia or high-tech countries as Israel. European Commission published in 2015 document called Digital Agenda which is one of the seven pillars of Europe 2020 strategy (EC, 2017). Digital Agenda focuses on ICT to help with economic progress and innovations as European Commission strongly recommend to focus on ICT development.

ICT pillar concentrate on following topics:

- achieving the digital single market,
- enhancing interoperability and standards,
- strengthening online trust and security,
- promoting fast and ultra-fast internet access for all,
- investing in research and innovation,
- promoting digital literacy, skills and inclusion,
- ICT-enabled benefits for EU society.

The European Commission targets to digital society which brings benefits from the digital single market. It is meant to be developed and harmonized services which work globally among EU citizens as eGovernment, eHealth, Telemedicine, Smart-cities etc.

## **COMPARISON of ICT ENVIRONMENTAL CONDITIONS**

### **Israel innovation & ICT approach**

There are many pieces of knowledge to be reference and analyse about Israel economy way and especially areas that are linked to Israel ICT entrepreneurs and their field of innovation. Behind parts with positive results we could find various reasons; generally Israel's people mentality, business culture as known Israeli approach called chutzpah and all the different challenges that nation is facing regarding compulsory army service where assertiveness and pro-action behaving is a part of casualty. Also there is stable long-term support of state or public research, strong universities support and support of small and medium entrepreneurs with the focus on high-tech start-ups.

Although we admire that information we could also find a few deficiencies and warnings growing up from the narrow specialization.

“A decade ago, Israel had far the highest density of start-ups in the whole world, and draw up more venture capital than anywhere. Today, the entrepreneurial pace feels more like warmish than hot” (Lagorio, 2015). Currently Israel authorities proposing and putting in place new ways of supporting entrepreneurs and lower down their business administration.

By examining environment area of SME country which is very similar to Israel with focus on ICT start-ups - USA we pull into those data; approximately 1 million of a new business are set up every year, 40 % of them finish their activity within one year and within 5 years overall collapse 80 % of them -

800 000. From the 200 000 remaining businesses within next 5 years stops activity also 80 % - 160 000. So it means that till 10 years discontinue 96 % of initial businesses (USITC, 2014).

Behind those numbers are different reasons but a few of them are valid especially for ICT companies and are worth to be highlighted. One of them is “Failure to anticipate or react to competition, technology, or other changes in the marketplace” (Mason, 2011). This experience from micro range goes around to the macro area of ICT complying what was already spotted about accepting of innovations in ICT and importance of ICT as business and users technology.

## Innovation environment comparison

State economy with effectively set up state administration, enforceable law and low entrepreneurs barriers can use its full potential to increase life standard and global growth of positive factors, which returns in creation on new innovations and improvements, realizing and commercializing them. In table 1 was chosen 10 countries with similar size of population as the Czech Republic and Israel (+/-20 %). For those countries were obtain data from a branch of World Bank - World Bank Group's Doing Business initiative (WB, 2015) which brings information about the easiness of doing business – establish and running companies in selected countries. Complete ranking compares 189 countries. By comparing this study with similar studies of organizations Insead (INSEAD, 2017) and World Economic Forum (WEF, 2017) we are getting similar results.

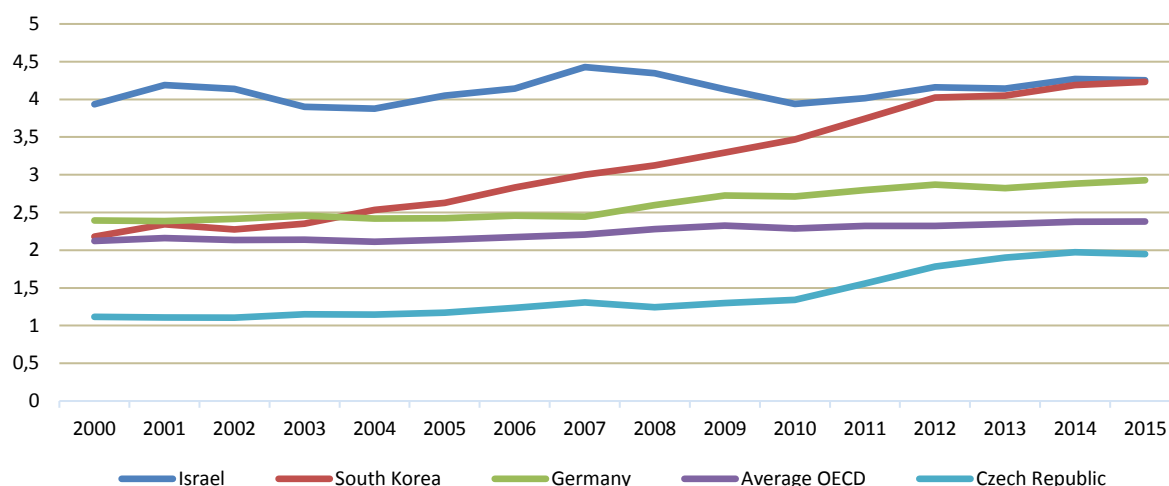
Demonstrated comparison of chosen countries helps us in getting another relevant data for the study. Israel was ranked by position 53 from 189 countries, which is relatively low position in contrast with above findings of his strongly developed ICT area, top innovative environment and high number of start-ups not only ICT focused. As the reasons can be pointed out the unstable political background in the region which cause limitation of long-term investment and predomination of short and middle term investments, furthermore high corporate taxes and high taxes of high-income persons [6]. The Czech Republic in this comparison achieved better results with 27<sup>th</sup> place of ranking. Items in which Czech Republic scores considerably better results are foreign trade with 1<sup>st</sup> place opposite to ranking 58<sup>th</sup> of Israel, getting electricity, rank 13<sup>th</sup> against 91<sup>st</sup> place of Israel, registration of property, rank 32<sup>nd</sup> against 127<sup>th</sup> place of Israel and area of tax stress which places the Czech Republic on 53<sup>rd</sup> place against 103<sup>rd</sup> of Israel. Israel achieves better results in areas of starting business, property permits and investments protecting. Substantial of problematic parts of Israel are caused by geographical placement of country, historically difficult geopolitical situation and tax burden.

Country	Population (mil.)	Overall ranking 2016	Starting a business	Construction permits	Getting electricity	Registration property	Getting credit	Protecting investors	Paying taxes	Foreign trading	Enforcing contracts	Resolving insolvency
Singapore	5,4	<b>1</b>	10	1	6	17	19	1	5	41	1	27
Hong Kong	7,2	<b>5</b>	4	7	9	59	19	1	4	47	22	26
Switzerland	8,1	<b>20</b>	69	45	5	16	52	78	18	22	22	41
Austria	8,5	<b>21</b>	106	47	17	26	59	36	74	1	6	18
Portugal	10,5	<b>23</b>	13	36	25	27	97	66	65	1	20	8
Czech Republic	10,5	<b>27</b>	81	130	13	31	32	53	53	1	68	26
Bulgaria	7,3	<b>38</b>	52	51	100	63	28	14	88	20	52	48
Hungary	9,9	<b>42</b>	55	88	117	29	19	81	95	1	23	65

Israel	8,1	<b>53</b>	56	96	91	127	42	8	103	58	77	29
Serbia	7,2	<b>59</b>	65	139	63	73	59	81	143	23	73	50

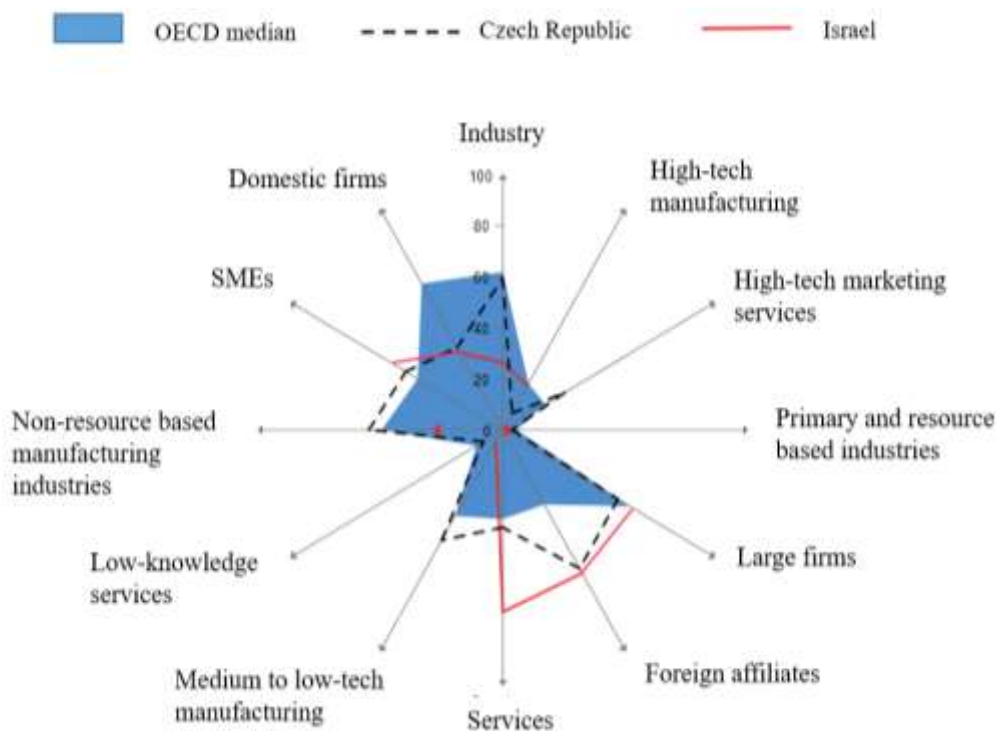
**Table 1.** Entrepreneurs and business conditions in selected states with similar size. Source: Own elaboration based on World Bank (2014).

Data on figure 1 illustrate gross domestic expenditures on research and development. Czech Republic's amount of expenditures on R&D is long-term staying behind of OECD countries average. In closer comparison were in 2015 gross domestic expenditures on research and development 1,947 % of GDP, in contrast to expenditures of compared country Israel - 4,253 % of GDP. In the period from 2007 to 2013 raised expenditures significantly almost by 40 % in the Czech Republic. However, in recent period counted from the year 2013 was growing tendencies slowing down and by the year 2015 expenditures slightly decreased from 1,973 % to 1,947 % of GDP. Germany as the neighbour and the biggest export partner for the Czech Republic, strongly focused on innovations and technology development has expenditures of 2,927 % of GDP. OECD countries have average expenditures on R&D 2,38 % of GDP.



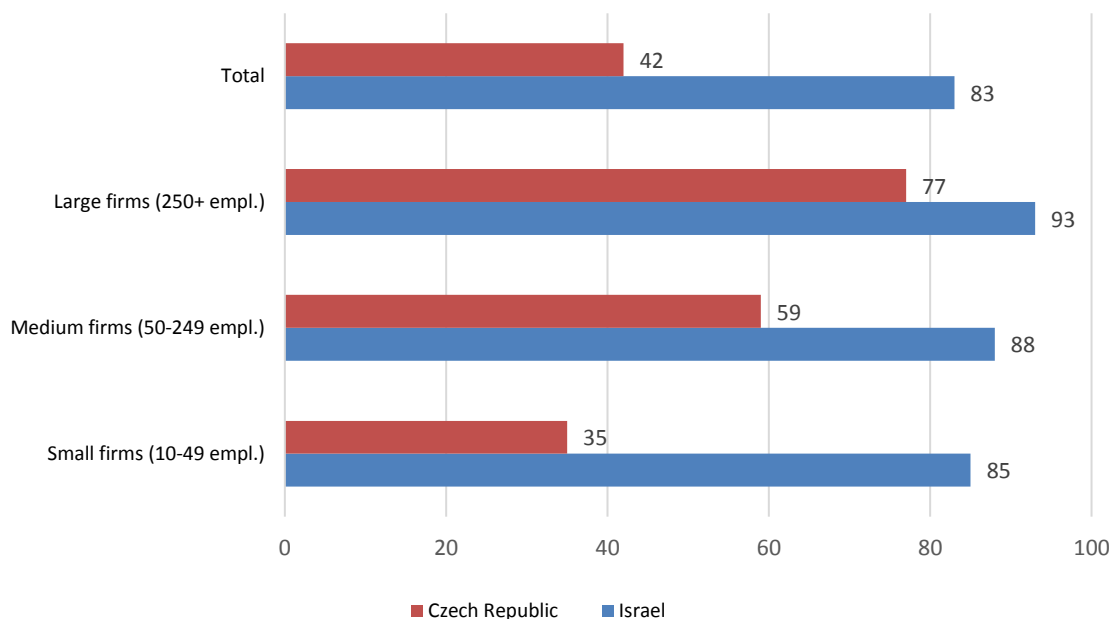
**Fig. 1.** Gross domestic expenditures on R&D, (%), 2000 – 2015. Source: Own elaboration based on OECD (2017).

Figure 2 demonstrates innovation activity by structural expenditures of firms on R&D and compare the Czech Republic and Israel. On figure can be seen that in the segment of services are expenditures in Israel on R&D 71,4 % of total expenditures compared to 38,2 % expenditures in the Czech Republic. Also segment high-tech has a higher representation in Israel - 20,1 % compared to 7,6 % expenditures in the Czech Republic. The Czech Republic has a higher share in non-resource based manufacturing industries which share is equal to 54,7 % compared to 25,6 % in Israel. Important is also information in the segment of SMEs, where expenditures in Israel are equal to 60,1 % compared to 45,7 % share in the Czech Republic.



**Fig. 2.** Comparison of structural expenditures of firms on R&D in Czech Republic and Israel. Source: Own elaboration based on Czech Statistical Bureau, Bureau of Statistics Israel (2017).

Figure 3 illustrates combination of data from Czech Statistical Bureau and Central Bureau of Statistics Israel. This comparison demonstrates innovation activity by the size of entrepreneurs in both analysed countries. Comparison suggests us almost double innovation activity in Israel - 83 % firms with some kind of innovation activity in Israel and 35 % innovative firms in the Czech Republic. In the segment of large firms the difference is not as significant - 77% of large firms innovate in the Czech Republic compared to 83 % of large firms which innovate in Israel. One of the reasons of the considerable difference is more stable baseline of material, financial and human resources by large firms for innovation purposes. In the segment of medium firms is difference 59 % in the Czech Republic compared to 88 % in Israel. The greatest difference is in segment of small entrepreneurs where in Israel innovate 85 % from total amount of entrepreneurs in the segment and in the Czech Republic only 35 %. One of the main reasons behind those results is stable state support of new entrepreneur's projects, start-up incubators, material and financial subsidies followed strong support of private sphere. In the Czech Republic was innovation support negatively influenced by the financial crisis, when companies reduced their investments to innovative solutions especially to non-technical innovations and solutions.

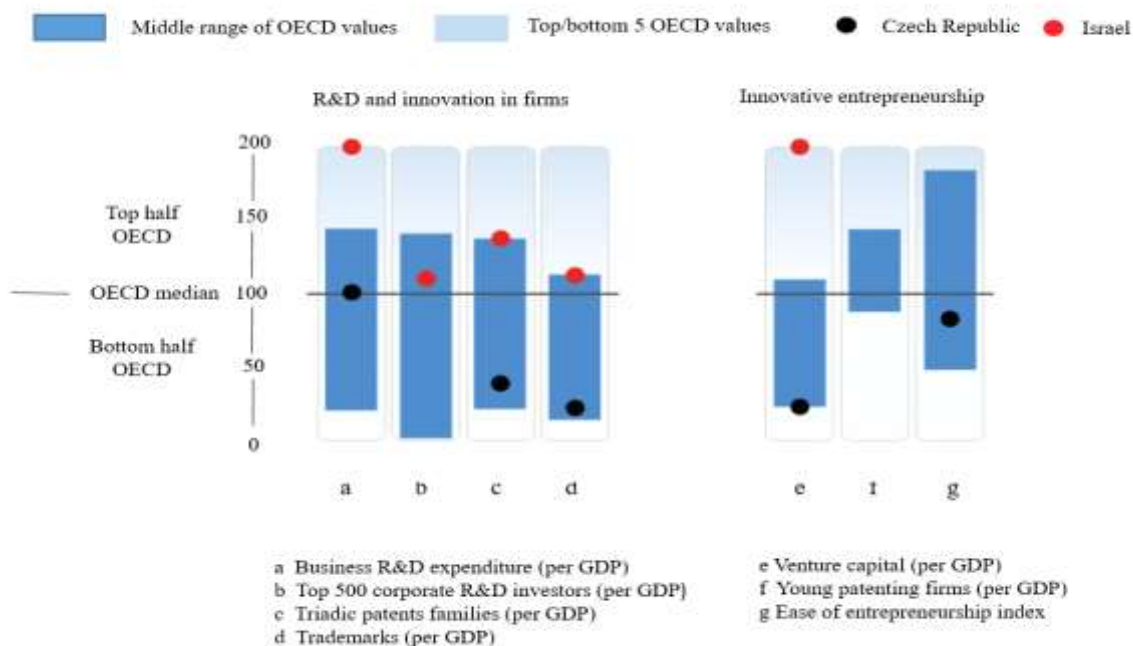


**Fig. 3.** Comparison of innovation activity Czech Republic vs. Israel, 2012-2014. Source: Own elaboration based on Czech Statistical Bureau, Bureau of Statistics Israel (2017).

Figure 4 shows the comparison of chosen criteria innovation system the Czech Republic and Israel. The comparison is based on data from databases of OECD, Czech Statistical Bureau and Central Bureau Statistics of Israel. Bottom and top is represented by lowest/highest 5 values and figure are divided by its median on the bottom half and upper half.

The left part of figure 12 is devoted to companies' innovations and R&D. Column (a) compares R&D expenditure which was already described above. Column (c) indicate a difference in a number of registered patents which are marked as triadic. Among triadic patents belongs patents that are registered by European Patent Office (EPO), the United States Patent and Trademark Office (USPTO) and the Japan Patent Office (JPO) [3]. It's obvious that Israel with value 3,5 registered patents per 1 bio. USD belongs among upper half countries in contrast to placed Czech Republic in the bottom half of OECD countries with value 0,14 registered patents per 1 bio. USD. The similar is relevant for column (d) where the compared number of registered trademarks is. Israel reach the value of 1,33 registered trademarks per 1 bio. USD opposite to the Czech Republic with 0,24 registered trademarks per 1 bio. USD.

In the right part of the figure are data corresponding to entrepreneur's innovations. Column (e) shows the amount of risk capital invested to start-ups. In this area has Israel in the long-term the highest rate of risk capital with 0,38 % GDP. Czech Republic with value of 0,006 % GDP belongs to OECD countries with the low volume of risk capital and lack of investors willing to support high-risk projects. Column (g) represent the index of entrepreneurs' environment. In this respect the Czech Republic brings better results. In scale of 0 – 6 where 0 stands for strong entrepreneurs barriers and 6 for low, reach Czech Republic – 4,18 and Israel 3,5.



**Fig. 4.** Comparison of national innovation systems Czech Republic vs. Israel – 2014. Source: Own elaboration based on OECD (2017).

## CONCLUSIONS

Information and communication technologies are an instrument that can bring new effective ways and solutions to the economy and social environment. Their support on a national level by a maintenance of correct business atmosphere with the proper legal environment, supporting public research and development, subsidizing of new entrepreneurs ideas and start-ups is a proper way how to create and increase national wealth.

ICT is a resource of economic growth on side of demand and side of supply. Is it necessary to distinguish which site is preferable to support by the government. The Czech Republic strongly supported individual ICT producers of hardware components resulting to be 9<sup>th</sup> biggest ICT exporter in the world. Unfortunately, this counts only assembling imported parts which results low added value of manufacturing and offering low-income jobs. By looking to the close history we can see slightly better support be increasing state expenditure on R&D although still below the average of OECD countries and far below the top technology and innovative countries as Israel is. It is very questionable why in the Czech Republic in the period of the financial crisis where expenditures on R&D growing but recently in the overall world economic prosperity are expenditures constant moreover slightly decreasing. Low expenditures on R&D, tiny support of small entrepreneurs and innovative start-ups with increasing administrative burden is the reason why results in comparison of innovation activity in the Czech Republic are far behind results from Israel.

The Czech Republic can improve economic growth instead of supporting a new investment of companies producing low added value goods supporting by different types of subsidies public R&D and new innovative start-ups to become the high-tech country. As a country for comparison was chosen Israel which is an innovative leader in high-tech ICT industry, growing correct business environment by rising up start-ups and supporting them what generally makes country economically strong with a



modern economy and business structure. Although we also demonstrated there are some areas which needs to be improved or which are specific and related to the geographical and geopolitical situation.

## Acknowledgements

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# **ANALYZING AND SCALING EFFECTIVITY OF SOURCES IN LARGE DATABASE SYSTEM IN E-COMMERCE ORGANIZATION: CASE STUDY**

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## **ABSTRACT**

*Standards and norms help us in the complexity and quality of delivered services across systems. Increased demands on ICT facilities enable organisations to use data in a further decision to higher results with a lower risk of failure.*

*With this approach, the company achieves higher labour productivity, improves processes and constantly evaluates and continuously improves service delivery and quality.*

*A reward of this is the ability of an organisation to better plan and scale resources. These results raise in long-term better results. Increasing production/quality of service also allows you to reduce operating costs per unit of work.*

*The organisations are know-how owners at the expense of individuals. Investors and owners have a better insight into the company, and management allows processes and standards to respond quickly to market changes in the environment. Perform Quick Business State Audit, etc.*

*The company that uses data for decision-making is better placed to react properly and quickly to the necessary changes in the organisation. The potential is offered of synergies that are hidden in individual segments or verticals. This makes it possible to multiply the benefits of partial decisions.*

*Standards and standards are key to the growth of an organisation while maintaining efficiency and flexibility. In our case, it was a separate vertical in a large company. An organisation unit itself is responsible for an SMB company. We set up internal processes, introduced standards, defined standards, and based on them we continually evaluated team results during data have driven.*

*The changes introduced a 300% increase in performance, a 12% database extension, and a 12% revision of the existing database.*

## **KEYWORDS**

*data mining, ITIL, COBIT, service management, lifecycle management, standard, process management, human sources, operation and strategy management, increase sources effectivity, data-driven,*

## **SUMMARY OF THE METHODS**

The main purpose of the theoretical part of the thesis was to acquaint the user with the basic aspects of ITIL, COBIT and ISO 9000 and 9001 standards. Normative requirements are using for effective work regarding overarching processes in the management and resources organisation.

Motivation: a review of efficiency using of current resources in the company, assistance in case of key decisions in the area of ICT, weak spots identification and their improvement. This work shows the possible offer for customer and organisations. Reflects the need to innovate, as well as the need to increase the added value of ICT and generate cash flow.

The result is not only to present a simple deployment of ITIL and COBIT in companies' unit but also to highlight the benefits that they have and the nature of the organisation, systematic and economical at the same time. Especially the last point may help to increase competitiveness as suppliers of services will increase service quality and services.

For reasons of practicality, the process of analysis is implemented according to the two companies.

## **SUMMARY OF THE THEME**

We manage a large information database (DB) with products. The database is available to thousands of e-shop clients and hundreds of thousands of users who help with everyday purchases and quality products.

Known weaknesses in the database were insufficient products that affected all activities, especially maintenance and development. Maintenance was very difficult with a small team and old ICT tools. There were no uniform processes, procedures and standards.

Technological debt has only deepened these problems. These major factors prevent sustainable productivity growth and service development. Database administrators have not been sufficiently integrated into financial solutions for priorities and processes. There is no commercial view of the data here, which led to the resignation of some customers. Missing tools for system monitoring and database status evaluation.

The Company's management plan to increase the competitiveness of the product and extend the benefits to the user. It was a turning point. A key role in this transformation is played by the database part of the service. It is the key to success the whole product. The aim was to overcome the shortcomings described above with the help of a completely new approach.

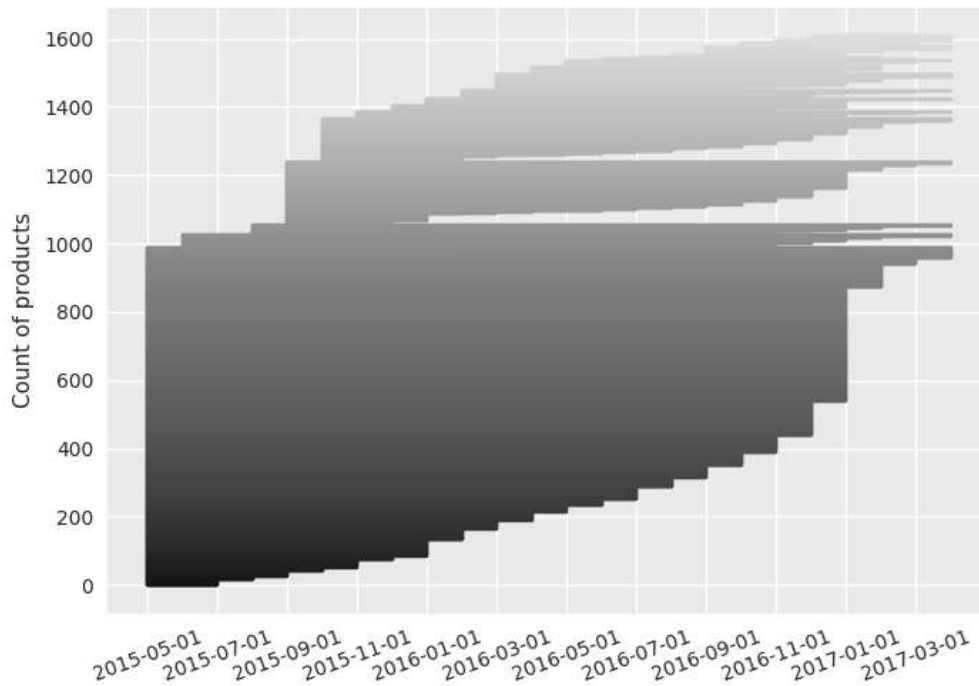
To improve the database and foster it, it was necessary to increase the number of administrators who are in charge of this activity, to introduce monitoring and standards that would allow not only the quality but also the development of the database. These visions meant simultaneously concentrating development capacities on tool enhancements.

Improving the database and extension mean an increase the number of administrators. At the same time, standards and quality monitoring were introduced. The normalisation of the work was gradual, and we optimised the processes at the same time. Everything is done for the sustainable development of the database. These visions also mean concentrating development capacities on tool enhancements.

The goal of the strategic changes was to increase the number of customers by improving and making the information in the database more attractive. Improving and developing business relationships is based on the quality of the service, which is essentially dependent on quality information. In figures, the initial plan was to have a quality of 350,000 <sup>1</sup> out of a total 1,300,000 within 12 months.

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<sup>1</sup>information blocks describing a particular structure (human, object, goods, category, etc.; IB). Each such block has a different role, function, method of monetisation, and processing difficulty. In our case, this is a block of



**Figure 1:** The figure shows the IB status histogram in one of the product categories.

- The colour indicates the age of the product over time (the darker = the older).
- Jumps for different periods show single-shot fix it with bulk data import. This method has been dropped, and now all emerging products are under the control of database administrators. There is shown in the light grey a part of the histogram, where a much healthier increase in data is recognisable.
- Some older users are still searching for some of the older data; however 90% of the information is not older than two years.

## A PREREQUISITE FOR CHANGE

The main prerequisite for changes is an identification of problems and their description. In our case, we had to start measuring activities, evaluating and simultaneously exploring existing processes. Subsequently, we have improved our processes in line with expectations of increased performance that we continually measure and evaluate. Normative requirements are used for effective work, which is to cover processes in organisation and management and resources.

We monitor the efficiency of using existing human resources, focusing on business priorities. Quality tools here are key to scaling up, identifying risks and preventing them.

We have begun gradually to change process settings and informal standards. The aim was to increase the competitiveness of the whole product. It also includes regular communication with clients.

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"goods". We mention IB, which accounts for 97 % of database administrators work, and the same volume of revenue they generate

## **TOOLS**

Current information management tools in the database suffered from inadequate maintenance. Over three months, more than 31 requests for bug fixes and functionality enhancements have been mapped. The solution has ruined the process acceleration and quality improvement.

It was also a great moral aspect for administrators when the basic malfunctions of the system were resolved for several years. We have reduced the error rate and the unsystematic work. We have improved our routine work, accelerated and documented in the knowledge base. We continue to develop these documents in line with the development of tools and processes.

## **PROCESSES AND PEOPLE**

People, tools and processes are the basis of the company. Informal processes and lack of standardisation and the absence of a knowledge base resulted in a lower degree of specialisation of database administrators. The main benefits of implementing standards and formal procedures are to protect the company's know-how, better coverage of information and even distribution among all team members. The target state is as follows: versioned documents are regularly updated in line with the development of the project and have their responsible manager.

Each team member knows his role, powers, responsibilities and knows whom to contact. Product managers are fully open to innovation that comes from teams and gives them full support. Improving data quality, retaining knowledge, developing tools, and conceiving long-term development of the entire database would not be possible without mapping, setup and measurement. (Mojžiš Petr, 2013, page 29-36)

The result of intense leadership was the formal definition of problems, the design of solutions, the choice of solutions concerning the speed of benefits and the long-term strategy focused on quality. Accompanied by lower instantaneous performance growth. At the same time, documentation of tools, processes and roles was created. An integral part of systems is a flow that contributes to systematic work in line with corporate priorities and standards.

After setting the criteria and goals, we had a clear direction for process change, and we could choose the best solution. (Mojžiš Petr, 2013, page 32)

## **ON THE START**

An important milestone was the mapping of workloads and agendas, tools, shaping up to now unconscious working processes. At the same time, the project has been finalised introducing logging, which itself charted ca 70 types of interactions that database administrators perform over 12 types of CA IB. This logging is accompanied by the 14 related processes.

Labor standards, knowledge base maintenance is not captured at this moment. Processes are informal. At the same time, we have mapped about 30 malfunctions of the database administration application. Reorganizing people and recruiting means that we have two more people available (32). Activity logging over the database in conjunction with basic reporting of people's activities has allowed us to make gradual process changes. Another benefit is a using of collected data for machine learning. Prioritisation of work is in line with business priorities.

## **6 MONTHS LATER**

Evaluate the first iteration of changes, new tools and system features that will allow for further growth. Implementing processes and standards that will continue to reduce performance gaps have helped to plan capacity and identify bottlenecks. Actual performance is therefore sufficient to meet the targets set for 2017. The goal was to establish and revise 350,000 IB.

Our ambitions are much higher, with a gross figure of around 450,000 IBs. There is a strong dependence on the implementation of new features by our development department. The current benefits of the introduced changes are fully in line with the company's expectations. There are other synergies that we plan to take full advantage of by the end of the year to maximise benefits for our clients.

## 12 MONTHS LATER

Throughout the year, we managed to meet all of the targets. With two more people, we currently serve 16× more work than before running any changes.

With the support of new features in existing tools and ongoing internal process improvements, we can increase performance by 1.5 – 2×, so we will be able to carry out up to 32× more work with the same number of people. We are financially talking about the tens of millions of crowns in turnover that we bring to our company.

We formalised processes, defined roles, summarised people's know-how. Everything is now concentrated in one shared place in regularly maintained documents. The main documents include the administration interface manual, the content and priority of database administrators work, standards, and database work standards. Processes are more transparent and have clear business priorities that are directly reflected in the job descriptions and evaluations of database administrators.

We continue to improve the tools that are a necessary condition for the whole project. E-commerce technologies are key to the success of the entire product. Information databases play a key role every day. Today, we are talking not only about processing textual information, but also image data, adding and enriching data from external sources, or data mining, which enables us to double the information we have gained and to add even more added value to our customers.

The collection and storage of data that is needed for data mining is a separate chapter outside the scope of the article (author's note).

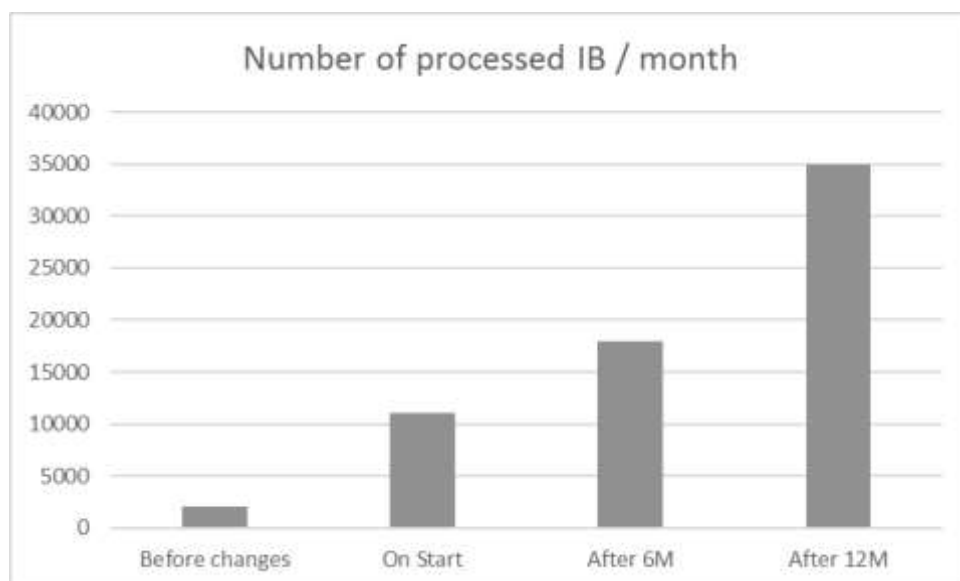
## SUMMARY

In 12 months, the changes had to bring a quality status to 350,000 IBs. The expected sales growth and simultaneously increase customer satisfaction. This goal has been overcome.

By the end of this year, we will be able to overcome this goal to be around 500-650.000 IBs. For the next 12 months, we have the ambition not only to maintain but also to multiply this speed, which in reality means benefits at the level of tens of millions crowns in turnover per year.

It should be noted that these changes would not be viable without the initial support of the top management of the company, which gave us these mandates and all the necessary means.

As can be seen from the chart below, the main difference before the change and the "start" position was the team's staff expansion to double and team organisation. The step-by-step introduction of processes, standards, and first tool enhancements is illustrated by the column "After 6M", where implementation of new tools and further process optimisation has taken place. In the column "After 12M", we see the current status of most changes which have been made.



**Figure 2:** Number of processed IB / month for individual period

## CONCLUSION

Through the processes, we set the initial growth, which we subsequently supported through the new functions of the database administration system and further increased the performance per unit of work. Also, based on collected data, we evaluated the benefits and further optimised processes.

At this time, ICT will continue to help us keep productivity growth per unit of work through technology. With the promise of implementation of other technologies, we will be able to maintain this pace and so completely change one of the leading Czech e-commerce services. However, an integral part must be to take into account the business priorities, standards and processes that are a key and integral part of ICT in the 21st century.

The technologies that help us on the backend are very important, but our ICT improves user-functionalities such as search, data delivery speed, API expansion, etc.

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# DESIGN AND REALIZATION OF THE WIRELESS CONNECTION IN INTERNATIONAL COACH TRANSPORT

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## **ABSTRACT**

*The main goal of the presented project was to design and realize a solution for wireless connection in international coach transport. It was necessary to find the solution, which can provide mobile data connection in different countries and share this connection by Wi-Fi to passengers. Thanks to design and pilot testing the suitable hardware and specific configuration were used in international coach transport on a journey from the Czech Republic to Croatia. Configuration and whole solution are possible to change for different routes. It depends on the requirements and the company. A device which was selected for the internet connection uses LTE and 3G technology depending on location and mobile signal coverage. These technologies support sufficient speed and quality of connectivity. In general, quality of mobile connectivity depends on mobile signal coverage. LTE technology is now the fastest and state-of-the-art technology for mobile connection. Mobile networks with LTE are still growing and innovating, so the LTE coverage is wider.*

## **KEY WORDS**

*WiFi, mobile data connection, coach transport,*

## **INTRODUCTION**

A wireless data connection has become like a standard service in coach transport. In international bus transport or public transport passengers ask for the wireless connection for satisfying their work or relaxation demands. Especially in the international bus or train transport, a providing of the wireless connection is closely related to some specific difficulties. Typically, the most important one is how to guarantee high quality and high-speed connection in one way and different countries.

The aim of the presented project was to design and realize a wireless connection in international coach transport and to evaluate the solution in real conditions. The main requirements of the project were the cost of the solution, the quality and the reliability of the connection and the simplicity of the hardware.

## **METHODS**

In the beginning, it was necessary to set up requirements for the whole solution. Some of them are from the previous solution which was working only in the Czech Republic. New requirements were consulted with the coach company. They would like to extend the first solution and provide a wireless connection on their routes to the other countries in Europe. The main requirements were speed, stability and support of two data SIM cards. The main problem was choosing convenient hardware. The solution is based on

industrial router produced by company B+B SmartWorx. The router is supporting two SIM cards slots. Then it is possible to make the solution with different mobile operators or just with two different data SIM cards from the same operator. In general on the bus is an industrial router with two data SIM cards. The router is connected to the internet by a mobile data. Access to the internet is on the bus supported by a wireless connection. A traveller can just use his mobile phone, tablet, etc. and connect to the internet by Wi-Fi. For this type of mobile data SIM cards is necessary to buy the biggest data package. This router supports LTE mobile technology. The router is connected to LTE whenever is it possible and there is a good quality of coverage. In other situations, it is connected to 3G technologies or just to 2G standard. It depends on the coverage of mobile data. So the solution was supported by more SIM cards. Pilot testing was on tour from the Czech Republic to Croatia.

It was necessary to use 4 SIM cards, each from a different country. It was the cheapest way how to do it. Before this test, travel agency did not want to pay too much, so they provided this service only in the Czech Republic and Croatia. But the same function is with more cards, only its necessary to change the router to the European SIM cards. The first version of this solution was before the European Union changed the roaming law. A different situation is now after that changes. This law started the 15th of June 2017. Now it is possible using home tariffs in other countries from the European Union like at home. Now it is easier to make this solution for whole Europe. The actual model is working with 2 SIM cards from the same mobile operator. One of these SIM cards has mobile data tariff which is not included in changes in roaming. This tariff offers bigger data budget than normal mobile data tariffs – 30 GB. This tariff is set on the first SIM card and the router firstly trying connect this one. The second SIM card has normal tariff - 20GB. If it's not possible to connect the first SIM card, you are not in the Czech Republic and automatically it will switch to the second SIM card. After solving these problems, it is possible to use this solution for whole Europe except countries which are not in the European Union. It is very important to take care of it because in different countries are very big fees for foreign connection. For example, there is a problem with Switzerland, when the bus goes from the Czech Republic to French Alps. After some interviews with mobile operator businessmen, there is one solution which can solve this problem. According to their statement, it is possible to block mobile data connection in countries which are not members of the European Union. Problem is still actual so that this option will be tested in the following months.



Figure 1: The visualisation of GPS record of the testing journey from the Czech Republic to Croatia

## RESULTS

Pilot testing was on tour from the Czech Republic to Croatia and back from 16th September to 18th September 2016. Travel agency wanted only internet connection in the Czech Republic and Croatia without Slovenia and Austria. There were fewer options in 2016 because it was necessary to have SIM card from every country they went through. It was the best choice for the lowest cost. The tour started in Czech town Trutnov and during the tour bus stopped in other Czech cities to take more clients. That all started at 12 am, and the bus reached the Czech-Austrian border at 6 pm. By this point, the bus lost the internet connection. The bus reached Croatian border at 12 pm. After that was again online and people can use the connection. The tour finished at 7 am in Croatian – Ploče. During the tour in Croatia bus stopped in other towns where people left to their hotels. Last people from the bus left in Ploče. With the same plan went the bus back to the Czech Republic. During the tour were monitored stability, speed and technology which was used. Technologies were better in Croatia than in the Czech Republic, but it is true that in Croatia it was more on highways than normal roads. Also, the bus had GPS monitoring, so it is possible to see the tour in Figure 1.

Coverage of mobile technologies in every country they went through was also a goal of analysing in this thesis. Emphasis was placed on new mobile data technologies like LTE and 3G. As is it possible to see in Figure 2, in Croatia is appropriate coverage with these technologies. In this thesis is analyse of every country with the current map of coverage.

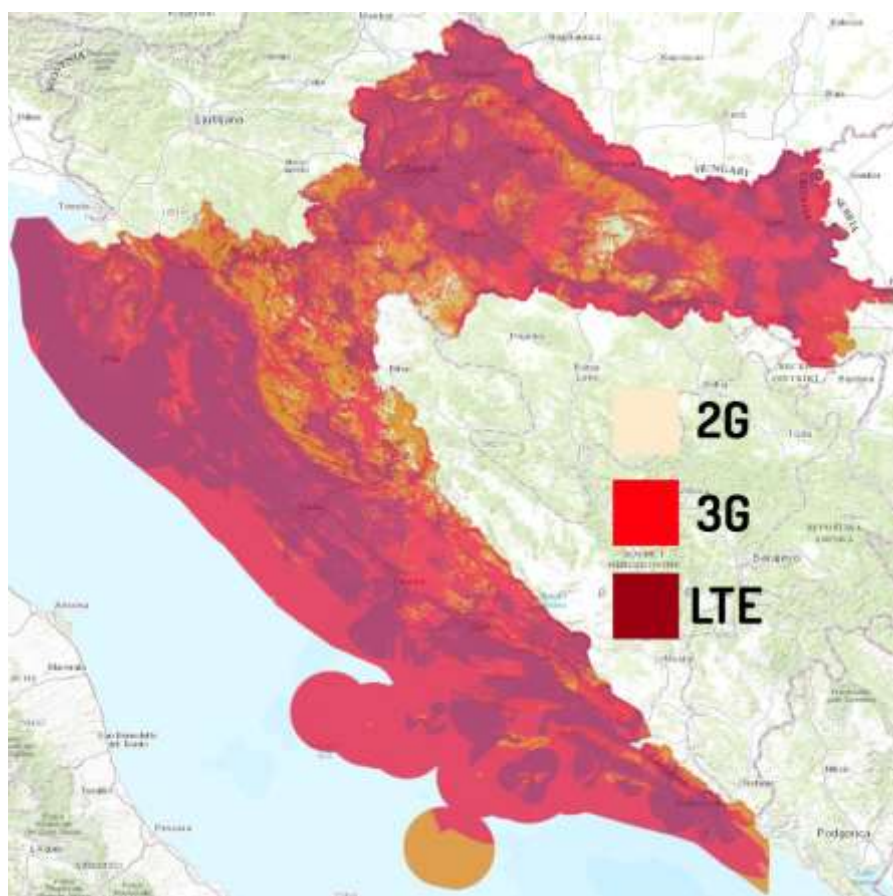


Figure 2: The map of mobile data technologies coverage in Croatia

Test of speed, stability and technology was every 10 minutes. The main reason for this period of testing is mobile data budget. If the router is using LTE connection than it is demanding the mobile data. So it is not possible to make tests, for example, every minute. Mobile data tariff has only 25 GB, and that is only for one month. Total of 55 measurements was made in Croatia. The average speed of download was 15,13 Mbps and upload 6,48 Mbps. Average latency was 60,77 milliseconds. In general, it was 52 % by LTE technology and 40 % by 3G technology in Croatia.

In the Czech Republic it was a little bit better. Average download speed was 21,39 Mbps and upload 7,46 Mbps. Average latency was 30,9 milliseconds. Speeds and latency were better than in Croatia. There was 87 % of LTE technology and 3 % of 3G technologies in the Czech Republic. Of course, it depends on the particular route. There were 59 people, and 31 of them tried to access to the internet by wireless connection during the test. Status of the router was monitored all time during the tour, and there were 31 unique devices. People used 2,1 GB of data in the Czech Republic and 1,9 GB of data in Croatia. Using data also depends on the time when people are travelling. When the bus went to Croatia, fewer people used this service because they were in Croatia during the night and early morning.

## CONCLUSION

It was found the new solution which is appropriate for this using – for wireless internet connection in international coach transport. The final configuration was made after the pilot testing, which was uploaded to every device and now it is possible to access the internet on the whole journey on bus tours. Thanks to changes in rules about roaming in the European Union is now possible to use this solution in every country which is the member of the Union. It is a new standard of travelling by bus in Europe and extra service which don't have every company. The solution provides easy access to the Internet and good service for travellers. Also, technologies are appropriate for the solution. There is used LTE

connection where it is possible. It depends on the coverage of this technology. LTE is future of mobile technologies at least for the next five years. If it is not possible to use LTE, the router is trying to connect via 3G technologies, after that via 2G technologies. Support for LTE is important because when the higher number of travellers want to connect to the internet, we need higher speed for download and upload. Which we can find thanks to LTE, and it is enough for more connected travellers. For Czech companies is a plus that it has a support of Czech language. Of course, there is also support in English. If there is any problem from the producer side, they usually make new firmware which solving the bugs in few months. The whole solution is possible to expand. For example, with GPS monitoring, intranet services like fun portal with movies, series, books, etc. Also, camera system and many other things. But these other services are for another thesis or researches. Future of this solution depends on roaming rules in the European Union and also the modernization of mobile data technologies. When will be ready technology from category 5G or new standard of LTE; it will be possible to use hardware with these modern technologies and speed will be higher. The same problem is with coverage of mobile data technologies. Every year it will be better and better with coverage and solution will be more stable. We will see if it still is standard of transport in future or every traveller will have their own connection without limits.

The general issue from coach company and travel agency was completed, and now there is the solution for them. They are more types of hardware on the market in Europe, but just some of them are price friendly for Czech companies and also east countries. There is a compromise between quality and price. Czech companies are grand with prices of these devices, so it is possible to offer this solution to other partner companies.

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# NEGATIVE IMPACT ON HUMAN HEALTH AND SOCIETY IN THE USE OF ICTs

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## ABSTRACT

*Currently, the Information and Communications Technologies (ICTs) have penetrated into all spheres of human life, becoming an integral part and locomotive of building global information society. The widespread use of information systems in culture and medicine, social sphere, economy, education and transport infrastructure becomes everyday reality. On the basis of modern ICTs have been developed new areas of social, economic and political activities of mankind, striving to the information society. However, ICTs, as well as other widespread today technology trends and despite many positive factors for a creative society and man, can exert a negative impact on the direct user, his health and performance, as a single living being, and as a member of society. In general, this affect has not been studied completely yet and requires a comprehensive system analysis for the identification, classification and development of recommendations and tools for early detection and adopting a set of actions from each of ICTs ecosystem stakeholders. In the article an attempt is made to systematize the elements of possible negative impact process in the use of ICTs starting from the sources to symptoms and disorders of human health. The article contains classification of sources of negative impact factors on human health and society when using ICTs, analysis and classification of harmful and diverse impact factors, such as, physical, chemical, psychophysiological, socio-pathological risky factors, systematization of negative effects such as Internet and ICTs applications' addictions, information dependent diseases, information and psychological disorders, information overload and distortion of information. The article attempts also to form a model of assessing possible negative impact on human health and society in the use of ICTs. Correspondent applied tools and methods are highlighted.*

## Keywords

*information ecology, information and communications technologies, Internet addiction, negative ICTs factors, information dependent disorders, using of ICTs*

## INTRODUCTION

In our days the Information and Communications Technologies (ICTs) have been penetrated into all spheres of human life, becoming an integral part of any public relations. The widespread use of information systems in culture and medicine, social sphere, economy, education and transport infrastructure becomes everyday reality. On the basis of modern ICTs new areas of social, economic and political activities of mankind, striving to the information society, have been developed.

ICTs can be used for a variety of human activities, so they are transforming virtually every sector of society and the economy. Innovations in ICTs create new opportunities to improve human health and nutrition, ease of access to information, to expand knowledge, to stimulate economic growth and citizens' participation in public life. The determinative feature of the ICTs - is the ability to help a person in collecting, processing, storage, retrieval and dissemination of information and knowledge. Management of knowledge has become extremely important in today's global economy, where success often depends on the ability to quickly acquire and effectively use the valuable cumulative information, as well as operational and cost-effective way to transfer it to others.

The World Summit on the Information Society (WSIS), held in two phases in Geneva 2003 and Tunis 2005, followed by WSIS+10 established a clear vision for building an inclusive global information society and using potential of information and communication technologies to achieve the development aspirations of all the world's inhabitants. Recognizing the importance of ICTs as valuable assets for economic growth, world leaders representing governments, civil society, private sector and technical community, expressed their strong political commitment towards building an inclusive, people-centered and development-oriented information society. Reaffirming the importance and high potential of ICTs for all the interested stakeholders the safety and healthy using of ICTs was declared: "Recognizing that ICTs are progressively changing our working practices, the creation of a secure, safe and healthy working environment, appropriate to the utilization of ICTs, respecting all relevant international norms, is fundamental"(ITU, 2003).

However, as well as other widespread today technology trends, despite many positive factors for a creative society and man, ICTs while using by a human being have a negative impact on his health and performance as a single living being, and as a member of society. As our research shows, some of these effects have been studied so far, some are only being discussed. So, in general, the negative factors have been studied yet not completely and require a comprehensive system analysis for the identification, classification and development of recommendations for early detection and adopting a set of actions from each of ICTs ecosystem stakeholders.

## **THE SOURCES OF NEGATIVE IMPACT WHEN USING ICTS**

It is obvious that a person has the highest risk of being exposed to the negative impact of ICTs when he or she is directly confronted with the sources of harmful and hazard factors of ICTs. Our previous research (Ievlev, 2017) allowed highlighting the following sources of negative impact on human health while using ICTs: terminal (end user) equipment; information- communication services; information resources.

Further in the article we will consider each of these sources in terms of content and degree of risky effects on human health, the impact of possible outcomes and recommendations to prevent and minimize the impacts.

## **THE WORK AT COMPUTER**

The most studied and "normalized" source of negative impact factors is work with a computer, which belongs to the category of works related to risky and harmful working conditions. Based on standards of safety work at computer, in particular (State, 1972; State, 1982; World, 1987) we propose the following classification of hazard and harmful factors for human working at computer.

The physical hazard and harmful factors (1) include: increased levels of radiation; static electricity and dust outside the working area; reduced levels in the working area; elevated levels of glare; uneven distribution of brightness in the field of view; high brightness light image; high value of voltage in the electrical circuit, etc. Chemicals harmful and adverse factors (2) include an increased content in workplace air of carbon dioxide, ozone, ammonia, phenol and formaldehyde. Psychophysiological harmful and adverse factors (3) include eye and attention strain; intellectual, emotional and prolonged static loads; labor monotony; a large amount of information processed per unit of time; inappropriate workplace organization.

The mentioned above hazard and harmful factors can lead to negative effects on human health and performance. The review of several related publication, e.g. (Yan, 2008; Ellahi, 2011; Shrivastava, 2012; ICNIRP, 2008) permits us to draw the following conclusions. The list of main computer related health disorders includes muscle and joint diseases, eye diseases and stress. The muscle and joint diseases may be connected with neck torpor, pain in the shoulders, in the loins, etc. However, there can be more hard problems such as the Carpal tunnel syndrome (CTS), which refers to the damage of arm nerves due to the excessive time spent working on the PC, a Mouse Shoulder (MS) and Cervical Pain Syndrome (CPS). The negative effects of computers on our eyes can be referred to as CVS (Computer Vision Syndrome), which includes dryness of the eyes, eyestrain, backache, neck ache, wrist ache, reduced

acuity of vision, distress, reduced capacity of concentration, and so on. Computer related health disorders such as carpal tunnel syndrome, stress, computer vision syndrome and musculoskeletal disorders may occur simultaneously among prolonged computer users such as employees and students.

The "computer addiction" factor could be referred of the negative impact on human health too. The term "computer addiction" defines a pathological addiction of a person to work or spent time at the computer, e.g. (Moscalenco, 2015) . The features of this addiction, as well as addiction to use a mobile phone or various other gadgets, are the following: withdrawal symptoms, the desire to get the object, reduction of a critical attitude to the negative sides of addiction, loss of interest in relation to the social side of life, visage and daily living wants. In this connection, it is proposed to supplement the existing classification by (4) socio-pathological harmful factors.

The impact of negative factors of using computers and other terminal devices has been studied quite completely- there are a number of international, regional and national standards in this field and regulatory requirements for equipment, ergonomics, the environment, recommendations on workplace equipment. Main Russian Federation standards are based on Sanitary rules and norms (SanPiNs) and State standards (GOSTs), e.g., SanPiN 2.2.2 / 2.4.1340-03 "Hygienic requirements for personal computers and the organization of work", GOST "Display tools for individual use. General ergonomic and safety requirements".

The list of other countries' standards includes two groups: the first group contains the EMC and electrical safety requirements (European CE, SEMKO AB, Canada FCC Class B, the Swedish E-2000, the international EPA EnergyStar) and the second group stands for the standards that include the requirements for ergonomics: Swedish MPR-II, the international standard ISO 9241, the German TUV Ergonomie, VESA DDC, TCO. The World Health Organization WHO ( <http://www.who.int/ru/>) identified the study of the biological effect of low-frequency EMF on the display, as one of the priority directions in science. In Germany, work with PC and VDT joined the list of the 40 most hazardous occupations. In the US, EMF problem is recognized as a national.

The other terminal device, the use of which causes global concern is the mobile phone. The mobile phone has a thermal (power) and no thermal (vortex) impact. As a result of heat exposure (more than 10 uW / cm<sup>2</sup>) possible violations of various human organs (clouding of the lens of the eye, violation of the functional parts of the middle ear, etc.) could occur (Site, 2017). The WHO issued the following opinion on the latest mobile and wireless networks: "In view of the very low level of radiation, the assumption that the weak RF signals from base stations and wireless networks can cause serious damage to human health, not scientifically proven" (Site,2016).

## **ICTS SERVICES AND APPLICATIONS**

The second source of potential negative impact is ICTs services and applications, including information and communication services and mobile applications, email, and social networks.

The use of the Internet, computers, mobile phones, smartphones and other electronic devices has dramatically increased over the last decades in all parts of the world. However, this increase is also associated with documented cases of excessive use that warrant consideration. A close to "computer addiction" factor is the Internet addiction. Symptoms of the Internet addiction is a compulsion to check e-mail, chat rooms living, uncontrollable urge to search and search various kinds of information in the network.

Internet addiction is not formally recognized by any organizations worldwide. As a result, no official definition exists. Researchers use a variety of terms to refer to the issue, including Internet Addiction Disorder (IAD) (Cash, 2012), Problematic Internet Use (PIU) (Caplan, 2002), Pathological Internet Use (PIU) (Byan, 2009). Despite the lack of agreement on the label, all of these terms describes the same pattern of behavior, characterized by excessive or poorly controlled preoccupations, urges, or behaviors regarding Internet use that lead to impairment or distress. There are at least three IAD subtypes: excessive gaming-gambling, sexual preoccupations (cybersex), and socializing or social networking, including e-mail and messaging (Weinstein, 2014).



In some cases, people are addicted watching porno and reading porno literature on various sites. This phenomenon could not be called the Internet addiction, if the same people like to read the usual “dirty” magazines and watch porn movies on TV. In this case, the Internet is the only source of information, and the very addiction should be viewed as a violation of sexual behavior or sexual relationship.

A little different is the case related to video games and correspondent addiction. As in the case of visiting pornographic sites, a computer is only the instrument to access the desired information and as itself the work on PC for people suffering gambling does not attract in general.

According to the Center for Internet Addiction (Donald, 2017), Internet addiction affects as many as one in eight Americans. People in some Asian countries such as China and Korea may have even higher rates of problematic Internet usage than their U.S. counterparts, with as much as 30 percent of the population addicted. Gender also matters, with many more males being addicted than females. Cybersex and cyberporn are the most common types of Internet addiction.

The World Health Organization (WHO) is planning to recognize Internet addiction as a mental disorder. A new International Classification of Diseases (ICD-11) is preparing now to be published in 2018, which should enable this issue. As soon as the Internet addiction is included into official list of diseases it can be treated by doctors with drugs and psychotherapy. According to psychologists, the same diagnosis could be diagnosed to taking selfies, online games, SMS and social networks addicted people.

## **INFORMATION RESOURCES**

The third negative impact source stands for information resources (information). The analysis of open sources showed that today there is no any sufficiently substantiated and detailed classification of the impact of information on the person. This is due to the novelty and complexity of this issue, as well as to the fact that the classification procedure itself and its result depend on the tasks that need to be addressed, and on the elected bases and criteria used in the classification.

An increased demand of person for information and information technologies gives rise to many issues. On the one hand, the everyday information flow, which falls on the person, is so great, that it is hard to handle it in time. On the other - the habit of living in information environment creates a need for obtaining information constantly, so the “information addiction” appears.

Now we are not speaking on the Internet addiction, when a person feels the need to be always online but on addiction to be the information consumer in general. The form could be various - paper, electronic, audio or video (although it should be noted that this behavior arose in the Internet age with its huge flows of information).

The rapid growth in the use of ICT in society has marked certain trends that may be related to the information, as a risk factor: an increase in the incidence of mental disorders, neuroses, cardiovascular disease, increase in the number of suicides, the highest share in the structure of mortality information-dependent causes (Parakhovsky, 2016).

The observed increase in morbidity and disability due to mental illness - directly and the increase the incidence of blood circulatory system diseases, increased mortality and a high proportion in the structure of mortality information-dependent reasons - indirectly, may be associated with unfavorable information environment in a country, region and the world and evidence the negative impact of information on human health and society in general.

The WHO predicts (RG, 2017) that by 2020, mental illness will come in first place in the structure of morbidity, ahead of cardiovascular disease. According to the WHO statistics, the every 4-5<sup>th</sup> inhabitant of the planet currently suffers from mental illness. By 2020, the situation threatens to get worse: every 3<sup>rd</sup> person to be sick. Of course, we are not talking about serious mental illness, but the proportion of soft forms and the border states will increase significantly. By 2020, the depression will be released as the second leading cause of disability and death. Now the disease is on the first place by number of days of disability.

The International Classification of Diseases, the 10th revision, ICD-10 (<http://mkb-10.com/>) defined nosological entities that have an etiological relationship with the influence of information: mental and behavioral disorders (F class, F00- F99), acute stress reaction (F43), a reaction to severe stress and adjustment disorder (F43.0), post-traumatic stress disorder (F43.1), depressive episodes (F32), recurrent depressive disorder (F33); gambling - pathological attraction to gambling, computer games, may be similar to the conduct disorder, addictive behavior, including Internet-dependence (F63.0), etc.; factors influencing the health status and contact with health services (Class XXI, Z00- Z99); potential health hazards related to socioeconomic and psychosocial circumstances (Z55-Z65), problems related to work and unemployment (Z56) , the threat of losing a job (Z56.2), a busy schedule (Z56.3), conflict with boss and co-workers (Z56.4), improper operation (Z56.5), other physical and mental stress at work (Z56.6).

In addition, according to the Information theory of emotions by P.V. Simonov (Simonov, 2009) and Concept of stress of H. Selye (PSYERA, 2016) socially relevant information leads to the development of emotional stress and its consequences in the form of diseases: cardiovascular (ischemic heart disease, atherosclerosis, heart attacks, strokes, etc.), digestive system (stomach ulcer) , immune system, cancer diseases, mental illness, increased levels of accidents and suicides (this applies to classes II, IV, V, VI, VII, VIII of ICD-10).

Other forms of information negative impact of human and society are the information and psychological effects and distortion of information (disinformation).

Information and psychological activities of various groups and associations of people, in particular, some political parties, political movements, nationalist and religious organizations, financial and economic and commercial structures, lobbying and mafia groups, etc. could be a harmful for a person. Their activity becomes dangerous, when in order to achieve their goals, they begin to use various kinds of information and means of psychological influence, thereby changing the behavior of people in a way that causes damage to their own interests.

If the information has undergone modifications carried out for destructive purposes, such information is defined as a distorted or disinformation (Slovochel, 2017). Thus, the distorted information is a destructive kind of socially significant information, distorting the adequacy of political reality.

The last form of information negative impact group in our classification is “information overload”. Here we are dealing with the volume of user information rather than the content. Businessdictionary.com defines information overload as the “stress induced by reception of more information than is necessary to make a decision (or that can be understood and digested in the time available) and by attempts to deal with it with outdated time management practices”. Information overload “places knowledge workers and managers worldwide in a chronic state of mental overload. It exacts a massive toll on employee productivity and causes significant personal harm, while organizations ultimately pay the price with extensive financial loss” (Zeldes, 2007). Hundreds of thousands of hours are lost in a typical organization—up to 25% of a workday—just from workers’ attempts to cope with the flood of information (Spira, 2011).

## **ASSESSING MODEL**

Let us consider a model for assessing the probable negative impact on human health and society in the use of ICTs (Fig.1).

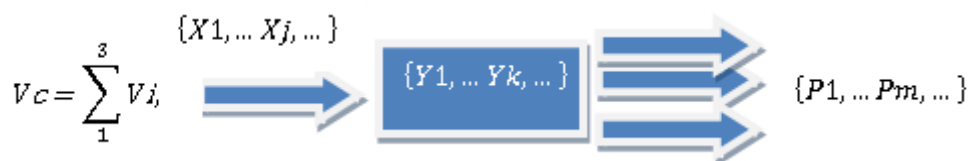
The cumulative flow on the input of the model corresponds to the negative impacts in the use of ICTs discussed above, and namely, arising from:

1. The terminal ICT equipment, including computers, mobile phones, tablets, routers and repeaters of radio access (Wi-Fi) and peripherals (printers, scanners), etc.;
2. ICT services and applications, including information and communication services and mobile applications, e-mail, social networking, etc.;
3. Information resources (information).

The total flow of negative factors:  $V_C = \sum_1^3 V_i$ , where  $i$  - the type of source of exposure. Each type of exposure is characterized by parameters  $V_i = \{X_1, \dots, X_j, \dots\}$ , such as focus, intensity, duration. The parameter values we will define as discrete, for example, using the following values: acceptable, dangerous, marginal permitted or minor, medium, high, etc.

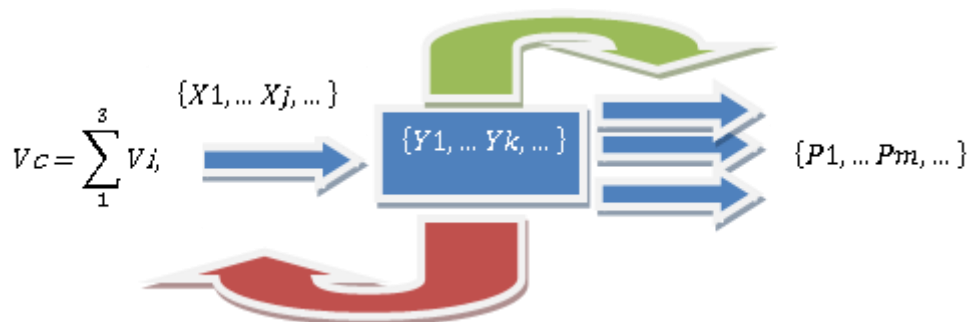
The total negative effects flow is directed to the person who is characterized by a set of conditions  $S_C = \{Y_1, \dots, Y_k, \dots\}$ , such as age, occupation, education, income, marital status, living conditions, health status, etc.

At the output of the model- predicted effects on human being  $\{P_1, \dots, P_m, \dots\}$  such as fatigue, psychiatric disorders, vision deterioration, etc.



**Figure 1.** Model for assessing the negative impact on human being in the use of ICTs

This model could be more complicated if we consider the state of a group of people, society and other ICTs ecosystem stakeholders, which involves the interaction between them to achieve the common aim- prophylaxis and preventing the effect of negative impact, for example through the development of standards, recommendations, the restrictive measures at the state level (governments) . In addition, the model can include measures to mitigate or eliminate the consequences of actions by, for example, physical therapy, procedures, psychological care, and medical treatment (Fig.2).



**Figure 2.** Model for assessing the negative impact on human being and society in the use of ICTs

It is clear that further formal description of the model, as well as obtaining simulation results is a difficult task. The solution requires the involvement of various methods and tools of mathematical, simulation apparatus.

The analysis of open sources, e.g. (Institute, 2017; Electronic, 2017), allowed identifying the following applied tools:

1. System analysis of human information perception processes in order to create at least a simplified mathematical, algorithmic, computer models of perception. There can be used a variety of approaches, which tested in the sphere of applied mathematics, probability theory and mechanics.
2. At the initial stage of the investigation it may have to use a variety of identification experiments, specialized laboratory facilities, applicable psychophysiological methods and sociological studies.
3. With the help of psychological tests and scales, techniques, fixing vegetative-vascular reactions to emotionally significant information exposure, using neuroimaging techniques (positron emission tomography, EEG mapping) it can be developed an acceptable and unacceptable qualitative and quantitative parameters of information effects in terms of the impact on the mental health.

4. To solve the problems of information ecology, especially in the field of research, it is recommended to use techniques such as timing (including self-observation), methods of expert assessments, interviews and surveys (including an assessment of the quality of life). As part of the laboratory experiment, with the participation of volunteers it is possible to use more complex neurophysiological research.

5. Main methods of assessing the impact of the environment on human health: clinical epidemiology methods, statistical data analysis and Data Mining. The basis of the Data Mining techniques makes all sorts of classification methods, modeling and prediction, based on the use of decision trees, artificial neural networks, genetic algorithms, evolutionary programming, associative memory and fuzzy logic.

## CONCLUSION

The building of Global information society is directly connected with ICTs full- scaled employment and development. However, together with indisputable benefits to human being and society, the direct usage of ICTs can bring negative impact on the end user, which finally can result in serious physical and mental disorders in human health and performance. The process of probable negative exposing of human in the use of ICTs requires detailed system analysis and comprehensive study for timely detection, prevention and therapy. In the article we made an attempt to systematize the elements of the process on the levels of (i) sources of negative impact, (ii) symptoms and (iii) disorders of human health. The elements of the levels are interconnected by cause- and- effect relations. We proposed the classification of sources of possible negative impact in the use of ICTs as terminal (end user) equipment; information-communication services; information resources and represented the classification of hazard and harmful negative factors in the use of PC. Then we systematized the forms, symptoms and disorders generated by every “negative” source. The proposed systematization could be used as a base for further expanding and development. Finally we proposed the model for assessment the possible negative impact on the ICTs end user as a human being and as a member of society and then we highlighted the correspondent applied methods tools for practical assessment.

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# Use of biometrics in banking and presentation of these products via social networks

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## Keywords

*Biometrics, Digital environment, Social media, banking*

## Abstract

*Current trends in marketing communication are offering more and more options and opportunities to manage customer relationships so that individual campaigns and other methods of marketing communication will become most effective and acceptable for customers. The paper is mainly focused on monitoring the possibility of customer relationship management in the digital environment, together with the possibilities of presentation new safety modern communication with bans. Digital technologies and digital marketing bring a combination of more benefits and factors that together can present information about the product, brand or service more effectively and comprehensively. The paper refers to the growing profitability of social media (focusing on Facebook) in presentation products in the Slovak internet banks products.*

## INTRODUCTION

Technology development, on the one hand, offers service improvements and increases the convenience for users of different applications and products that the virtual and digital world offers us and the possibilities of today's technology. On the one hand, all these facts enable a person to improve their quality and "increase communication comfort, but there is an increased risk of identity or access data being stolen. Therefore, application technology companies also need to increase security and enhance the identity of the client and their originality when offering services. It started with the assignment of different numeric codes or by creating a grid card and now the most currently used code sent via SMS.

Further technology development and mobile phone development has enabled technology to implement devices such as a fingerprint reader. In true key combination, the fingerprint reader also includes a means for controlling mobile and mobile devices and individual features. This application also enables password consolidation using the most powerful and state-of-the-art AES-256 encryption algorithm. (<https://www.truekey.com/sk>)

Likewise, this application scans the face scanner in the client identifier of the technology, identifying the client and logging it into all its programs or applications.

The real question is where this development of human identification will be directed.

Another possible dough is wearing "wearables" or combining mobile client identification with a mobile phone. (Skyba, 2017)

*All these paths are the means by which the consumption of services through digital marketing is created.*

Digital marketing (or online marketing, internet marketing, or web marketing) means "a set of marketing activities in the Internet (online)" (BESTPRACTICE, 2017). In a simple way, it could be say that digital marketing represents marketing activities realized through internet and mobile communications, i.e., on the internet, through social networks, email, apps, platforms, and more (Kannan & Li, 2017).

Digital marketing is currently covering a professional term that describes the entire process of using digital technologies to acquire customers and build customer preferences, brand support, customer retention, and sales growth (Smutný, Rezníček, & Pavlíček, 2013). However, digital marketing goes beyond internet marketing and also includes channels that do not require internet usage (mobile phones - SMS and MMS, display advertising, social media marketing, search engine marketing,...).

Progress in this area also requires progress in the development of mobile technology and hardware.

Windows in September and Samsung in October 2017 have patented a similar technology of fingerprint reading through the mobile screen. (<https://www.windowscentrum.sk/samsung-si-dal-patentovat-skener-odtlackov-prstov-priamo-v-displeji-tak-skoro-sa-vsak-tejto-technologie-nedockame/>)

In 2016, 1,893 were sold around the world, and sales are expected to reach 1,882 in 2017, assuming that in 2018 there will be an increase of 1,926 and between 2019 and 1,932 billion phones. (Gartner, 2017)

These new owners of new phones are potential clients and users of new technologies that will be signed by clients via fingerprinting or face identification.

Peter Kapitán, in his interview with the Economic Newspaper, said the prints were no longer modern, and technology shifted to the realm of biometry of the face or the identification of the voice. (Kapitán, 2017)

Banking companies, as one of the sectors that use the biometric identification of a client, are trying to combine these advanced technologies with the traditional forms of their product sales in order to increase the security of the services provided. VISA announced the introduction of a new payment card product with a fingerprint reader, which will be used instead of a PIN verification code for payments. (Engadget, 2017)

## METHODOLOGY

Visa surveys show that up to three quarters of so-called "Z" (people between the ages of 16 and 24) would welcome the possibility of payments using biometric features that they consider safer than their standard identifiers. "In the future, biometrics can be more or less paid anywhere, and biometric sensors can be expected to become a standard part of all new smart devices," (Gajdoš, 2017) These surveys were made worldwide by the company.

The specificity of the Z generation is that it is the first global generation that is technologically advanced and uses the global Internet space as the most used medium for sharing and, at the same time, the most widely used source of information. (Sujansky, Ferri-Reed, 2009)

The basis of our research will be to find out if the generation Z in Slovakia will also be addressing this issue.

Another exploration will be to investigate the means that respondents will recognize when using biometric data.

## RESULTS AND DISCUSION

By processing of results, the author assumed that all of these online marketing parameters are equally important for realisation of sales support. The results shown in Table 2 were obtained by conducting a survey among students (daily form students) of the 1st year of Master's study at the Management

Department of Educational Faculty (Catholic University in Ružomberok) in Poprad and student of Gymnázium Štefana Mišíka v Spišskej Novej Vsi. The respondents were acquainted with the evaluation criteria, which they subsequently evaluated at selected online bookstores in the January 2017. Information was obtained from 90 students (respondents) during the course of marketing communication. Each of the criteria could be rated on a scale of 0-5, where 0 was the worst rating, on the other hand the 5 best rating for that criterion.

Subjective view of the individual attributes students assessed after visiting the official web side banks in Slovakia. They were looking for profiles of selected internet on the Facebook social network. At the same time, however, they also expressed their opinion of own experience. By evaluating profiles in terms of users, respondents rated available information as the number of "likes" and the number of people who talked about it. Subsequently, they presented a subjective view of selected attributes such as profile appearance, way of communication with customers, the number and content of videos, content for customers, product and services, additional services and customer information.

The obtained variables were analyzed. The table shows the results of the analysis of selected internet bookshops together with the rating (overall average) of monitored criteria.

Online Bank	Attributes (Facebook)										
	Number of "likes"	Talking about	Communication with customers	Photos and videos	Content	Offer (products and services)	Additional services	Information	Biometrics products	Total Score	Rank
<b>Slovenská sporiteľňa</b>	5	4,3	4,9	4,2	4,8	4,9	4,7	4,8	4	<b>41,6</b>	<b>2</b>
<b>VUB</b>	5	4	4,9	4,6	4,9	4,9	4,7	4,8	4,8	<b>42,6</b>	<b>1</b>
<b>OTB banka</b>	1,2	3,2	4,8	3,5	4,7	4,6	4,6	4,7	1,2	<b>32,5</b>	<b>8</b>
<b>ČSOB</b>	3,5	2,8	4,8	3	4,6	4,7	4,9	4,8	4,6	<b>37,7</b>	<b>5</b>
<b>Prima banka</b>	1	5	3	1	2,4	3,3	2,1	3	3,2	<b>21,8</b>	<b>9</b>
<b>Poštová banka</b>	3,2	4,8	4,6	5	4,3	4,8	4,7	5	2,3	<b>38,7</b>	<b>4</b>
<b>Tatra banka</b>	4,9	4	4,2	3,5	4,8	4,6	4,6	4,3	5	<b>39,9</b>	<b>3</b>



<b>Raiffeisen bank</b>	4,6	3,5	3,9	3	4,3	3	4,2	3,8	2,5	<b>32,8</b>	<b>7</b>
<b>UniCredit bank</b>	4,2	4	4,8	2,8	4,3	4	4,6	4,3	1,8	<b>34,8</b>	<b>6</b>

Table 2: Analysis of Facebook profiles of selected online banks Source: own processing

The quantification of these views enabled the conclusion of this contribution to summarize some contextual implications extending the possibilities of scientific and practical discussion. In order to better interpret the obtained results, they were processed into graphical form (Figure 2).

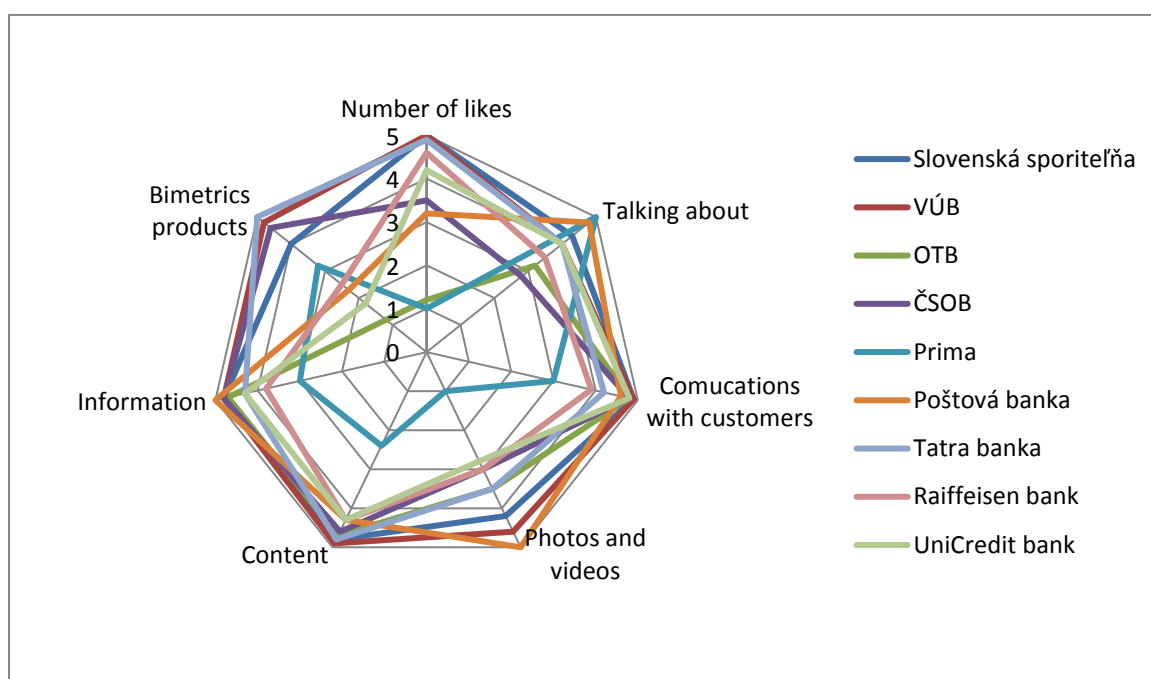


Figure 2: Analysis of FB profiles of selected internet banks Source: own processing

The obtained results show that the differences in the marketing activities of selected internet banks on Facebook are minimal. They only differ in the number of fans who have labeled answer "Talking about". The low figures in the assessment of this attribute point to the low knowledge for respondents of online banks Prima banka and OTB bank.

We see from the results that the most affected person of the generation Z is through Facebook communication and consequently seeks information through the banks' websites.

It is therefore necessary for young generations to provide information through media that is understandable to a young person.

In the first place, the respondents addressed the issue of interest and sharing.

We see that, on the other hand, many banks, at all or very little, share information about the biometric aspects that are needed to secure payments. Visa estimates that up to 60 percent of operations will be secured biometrically.

## CONCLUSION

We see that the Slovak respondent is not interested in the use of biometric factors to increase the protection of their communication with the bank and their use in practice.

Generation Z radically changes the look of marketing banks that, if they want to attract the generation of the youngest clients, have to respect the medium that is a generous source of information for their generation Z and they share their offer through Internet media, especially YouTube.

Focus on the Z generation is also needed in communications as part of the presentation of these modern products, just through the media used by this generation. Most uncommunicative information on new products and their safety is being done on the Slovak banking market through video to individual products.

It is clear that some banks understand the meaning and place of the social media very focused on the generation that communicates through this medium and share the information by the way most used by the generation Z.

The final recommendations based on the research presented in this paper are for banks to make use of the space offered to them through the social network and to share the latest trends in technology innovation and increased security through the media used by the Z generation, and this is mainly video. It is also important to build a community, but it is the interest of the generation that is at the top of the Z population.

Access to the Internet and the use of mobile phones radically personalizes the purpose of detecting the user, especially by using fingerprints. The banks that give access to the products to the user through the fingerprint that I am associated with signing into the bank account are connected with the mobilization of the mobile phone and the payment, by credit card. All these things increase security, it makes access to products more difficult, but it can seriously disturb the freedom and protection of clients' personalities, but it does not seem to matter to the generation Z.

The results presented in this paper are partial and the research will be expanded by analysis of Facebook profiles with some "soft" metrics, such as textual analysis of comments and posts, as well as frequency of posts.

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# MODELING THE RESEARCH PROCESS

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## **ABSTRACT**

*In the modern works on management sciences, the Knowledge Management and its role in any organization's competitiveness are of high value. Yet much less attention is paid to the processes performed by Knowledge Workers, especially those working not in business, but in the academic sphere. That is why the paper is aimed at modeling the core processes (and their particular stages), conducted by researchers. The models are created using BPMN and CMMN standards.*

## **KEY WORDS**

*Knowledge Management, Knowledge Worker, researcher, research process, Business Process Model and Notation, Case Management Model and Notation, core process, support process*

## **INTRODUCTION**

In today's theory of management there exists a firm thesis that managing knowledge at every stage of the working process is vital for every organization that wants to stay competitive at the market, regardless of the sphere, in which it functions. A lot of research has been conducted on the importance of knowledge management (KM), its stages, evaluation of its efficiency etc. However, this research mostly takes into consideration the organizations that produce some highly-technological products, which embody the knowledge of employees. The group of such highly-qualified employees, engaged in the KM process, are called Knowledge Workers (KW). They are distinguished by the fact that they add value to work through mental activities and, mostly, they are referred to as representatives of business institutions.

The *general objective* of this paper is to consider Knowledge Workers in the academic sphere, particularly researchers, who apply information not for production goals, but to generate new parts of knowledge. The authors find it reasonable to study the process of research by its steps, in order to see how each of them can be managed and what additions or changes should (if necessary) be implemented.

The *practical objective* of the paper is to obtain a schematic model of the research process conducted by Knowledge Workers in the academic sphere. The *methods* applied for realization of the objective are

Business Process Model and Notation (BPMN) and Case Management Model and Notation (CMMN), performed with the help of “Camunda” platform<sup>1</sup>.

The research is conducted following the four main steps:

- 1) Characterize BPMN and CMMN as methods for knowledge modeling and define limitations as for their application.
- 2) Consider the model of key business processes (in accordance with the work of M. Porter) – in order to justify the selection of processes for modeling.
- 3) Connect the key business processes with the modeling methods – with the objective to justify the selection of BPMN and CMMN.
- 4) Conduct the modeling of three core processes – to realize the practical objective of the paper.

## **BUSINESS PROCESS AND CASE MANAGEMENT MODELS**

The Business Process Model and Notation is the global standard for process modeling, developed by the OMG<sup>2</sup>. It is aimed at supporting the complete range of abstraction levels, from a business level to a technical implementation level. This goal of BPMN is presented in the standards document (OMG, 2014), which states that “The primary goal of BPMN is to provide a notation that is readily understandable by all business users, from the business analysts that create the initial drafts of the processes, to the technical developers responsible for implementing the technology that will perform those processes, and finally, to the business people who will manage and monitor those processes. Thus, BPMN creates a standardized bridge for the gap between the business process design and process implementation.” The BPMN defines several diagram types for specifying both process orchestrations and process choreographies (Weske, 2012).

While BPMN describes the well-structured processes, which in 90% of situations will be conducted following the same scheme, Case Management Model and Notation standard (OMG, 2016) was developed to capture work methods, which require the activities performed in an unpredictable order in response to evolving situations.

The CMMN, using an event-centred approach and the concept of a case file, expands the boundaries of what can be modeled with BPMN, including less structured work efforts and those driven by knowledge workers. A combination of both BPMN and CMMN enables covering a much broader spectrum of work methods.

## **MODELING THE CORE RESEARCH PROCESSES**

There is no doubt that the process of research is a creative process and thus may be difficult to study and normalize. The authors consider that the sequence of research process activities depend on the following factors:

- topic of research,
- type of research (whether it is a qualitative or rather a quantitative one),
- methods of research (e.g. an experiment, a questionnaire, technology testing etc.),
- stage of research (a newly started or a continuation of previous research),
- data available (how much data can be obtained for the analysis; whether the data were obtained previously or should still be gathered),
- experience of the researcher,

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<sup>1</sup> Camunda – an open source platform for workflow and business process management (<https://camunda.org>).

<sup>2</sup> Object Management Group – an international, open membership, not-for-profit technology standards consortium, which develops enterprise integration standards for a wide range of technologies and industries (<http://www.omg.org>).

- researcher's personal features (whether the person follows a precise plan or conducts the research ad hoc).

Yet, the authors put forward the *first hypothesis*:

H1: *Major stages of the research process can be modeled with the help of business processes modeling standards and terminology.*

To prove this hypothesis, the authors refer to the work of (Porter, 2008). On the basis of Porter's key business processes the scheme was developed, presenting the *landscape of research work*, conducted by Knowledge Workers (Figure 1). The whole research work is divided into four *stages*:

- 1) management processes,
- 2) core processes,
- 3) support processes,
- 4) monitoring processes.

Each stage includes the most frequently conducted processes, but, depending on the use case, can be modified and more processes can be added (instead of suspension points).

Support processes and Management processes form the basis for the Core processes conduction, define the direction of their realization. Monitoring processes, on the one hand, do not directly influence the Core processes, but, on the other hand, assist them by providing analysis of necessary improvements.

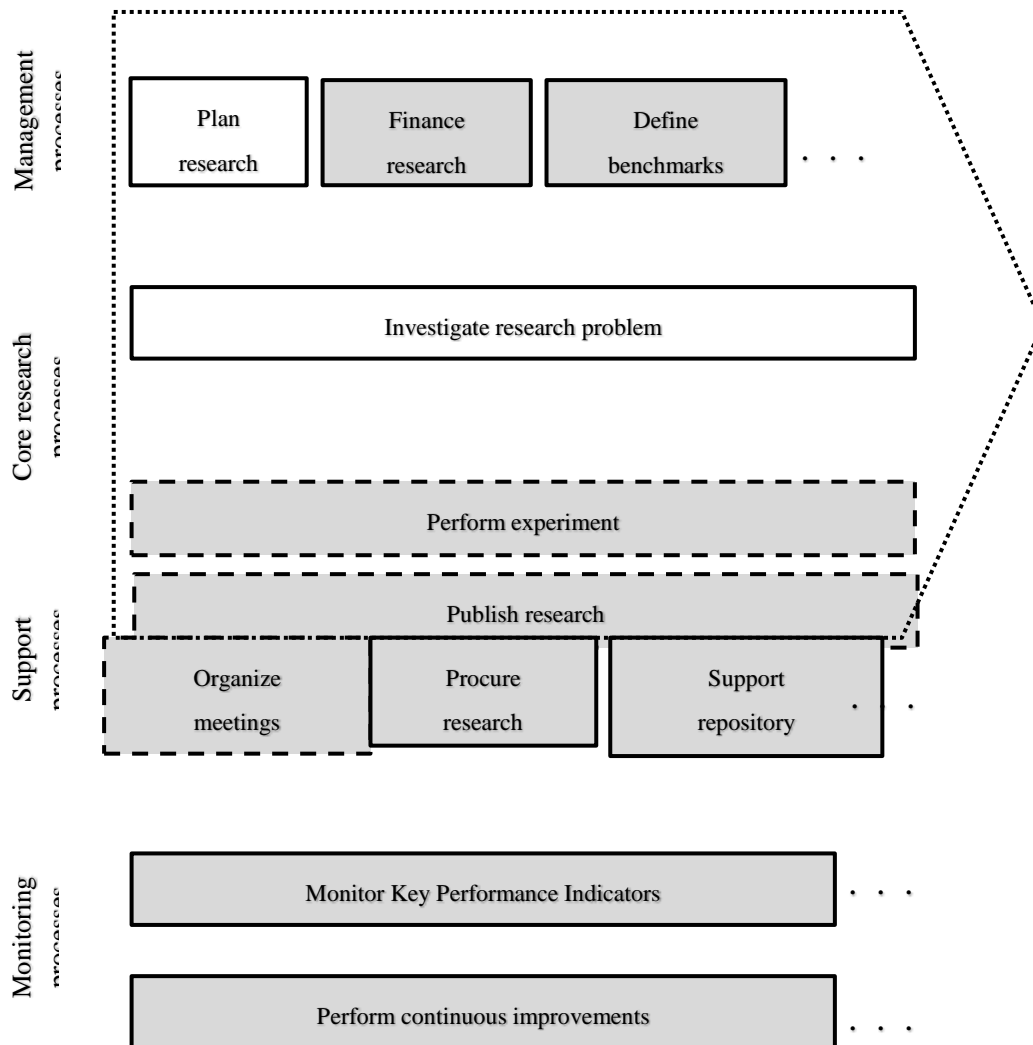
Additionally, the scheme reflects the division of the processes into two classes: those modeled with the help of BPMN (grey colour) and CMMN (white colour) standards. It allows to draw an intermediary conclusion about the fact that most processes of the research landscape are rather standard, conducted in a particular sequence, and, thus, can be modeled following a predefined sequence – hence with BPMN. Even the processes, which are complex, variable and less structured (e.g. Plan research of Perform research) can be modeled, yet only with the help of CMMN. This allows to prove the authors' hypothesis about the possibility of modeling research processes.

Moreover, the authors put forward *the second hypothesis*:

H2: *Depending on the use case the processes in the research landscape can be obligatory (solid line shape) and discretionary (dashed line shape).*

Therefore, it can be stated that the following stages are performed only if needed:

- conducting an experiment (use case: the research requires empirical justification),
- publishing research (use case: the author finds it reasonable to share the results with the scientific community),
- organize meetings (use case: the research is conducted in a research team).



**Figure 1** – Research work landscape [source: own, (Porter, 2008) and (Dumas et al., 2013)]

To fulfil the practical objective of the research – to model the research process conducted by Knowledge Workers in the academic sphere, three core processes from the figure above were selected:

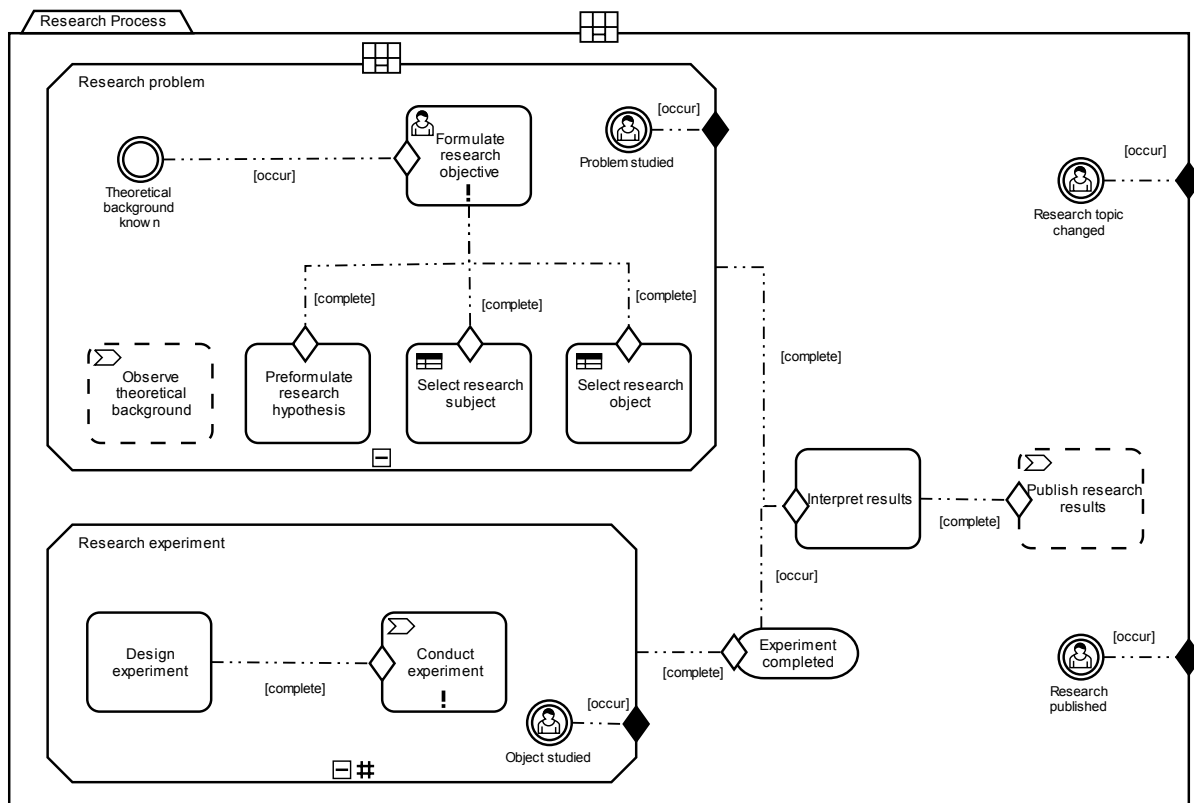
- 1) Investigate research problem (further – Research problem),
- 2) Perform experiment (further – Research experiment),
- 3) Publish research.

Modeling is performed in the following order:

- 1) general *Research process* in CMMN (Figure 2), which includes the expanded stages of *Research process: Research problem, Research experiment and Publish research results*;
- 2) *Publish research results* (Figure 3) in BPMN;
- 3) *Research experiment* (Figure 4) in BPMN.

In Figure 2 (*Research process*) the *Research problem* stage should begin only when the theoretical background of the problem is known and would finish in case the problem is properly studied (event *Problem studied*). It is supposed that the two major stages may run simultaneously or successively, but only the completion of both of them can allow proceeding to the task of results interpretation (*Interpret*

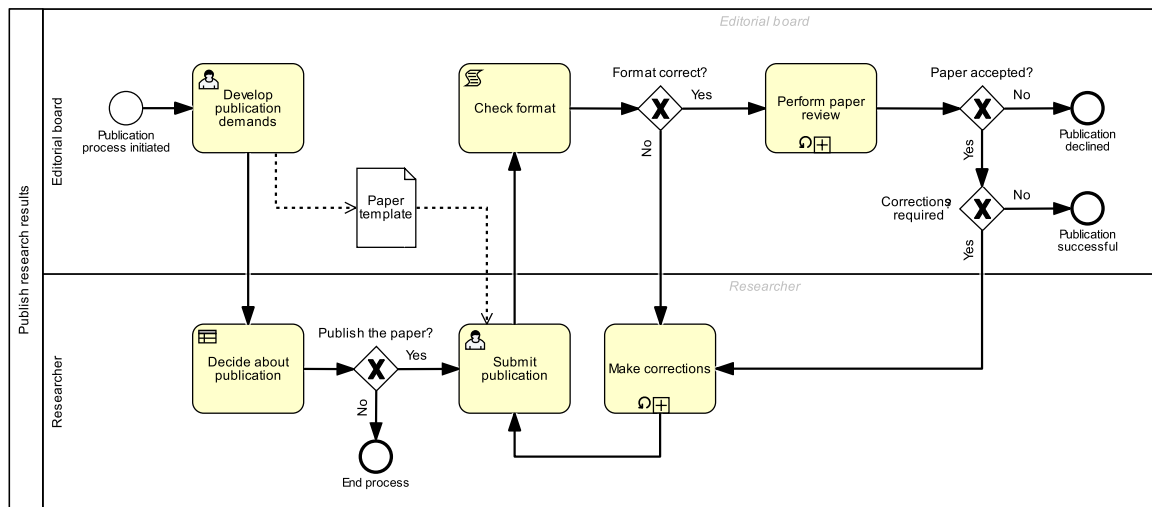
results). After the results are interpreted and somehow processed, we can proceed to the task of research paper publication (*Publish research results*), which is discretionary. It is suggested that the whole research process can be finished (or interrupted) by two events – *Research topic changed* (the authors assume that in this case the research process is started from the beginning) and *Research published*.



**Figure 2** – CMMN model of a research process, conducted by a KW

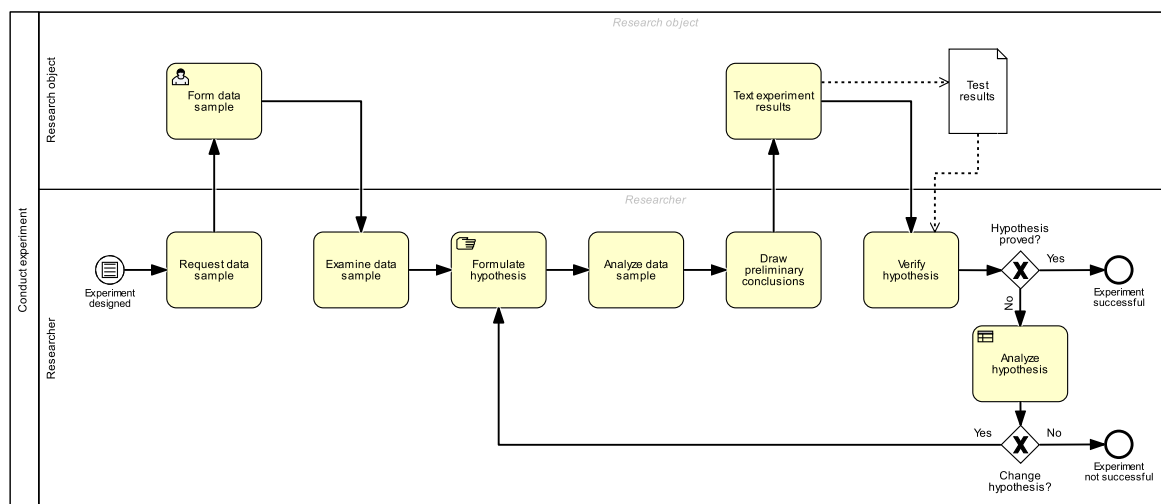
If we consider the use case, when the researcher finds it reasonable to publish the paper (or a chapter in monograph etc.) and we assume that the event *Research published* takes place, then it is reasonable to model the process of actually publishing this paper (Figure 3). The process is a single pool containing two lanes (two actors in the process) – the *Researcher* himself and the *Editorial board* of the scientific journal/book. It is supposed that the process is initiated by the *Editorial board* (event *Publication process initiated*) and, if all the steps are completed, can be finished by one of the two possible events – *Publication declined* or *Publication successful*. The third end event is also possible – almost in the beginning of the process, in case the researcher decides not to publish the paper (*End process*).





**Figure 3** – BPMN model of a process of publishing KW's research

For the use case, when the research requires empirical justification, the task *Conduct experiment* is a process task and thus is also supposed to be presented as a BPMN model (Figure 4). The process is to be started after the experiment is preliminary designed (task *Design experiment* in the *Research Process CMMN* model) and after the experiment is preliminary designed (event *Experiment necessary*). This process includes two lanes as well – *Researcher* as the first actor and *Research object* (e.g. an organization which will be studied) as the second one. The process has two options of the event in the end – *Publication declined* (in case the paper is not accepted, even after the loop of *Make correction* task) and *Publication successful* (if corrections are not required or they are conducted in a right way).



**Figure 4** – BPMN model of a research experiment process, conducted by a KW

Herewith the practical objective of the paper is fulfilled – the schematic model of the research process conducted by Knowledge Workers in the academic sphere is created.

The modeling process has also allowed to define differences between the two key modeling standards – BPMN and CMMN, as well as to clarify, that the CMMN standard is more suitable for non-structured processes, which require creative thinking, while the BPMN is applied for business processes of standard

order. Thus, it can be stated, that the landscape of research work, performed by Knowledge Workers in the academic sphere, includes both precise and ad hoc processes.

Here the first hypothesis of the paper was proved: it can be claimed that major stages in the research landscape, regardless their structure, can be modelled with the help of business processes modeling standards.

The modeling also has proved the second hypothesis of the paper: it can be stated that (depending on the use case) the processes in the research landscape can be obligatory (conducted always) and discretionary (conducted if required).

## CONCLUSIONS

1. The research has allowed to obtain models of three core processes, conducted by Knowledge Workers in the academic sphere: *Research Process*, *Conduct experiment* process and *Publish research results* process. Such modeling allows the authors to draw a number of conclusions, which can be applied for further research.
2. It was proved that the Case Management Model and Notation standard is more appropriate for modeling ad hoc, creative processes – like the *Research Process*. It presupposes that the sub-processes can be conducted in different sequences and, also, some of them can be omitted – depending on a certain number of factors (as discretionary processes), while some of them are obligatory for the whole process to be finished.
3. These research process models enable the next step of the research to be taken. They will be applied in order to design the Knowledge Management Information System for support of Knowledge Workers activity in the academic sphere.

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## **ANALYSIS OF E-COMMERCE WEBSITES IN THE CZECH REPUBLIC FROM THE MOBILE WEB DESIGN**

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### **ABSTRACT**

*The purpose of this paper is to investigate current situation regarding web pages in the Czech Republic. The main aim is to focus on e-commerce websites. The main emphasis is put on an investigation of readiness of websites for displaying on mobile devices. That means that responsive design with all its main features is taken into account. The current state of this issue is analyzed in the context of the using of different types of devices to access the internet in the Czech Republic. Moreover, this issue is also discussed within the context of the worldwide situation of this problematics. The analysis is based on the most up-to-date statistical data and studies regarding responsive web design. Based on this analysis are described the most important findings with respect to the time progress and comparison of the current state within the Czech Republic with the worldwide trends. Part of the results is the definition of most important gaps as well as the suggestion for improvement of the current state with respect to the nearest time period.*

### **KEY WORDS**

*web design, responsive web design, websites, internet, Czech Republic*

### **INTRODUCTION**

The number of users that use mobile devices for the internet access increases every year. It's quite an important as well as actual issue. The aim of this paper is thus to analyze the current situation in the Czech Republic. According to website providing global statistical data Statcounter (2016) was in the October 2016 for the first the worldwide mobile and tablet internet usage higher than desktop internet usage. Mobile internet usage was in the October 2016 51,6% while desktop internet usage was 48,7%. This is very important milestone. Despite the increasing number of users that use mobile devices for display of websites, within the web design was still the first desktop web design approach. Based on the web design for desktop was consequently designed the mobile version of the website. This approach was a challenged by the mobile first approach. This idea was for the first time published by Luke Wroblewski in year 2009 (Wroblewski, 2009). Interesting is that in this year was worldwide mobile internet usage only 1,28% (Statcounter, 2017a).

It is obvious that this idea was truly timeless. Nevertheless, even this approach has its positives and negatives. Different points of view are clearly stated for example in article by Jahoda (2015). The fact remains that this approach points out very clearly that it is important to take into account also mobile devices.

### **INTERNET ACCESS IN THE CZECH REPUBLIC**

Currently is worldwide number of mobile internet usage 50,02%, tablet internet usage is 4,3% and desktop internet usage is 45,68%. It is clear that the desktop internet usage is decreasing in general.

Now, let's focus on the Czech Republic and on the differences within the world. In the Czech Republic is the situation in contrast to the worldwide quite different. In the Czech Republic is still the main desktop internet usage, it leads with 79,04%. The next is mobile internet usage with 18,21% and the last is tablet internet usage with 2,75% (Statcounter, 2017b).

Country	Desktop	Mobile	Tablet
Czech Republic	<b>79,04</b>	18,21	2,75
United States of America	<b>52,69</b>	39,29	8,02
United Kingdom	<b>53,73</b>	35,28	10,99
Germany	<b>58,39</b>	35,13	6,48
India	20,54	<b>78,84</b>	0,62
China	38,63	<b>59,33</b>	2,04
Worldwide	45,68	<b>50,02</b>	4,3
Africa	34,17	<b>63,23</b>	2,6
Asia	33,33	<b>64,61</b>	2,06
Europe	<b>58,97</b>	34,94	6,08
North America	<b>54,13</b>	38,06	7,8
Oceania	<b>53,25</b>	36,27	10,48
South America	<b>64,06</b>	34,39	1,56

**Table 1** – Devices used for internet access in different countries and world areas (Author, based on data from gs.statcounter.com)

Let's look at the comparison of selected countries and world areas. From the table can be discovered that the most are for the internet access used mobile devices in Asia and Africa, followed by the North America with Oceania and at the end is Europe and the South America. The Czech Republic is even compared to Europe still under the average. Desktop is here still quite dominant. But even here can be seen a clear trend towards the usage of mobile devices. At the end of year the 2009 was in the Czech Republic desktop internet usage almost 100% (99,61% exactly) (StatCounter, 2017c).

Moreover, in the year 2015 the main search engine Google began to prefer (at least within the mobile search) websites which are ready for display on mobile devices (Ungr, 2015).

From the above mentioned is obvious that internet access from mobile devices is worldwide increasing and the Czech Republic is not an exception. The Czech Republic is compared to the world and to Europe as well still under the average, but even here is mobile internet usage on the rise. It points out to the importance of website development that will respect features and specialties of mobile devices.

Let's focus now on the data of the Czech Statistical Office. From the data (The Czech Statistical Office, 2017) provided can be seen that the number of internet users in the Czech Republic increases permanently and that mobile internet usage is more and more popular. In the year 2016 in the Czech Republic, 6,7 millions of people older than 16 years was using the internet. It is 76,5 %. Compared to the year 2006, it is an increase of 36%. The internet in a mobile device was used by 54% of the internet users in the year 2016. Three years before was this number only about 20%. In detail, it was 20,7% in the year 2013, 28,5% in the year 2014 and 37% in the year 2015. On this count is the Czech Republic still under the average of the European Union (65% of people at the age of 16 – 74 use mobile internet). The highest numbers have Denmark, Sweden, and the United Kingdom with numbers around 75% (for the year 2015) (The Czech Statistical Office, 2016).

The importance of mobile internet and websites which are without any problems accessible from mobile devices is thus very clear. The importance of mobile devices for the internet access is every year higher. Let's discover now to the current state of websites from the perspective of readiness for display on mobile devices in the Czech Republic.

## **E-COMMERCE IN CZECH REPUBLIC**

For the insight to the current state of websites focused on e-commerce in the Czech Republic will be used data from the study ČKR for the year 2017 (Šťastný a Husták, 2017). The study shows that 20% of e-shops are still not ready for customers that are using mobile devices. Interesting is the comparison with previous years. In the year 2014 was for the internet access from mobile devices ready only! 25% of e-shops, in the year 2015 43% and in the year 2016 it was already 72%. The numbers from the year 2014 was really alarming. Nevertheless, the numbers from the year 2017 indicate that e-shops in the Czech Republic are improving every year, they are trying to adapt to the new demands.

This study was conducted on the top 100 e-shops in the Czech Republic. These e-shops are market leaders. It is thus quite probably that data can show a slightly more optimistic state of things. In case that also other, smaller e-shops would be taken into account, the result could be a little bit worse. However, for the general overview are these data completely sufficient.

Let's look at the most important findings with respect to the possible improvements of websites that should be accessed from mobile devices:

Usage of geolocation. Only 10% of e-shops use the possibilities of geolocation for display of the nearest contact or pick up place. The geolocation is one of the most important advantages that access from mobile devices offer. It is very crucial point.

The contact address is always well seen. Only 55% of e-shops has well seen contact within the order process. Contact should be always well placed to be seen on every page, ideally on the same place. It is really important within the order process as in case the user has an issue, he/she is able to contact the e-shop immediately.

The delivery time. 51% of e-shops displays the delivery date of the good. Delivery time is one of the most important factors, as today's world is really fast. It is one of the factors that could be the game changer and that can decide whether the customer will buy something on your site.

Form validation. 43% of e-shops displays error message in the moment the user leaves the input right next to the field. 26% displays error message next to the field after the click on the "continue" button. 4,7% of e-shops displays in case of error only general error message or doesn't display any error message at all. 3% of e-shops displays correct error, but this error is displayed above the form or in the pop-up window. The form must be always well displayed also on mobile devices. Generally, it is one of the most important parts of website. In case of error must be the user clearly warned and pushed towards the correct entry.

Quick change of personal data. Only 30,8% of e-shops enables a quick update of user's data right next to the displayed data. In mobile, it is necessary to have everything at hand. When the user wants e.g. change his username, he must not be forced to find a link, this link must be at dispose right next to the data.

## **WEB DESIGN AND E-COMMERCE TRENDS WORLDWIDE**

When we focus on other papers which were conducted outside the Czech Republic, we will gain another important findings and inputs for the improvement as well as for the possibility of comparison with the Czech Republic.

According to Everts (2015), the speed of the site loading is very important. Mobile websites that have been loaded 1 second faster report up to 27% higher conversion rate. According to Akamai (2014) was

in the year 2014 only 11,3% of websites responsive (the study was based on the top 100 000 websites worldwide).

Other study (Fulgoni, 2016) has identified the most often issues within the mobile e-commerce. The most frequent barriers to mobile purchasing are: do not feel secure providing payment information over mobile devices, cannot see the product detail, navigating between screens is too difficult/slow, cannot browse between multiple screens easily to comparison shop, too difficult to input my name, address, and payment information, cannot navigate to coupons easily.

According to Ironpaper (2015) 40% of users leave the website in case the loading of the site is longer than 3 seconds and 4 out of 5 users of mobile internet use mobile device also for online shopping. According to Adobe (2015) 8 out of 10 users will choose a different search result if the first one is not mobile friendly. This is very high amount that shows the high importance of responsive webdesign.

Now let's focus on the mentioned findings in the context of worldwide trends for the year 2017 (based on Ironpaper, 2017 and Sukhraj, 2017):

- Bigger is better — for example: images, buttons, menus, all should be made to be seen and easily accessible
- Use visuals — photo, animation, video. It's better for understanding.
- Give users big picture overview of your site (even on a small screen) – don't make them guess what your site is about
- Design for differentiated sections and eye-catching transitions to help user navigate better
- Provide a visitor with hierarchies using typography (size and font).
- Create custom visuals and iconography that speaks directly to brand story and personality.
- Keep the content relevant. All content – text, videos, pictures, etc.
- Make websites load fast. Users don't want to wait.
- Focus on UX on mobile. Consumers are more likely to recommend and buy from the business that has a better mobile experience.
- Engage social media. Most social media activity takes place on mobile.
- Don't forget on digital advertising targeted towards mobile.

For more complex overview will be this list enhanced by selected marketing statistics for the year 2017 (Sukhraj, 2017). As of March 2017, 80% of top Alexa websites were mobile adaptive. 51% of all digital ad budgets in 2016 were spent on mobile. By 2019, mobile advertising is expected to represent 72% of all U.S. digital ad spending. 48% of consumers start mobile research with a search engine --but 33% go directly to the site they want. Google drives 96% of mobile search traffic, followed by Yahoo at 2% and Bing at 1%. 80% of social media time is spent on a mobile device. 57% of users say they won't recommend a business with a poorly-designed mobile site. 71% of marketers believe mobile marketing is core to their business. From the clearly results the importance of responsive design and generally a focus on mobile devices – from the webdesign as well as online marketing point of view.

## CONCLUSION

When we compare the data, we will find that the situation in the Czech Republic is not bad at all. It is clear that owners of e-shops in the Czech Republic are very well aware about the necessity of responsive design. Therefore, they update and enhance their e-shops. Of course, there is still a space for improvement. It is also necessary to take into account the most recent worldwide statistics and trends. The situation in the Czech Republic is quite good, this is cause paradoxically by the fact that there is still dominant desktop internet usage and mobile internet usage is not so frequent.

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It is mainly dependent on the target group. In case the e-shop has an older customer, accesses from mobile devices will not be as frequent as in the case that e-shop sells mainly goods for young people. Nevertheless, this situation is changing quite rapidly. It is necessary to take into account constantly increasing number of accesses from mobile devices and even in the case that at this moment this need seems not to be urgent.

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## INFORMATION ETHICS

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### **ABSTRACT**

*The topic of our survey was to analyse and compare the opinions of students on ethics on the Internet. The survey took place at the University College of Business in Prague and its respondents were students of the field of study Tourism. We used the same methodology as previous surveys, the results, however, differ in some aspects. Respondents' preferences are similar, but, what influences the results is the higher proportion of women than in other comparable surveys. Women are in fact usually more cautious and their relationship to information technologies is less clear-cut than is the case with male-students. In addition to that, other differences may be explained by the fact that some acute issues have been partly solved since the last survey or their solution is expected soon, and that is why the respondents were in some cases more conciliatory compared to previous surveys.*

### **KEY WORDS**

*Information ethics, Data ethics, 'Ten Commandments' of Computer Ethics*

### **INTRODUCTION**

The aim of our study, inspired by a research project carried out at the University of Economics, Prague, was to conduct similar research at a private university where similar subjects are taught. Our research explores students' attitudes to copyright and copyright regulation, focusing on attitudes to copyright among economics students.

In the Czech Republic, the topic has been explored by T. Sigmund, whose paper (Sigmund, 2016) introduces the answers by students of the University of Economics, Prague. As early as 1999, M. Zlatuška introduced the Czech academia to a set of standards known as the Ten Commandments, which was in fact the translation of the Ten Commandments of Computer Ethics created by Ramon C. Barquin in 1992. Other recommendations for information ethics and legal issues, based on the ten commandments though specifically for academic publishing, are discussed by Knecht and Dvořák (Knecht, 2013). Though inspired by the general standards included in the ten commandments of computer ethics, these recommendations were modified to cover the specificities of science and research in the Czech Republic.

L. Floridi and M. Taddeo (Floridi, 2016) also explore information ethics, though more specifically data ethics, i.e. the generation, recording, curation, processing, dissemination, sharing and use of data.

B.C. Stahl et al. have called for more information ethics and for more research, emphasising the influence of information ethics on the professional, social and private aspects of life.

Information ethics and the phenomenon known as Big Data are explored in a paper by B.D. Mittelstadt and L. Floridi, who discuss the ethical consequences of big data.



## MATERIALS AND METHODS

Our survey involved 52 respondents: 23 males (44%) and 29 females (56%). They were students studying subjects in economics of tourism. Our respondents were enrolled in both the full-time and distance-learning forms of study, the latter being convenient for students already in employment. The respondents were aged between 20 and 30 years and were in the second year of a master's programme, close to graduation.

The following is a breakdown of the students based on the amount of time they spend working:

don't work	15%
have some temporary jobs	13%
have part time jobs less than 20 hours a week	19%
spend 20 or more hours a week at work	36%
work full time	17%

First, the respondents were asked about their preference for either good social relations or work performance:

- 60% prefer good social relations;
- 40% prefer work performance.

These findings are different from those at the University of Economics, Prague, which were as follows: 37.5% of the respondents prefer good social relations, while 62.5% prefer work performance.

The difference may be explained by a higher percentage of women among our respondents as opposed to the survey conducted by T. Sigmund at the University of Economics.

Our survey was conducted from 1 October 2016 to 31 January 2017 via an online questionnaire.

To analyse all the data, we used methods of descriptive statistics and methods analysing contingency (Kruskal-Wallis and chi-square test).

Students were found to perceive corruption to be very high. The following are our respondents' answers in more detail:

- 13% corruption is very high;
- 48% corruption is high;
- 27% think corruption is as high in the Czech Republic as it is in other EU member states.

A mere 11% of the respondents consider corruption to be low.

It is interesting to see that women tend to be more pessimistic, whereas men tend to suggest that corruption is as high in the Czech Republic as in the rest of the EU.

The results are on the 5% significance level independent of gender ( $p=0.650$ ,  $\chi^2=0.206$ ), independent of the preference for social relations or work performance, with those preferring social relations being more critical towards corruption ( $p=0.506$ ,  $\chi^2=0.443$ ).

Students enrolled in subjects related to tourism are interested in the topic of territorially-limited internet services, i.e. the availability of some paid services being restricted to one country.

- 21.1% of the respondents strongly disagree with the current situation;

53.8% rather disagree;

15.3% rather agree;

9.6% strongly agree.

The students of the University of Economics were found to be more critical towards such practices; by contrast, the less critical attitude prevalent in our survey may be explained by the fact that roaming charges will soon be abolished.

The results are on the 5% significance level independent of gender ( $p=0.712$ ,  $\chi^2=0.136$ ), independent of the preference for social relations or work performance, with those preferring social relations being more critical towards corruption ( $p=0.409$ ,  $\chi^2=0.682$ ).

When asked whether a link to a free download of a copyrighted work is a violation of the copyright, the respondents answered as follows:

30.7% definitely consider it a violation of the copyright;

50% rather consider it a violation;

17.3% rather don't consider it a violation of the copyright;

1.9% definitely don't consider it a copyright violation.

The above results are significantly different from those obtained in the University of Economics survey, suggesting that students of tourism are much stricter on copyright violations.

The results are on the 5% significance level independent on gender ( $p=0.148$ ,  $\chi^2=2.095$ ), with men being more tolerant and significance level independent on the preference for social relations or work performance ( $p=0.631$ ,  $\chi^2=0.23$ ), with those oriented towards social relations being more tolerant.

Another question asked in the survey was related to copyright protection expiring 70 years after the author's death. Most respondents (40.3%) consider this period to be sufficient; 13.4% would prefer the period to be extended, whereas 15.6% consider the period to be too long.

The results are on the 5% significance level independent of gender ( $p=0.180$ ,  $\chi^2=1.794$ ), and are significance level dependent of the preference for social relations or work performance ( $p=0.01$ ,  $\chi^2=10.162$ ).

The survey next asked about the topical issue of whether libraries have the right to make digital content accessible.

57.7% definitely agree with that;

32.7% agree but admit some exceptions;

1.9% disagree but admit some exceptions;

7.7% are definitely against that right with no exceptions.

The results are on the 5% significance level independent of gender ( $p=0.459$ ,  $\chi^2=0.548$ ), and are significance level independent on the preference for social relations or work performance ( $p=0.553$ ,  $\chi^2=0.352$ ), with those preferring social relations tending to prefer a free availability of digital content in libraries.

One of the hotly discussed issues in Europe these days is whether countries should have the right for exemptions from European copyright legislation.

- 3.8% definitely agree with that right;
- 51.9% rather agree;
- 32.7% rather disagree;
- 11.5% definitely disagree.

The results are on the 5% level independent on gender ( $p=0.158$ ,  $\chi^2=1.998$ ), with men tending to agree with national exemptions from copyright, and independent of the preference for social relations or work performance ( $p=0.325$ ,  $\chi^2=0.970$ ).

An interesting question is whether or not to introduce the right to modify the copyrighted content and the right of natural persons to cite audio-visual works for non-commercial use without the permission of the author.

- 11.5% of the respondents support the introduction of the right;
- 28.8% rather support the right;
- 40.4% rather don't support the right;
- 19.2% definitely don't support the right.

The results are on the 5% significance level independent of gender ( $p=0.383$ ,  $\chi^2=0.761$ ), and are independent of the preference for social relations or work performance ( $p=0.146$ ,  $\chi^2=2.111$ ).

The issue attracting the most attention is whether empty media should be subject to taxation. This is naturally something that young people often discuss.

- 0% definitely support taxation of empty media;
- 11.5% rather support taxation;
- 55.7% are rather against taxation;
- 30.7% are definitely against taxation;
- 1.9% do not know what empty media are.

The result is quite unanimous and expresses the negative approach of students against this rule. Paying for empty media is sometimes interpreted as a presumption that people would copy illegal content on them, which makes people angry.

Another interesting question concerns the idea of authors and artists receiving a proportion of the income from the sale of their copyrighted works.

- 73.1% agree with the idea;
- 7.6% think the proportion should be higher;
- 19.2% consider the proportion too high.

The above results reflect the respondents' opinion on the importance and remuneration of the publishing companies.

The last question, more philosophical in nature than the previous ones, concerns the conflict between instruments for promoting copyright and human rights, e.g. the right to privacy.

- 59.6% of the students think basic human rights are more important than copyright;
- 19.2% think there is no conflict and both rights are in compliance;
- 7.6% think that the conflict has no solution;

11.5% expressed a preference for copyright over basic human rights;

1.9% do not know the answer.

It is interesting to note that the results of both surveys are practically identical. It turns out that students clearly prefer human rights to copyright.

## RESULTS AND DISCUSSION

There have recently been attempts to clearly define information ethics. One of the prominent authors writing on this topic is the Italian philosopher and logician L. Floridi who described data ethics as a result of new dimension of ethics that studies and evaluates moral problems related to information.

As early as 1993, K. Janoš (Janoš, 1993) described information ethics as “an area of moral employed in the creation, distribution, transformation, storage, searching, use and organization of information.” In a narrow sense, information ethics is directly relevant for journalism and IT; in a broader sense, it concerns many other fields, including education. It is also important to distinguish between computer ethics and information ethics, the two concepts being far too often used interchangeably in academic writings.

This concept complies with R. Capurro's concept of information ethics introduced in 1999 and, especially, that from 2008, which – unlike that of K. Janoš (Janoš, 1993) – contains historical and philosophical aspects. For Capurro, information ethics is, first and foremost, descriptive and reflects attitudes to information as seen in various cultural paradigms. It also contains evaluation aspects for the evaluation of morality and tradition. Capurro (Capurro, 2008) maintains that information ethics existed as far back as in Ancient history. The other concepts of relevance to information ethics are those of microethics and macroethics. Microethics has to do with the individual's behaviour (privacy protection, intellectual property protection); macroethics, on the other hand, concerns aspects of society as a whole, i.e. the influence of IT on the whole society, with related concepts of digital dividing and the vulnerability of the information society.

The question is whether information ethics is a full-blown discipline or an extension of ethics into IT. K. Gorniak (Gorniak, 2007) and G. Walsham (Walsham, 2012) have been among the prominent players in this conflict. K. Gorniak (Gorniak, 2007) calls for a special theory of ethics specific for IT and the Internet. Another author supporting the creation of a new theory that would describe the new problems related to new technologies is J. Ladd (Ladd, 2000). The absence of new theories makes ethics lose sight of the practical problems of today's world, leading to a moral vacuum. However, G. Walsham (Walsham, 2012) does not think a special theory is needed, preferring to seek solutions to these questions in cooperation with the general theories of ethics. One of those striking a middle path is J.H. Moor (Moor, 2002) who believes computer ethics is a fully-fledged discipline which is, however, completely dependent on the general concepts of ethics.

## CONCLUSION

Our research compares results obtained at two Prague universities, the University of Economics and the private University College of Business, which focuses mainly on tourism. Students of University College of Business mostly prefer good social relations as opposed to students of the University of Economics who prefer work performance. These differences can be attributed to the fact that more women study at the University College of Business than at the University of Economics. Other results were similar for the corresponding age groups of respondents.

Copyright on the Internet is an issue frequently debated by the young, and especially by university students, as these people are more significantly engaged in the virtual environment than previous generations. This is a generation that is online practically throughout its active life, inspiring an overstated term “Digital Natives”.

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Macroethics deals primarily with the existence of standards, practices, institutions and legislation that grow out of microethical aspects; sometimes it extends into information science, one example being investigation of the life cycle of information. However, it also extends into political science, sociology and the law; microethics, by contrast, is sometimes understood as nothing more than computer ethics or cyberethics.

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# **ANALYSIS OF ELECTION RESULTS IN THE CZECH REPUBLIC IN 2017**

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## **ABSTRACT**

*End of this year's parliamentary elections in the Czech Republic ignited discussion on possible changes to the electoral system. It goes without saying that every political party would want an electoral system in which it would get more mandates with the relevant results so that it could relay government with only one partner. This article aims to analyze the election results and shows how the results would change with a fairer alternative to a division of regions.*

## **INTRODUCTION**

In 2017 parliamentary elections took place in the Czech Republic. Basically, election systems are usually discussed immediately after elections. The situation in the Czech Republic is specific – there is the permanent representation of Communist Party, which is a party that usually nobody wants to cooperate with, then the creation of the government is complicated almost at any time and this year's elections do not show otherwise.

D'Hondt's method, which was originally selected with a target of strengthening larger parties, and thus easier creation of post-election coalitions, is now perceived as a major problem of the entire electoral system. Especially since it was used for its second time in 2006, all analysts point to a giant disproportions in the current system, where the largest region has five times the number of seats than the smallest region, while half of the counties only have 10-13 mandates, resulting in paradoxes, when the difference of less than 1% in the election result can be more than twice the difference in the number of mandates (2006, KDU-ČSL versus the SZ), or a party in one region having over 9% does not get any mandate, while in another the turnout of the mandate is less than 5% (2006, SZ, Liberec vs. M oravian-Silesian Region).

After the historical introduction, we will focus on the analysis of existing results. We bring various alternative simulations. The first thing to focus on is the election options that weaken the influence of large parties at the expense of small ones - D'Hondt for the whole of the republic, the abolition of the 5% quorum, or the calculation by other methods. Next, let's look at the impact of several "what if" options - such as the Parliament without TOP and STAN.

In conclusion, we will analyze in detail the possibility of regions divided mainly according to the already used standardized classification of territorial units for the needs of Eurostat and CZSO.

## **HISTORY OF ELECTORAL SYSTEMS IN THE CZECH REPUBLIC**

By 1998, the Hagenbach-Bischoff method was used in the Czech Republic for elections to the Chamber of Deputies. This method was replaced by the D'Hondt method in 2000. In Act No. 204/2000 Coll. is the so-called modified D'Hondt method, where the D'Hondt denominator starts not with number 1 but with the number 1.42. This system was abolished by the Constitutional Court in the following year (No. 64/2001 Coll.). The law was amended by Act

No. 37/2002 Coll., which uses the classic D'Hondt divisor and is valid by now. Interestingly, the Senate proposed a return to the Hagenbach-Boschoff quota, allowing stronger representation of smaller parties, while the government's attempt was to allow the formation of coalitions composed of fewer parties.<sup>1</sup>

The fact that the topic is still open suggests that it was discussed at the government meeting on February 9, 2009, with the recommendation to revert to the Hagenbach-Bischoff method where all remaining mandates would belong to the winner of the election. The Explanatory Memorandum to this Recommendation states, inter alia:

*"The current electoral system does not create good conditions for the emergence of stable governments. Relatively equally, it strengthens both competing strong parties, which provide over-proportional gains in mandates, to the detriment of small parties with high coalition potential, and at the same time without affecting the "moderately" large, but coalition-incompatible, KSČM. This makes the maneuvering space for the election winner narrow down to two choices:*

- 1. Coalition or other cooperation with the main defeated opponent ("Big Coalition" or "Opposition Agreement"),*
- 2. A very fragile coalition with small parties, some of which may be represented in the Chamber of Deputies significantly under-proportion. "2*

Already this text draws attention to the significant difference in the distribution of mandates in the regions and mentions possible doubts about the equality of active electoral rights from voters' views when the voter's vote has a considerably different weight in different regions. This situation is proposed to be addressed by the use of the NUTS-2 statistical regions, which divide the CR into eight regions and provide approximately the same size of the regions. The interconnection is at the level of the existing regions. As it was a unparagraphed recommendation, it was not included in the 759/0 parliamentary press. The Amendment to the Act on Elections to the Parliament of the Czech Republic of 3 March 2009. On March 24, 2009, current government was mistrusted, thus further attempts to change the electoral system were stopped.

Therefore, the classical D'Hondt with a 5% quorum is currently used to convert the voters' votes into mandates, with divisors 1, 2, 3, etc. and ČR is divided into 14 counties.

## ELECTIONS RESULTS

Firstly, the election results from the election in 2017 are as follows. The voter list was exactly 8,374,501 voters, 5,060,759 valid votes were cast, and the voter turnout was 60.84%. The table shows parties that have exceeded 0.5% and are therefore relevant for further analysis.

<b>Election results in elections to the Chamber of Deputies, Czech Republic, 2017</b>			
<b>Abbr.</b>	<b>Election numbers 2017</b>	<b>Votes cast</b>	<b>Results in %</b>
<b>ANO</b>	21	1 500 113	29,64%
<b>ODS</b>	1	572 962	11,32%

<sup>1</sup> Source: Web pages of the Chamber of Deputies, <http://www.psp.cz/sqw/hp.sqw?k=305>.

<sup>2</sup> Source: Underlying materials for government meetings 9. 2. 2009, [https://www.vlada.cz/assets/media-centrum/aktualne/ma\\_rack7hpc76ix.doc](https://www.vlada.cz/assets/media-centrum/aktualne/ma_rack7hpc76ix.doc)

Piráti	15	546 393	10,80%
SPD	29	538 574	10,64%
KSČM	8	393 100	7,77%
ČSSD	4	368 347	7,28%
KDU-ČSL	24	293 643	5,80%
TOP 09	20	268 811	5,31%
STAN	7	262 157	5,18%
Svobodní	12	79 229	1,57%
Zelení	9	74 335	1,47%
Rozumní	10	36 528	0,72%
REAL	26	35 995	0,71%
Other		90 572	1,79%
Total ČR		5 060 759	

(Source: www.volby.cz)

## THE WHOLE OF THE CZECH REPUBLIC AS ONE REGION

First, we look at the whole Czech Republic as one region and compare the percentage results, the number of mandates achieved, and several possible calculations. From [AdJ2017] we have a calculation for the Hagenbach-Bischoff method used up to 1998 and applied to this year's votes cast. We also add the modified Hagenbach-Bischoff method according to the governmental proposal of 2009 (ie all votes in the 2nd scrutiny belongs to the winners). We also calculate how the results would look if the whole CR was considered as one district. Here, a quorum of 5%, reduced quorum of 1%, or eventually no quorum is used. The 3% quorum (for a state activity allowance) is not stated, as no party has reached between 3 and 5%.

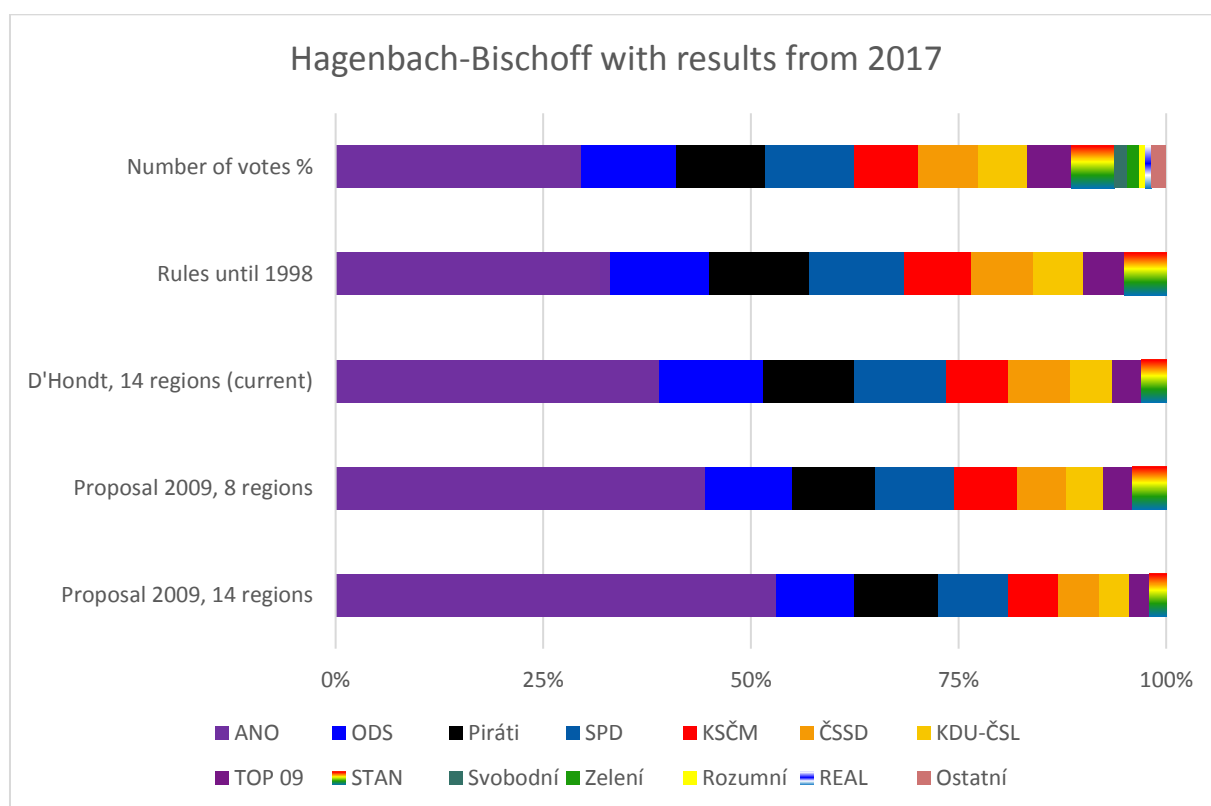
Abbr.	Results %	Real mandates	Hagenbach-Bischoff			The whole Czech republic as one circuit		
			1998	2009		5% quorum	1% quorum	Without quorum
			8 regions	14 regions				
ANO	29,64%	78	66	89	106	64	62	61
ODS	11,32%	25	24	21	19	24	24	23
Piráti	10,80%	22	24	20	20	23	22	22
SPD	10,64%	22	23	19	17	23	22	22
KSČM	7,77%	15	16	15	12	17	16	16
ČSSD	7,28%	15	15	12	10	15	15	15
KDU-ČSL	5,80%	10	12	9	7	12	12	12
TOP 09	5,31%	7	10	7	5	11	11	11
STAN	5,18%	6	10	8	4	11	10	10
Svobodní	1,57%	0	0	0	0	0	3	3
Zelení	1,47%	0	0	0	0	0	3	3
Rozumní	0,72%	0	0	0	0	0	0	1
REAL	0,71%	0	0	0	0	0	0	1
Others	1,79%	0	0	0	0	0	0	0



The graph below shows specifically that in case of the number of mandates in case of abolition of 5% of the quorum and of all regions would better correspond to the percentage distribution of votes. However, this method would not improve the problematic situation after the elections with coalition formation. It is interesting to compare the fact with the recalculation according to the governmental proposal of 2009 – if we take the 8 recommended counties, the winning ANO would get 11 more seats. This proposal is absurd with 14 counties - less than 30% of votes is enough for 54% of mandates. Let us look at how individual post-electoral coalitions would be affected by the post-electoral coalition ODS + Piráti + ČSSD + KDU-ČSL + TOP 09 + STAN + Svobodní + Zelení over the post-electoral cooperation of the parties ANO + SPD + KSČM. We do not consider two possible Members from Rozumní and Realisté:

Coalition	Results %	Real mandates	Hagenbach-Bischoff		The whole Czech republic as one circuit		
			1998	2009	5% quorum	1% quorum	Without quorum
„Democrats“	41,45%	70	80	55	81	85	84
Coalition with ANO	48,05%	115	24	135	104	100	99

Here we can see that the real results, in the end, make a significant contribution to the coalition. So there is probably no need for an electoral system to change in terms of expected government parties.



## POSSIBLE ALTERNATIVE RESULTS

The text [Adj2017] addresses how the House would look if the KDU-CSL and STAN were not elected separately but would join the planned coalition and the same number of voters would vote for this coalition as they would eventually vote to both individual parties. These calculations ignore the fact that some voters would have been deterred by the merger and others would be brought in. It shows, however, D'Hondt's full influence on smaller parties.

<b>Coalition KDU-ČSL + STAN modellation</b>		
	Reality	Coalition
<b>ANO</b>	78	75
<b>ODS</b>	25	23
<b>KDU-ČSL + STAN</b>	16	22
<b>Piráti</b>	22	22
<b>SPD</b>	22	22
<b>KSČM</b>	15	15
<b>ČSSD</b>	15	15
<b>TOP 09</b>	7	6

(Source: [Adj2017])

Immediately after the elections, it was clear that a situation where the election winner - the party ANO - would have the problem of assembling the government for disagreements with other parties. We can see that the coalition would greatly help the parties themselves, but ANO would not be weakened too much and the problems to assemble the government would remain. In [Adj2017], the author addresses a previously not considered KDU-ČSL + STAN + TOP 09 coalition, even though it would not have enough mandates for a coalition government base, although the ANO position would be significantly weakened.

Surveys during the counting of votes predicted STAN's failure. It seemed that even TOP09 would have less than 5%. Finally, both parties have their representation in the Chamber of Deputies, that has the largest number of parties since 1992 when there were also 9 parties. A large number of parties is a synonym for the problematic creation of post-electoral coalitions and the subsequent non-stability of the government. Let's look at how the House would look if one of the parties did not really get the 5%.

Let's take the number of votes for each party and assume that some of the TOP or STAN voters would elect a party that did not reach the Chamber of Deputies. I.e. the votes of these voters are counted in the number of all votes in the region and affect the distribution of mandates between the regions, but they no longer enter the distribution of mandates in the region itself.

<b>Modeling results with fewer votes for STAN or TOP09</b>				
	real	without STAN	without TOP	without TOP & STAN
<b>ANO</b>	78	80	80	83
<b>ODS</b>	25	25	25	25
<b>SPD</b>	22	22	23	24
<b>Piráti</b>	22	23	25	25
<b>KSČM</b>	15	16	15	16
<b>ČSSD</b>	15	15	15	16
<b>KDU-ČSL</b>	10	11	11	11
<b>TOP 09</b>	7	8	0	0
<b>STAN</b>	6	0	6	0

(source: [www.volby.cz](http://www.volby.cz) + own calculations)

The results of the elections allowed a single coalition of two parties - ANO + ODS. This is completely impossible due to conflicts between the parties. If any of the STAN or TOP parties were missing, a new possible coalition of two sides could emerge - SPD + ANO. It is quite likely that this coalition will ultimately be the basis of the government coalition, however, with the support of another subject.

## WHY DIVIDE THE REGIONS FAIRLY

As already mentioned in the introduction, the current system of regions causes a large disproportion in the number of mandates to the county and the associated necessary number of percentages to the MP's profits in the region. Responsible voters are aware that they are choosing a party with lower potential, so they are willing to travel to neighboring counties to make their voice meaningful.

In 2006, the last SZ was 6.19% and 6 mandates, while the penultimate KDU-ČSL 7.22% was enough for 13 mandats. The absurd situation was also influenced by the fact that 4.34% of the votes in the Moravian-Silesian Region were enough for the mandate, while 9.58% in the Liberec region did not.

In the world where D'Hondt is used, it is typical that the counties are about the same size. In the Czech Republic, the smallest, Karlovy Vary region has 5 deputies, in the largest region, it was 25. It follows that in the smallest region, the mandate is needed in the extreme case by more than 10% of the votes, whereas in the largest it is needed even below 5% votes in the respective region. Interestingly, the Karlovy Vary Region also had the lowest turnout.

So let's look at how many voices in the respective region or on the relevant party will be forfeited - people go to the elections and their vote counts only in the national number, but will not contribute to the election of a representative. In the extreme case, it can even help to increase the number of deputies in the region and thus reduce the number of deputies of the elected party in another region.

Below is an example of several counties of varying size and how many voices did not contribute to the election of the Member. The percentage of lost votes is calculated against all votes cast, and against the votes cast by the parliamentary parties. Here we can see that 42% of the voters in the Karlovy Vary Region do not have representatives in the Chamber of Deputies elected. For a number of political parties in the Czech Republic, a percentage of unrepentant ones is common, but this is already an alarming disparity.

Lost votes with respects to the regions							
	Středočeský	Praha	Moravskoslezský	Zlínský	Plzeňský	Liberecký	Karlovarský
<b>Total number of votes</b>	660 633	611 450	547 789	294 679	271 510	208 817	122 142
<b>Lost votes</b>	19 925	0	28 604	8443	35 774	38 914	43 119
<b>% vs all votes</b>	9%	7%	11%	9%	20%	25%	42%
<b>% of parliamentary parties</b>	3%	0%	6%	3%	14%	20%	38%

The next table tracks the number of votes counted, while the parties to the national average to enter the Chamber of Deputies, but to gain the mandate again, these votes were not counted in the region and the party has 0 members. Again, only 2 sides are represented in all regions, and 43% of the votes are the weakest STAN.

Lost votes with respects to the parties				
	Regions mandates	with	Lost votes	% of lost votes
ANO	14		0	0%
ODS	13		10 796	2%
Piráti	14		0	0%
SPD	14		0	0%
KSČM	12		23 941	6%
ČSSD	12		20 341	6%
KDU-ČSL	9		42 733	15%
TOP 09	4		106 574	40%
STAN	5		112 699	43%

## MODIFYING THE DIVISION OF REGIONS

[StK2016] divides the Czech Republic at the level of districts into 10 constituencies. It leaves Prague as one region with 22 mandates and, in the remaining districts, honors the borders of the regions and tries to make the constituencies more compact. There will be 18-21 mandates in each. The author, however, draws attention to the problem of the calculation. D'Hondt does not count the potential voters but real votes, so the accuracy of the calculation would require at least approximately the same voter turnout in all regions. On the other hand, it can be said that the region where voters do not have an interest in the election will be penalized rightfully.

What the author completely neglects is that voters staying abroad are assigned to one of the regions by lot, which also affects the number of voters and thus the number of seats in the region. On the other hand, some 15,000 foreign voters were enrolled in 2017, about 10,500 voted, which was 1.6% of voters in the region.

The organizational structure in the Czech Republic is based on the regions. Splitting into non-matching regions would be difficult to organize. It is, therefore, appropriate to respect the borders of the regions, only to connect them in larger units. One such link is the NUTS 2 statistical regions (see table). This split was also foreseen by the unapproved amendment of 2009. The smallest regions - Karlovy Vary and Ústí - are also together, and as they have the slightest turnout, 18 mandates would be based on this region. The ratio of the largest and smallest region is therefore 11: 6, which is not ideal, but significantly better than 5: 1 as it is now.

NUTS 3		NUTS 2			
District	code	region	Code	residents	mandates
Hlavní město Praha	CZ010	Praha	CZ01	1 259 079	24

<b>Středočeský kraj</b>	CZ020	Střední Čechy	CZ02	1 315 299	26
<b>Jihočeský kraj</b>	CZ031	Jihozápad	CZ03	1 212 423	23
<b>Plzeňský kraj</b>	CZ032				
<b>Karlovarský kraj</b>	CZ041	Severozápad	CZ04	1 123 265	18
<b>Ústecký kraj</b>	CZ042				
<b>Liberecký kraj</b>	CZ051	Severovýchod	CZ05	1 506 813	30
<b>Královéhradecký kraj</b>	CZ052				
<b>Pardubický kraj</b>	CZ053				
<b>Kraj Vysočina</b>	CZ063	Jihovýchod	CZ06	1 682 748	33
<b>Jihomoravský kraj</b>	CZ064				
<b>Olomoucký kraj</b>	CZ071	Střední Morava	CZ07	1 220 972	24
<b>Zlínský kraj</b>	CZ072				
<b>Moravskoslezský kraj</b>	CZ080	Moravskoslezsko	CZ08	1 217 676	22

(zdroj: cs.wikipedia.org/wiki/CZ-NUTS, www.vlada.cz + výpočet)

An alternative division is the increase of the number of voters in the Northwest region of the Liberec Region and the creation of the Central Region containing Vysočina, the Hradec Králové Region, and the Pardubice Region.

Kraj	Region	Mandates
<b>Hlavní město Praha</b>	Praha	24
<b>Středočeský kraj</b>	Střední Čechy	26
<b>Jihočeský kraj</b>	Jihozápad	23
<b>Plzeňský kraj</b>		
<b>Karlovarský kraj</b>	Sever	26
<b>Ústecký kraj</b>		
<b>Liberecký kraj</b>		
<b>Královéhradecký kraj</b>	Střed	32
<b>Pardubický kraj</b>		
<b>Kraj Vysočina</b>	Jižní Morava	23
<b>Jihomoravský kraj</b>		
<b>Olomoucký kraj</b>	Střední Morava	24
<b>Zlínský kraj</b>		
<b>Moravskoslezský kraj</b>	Moravskoslezsko	22

## CONCLUSION

In this article, we have shown the effects of different electoral systems on the changes in the proportionality of mandates to votes. The original system used up to 1998 corresponded to more real

percentages than the system currently used. The system proposed in 2009 was even further away. It is likely that the governing parties will feel confident enough to build system tailored to themselves. Whether it is right or not is a political issue rather than an analysis.

What is appropriate, however, is the size of the electoral regions so that voters feel that their voice is equal in each of the regions, and perhaps it also increases the interest to vote in the least-developed regions.

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# PERSONALISTIC MANAGEMENT IN EDUCATION

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## ABSTRACT

*Management in education is primarily concerned with the management of human resources. Personalistic management in education should be directed towards the development of all individuals (teachers, students, administration and service personnel, parents). In the process of personalistic management it is crucial to preserve the traditional values of the people: self-knowledge, openness, professionalism, discipline and consistency, justice and honesty, respect for other people. In this article, the concept of human being in a personalistic perspective as well as the process of managing through values in education will be presented.*

**KEYWORDS:** management, personalism, education, values

## INTRODUCTION

Management in education is primarily concerned with the management of human resources. In the educational organisation human resources includes teachers, students, administration employees, as well as parents. These resources should be managed appropriately. In sociological terms, the term "management" is a formal relationship between people who occupy different positions and perform roles related to them. The effectiveness of the educational system depends on the quality of the functioning of such connections<sup>1</sup>. In this article, the concept of human being in a personalistic perspective as well as the process of managing through values in education will be presented.

## HUMAN BEING AS A PERSON

The concept of a human being as a person was developed by the deliberations of the ancient philosophical tradition. It began in the early patristic period and is a combination of philosophical currents and the Christian theology.

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<sup>1</sup> L. Gawrecki, *Pedagogika zarządzania*, w: *Pedagogika*, t. 4, *Subdyscypliny i dziedziny wiedzy o edukacji*, red. B. Śliwerski, Gdańsk 2010, s. 374.

M. Gogacz while analysing the history of European thought, distinguished two leading models of human definition, on the basis of which the concept of a person originated and developed:

- a Platonic model – relationalistic, which is limited to the statement that one can speak about the human being in the context relations between human beings and the external beings. We can distinguish the following relations: "man-God" (M. Eliade, S. Kierkegaard, K. Rahner) "man-culture and nature" (Norwid), "man-other person" (Buber), relation between "a men and some wider structure treated as a whole" (Levi-Strauss, Teilhard de Chardin, Marx), relation "to oneself" (M. Heidegger, JP Sartre);

- Aristotelian model - substantial or essentialistic, according to which one can speak about the human being in the context of the inner content of man. This content is defined as a substance, or rather a rational substance (eg. Boethius, Thomas Aquinas, Maritain, Wojtyła, Gilson, Krapiec)<sup>2</sup>.

The first definition of a person was formulated by Boethius (c. 480-524), describing it as *rationalis naturae individua substantia*, so an individual substance of rational nature. In addition to the definition of Boethius, two more were given in the scholastic philosophy. The first one was taken from the theological patristic writings: *Persona est hypostasis distincta proprietate ad dignitatem pertinente* (hypostasis distinguished by a property of dignity). The second one was formulated by Richard of Saint Victor: *Persona est intellectualis naturae incommunicabilis existentia* (incommunicable existence of intellectual nature)<sup>3</sup>.

The Greek term *prosopon* meant "a mask". In the ancient Greek theater, its function was not only to cover the face but to reveal the essence of the message that was carried by the actor. The mask was to express the essence of art, to indicate whether it was a tragedy or a comedy. The content of the message was expressed by the action, words, gestures and the whole body of the actor.

In defining a person, the essential element is the activity, because they characterise the nature and specificity of the acting subject. Speaking about a man, one can use two terms: "nature" and "person". Nature is the subject of what is happening inside a person; the person is the "me" that manifests itself outside and is a conscious cause and subject of action. Through actions one can get to know the subject, that is the acting person<sup>4</sup>.

So, the term "person" means everything that a human being expresses through his or her autonomous and rational actions, the choices made, presenting a man as the author of acts. Through this the human being becomes himself. Man thus reveals himself as a person through realising the possibilities that lie within him<sup>5</sup>. An important element defining a person is the ability to self-consciousness and dispose of himself. Unlike another being who is not a person, the person is aware of his "me" and thus capable of developing himself through realising certain values, but being at the same time responsible for his actions<sup>6</sup>.

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<sup>2</sup> M. Gogacz, *Wokół problemu osoby*, Warszawa 1974, s. 16-17, 23-25.

<sup>3</sup> J. Herbut, *Osoba*, w: *Leksykon filozofii klasycznej*, red. J. Herbut, Lublin 1997, s. 417-418.

<sup>4</sup> W. Granat, *Osoba ludzka: próba definicji*, Sandomierz 1961, s. 7-8.

<sup>5</sup> Por. A. Maryniarczyk, *Filozoficzne obrazy człowieka a psychologia*, w: *Człowiek – wartości – sens. Studia z psychologii egzystencji*, red. K. Popielski, Lublin 1996, s. 106.



Personalistic anthropology distinguishes seven qualities, on the basis of which the humanity of a person is manifested in individual and social life: ability to know, ability to love, freedom, religiosity, legal subjectivity, completeness, dignity.

For the first time the term "personalism" (from latin *persona* – a person) was used by Friedrich Schleiermacher in "Speeches" (1799) to describe faith in the personal God (theism), who is a separate entity from the whole universe and possesses divine, subjective actions<sup>7</sup>.

The following scholars may be included to personalists: Charles Renouvier, Max Scheler (1874-1928), Emmanuel Mounier, Romano Guardini (1885-1968), Jacques Maritain (1882-1973), Karol Wojtyła (1920-2005), Czesław Bartnik.

The influence of personalism is evident in the works of Polish pedagogues and psychologists, including Ludwik Jaxa-Bykowski (1881-1948), Jacek Woroniecki (1878-1949), Stefan Baley (1885-1952), Mieczysław Kreutz (1893-1971), Stefan Kunowski (1909-1977), Stefan Szuman (1889-1972), Karol Górski (1903-1988), Józef Pietera (1904-1989), Józef Pastuszka (1897-1989), Feliks Wojciech Bednarski (1911-2006), Adam Rodziński (1920-2014), Franciszek Adamski, Mieczysław Gogacz.

## MANAGEMENT THROUGH VALUES

The term "value" (lat. *valor*) comes from the verb "to be valuable" (lat. *valere*). This term was originally derived from economics (value of goods, usable value, exchangeable value). In ancient Greece the chief values were truth, goodness and beauty. For Christianity as foremost in axiology there are evangelical values: faith, hope and love. The French Revolution has emphasized the triad: equality, freedom and fraternity. Today, such values as human dignity, pluralism, solidarity are the leading ones.

What are the values? Many philosophers believe that the notions of "values" cannot be correctly defined. Defining values is difficult because its scope is very wide and includes an element of subjective feeling and evaluation. In a different way it will be formulated by an idealist, a materialist or a spiritualist, and among them by a sociologist, psychologist, or historian. When describing a value, its relation to good should be taken into account.

According to Ken Blanchard and Michael O'Connor values connect people so they can get involved in work for common goals. Management through values requires two conditions: belief in established values and zeal for incorporating these values into reality. The process of management through values consists of three phases:

1. defining the mission or purpose and values,
2. communication of mission and values,
3. combining daily practice with mission and values<sup>8</sup>.

Š. Kassay believes that success in business is the pursuit of continued development while preserving moral and ethical principles. In the process of management it is crucial to preserve

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<sup>6</sup> Por. J. Herbut, *Osoba*, dz. cyt., s. 417.

<sup>7</sup> Por. S. Chrobak, *Podstawy pedagogiki nadziei. Współczesne konteksty w inspiracji personalistyczno-chrześcijańskiej*, Warszawa 2009, s. 263.

<sup>8</sup> Por. K. Blanchard, M. O'Connor, *Zarządzanie przez wartości. Jak sprawić, by osobiste wartości pomagały osiągać nadzwyczajne wyniki*, Warszawa 2015, s. 33.

the traditional values of the people: self-knowledge, openness, professionalism, discipline and consistency, justice and honesty, respect for the others<sup>9</sup>.

From the very beginning of the history of the world, a man is accompanied by a philosophical reflection on the meaning of his existence. Over the gate of the Temple of Apollon in Delphi, there was an inscription that summarised the ancient wisdom: "Know yourself." This maxim motivated passers-by to reflect: "What kind of man am I?"; it encouraged them to discover the truth about themselves.

French philosopher B. Pascal rightly thought that man is an unknown being to himself. Therefore, in managing through values it is important to discover the truth about oneself, about who a man is. The discovery of this truth will allow the employees to perceive their own pros and cons, strengths and weaknesses, and will give the right sense to their personal and professional life.

Knowing oneself helps a man to understand other people. It allows a person to shape relationships with others so that they can be appreciated and properly understood. A man who is aware of his advantages and disadvantages will be more likely to accept another people as they are. Such man will respect their freedom and will not try to make them "on his own."

The openness is needed in collaboration with other people. It means readiness to accept new ideas or proposals. It is also the ability to express one's own thoughts and opinions. This value is necessary to define the problem and seek for its solution.

In modern education the crucial value is professionalism. It means the ability to perform one's work at the highest level. Professionalism in education includes the following elements: knowledge of general theory of organisation and management of education, ability to make decisions, knowledge of effective modes of interpersonal communication, ability to manage people<sup>10</sup>.

In the common sense, discipline is based on obeying the rules of a given social group, such as subordinating the rules of an organisation. Discipline and consistency are the ability to consistent pursuit of bringing matters to completion.

In the teamwork the mutual respect is extremely important. It contributes to building trust and cooperation. The foundation of good relationships in the team is also justice and honesty in relation to the other person. It manifests itself in the right action.

## CONCLUSION

The personalistic management in education should be directed towards the development of all individuals (teachers, students, administration and service personnel, parents). Success in education is possible when there is a common pursuit of development. The quality of the relationship between the subjects of education depends on the effectiveness of the education system. In the process of personalistic management it is crucial to preserve the traditional values of the people: self-knowledge, openness, professionalism, discipline and consistency, justice and honesty, respect for the others.

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<sup>9</sup>Por. S. Kassay, *Przedsiębiorstwo i przedsiębiorczość*, t. 5, *Uczenie się i wzrost. Rozwój umiejętności adaptacji w środowisku kompleksowym i burzliwym*, Kraków 2017, s. 335. Zob. A. Lisnik, K. Grenova, *Values development in teaching process*, "Scientific Bulletin of Chełm - Section of Pedagogy" 2014, s. 13-19.

<sup>10</sup> Por. K. Atamańczuk, R. Przybyszewski, *Edukacja i szkoła u progu XXI wieku*, Olsztyn 2001, s. 43.

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# YOUTUBE ACTIVITY OF POLITICAL PARTIES IN 2017 CZECH ELECTIONS

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## ABSTRACT

*This research aims to analyze Youtube usage activity of political parties in 2017 Czech parliament elections. Research data contains overall statistics of official Youtube pages and their activity on the previous month before the election. The correlations analysis part deals with the question of "How are recent and overall Youtube activities of Czech political parties related with election outcomes?".*

## KEY WORDS

*Politics on Youtube, 2017 Czech Parliament Elections, Political Usage of Youtube*

## INTRODUCTION

The 2017 legislative elections were held in Czech Republic on Oct 20th and 21st, 2017. In addition to conventional ways of propaganda, political parties use social media to reach out their prospective voters. According to the latest reports by TechCrunch, Hootsuite and We Are Social, Youtube has over 1.5B monthly active users, which makes it the second most popular social media platform after Facebook.

This paper aims to analyze official Youtube channels' activity of the parties which won seats in parliament in the 2017 Czech Legislative Elections. Throughout the paper, the following questions will be investigated:

- Which parties are the most active parties on Youtube?
- Is it possible to figure out election results by looking at some Youtube statistics? Which parties does differentiate themselves according to their Youtube usage?

The political parties which won seats in 2017 elections and are subjected to this research are the following:

<b>Parties</b>	<b>Youtube Pages</b>
ANO	<a href="https://www.youtube.com/user/anobudelip">https://www.youtube.com/user/anobudelip</a>
ODS	<a href="https://www.youtube.com/c/odscz">https://www.youtube.com/c/odscz</a>
PIRATES	<a href="https://www.youtube.com/channel/UC_zxYLGrkmrYazYt0MzyV1A">https://www.youtube.com/channel/UC_zxYLGrkmrYazYt0MzyV1A</a>
SPD	<a href="https://www.youtube.com/channel/UCJjGNjN97BAk85Xb_c7shOQ">https://www.youtube.com/channel/UCJjGNjN97BAk85Xb_c7shOQ</a>
KSCM	<a href="https://www.youtube.com/user/czkscm">https://www.youtube.com/user/czkscm</a>
CSSD	<a href="https://www.youtube.com/user/cssdtelevize">https://www.youtube.com/user/cssdtelevize</a>
KDU	<a href="https://www.youtube.com/user/kduosl">https://www.youtube.com/user/kduosl</a>
TOP 09	<a href="https://www.youtube.com/user/topvidea">https://www.youtube.com/user/topvidea</a>
STAN	<a href="https://www.youtube.com/channel/UC_IGa0F710u9c0WMNgdOSA">https://www.youtube.com/channel/UC_IGa0F710u9c0WMNgdOSA</a>

Among 9 parties, only SPD uses the party leader's personal Youtube page as an official Youtube channel.

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## METHODOLOGY

The research is based on manual data collection from Youtube on Dec 6th, 2017 between 6pm and 11pm CET. The data has two dimensions:

- Overall Youtube channel statistics of the Czech parties beginning from their joining
- day to Youtube until the mentioned time above
- The previous month (Sept 20th,2017 – Oct 19th,2017 period) activities of the Czech parties before the 2017 Elections
- For convenience, “the previous month” will refer to Sept 20th,2017 – Oct 19th,2017 period, throughout this paper.

The collected data is analyzed with Microsoft Excel formulas.

## RESULTS

The results of 2017 elections are following:

Party	# of Votes in 2017 Elections	Seats Won in 2017 Elections	Swing Compared to Previous Election	Seat Change Compared To Previous Election
ANO	1,500,113	78	10.98%	31
ODS	572,962	25	3.59%	9
PIRATES	546,393	22	8.13%	22
SPD	538,574	22	N/A	N/A
KSCM	393,100	15	-7.15%	-18
CSSD	368,347	15	-13.09%	-35
KDU	293,643	10	-0.98%	-4
TOP 09	268,811	7	-6.69%	-19
STAN	262,157	6	N/A	N/A

Youtube Activity of Political Parties in 2017 Czech Legislative Elections

### The Scoreboard for Videos Uploaded During The Previous Month

Party	Total # of Videos (Previous month)
SPD	53
TOP 09	38
STAN	28
ANO	24
PIRATES	19
ODS	16
KDU	12
KSCM	6
CSSD	6

SPD is the most active party on Youtube with 53 videos uploaded during the previous month.

### The Scoreboard for Total Content Duration During The Previous Month

SPD is again the leading party according to total duration of created video content with over 9 hours. KSCM takes the second place even if they have only 6 videos uploaded.

Party	Total Video Duration (Previous month)
SPD	9:02:15
KSCM	6:11:28
PIRATES	5:02:58
ANO	1:32:13
TOP 09	0:30:37
ODS	0:27:56
CSSD	0:26:29
STAN	0:18:45
KDU-	0:12:18

### Average Video Durations During The Previous Month

The longest videos are created by KSCM and the shortest videos are created by STAN and TOP 09. KSCM outliers with over 1 hour length of videos.

Party	Average Video Duration (Previous month)
KSCM	1:01:55
PIRATES	0:15:57
SPD	0:10:14
CSSD	0:04:25
ANO	0:03:51
ODS	0:01:45
KDU	0:01:01
TOP 09	0:00:48
STAN	0:00:40

### 3.5. The Scoreboard for Total Video Views During The Previous Month

TOP 09 has the largest number of total video views during the pervious month. The long KSCM videos resulted into the worst results according to video views.

Party	Total Video Views (Previous month)
TOP 09	1,540,202

ANO	1,267,615
KDU	1,207,115
PIRATES	1,051,195
ODS	990,656
SPD	341,034
STAN	236,682
CSSD	115,837
KSCM	10,922

#### Youtube Activity of Political Parties in 2017 Czech Legislative Elections

### 3.6. The Scoreboard for Average Video Views During The Previous Month

KDU-CSL is at the top of the scoreboard according to average view per video uploaded during the previous month. Once more, KSCM is at the bottom of the list with their long duration videos. The interesting result is for SPD. SPD was the winner of total view duration and total number of videos uploaded during the previous month. However, they have the second worst average per video view.

Party	Average Views per Video (Previous month)
KDU-	100,592.9
ODS	61,916.0
PIRATES	55,326.1
ANO	52,817.3
TOP 09	40,531.6
CSSD	19,306.2
STAN	8,452.9
SPD	6,434.6
KSCM	1,820.3

### The Most Watched Videos During The Previous Month

The most viral content is created by PIRATES during the previous month with nearly 1M views.

Partys	Video Title	Publish Date	Video Duration	Views
Pirates	Piráti: Pusťte nás na ně. Všichni nekradou!	26-Sep-17	00:01:04	932,678
KDU	V jaké České republice chcete žít?	26-Sep-17	00:01:00	632,717
TOP 09	Jde nám o právo a demokracii	04-Oct-17	00:00:30	532,961
TOP 09	Přijďte k volbám. My neuhneme	02-Oct-17	00:00:30	381,607
ANO	RODINNÁ VILA MILIARDÁŘE?!	06-Oct-17	00:05:25	365,383



## CORRELATION ANALYSIS

### Correlation Between Total Number of Videos Uploaded and Election Results

There is a strong negative correlation between number of videos uploaded ever and changes compared to previous elections. Thus, performance of political parties on Youtube creates question marks in minds.

	Total Video Views Since Joined Youtube	Total # of Videos Since Joined Youtube
Corelation with Swing to Previous Elections	0.430	-0.742
Corelation with Seat Change To Previous Elections	0.412	-0.739

### Correlation Between Number of Subscribes and Election Results

There is a strong positive correlation between number of subscribers and changes compared to previous elections. Therefore, number of subscribers can be an indicator of election results.

	# of Subscribers
Corelation with Swing to Previous Elections	0.773
Corelation with Seat Change To Previous Elections	0.780

### Correlation Between Average Video Views Per Video and Election Results

There is a very strong correlation between average video views and election results.

	Average Views Per Video
Corelation with Swing to Previous Elections	0.871
Corelation with Seat Change To Previous Elections	0.869

However, the significance of correlation coefficient goes down when the previous month statistics considered.

	Average Views per Video (Previous month)
Corelation with Swing to Previous Elections	0.516
Corelation with Seat Change To Previous Elections	0.483

Therefore, we can conclude that continuous performance is more important for political parties than the previous month performance.

**Correlation Between Average Video Views Per Day and Election Results**

Average video views per day has a correlation with election results. Considering results for average video views per video and per day together, the importance of continuous Youtube performance can be mentioned.

	Average Video Views Per Day
Corelation with Number of Votes	0.642
Corelation with Seats Gained	0.627
Corelation with Swing to Previous Elections	0.621
Corelation with Seat Change To Previous Elections	0.619

**Correlation Between The Previous Month Activity and Election Results**

There is weak correlation between all of the previous month metrics and election results. Therefore, we can conclude that the previous month before the elections is not the most significant month to change people's mind for political parties.

	Total Video Duration (Previous month)	Total Video Views (Previous month)	Total # of Videos (Previous month)	Average Views per Video (Previous month)
Corelation with Number of Votes	0.055	0.306	0.069	0.158
Corelation with Seats Gained	0.036	0.299	0.037	0.168

**CONCLUSION**

SPD is the most active part during the previous month of the elections. KSCM has the longest content durations. The most viral content of the period is created by PIRATES. There is a strong negative correlation between number of videos uploaded ever and changes compared to previous elections. Number of subscribers can be an indicator of election results.

The strongest correlation is between average video views and election results. Considering results for average video views per video and per day together, the importance of continuous Youtube performance can be mentioned.

There is weak correlation between all of the previous month metrics and election results. Therefore, we can conclude that the previous month before the elections is not the most significant month to change people's mind for political parties.

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