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## ICT Driven Public Service Innovation

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Editor: András Nemeslaki

**ICT Driven Public Service Innovation**  
Comparative Approach Focusing on Hungary



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**Public Service Innovation**  
Comparative Approach  
Focusing on Hungary

National University of Public Service  
Institute of International Studies  
Budapest, 2014

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Institute of International Studies

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# Table of contents

## **Chapter 1 – ICT Driven Public Service Innovation** (*András Nemeslaki*)

1.1 ICT drives innovation .....	9
1.2 ICT development and structuration of socio-technical institutions .....	10
1.3 Innovation and innovation systems .....	12
1.4 The new world of many faceted innovation – innovation models in the networked economy .....	15
1.5 ICT and public service innovation – concepts and illustration in the case of Hungary .....	24
1.6 Summary .....	27
1.7 References .....	28

## **Chapter 2 – ICT Trends which Drive Public Service Innovation** (*Csaba Krasznay*)

2.1 Introduction .....	31
2.2 Current trends in IT .....	32
2.3 Main pillars: data, security and interoperability .....	35
2.4 Basis of IT: infrastructural questions .....	37
2.5 New applications, new users .....	42
2.6 ICT developments in Hungarian Public Administration .....	43
2.7 Challenges and Opportunities of the Next Few Years .....	46
2.8 Summary .....	47
2.9 References .....	48

## **Chapter 3 – Information Systems and Economic Value Added: A Comparative Illustration of Austria and Hungary** (*Péter Sasvári - Wolf Rauch*)

3.1 Introduction: the concept of added value and ICT development in organizations .....	51
3.2 The relationship of ICT development and economic performance .....	53
3.3 How does organizational use of ICT contribute to better organizational performance .....	59
3.4 The role of IT infrastructure .....	60
3.5 Information Systems .....	62
3.6 Information Systems management – responsibility for ICT .....	68
3.7 Conclusions .....	69
3.8 Acknowledgment .....	70
3.9 References .....	70

## **Chapter 4 – E-government: Efficiency Enabled by Interoperability** (*Mihály Csótó*)

4.1 The interoperability challenge – past, present and future .....	73
4.2 History and definition(s) the European context .....	73
4.3 Why is interoperability important? .....	78
4.4 Case studies: interoperability under power .....	81
4.5 Initiatives supporting interoperability in Hungary .....	85
4.6 Summary .....	88
4.7 References .....	89

<b>Chapter 5 – E-Inclusiveness and Its Importance in the Digital Age</b> ( <i>Szilárd Molnár</i> )	
5.1 Introduction: e-Government is a key factor in competitiveness and good governance .....	93
5.2 Usage of e-Government services .....	95
5.3 Barriers of using e-Government .....	98
5.4 Building the basic infrastructure of e-Government .....	100
5.5 Legal foundations for increased use: new administration model for ICT based services .....	102
5.6 Increasing user inclusion by the new e-administration model .....	104
5.7 Summary .....	105
5.8 References .....	107
<b>Chapter 6 – Information Security - Strategy, Codification and Awareness</b> ( <i>Támás Szádeczky</i> )	
6.1 Security implied by technology .....	109
6.2 Early strategies and legislation 1989-2008 .....	111
6.3 Interim strategy of 2009-2012 .....	117
6.4 Latest information security strategy from 2012 .....	119
6.5 Consequences .....	120
6.6 References .....	121
<b>Chapter 7 – ICT Enabled Cross-Border Governance</b> ( <i>Gyula Ocskay</i> )	
7.1 Introduction .....	123
7.2 Theoretical background of governance: modernity and the nation states .....	123
7.3 Theoretical background of borders .....	125
7.4 Cross-border governance .....	126
7.5 ICT enabled cross-border governance .....	130
7.6 Conclusion and Summary .....	134
7.7 References .....	135
<b>Chapter 8 – Social media and emergency – new models and policies enhancing disaster management</b> ( <i>Árpád Rab</i> )	
8.1 Introduction - not only life changer, but also lifesaver? .....	137
8.2 Social media in Information Society .....	138
8.3 Working solutions - experiences and directions .....	140
8.4 The Ushahidi platform - professional solution for crowdsourcing crisis information near real-time .....	142
8.5 Nextdoor - private neighbourhood social network .....	143
8.6 Lifeline - innovative Twitter geo-local accounting .....	145
8.7 Facebook - Disaster Message Board .....	146
8.8 Challenges of the next generation emergency management - factors influencing the new emergency management .....	147
8.9 Conclusions .....	151
8.10 References .....	152

## **Chapter 9 – Social Media Innovation in Political Communication:**

### **Alternative or Mainstream?** (*Norbert Merkovity – Robert Imre – Stella Major*)

9.1 Introduction .....	155
9.2 Manipulated ‘Old’ Media .....	155
9.3 New Media Landscape .....	156
9.4 Research: Australian and Hungarian representatives on the Facebook .....	159
9.5 Possible expectations of Australian and Hungarian MPs regarding .....	164
the new media .....	164
9.6 Social media as alternative media in political communication .....	166
9.7 Conclusion .....	169
9.8 References .....	169

## **Chapter 10 – The Quest for ICT Innovation Opportunities: Using Futures**

### **Studies Approach in Digital Government** (*Eszter Monda*)

10.1 Introduction: Connection of Futures Studies and Digital .....	
Government .....	173
10.2 Introduction to Future Studies .....	175
10.3 Using Futures Studies approach in digital government .....	180
10.4 Trans-disciplinary, complexity and participation characteristics .....	187
10.5 Scenario building in future studies .....	191
10.6 Summary and conclusions .....	194
10.7 References .....	194

<b>Authors</b> .....	197
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# Chapter 1

## ICT Driven Public Service Innovation

### 1.1 ICT drives innovation

In our volume we explore how info-communication technologies (ICT) and information systems (IS) enable innovation in some areas of public services. The relevance of this topic can be underlined either by arguments on ICT development or by analysing the pressures on public service to innovate.

During the last 20 years, when the term e-business and internet economy appeared, several industries have been restructured due to the ICT “disturbance”, some of them we can hardly recognize from their past perspectives. The internet has reformed for instance several media industries like music, television and film; retail business like books, newspaper, apparel, or electronics; and many of the services such as travel, banking, or insurance. Initially, the e-business revolution only happened in the industries of the informational or digital products and others which were not using information technology intensively remained intact. As, however, ICT became more pervasive and affordable pressure on innovation has also become more widely spread.

Pervasiveness might be characterized by penetration, mobility and by access to computers, devices and networks. We are very close to the situation when the total number of the world’s population is being connected, and pervasiveness reaches everyone. By 2020 terms the digital divide of in the globe will basically disappear, in Africa, Asia and South-America everyone will have internet access and mobiles, while the questions of hunger, epidemics and healthcare will still be unsolved. Affordability, on the other hand, means costs and how these costs of hardware, software and connectivity are compared to incomes and general economic development per capita. We can also witness tremendous progress in this area, not only the devices getting cheaper and cheaper but telecommunication rates as well. Our first argument for the pressure from ICT driven innovation are these fundamentally classic economical issues. However, ICT based industrial reconfiguration does not only happen because of the ICT economics, but because with their application we can do things fundamentally differently. In a fascinating monograph former Google CEO Eric Schmidt and Jared Cohen a foreign relations and counterterrorist expert paint an exciting new world of the future in the digital age –how ICT reshapes people, businesses and nations all together [1].

Since the 2008 global financial crises which really hit European Union countries as well, several concepts are being reconsidered or at least debated about governments and public services. Slow growth cannot provide enough funding, revenues of budgets are soaring and the costs of the welfare states are still growing. The long awaited efficiency has become an absolute must – needed more than ever. Given the fact that the largest employers in many countries are public services they should really provide high value added. If they do not function well, they do not provide economic stimulus.

Tasks and responsibilities are not getting less, and delivering them with fewer resources can only be achieved by radical restructuring, conceptual redesign of functionalities, and innovation in general. Due to richness and complexity of the pragmatic and conceptual problems and pressures of public administration, governance and government in our contribution we avoid getting entangled in these issues. For our purposes we just use the final conclusion of the need for innovation.

## 1.2 ICT development and structuration of socio-technical institutions

For the purposes of exploring how ICT impacts public service innovation we use a pragmatic definition of info-communication technologies, which characterise ICTs as the convergence of several concepts in digital technology, telecommunication and computer networks; artefacts which have embedded microprocessors and memory chips; computer hardware and software; communication tools and devices. We can safely say that due to the convergence of computing and communication the historical difference between the “classical” Information Technologies (IT), - like computers, servers - and communication technologies - such as telephones, media devices – are disappearing. As a terminological consequence of this quite often IT and ICT are used synonymously.

Study of ICT (and IT) belong to the domain of natural science (computer and system engineering, mathematics) most recently expanding into multidisciplinary directions of biology and medical sciences (“bioinformatics”) and chemistry (intelligent materials etc.) These research and development directions will determine major aspects of human life and its ecosystems greatly effecting evolution as well (genome science, extended life span, artificially augmented human life etc.)

From innovation point of view it is important that ICT is defined as a General Purpose Technology which is crucial for three main points:

- a) Expanding to everywhere
- b) With development it reduces cost of use
- c) Triggers innovation: it enables research and development, developing new products, services and processes

In Chapter 2 Krasznay summarizes those essential focal points and ICT drivers which have implications on innovation in other industries and sectors such a public administration. His conclusion is that by 2020 three main areas provide opportunities delivered by the ICT industry worldwide:

- Big Data and Information Security
- Cloud based infrastructure combined with extensive user mobility and embedded computing
- New style of collaborations and transformation of applications

As Krasznay introduces these points in detail we can realize that the extensive reach of ICT for basically everyone at reasonable costs, with minimal cognitive effort in a seamless fashion and by penetrating into every aspect of our life raises the ICT “social dimension” much higher than in earlier years.

ITs from the time of their inception are interacting with society. They have been used in organizations, complex social systems of all kinds: military, scientific, educational, business, public etc. Beyond the use of ITs, their developers themselves are part of different social communities of engineers, scientists, entrepreneurs and they are not being isolated from social values and motivations either. As a matter of fact, this is one of the key arguments that the treatment of IT as “a pure natural science artefact” can be questioned as it has so eloquently elaborated by the Nobel-laureate Herbert Simon in his classic “The Sciences of the Artificial” [2, pp. 17-18]:

No artefact devised by man is so convenient for ... functional description as a digital computer. It is truly protean, for almost the only ones of its properties that are detectable in its behaviour ... are the organizational properties. The speed with which it performs its basic operations may allow us to infer a little about its physical components and their natural laws: speed data, for example, would allow us to rule out certain kinds of “slow” components. For the rest, almost no interesting statement that one can make about an operating computer bears any particular relation to the specific nature of the hardware. A computer is an organization of elementary functional components in which, to a high approximation, only the function performed by those components is relevant to the behaviour of the whole system.

The highly abstractive quality of computers makes it easy to introduce mathematics into the study of their theory – and has led some to the erroneous conclusion that, as computer science emerges, it will necessarily be a mathematical rather than an empirical science.

In this context we expand the terms IT and ICT to Information Systems (IS) which notion entails the complex relationship between technology and society [3]. Information systems are not composed of technology alone, they are systems which emerge from the mutually transformational interactions between the information technology and the organization. The duality of this relationship is essential for understanding how innovation is enabled by ICT, because information systems are as much the result of ICT enabling an organization, as much as an organization enables an information system. Furthermore, both the economic value and the broader social value of such systems depend on how successfully this duality works, and how ICTs and organizations create new institutionalised socio-technical systems [4], [5], [6], [7].

In the field of information systems structural models – stemming from Giddens’s general structuration theory - are very useful theoretical frames to conceptualize the social process through which technologies are implemented, used and institutionalized[8]. In the centre of structural concepts we find structure: which is defined as a set of rules and resources organized as properties of social systems. Systems are reproduced relations between actors or collectives, organized as regular social practices, and according to these constructs social structure is constantly created through the flow of everyday practices shaped by a mutually constitutive duality of agency and institutions[9]. Two enhancements of Giddens general structuration theory had been applied specifically to the IS field; adaptive structuration theory and the theory of duality of technology [9].

Adaptive structuration theory (AST) developed by DeSanctis and Poole argues that structural features of information technology are not pure interpretations of institutional

structures, but they are incorporated by the designers as they reproduce and modify them, thus creating new structures within the technology. Successful adoption of IT in the AST framework happens when appropriation - the actions taken by individuals or groups to instantiate structures – are consistent with the technology’s structural potential [10].

The duality of technology concept offers an insight to how relationships between technology and organizations work[11]. The term captures the dichotomy of technology and human influence that technology both shapes and is shaped by human action. She argues that technology is physically and socially constructed through an ongoing dynamic interaction with human actions and becoming institutionalized through this structuration process. This interaction between humans and technology is the so called interpretive flexibility of technology - a key construct in the school of social construction of technology (SCOT) [12]. We can define it as a descriptor of the relationship between humans and technology containing three characteristic sets: the technology artefact, the human agent, and the context[12]. The duality concept captures both the creative, emergent nature of innovation adoption and also the physical, historical and contextual constraints at any given time.

In Chapter 3 Sasvári and Rauch present the concept of information systems and how they are deployed in business organizations. They describe the different characteristics of IS archetypes, and taking a mezo-economic approach to analyse the up-take in Austrian and Hungarian enterprises. They underline the critical differences and come to the conclusion, that ICT enabled structuration has created more effective socio-technical institutionalization within Austrian enterprises than Hungarian ones. In their study they also prove that higher level of ICT usage strongly correlates with corporate added value, so successful ICT institutionalization in the enterprise sector seems to be a good indicator for economic success.

Building on the technical and social implications of ICT, the main objective of the studies in this volume is to provide an overview how ICTs as general purpose technologies enable innovation in the public sector. Given, that the really broad church of innovation studies literature already has plenty of findings on this topic, we specifically would like to contribute to increase our knowledge in this area by presenting papers with original empirical research contributions focusing on Hungary and Central Eastern European regional comparisons.

### **1.3 Innovation and innovation systems**

According to the Oslo Manual innovation is defined as “the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations.” [13].

In the European Public Service Innovation Scoreboard (EPSIS) report, these categories are amended by the specialties of public organizations where the terms “product” and “marketing” had to be interpreted according to the special nature of these organizations[14].

Private Sector Innovations	Public Sector Innovations
product (good or service)	service
process	process
organizational	organizational
marketing	communication

*1.1. Table. Different type of innovation in the public and private sectors [14]*

For EPSIS the definition of public sector innovation: “An innovation is a new or significantly improved service, communication method, process or organisational method” [14].

In the field of communication these innovations might affect new or improved methods of promoting an organisation and its services; new ways to motivate user behaviour or citizens, or commercialisation of services or goods. In the field of organisational methods innovation might influence the methods of providing services or interacting with users; new or improved delivery or logistic; new or improved activities in maintenance, accounting or computing systems; improved management systems; or creative methods of organising work and decision making.

Whichever focus of innovation we take, let that be service, process or organization they are all connected to the notion of creativity; effective change management, uncertainty and risk taking, entrepreneurial agility, knowledge transfer and diffusion, implementation efficiency. Without going deeply into innovation theories, we can safely say that the lack of abilities hinder innovation; the process of up-taking and disseminating a new idea might be halted at many different stumbling blocks. Furthermore, as determinants of innovation – or according to our approach ICT enabled change - are not (only) to be found in individual organizations, but (also) in a broad societal structure in which organizations, as well as knowledge institutes, are embedded. Innovation is created during interactions between several actors like people, enterprises, institutions, and the flow of technology and information is essential to enable an innovative environment.

This conceptual problem is captured in the discourses about innovation systems or innovation eco-systems, which study the influence of societal structures on technological change, and indirectly on long-term economic growth, within nations, sectors or technological fields[15]

### **1.3.1 Linear innovation model**

The linear innovation model describes the classical and traditional diffusion of ideas from research to business application and organizational adoption which is often called the innovation chain. This innovation chain is the one-directional relationship between basic research, applied research, development, production and dissemination. Typical organizations along the chain are research institutes, universities, testing laboratories, enterprises and consumers. Government interventions usually in this type system attempts to support, motivate and create effective diffusion systems, basically to achieve

a steady and productive flow of innovations. R+D might be considered as a subsystem of the chain consisting of basic research, applied research and test development.

### **1.3.2 Spiral innovation model**

Spiral or circular innovation model emphasizes the importance of feedback at all phases of dissemination in contrast with the one-directional open chain linear model. Conceptually, in circular innovation systems ideas are fully developed in pilot format using miniature chains of research-development-testing-production, and then gradually expanding the functionality of the pilot cases by widening the scope of development and group of stakeholders. Government interventions in these systems focus on enhancing rich communication and cooperation between organizations, ensuring that task and knowledge sharing can happen in multi-directional flows.

### **1.3.3 Triple-helix Innovation model**

Etzkowitz and Leydersdorff have worked out the triple-helix innovation model [16], which they founded upon the experiences of those countries after the second world war which have been producing outstanding indicators in economic development, competitiveness, and adoption of innovations. They identified that there is a difference in economic performances among the countries with high level scientific outputs regarding the competitiveness, sustainability and efficiency in their different industries. They found that the explanation of these differences lie in the intensity of relationship and collaboration between enterprises, university laboratories and governmental agencies, therefore in the triple-helix innovation system pivotal roles are attributed to these three kinds of organizations for knowledge creation and dissemination:

- universities and research institutions, as knowledge creators and disseminators,
- governmental research agencies creating strategies and targeted R+D if necessary,
- innovative enterprises who are not risk averse and bring ideas to markets.

Triple-helix governmental models have been popular in the Scandinavian countries due their normative nature and natural fit with the culture of education and entrepreneurship in that region.

### **1.3.4 Networked or chaotic innovation models**

Networked innovation models capture the micro-level social processes which create functional institutions. We already argued that in the case of ICT adoption these emergent coalitions between people, organizations, technology and processes are essential for structuring effective socio-technical systems. In the case of innovation these models take on two empirical observations:

- a) stakeholders operating at the different phases of innovation are not sole organizations or individuals, but rather actors of complex networks,
- b) progress of innovation is non-linear and influenced by the emergent behaviour of the actor-network of humans, technology artefacts, and objects participating in the innovation process[17]

For instance, the networked conceptualization of the innovation process is a kind of acknowledgment that information and knowledge sharing happens between

R+D networks and industrial networks, and not a particular R+D and industrial company. At the same time, diffusion of technology amongst consumers happens according to the reaction of communities not only the reaction of singular individuals. From government intervention point of view this model implies, that supporting communities of practice, virtual and real associations, unions, permanent and ad-hoc grouping of actors enhance this networking process and consequently the innovation effectiveness.

The second point has an alarming consequence for state interventions, implying that normative control does not always result in successful innovation performance, a key reason being that micro-social emergent behaviours do not support government intentions, or generate unexpected results. There are plenty of narratives telling stories about failing strategies to innovate because of cultural resistance, mis-matching technology deployment, lack of user training, conflicting political and economical interests, lack of educational background or different interpretations of technology between social groups. These phenomena results in chaotic innovation outcomes and non-linearity.

## **1.4 The new world of many faceted innovation – innovation models in the networked economy**

As a result of the high penetration of ICT into organizations and as a consequence of several industrial reconfigurations due to impact of networked technologies several new form of innovation appeared which generate academic discourses regarding innovation systems. First we take an introductory look at some of the most significant ones –this is the only realistic objective since they number is growing rapidly – and then draw a conclusion on these discourses and the end of this section.

### **1.4.1 User innovation**

A lot of synonyms are in use to describe the essence of user centred innovation like “pro-sumer innovation”, “co-creation” or “user-empowerment”, and these are widely applied in marketing and entrepreneurship. A classic reference in this topic Eric von Hippel’s volume titled “Democratizing Innovation” which is freely available on Amazon Kindle in order to really be faithful to the title [18] . Von Hippel describes user innovation as a natural response to some special, niche economical demand which has not been supplied by complex organizational systems. User innovation is not an ICT phenomenon, for instance the IKEA business model has been referred as a typical non-IT model of the “pro-sumer” solution. Consumers are involved in the IKEA production process (the expression comes from the merger of the two expressions) basically by assembling the furniture at home on their own. While there is little innovation opportunity on how to put together a chair or a dining table, consumers can innovate the process of assembly which quite often becomes a team building exercise between friends, or part of a leisure weekend in the family.



The real proliferation of user innovation has started with the user friendly, easy access ICT solutions, intuitive interfaces and open standards. The concept of “lead user” is a typical role in IT development projects: this is usually a highly experienced user of the system under development, and he or she is basically co-creating with the professional developers by providing feedback, initiating functional changes and creatively testing existing solutions. Lead users are often used as bridges between the developer and the user communities to help the technology diffusion process by tutoring, helping and providing new ideas for applications.

Von Hippel describes the important economic trade off decision of “should I, the user, innovate or should I wait for the supplier to do that”. Generally, user innovation has several real and transactional costs which might make user initiatives rather unfavourable. For instance, lack of documentation and adherence to standards create island solutions which cannot be scaled up or expanded later. Also inconsistent quality, legal issues with warranty might suggest to stay away from tinkering amateur solution and instead it is worth waiting for the supplier’s innovation.

In cases, however, where the need is very unique and isolated, or for other reasons it is not economical for the supplier to penetrate customized solutions by users can be very efficient. Several ICT tools provide great opportunities for democratizing innovation: we HD cameras which some years ago were only available in professional studios, we have user friendly software tools to solve complex decision problems, cheap and easy access measurement gadgets to monitor our health and configure our treatment accordingly. We also have services which allow user configurations, platforms which are essentially built on user contributions and pro active innovative behaviour (social media sites, application markets etc.)

#### **1.4.2 Perpetual beta innovation**

With the extreme development of microelectronics technology and the seemingly unstoppable Moore’s Law innovation cycles which have been built on hardware and software have started to shrink rapidly. And since these technologies have become embedded, that is by now they can be found basically in the core of every innovation, short innovation cycles are characteristic in almost every industry. Not only new mobile phones are out every year, but accompanying software updates are also so out with even higher frequency. Corporate IT infrastructure and personal computers also become obsolete in around three years pushing the requirements to realize benefits unreasonably quickly and aggressively in order to provide economic returns on these investments.

The combination of this technology pressure with the concept of user innovation has resulted in the perpetual beta innovation model, which is a manifestation of the shocking realization that innovation cycles never end, or service providers cannot guarantee of the shelf solutions – signed-and-sealed – and their maintenance according to traditional product development models. Beta tests have been used in software development for many years before the “perpetuality” phenomena came around; this has been the phase of user testing in real environments, before companies have released the final product, which had guaranteed quality. Beta testers were usually a selected group of users, in an optimum situation representing all the features of the intended

wider user community, so they experiences could be fed back to the developers to adjust flaws of design and improve functionalities.

Google, Facebook, Flickr and many other products were released to the market by stating that all users are basically beta testers, and the development is ongoing. User communities continuously provide ideas, drawing attention on security holes, refining solutions and creatively configuring these developments for their own needs. Perpetual beta type developments therefore put a lot of trust in collective intelligence and active participation.

Needless to say, that there are major risks attached to leaving users “playing” with applications on their own, and working with never “officially” approved releases. In some areas, like mission critical applications, high risk and exposure products, or where safety and security are of high concerns this innovation approach might carry more threat than advantage.

### 1.4.3 Open innovation

Open innovation as a concept is advocated and systematically documented by Henry Chesbrough [19]. According his definition open innovation is a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as firms look to advance their technology. Innovating openly involves sharing risks with partners and capitalizing on permeable boundaries between firms and their environments where innovations can easily transfer inward and outward.

The concept of user innovation, perpetual beta, but also the famous open source software development paradigm were playing great influence in conceptualizing the need to open up the closed innovation systems.

Open source software is not a new concept; the open source movement was initiated by Richard M Stallman already in 1983. The beginnings can be dated to the GNU-project which was a theoretically positioned platform idea against the UNIX development, thus the acronym recursively means GNU is Not UNIX. This refers to the fact, that code is UNIX-like, but not UNIX and free.

Later, in 1984 it was followed by the GNU Manifesto, then the GNU Foundation in 1985, and finally a GNU Open Software Licence in 1989. According to these developments a given application falls under the category of free software if it

- can be used by anyone,
- can be modified according to user needs (and for this purpose the source code is available),
- can be freely distributed and anyone can continue its development, and the results
- can be freely posted and distributed.

The GNU General Public Licence has a crucial importance in software innovation because it provides legal rights to developers everywhere to freely distribute and modify application, and also for its users to have access free of charge. GNU is the first and most widely known free software licence. By now, open source platforms intertwine our everyday life from mobile (Android Operating System) to internet browsers (Mozilla-Firefox) and special applications (Moodle-E-learning, Open-Office, etc.)

The notion of licence and patenting are in the core of open innovation. Companies cannot really afford to rely entirely on their own research, they should instead buy or license processes or patents from other companies as well. In addition, internal inventions not being used in a firm's business should be taken outside the company (e.g. through licensing, joint ventures or spin-offs), so the spread of knowledge and innovation ideas should be encouraged.

Open innovation opens doors to several off-springs of business model innovations, where revenue streams can be creatively orchestrated balancing between licence based and free software solutions. The “selling for free” and “subsidising by third parties” models just like the multi-user platforms are great applications of open innovations.

#### **1.4.4 Living lab innovation**

A living lab is a user-centred, open-innovation ecosystem, often operating in a territorial context (e.g. city, agglomeration, a region), integrating concurrent research and innovation processes within a public-private-people partnership. Although the concept was introduced first and is accredited to the Massachusetts Institute of Technology (MIT), over the years it has become a core of European innovation endeavours. Since 2006 in four waves several initiatives were launched resulting in 320 accredited living labs in Europe.

The living lab process, described by [20] which integrates both user-centred research and open innovation, is based on a maturity spiral concurrently involving a multidisciplinary team in the following four main activities:

- Co-creation: bring together technology push and application pull (i.e. crowdsourcing, crowdcasting) into a diversity of views, constraints and knowledge sharing that sustains the ideation of new scenarios, concepts and related artefacts.
- Exploration: engage all stakeholders, especially user communities, at the earlier stage of the co-creation process for discovering emerging scenarios, usages and behaviours through live scenarios in real or virtual environments (e.g. virtual reality, augmented reality, mixed reality).
- Experimentation: implement the proper level of technological artefacts to experience live scenarios with a large number of users while collecting data which will be analysed in their context during the evaluation activity.
- Evaluation: assess new ideas and innovative concepts as well as related technological artefacts in real life situations through various dimensions such as socio-ergonomic, socio-cognitive and socio-economic aspects; make observations on the potentiality of a viral adoption of new concepts and related technological artefacts through a confrontation with users' value models.

“A living lab is not similar to a testbed as its philosophy is to turn users, from being traditionally considered as observed subjects for testing modules against requirements, into value creation in contributing to the co-creation and exploration of emerging ideas, breakthrough scenarios, innovative concepts and related artefacts. Hence, a Living lab rather constitutes an experiential environment, which could be compared to the concept of experiential learning, where users are immersed in a creative social space for designing and experiencing their own future. Living labs could also be used

by policy makers and users/citizens for designing, exploring, experiencing and refining new policies and regulations in real-life scenarios for evaluating their potential impacts before their implementations”<sup>1</sup>

#### 1.4.5 Mash-up innovation

In the world of web design mash-ups are considered as typical Web 2.0 applications or technical solutions. The terms covers technologies when the data sets of two or more applications are connected or they presentation layer is merged in some way, which results in a new service or application. This connection is transparent to the user, it is seamless, fast and intuitive for providing high quality user experience. Mash-up applications are characterised by integration, aggregation and visualization and they provide high value added both for business and personal use. Technically, mash-ups are built on the API technology (Application Programming Interface) which creates the open data interchange and access to any user.

Several mash-up applications are collected, stored and commented on [www.programmableweb.com/mashups](http://www.programmableweb.com/mashups) at the time of writing this manuscript for instance there were more than 7400 mash-ups in 20 categories. For the sake of interest I show the most popular categories and the number available applications:

- mapping (2741)
- deadpool (1388)
- search (1090)
- social (1053)
- shopping (792)
- photo (790)
- video (681)
- travel (551)
- music (549)
- mobile (475)
- messaging (443)
- reference (409)
- news (388)
- visualization (340)
- fun (325)
- telephony (295)
- sports (293)
- realestate (252)
- microblogging (251)
- widgets (224)

Most popular mash-ups are mapping applications where a database is visually projected on geographical data, like showing how crime is distributed in cities, where the best fishing areas in the country can be found, how to find the best higher educational institutions or simply shopping and other service outlets in a neighbourhood.

1 WikipediaonLivingLabs:[http://en.wikipedia.org/wiki/Living\\_lab](http://en.wikipedia.org/wiki/Living_lab). Downloaded: 2014. 05. 04.

Mash-up innovations are the engines of several social media initiatives; in chapter 8 Rab discusses for instance how disaster management, crises relief can be supported by innovative social media applications such as ushahidi.com and nextdoor.com. Rab shows that the core of these platforms are built on the premise that gathering crisis information from the general public provides new insights into events happening in near real-time. He argues that these solutions are expected to help organizations marshal efforts to assist areas that are not well covered in the mainstream media. The Ushahidi platform, for instance is a collaborative project created by volunteers and managed by a core team. Most of the development team comes from different countries in Africa, including Kenya, Ghana, South Africa and Malawi, but there are also contributors in US and Europe.

Similarly to the open innovation concept, the mash-up approach also outgrows its pure ICT orientation. When expanding the notion of how to combine core competencies of two or more organizations, ideas or initiatives we can always refer to the mash-up models; at the end there has to be some sort of collaboration after all, since behind solutions there are always individuals, companies and different business interests. For innovation success these have to be aligned also.

#### **1.4.6 Platform innovation**

During the introduction of the previous models we have used the terminology “platform” in several occasions, just like we do that in everyday life, without being aware of the significance of platforms on the new generation of innovation models. During the last years, the ICT industry has become very platform driven, since most of the products from operation systems, to game consoles, and social media, extended to e-business portals all the way to the latest applications markets (App Store and Google Play) are actually platforms.

Platforms in economics are defined as two- or multi-sided markets (networks) because they supposed to service the different “sides” by aggregating demand and provide effective pricing mechanisms using the spillover effects and causal relationships between the “sides” [21].

Contrary to the so called one-sided networks, which were dominant at the appearance of the internet, participants in two-sided networks do not change roles, that is the suppliers are always suppliers and the customers are always customers. To see the difference, we can refer to e-mail networks, which are typical one-sided platforms, where participants constantly change roles: they both senders and receivers of messages.

There are two key actors in two-sided network models, firstly the sides (naturally they are different, but economically they have similar behaviours) and the network provider (the platform). Platform provides the basic infrastructure (hardware, software and services) and the general rules of the network (norms, protocols, contracts, guidelines).

I summarize some illustrative two-sided networks or platforms in 2. Table, indicating the two different sides and the different structures.

Platform (Network)	A side Users	A structure	B structure	B side Users
DVD	Viewers	Winner Takes it All		Studios
Windows Desktop	Users	Winner Takes it All		Developers
Online auction	Buyers	Winner Takes it All		Sellers
PDF	Readers	Winner Takes it All		Writers
Credit cards	Customers	Mixed Mode	Mix Mode	Merchants
Videogames	Gamers	Mono	Mix Mode	Developers
Recruitment sites	Job seekers	Mixed Mode	Mix Mode	Employers
Shopping mall	Customers	Mono	Multi	Merchants

1.2. Table. Illustration of different platform structures

Economics of two-sided markets are very complex, but as an introduction it is sufficient to know that the purpose of platform strategies is to create critical masses on both sides by creating effective same-side and cross-side network effects [22].

If we take videogame platforms, for instance, (Microsoft X-Box, Sony Playstation, or Nintendo Wii) revenues to Microsoft, Sony and Nintendo will flow in, if they have large number of gamers who play with lots of games. Therefore one strategy for these platform providers, is to create gamer communities to enhance the willingness to play. This is a same-sided network effect strategy. On the other hand, gamers can only play, if they have a good selection of a games to choose from provided by many different developers. Gamers will only by X-Box, Wii or Playstation if they certain that the platform has many developers, but developers will only invest into new game design, if they are certain that the platform is used by many gamers. This is a typical cross-side network effect. I invite the reader to identify same-sided and cross-sided network effects for the platforms in 2. Table.

Network strategies and complex pricing mechanism between the two sides and the platform might result in three extreme platform usage which are indicated in 2. Table. These are mono-homing, multi-homing and the winner-takes-it-all (WTA) structures.

Mono-homing is when users of a service join only to one platform, because they service needs are satisfied and/or it is convenient or technically feasible for them. For instance, in the case of videogames, users by usually one game console for many reasons. Probably the most important is pricing and the second is the lock-in effect of learning one system and collecting one set of DVD game collection.

Multi-homing is the situation when it is convenient and/or economical to participate in two or more platforms. When we as university students for instance, they often claim that they participate in more than one social media platform - Facebook and Twitter – for instance because each serves different needs and both of them have easy access and low costs. Or in the videogame industry developers must develop a multi-platform innovation strategy otherwise they would lose two third of their potential client base.

When a platform reaches such high penetration on both of its sides that its competitors cannot maintain their operation a platform monopoly arises and the winning platform takes all the market in that industry. The history of ICT is full of

these “platform wars” when two or more networks compete to win market dominance. For instance, in the DVD industry the HD war was won by Blu-ray over the Toshiba HD-DVD standard, so the latter has entirely disappeared. In software platform wars many battles were won by Microsoft products that is why we use Word and Excel as word-processing and spreadsheet standard platforms. In the video game industry the platform war is very intense, just like in the mobile application markets (Google Play or Apple Store).

Understanding how platform economics is working has a pivotal importance for public service innovation, because there is a wide proliferation of such solutions in the forms of web portals, social media applications, citizen forums, marketplaces and e-purchasing developments. In our second chapter Csóto describes the legal platform innovation of the Hungarian public administration, the introduction of the so called regulated electronic administrative services (REAS) concept.

#### **1.4.7 Systemic Innovation and Social Innovation Model**

Innovation models also develop, even if they are not with the same speed as technology, but fast enough that it is difficult to give a full account of all of them. This is the reason, for which the last important model which I discuss as summary is the concept of systemic innovation.

It is important to note that the need to systemize innovations is not only due to technology pressure, on the contrary. In the developed world, but especially in Europe we are in the middle of the worst financial and economic crisis since the second world war, with the highest levels of unemployment, inter-generational worklessness material poverty, health and wealth inequalities for decades. These challenges are already swamping public budgets (and in the case of ageing and chronic disease, private budgets too) as well hampering Europe’s competitiveness and economic growth in the long term. There is a growing recognition across the continent and around the world, that new and innovative approaches are required to meet the economic, social and environmental challenges now and into the future.

These challenges were the main initiators of the Social Innovation Europe initiative (SIE) which represents a major effort to build the social innovation field in Europe.<sup>2</sup>Funded by the European Commission’s DG Enterprise and Industry, project participants are the Euclid Network, the Danish Technological Institute and the Young Foundation and led by the Social Innovation Exchange (SIX). According to SIE, the field of social innovation is beginning to gather momentum, with significant investment from foundations, governments and businesses. Europe is playing a leading role in setting an agenda that embeds social innovation into the centre of policy making and service delivery. The Europe 2020 Strategy makes a strong commitment to promoting social innovation, and the European Commission’s Innovation Union strategy clearly places innovation at the centre of the policy agenda for meeting social challenges affecting Europe and its Member States.

2 <https://webgate.ec.europa.eu/socialinnovationeurope/>. Downloaded 2014. 05. 05.

Social innovations can be understood as “new solutions (products, services, models, markets, processes etc.) that simultaneously meet a social need (more efficiently and effectively than existing solutions) and lead to new or improved capabilities, assets and/or relationships. In other words, social innovations are both good for society and enhance society’s capacity to act.”[23].

The concept of systemic innovation attempts to answer the practical experience that, the overall impact of most of social innovations, the projects, ideas, organisations, products and enterprises, is limited and separately, even if scaled up, social enterprises and new products and services alone cannot effect the wide scale change that is so urgently needed.

Combining therefore the social needs identified by SIA and the technology push for innovation development, there is a solid argument that a systemic approach is required across the proliferation of initiatives. Systemic innovation is: “A set of interconnected innovations, where each is dependent on the other, with innovation both in the parts of the system and in the ways that they interact.”[23]

Systemic social innovation occurs when a number of complementary innovations occur in a parallel and interconnected way to impact on a social issue or problem. An example of an individual social innovation might be a social enterprise that provides apprenticeships and other training to disadvantaged young people. A systemic approach to the same issue would look at how a combination of innovations in education provision, community services and business regulations could all be used to impact on youth unemployment. Since systems exist at different levels, a systemic approach of this nature might apply to a single town, region or a whole country.

The Social Innovation Europe initiative identified three broad frameworks for enhancing systematic innovation in the Europe 2020 strategies; The Innovation Union, the EU innovation partnerships, and the Social Business Initiatives.

The Innovation Union is one of seven flagship initiatives launched in 2010 by the European Commission as part of the Europe 2020 Strategy. The overarching aim of the Innovation Union is to translate innovative ideas into goods and services which can create jobs and growth for a smart, sustainable and inclusive Europe.

The Innovation Union takes a systemic approach to innovation; it is an integrated innovation strategy, based on a broad view of innovation that includes actors from the private, public and third sectors. It aims to improve the conditions for innovation by removing obstacles which prevent innovative ideas from reaching the market, such as expensive patenting, market fragmentation, slow standard-setting and skills shortages etc. It is also pioneering new forms of cross-sectorial collaboration, including the new European Innovation Partnerships which bring together European institutions, national and regional authorities, businesses and civil society organisations to tackle specific challenges.

A core initiative of the Innovation Union is the European Innovation Partnerships (EIPs). EIPs are intended to address major societal challenges that are of common concern across Europe, by scaling up and accelerating the development and deployment of innovative new solutions. EIPs are not a new European legal or financial instrument and they do not replace existing decision making processes.



Rather they are an initiative to bring together actors at all levels and in all sectors to mobilise resources and expertise, drawing together all existing efforts into a coherent framework. The first European Innovation Partnership on Active and Healthy Ageing (AHA) was initiated in October 2010 to tackle the common challenge of an ageing population across Europe, as a pilot to test out the concept of the Partnership. Another four major challenges where an EIP could achieve real value have been identified; these are related to agriculture, water, raw materials and smart cities.

The Social Business Initiative (SBI) was launched by the European Commission in November 2011 with the aim of fostering a favourable environment for the development of social business in Europe. The initiative suppose to making it easier for social enterprises to obtain funding; increasing the visibility of social entrepreneurship and improving the legal environment of social business. As part of the SBI there will also be a range of actions to create new European Venture Capital Funds and promote social entrepreneurship among older people, in the context of the European Year for Active Ageing in 2012.

Systemic innovation on the policy level involves the fundamental transformation of the systems of society on which we all depend – such as healthcare, housing, education or energy. This is rarely achieved through a single organisation or sector, but involves a complex interaction of public policy and reforms to legislation, changes to business cultures and practices, as well as shifts in consumer attitudes and behaviour.

Systemic innovation on the micro-level takes the complex non-linear system view as an organizing principle characterising innovations by non-linearity, ambiguity and uncertainty. In the near future this implies that we have to look at innovation as complex innovation ecosystems instead of singular projects with independent deliverables, deadlines and policy objectives.

## **1.5 ICT and public service innovation – concepts and illustration in the case of Hungary**

The purpose of the 13 authors of this volume is to provide both conceptual and empirical contribution to the discussion on how ICT enables innovation in public services. It is important to note, that we are not intended to exempt all the opportunities, neither want to analyse public administration in detail for innovation adoption. We simply present in the following nine chapters nine areas in the interface domains of public service, innovation, and ICT. By systematically presenting our studies we hope that the reader will learn several concepts and ideas while familiarizing his or herself with Hungarian applications in a comparative approach.

In the following, second chapter *Csaba Krasznay* organises those key trends and their conclusions which we can learn from ICT developments. He argues that there are three main groups of innovations which will be relevant for public administration in the coming decade. First is, the infrastructure dimension, enabling flexibility and adaptability to uptake new innovations. The success of ongoing developments will depend on the capability of innovative solutions' integration in this dimension.

Secondly, he draws the attention on the application level which provides vital functions like interoperability, clear databases, open data etc. A relevant driver will be in this context the changing behavior of citizens' use of ICT demanding high flexibility. Thirdly, he discusses technology trends in the user dimension. Raising digital competencies is the essence of strategies for governments in this respect.

In chapter three two authors *Peter Sasvári and Wolf Rauch* explore how business information systems are used in Hungary and Austria. Through their paper they introduce the structure of information systems and how the level of ICT use correlates with economic value added. They found that the average added value generated by the Hungarian corporations was nearly half of their Austrian counterparts with a narrow gap in terms of operational and tactical levels and with a more robust difference at the strategic level. The greatest difference was measured in the size category of the Hungarian microenterprises and small-sized enterprises since only half of them reported server-based networks, compared to their Austrian counterparts in the same size categories. In contrast, in the groups of medium-sized enterprises and corporations the difference in frequency rates could hardly be observed. In terms of the number of workstations, the Hungarian enterprises used half as many workstations as their Austrian peers in every size category. This chapter highlights the key importance of ICT based innovation that is there is a high correlation between the added value created by enterprises and their ICT development.

Chapter four explores interoperability as key driver of ICT use in public administration. *Mihály Csótó* discusses that no matter how much ICT promised better provision of public services to the "customers" – citizens and businesses - through the exploitation of digital tools, it became clear that technology investments were not automatically leading to better public services and better governmental procedures. Among others, the lack of interoperability is a fundamental obstacle to realizing the benefits of e-government and it remains a crucial and mainly unsolved part of the e-government agenda. Interoperability in a wide sense means the ability of a system to cooperate with another system, and it is complex: in addition to technical, semantic and organizational questions, it also raises legal, policy, and socio-cultural issues. Interoperability is also a crucial part of the e-government agenda especially at pan-European level. This chapter describes the basics and the history of interoperability in the e-government domain, and through the example of Estonia and Portugal it shows widely acknowledged e-government ecosystems whose results mainly based on an approach that puts interoperability issues in the centre of e-government development. The chapter also presents the case of Hungary where in the last few years the "new deal" of e-government development has been also interoperability-focused.

*Szilárd Molnár* in chapter 5 takes on the notion of e-government, and elaborates on inclusion and its importance in public service innovation. He shows that apart from technological barriers there are other obstacles for achieving high use of services such as the lack of awareness of the advantages and benefits offered by online services for the end-users, the high rate of distrust in internet contents and services, or the lack of easy-to-use online services, contents, training and information programs and campaigns serving the demands of non-users. According to the experiences of the countries standing in the front row in of e-governmental developments, the digitalization of

public administration processes does not automatically bring about a growth in the number of the users. Nevertheless, the socio-economic returns of the investments and developments can only be realized in case the e-services are used by a considerable proportion of the citizens and the enterprises.

In chapter 6 *Tamás Szádeczky* takes on a legal approach to analyse legislation history in Hungary to tackle with information security, both the handle fast paced development, and the problems of growing threats in cybercrime and cyber-terrorism. His research shows the trend of how a more and more definite legal regulation comes into being, even with inception of technical standards in legal regulations. Due to the wide range of important legislations, in the long-run wide range of social effects and a continuous improvement of information security awareness can be expected. Probably standard-based (e.g. ISO 27001 or COBIT) systems will multiply, given the fact that the organizations will be ready to comply with security rules. This trend is not only global, but also realistic in Hungarian legislation, which is discussed in detail in the article. Aligned with the national cyber-security strategy, Hungarian legislation had three phases until now: early strategies and legislation of 1989-2008, interim strategy of 2009-2012, and the latest information security strategy from 2012. This last had a huge milestone in 2013, when the Hungarian Act L of 2013 on Electronic Security of State and Local Government Bodies was introduced. The author argues that this change in strategy and regulations will result in greater security and the national security risk in the area of information and communication technologies will decrease. The Act is a good step in the direction of the appropriate level of government information security, but it still provides loopholes from the application of the rules.

One of the most promising fields of ICT innovation opportunities in the European Union is the area of cross border governance and is being both theoretically and practically outlined in chapter 7 by *Gyula Ocskay*. For the sake of a better understanding he successively defines the notions of 'governance', 'border', and 'cross-border governance'; finally focusing on the effects ICT solutions. His starting-point is that space is a social product, consequently the borders can be considered as results of conventions and not administrative or physical barriers. Since space is a social product it is determined culturally by the community / society and is defined by a particular discourse. National discourse on space is gradually loosing its self-evidence and new forms of institutionalised cross-border cooperation have emerged. This evolution will change not only the traditional terminology of space but also the way of governing things (i.e. 'governance'). The progress of info-communication technology resulted in the birth of virtual space, virtual identity. The world of spaces has given place for the world of flows. In this situation cross-border governance opens new perspectives for cooperation. By giving several concrete examples we try to point out the main directions and ways the ICT can be used for better governance in (spatial) peripheries.

Chapter 8 and Chapter 9 take on social media as innovation enablers for public services. Árpád Rab has collected fascinating stories from recent global and regional crises situations one lives were spared thanks to creative use of Facebook, Twitter or other innovative platform applications. He found that the main role of social media during disasters is communication. But in order to communicate effectively in distressed situations several traditions have to abandoned in the rigorous administrative

environments. There is a need to change perception of control - from a very top-down to a more interactive, open networked, starfish model. Emergency management has long been firmly rooted in a traditional top-down model, but with the growing role of social media this model is not sustainable.

Chapter 9 takes us to the world of political communication. *Norbert Merkovity, Robert Imre and Stella Major* the second international author team examines how social media impacts political communication. New ICTs, as they show, will not revolutionize political communication, what we see is a 'spectacular' development, adaption to the information environment, which process is once faster, other times slower. This makes one feel that what has been well-functioning in political communication in the past few years is now becoming obsolete. In their paper comparing Hungarian and Australian politicians using social media they conclude that: (a) the new ICTs have pluralized social communication therefore effecting not only citizens but the entire world of politics as well, (b) new political behaviors, institutional challenges themselves are forming the ever-changing information and communication environment, and (c) new theoretical dilemmas emerge, that requires new methodological approaches towards the thorough research of the field. This statement would mean the developing of 'new' political communication theory examining the three effects of networking technologies on political communication: globalization, changing media logic and new political communication.

In the final chapter *Eszter Monda* presents both the scientific foundation and the methodological values of future studies. Her key argument is that ICT enabled innovation opportunities can be more successfully exploited in public services, if these opportunities are systematicall scanned, analysed, tested and creatively motivated. Futures studies isuseful as an interdisciplinary theoretical concept and as a methodological approach as well, and the author shows it is also applicable for exploring the opportunities of public service modernization at large.

## 1.6 Summary

It is relevant to look at public service innovation from an ICT enabled point of view, for at least two reasons:

- a) ICT enabled innovation has happened in many industries
- b) level of ICT development is such that access and affordability is plausible.

We do naturally bear in mind, that public service organizations have other pressures to improve efficiency. Especially from the time of the latest global crisis, during the last five-six years discourses about the state have been intensified. It is important for our readers that we are not coming from this debate by providing an exhaustive analysis or all the aspects of public services but maintain the idea of such a monograph and research.

In our volume we take a case and issue based approach to show how ICT contributes to some of this discourses amongst which some have reached high maturity – like interoperability, inclusion and security – and others are at earlier or test stages of

their life cycle, like social media applications our future studies methodologies in e-government. We also put emphasize on originality and empirical results to our topics, this is the main reason we used Hungary and comparative international illustrations to provide added value to our readers.

In order to put ICT based innovation in context in this introductory chapter we also provided an overview of broad church of innovation eco-system: illustrating new approaches to create service, process and organizational models in organizations.

Finally, we would like to make a reference to our earlier arguments about the importance of public service effectiveness and efficiency. If we were to summarise in a brief sentence the conclusions our findings of our studies and cases about ICT based innovation we should emphasize creativity, perseverance and courage for continuous development of newer and newer models.

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# Chapter 2

## ICT Trends which Drive Public Service Innovation

### 2.1 Introduction

Information technology has changed rapidly and fundamentally in the past few years. These changes enable the easy and effective reach of billions independently from location and media. Under the hood the IT base infrastructure has become more secure and flexible to assist in full scale service of different types of users. We are in the middle of a technology change wave, users have accepted the new style of IT and governments worldwide are beginning to adopt the successful best practices of businesses.

According to the definition of National Institute of Standards and Technology (NIST) information technology (IT) in a public administration environment means “any equipment or interconnected system or subsystem of equipment that is used in the automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information by the executive agency. For purposes of the preceding sentence, equipment is used by an executive agency if the equipment is used by the executive agency directly or is used by a contractor under a contract with the executive agency which 1) requires the use of such equipment; or 2) requires the use, to a significant extent, of such equipment in the performance of a service or the furnishing of a product. The term information technology includes computers, ancillary equipment, software, firmware and similar procedures, services (including support services), and related resources.” Information system is “a discrete set of information resources organized for the collection, processing, maintenance, use, sharing, dissemination, or disposition of information.” [15]

But what can be adopted from business practice and what is completely different in public administration? A governmental system shall serve citizens, businesses and also public servants. It shall provide intuitive, user friendly interface for users, interoperable and secure interface for other IT systems and shall use old legacy systems and inconsistent databases. An e-government system must integrate the rigorous legal and technology requirements and the constantly changing user requirements.

In this chapter we introduce the current IT trends to highlight key concepts coming from the past few years, some examples of public administration adoption of these technologies and existing or planned developments following these opportunities in the Hungarian governmental IT. With Hungary’s case we illustrate how existing resources could provide a better and more useful e-government system for both affected parties if a proper strategy is applied.



## 2.2 Current trends in IT

Technology analysts and IT manufacturers usually mention the same trends in their publications. Most of the short term visions come from long term trends which were founded in the last 5 years. OECD analyzed the national ICT strategy of 22 countries in 2012 and summarized the key R&D directions. These directions show the main trends in IT which are important from economical perspective for the governments. [18]

- Technology and elderly people;
- Cloud computing;
- Converging technologies and scientific disciplines;
- Digital content/semantic technologies;
- Smart grids;
- Smart transportation;
- Network infrastructures;
- Software engineering and data analytics;
- ICT and Internet security and safety.

This is only one but picturesque example for the trends. In the current chapter we summarize the intentions of the last few years and create an own set of technology trends that fits into the logic of the chapter.

Gartner, Inc. as one of the leading technology analyst firms laid down its predictions in the “Top 10 Strategic Technology Trends for 2014” publication. In Gartner’s vision these are the most important visions (excerpts from the original publication): [5]

### 1. *Mobile Device Diversity and Management*

Through 2018, the growing variety of devices, computing styles, user contexts and interaction paradigms will make „everything everywhere” strategies unachievable. The unexpected consequence of bring your own device (BYOD) programs is a doubling or even tripling of the size of the mobile workforce. (...) Balance flexibility with confidentiality and privacy requirements

### 2. *Mobile Apps and Applications*

Gartner predicts that through 2014, improved JavaScript performance will begin to push HTML5 and the browser as a mainstream enterprise application development environment. (...) Apps are smaller, and more targeted, while a larger application is more comprehensive. Developers should look for ways to snap together apps to create larger applications. Building application user interfaces that span a variety of devices require an understanding of fragmented building blocks and an adaptable programming structure that assembles them into optimized content for each device. (...) For the next few years no single tool will be optimal for all types of mobile application so expect to employ several. The next evolution in user experience will be to leverage intent, inferred from emotion and actions, to motivate changes in end-user behavior.

### 3. *The Internet of Everything*

The Internet is expanding beyond PCs and mobile devices into enterprise assets such as field equipment, and consumer items such as cars and televisions. (...). The combination of data streams and services created by digitizing everything creates four basic usage models – Manage; Monetize; Operate; Extend.

#### 4. *Hybrid Cloud and IT as Service Broker*

Bringing together personal clouds and external private cloud services is an imperative. Enterprises should design private cloud services with a hybrid future in mind and make sure future integration/interoperability is possible. Hybrid cloud services can be composed in many ways, varying from relatively static to very dynamic.

#### 5. *Cloud/Client Architecture*

Cloud/client computing models are shifting. In the cloud/client architecture, the client is a rich application running on an Internet-connected device, and the server is a set of application services hosted in an increasingly elastically scalable cloud computing platform. The cloud is the control point and system of record and applications can span multiple client devices. The client environment may be a native application or browser-based; the increasing power of the browser is available to many client devices, mobile and desktop alike. Robust capabilities in many mobile devices, the increased demand on networks, the cost of networks and the need to manage bandwidth use creates incentives, in some cases, to minimize the cloud application computing and storage footprint, and to exploit the intelligence and storage of the client device. However, the increasingly complex demands of mobile users will drive apps to demand increasing amounts of server-side computing and storage capacity.

#### 6. *The Era of Personal Cloud*

The personal cloud era will mark a power shift away from devices toward services. In this new world, the specifics of devices will become less important for the organization to worry about, although the devices will still be necessary. Users will use a collection of devices, with the PC remaining one of many options, but no one device will be the primary hub. Rather, the personal cloud will take on that role. Access to the cloud and the content stored or shared from the cloud will be managed and secured, rather than solely focusing on the device itself.

#### 7. *Software Defined Anything*

Software-defined anything (SDx) is a collective term that encapsulates the growing market momentum for improved standards for infrastructure programmability and data center interoperability driven by automation inherent to cloud computing, DevOps and fast infrastructure provisioning.

#### 8. *Web-Scale IT*

Web-scale IT is a pattern of global-class computing that delivers the capabilities of large cloud service providers within an enterprise IT setting by rethinking positions across several dimensions. Large cloud services providers such as Amazon, Google, Facebook, etc., are re-inventing the way IT in which IT services can be delivered. Their capabilities go beyond scale in terms of sheer size to also include scale as it pertains to speed and agility. (...) Data centers are designed with an industrial engineering perspective that looks for every opportunity to reduce cost and waste. This goes beyond re-designing facilities to be more energy efficient to also include in-house design of key hardware components such as servers, storage and networks. Web-oriented architectures

allows developers to build very flexible and resilient systems that recover from failure more quickly.

#### 9. *Smart Machines*

Through 2020, the smart machine era will blossom with a proliferation of contextually aware, intelligent personal assistants, smart advisors, advanced global industrial systems and public availability of early examples of autonomous vehicles. The smart machine era will be the most disruptive in the history of IT. (...) If anything, smart machines will strengthen the forces of consumerization after the first surge of enterprise buying commences.

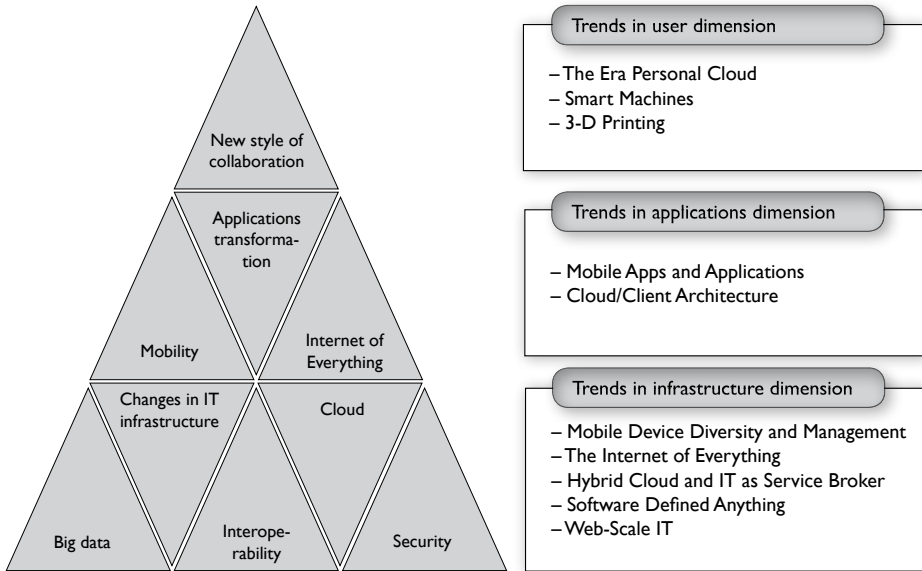
#### 10. *3-D Printing*

Worldwide shipments of 3D printers are expected to grow 75 percent in 2014 followed by a near doubling of unit shipments in 2015. (...) The consumer market hype has made organizations aware of the fact 3D printing is a real, viable and cost-effective means to reduce costs through improved designs, streamlined prototyping and short-run manufacturing.

Summarizing Gartner's predictions as short term initiatives and analyzing the advancements from 2008, we can draw up a few constant trends in information technology that should be followed in governmental IT. These are the following:

- *Big data:* Myriads of users and machines create staggering amount of digital data. This is both a challenge and an opportunity. Public administration can enjoy the benefit of this trend if uses data wisely. Infrastructure, applications and users should consider the Big Data phenomenon.
- *Security and interoperability:* as main pillars security and interoperability aspects shall be everywhere from infrastructure to users.
- *Changes in IT infrastructure:* the era of IT silos is over. Resources shall be centralized and shall be designed to be flexible enough to serve the constantly changing application and user demands.
- *Cloud:* As a result of changing IT infrastructure, cloud based solutions became the part of every IT solutions. Developers of systems and applications shall keep in mind cloud based solutions.
- *Mobility, the Internet of Everything:* IT architects shall count on the fact that users can be everywhere, can use anything and can be not just humans but also intelligent machines.
- *Application transformation:* Due to the rapid change of underlying infrastructure, applications should be transformed to gain the maximum benefits of shared resources and give excellent user experience for the affected parties.
- *New style of collaboration:* social media, mobility and consumerization evolved a new way of collaboration between users. This can be a huge opportunity for public administration.

Long term trends and predictions for 2014 can be summarized in Figure 2.1.



2.1. Figure. Short and long term ICT trends

## 2.3 Main pillars: data, security and interoperability

### 2.3.1 Big Data

According to Wikipedia “Big data is the term for a collection of data sets so large and complex that it becomes difficult to process using on-hand database management tools or traditional data processing applications. The challenges include capture, curation, storage, search, sharing, transfer, analysis and visualization. The trend to larger data sets is due to the additional information derivable from analysis of a single large set of related data, as compared to separate smaller sets with the same total amount of data, allowing correlations to be found to spot business trends, determine quality of research, prevent diseases, link legal citations, combat crime, and determine real-time roadway traffic conditions.” [22]

Governments continuously produce more and more data which enable the usage of big data phenomenon and helps in the construction of better e-services and preparing better decisions. Joseph and Johnson propose a model for leveraging big data to improve e-government services, ultimately resulting in transformational government. In their model there are four areas where big data can increase governmental efficiency (excerpt): [14]

- *Automation*: It can streamline big data and support its analysis by targeting bottlenecks.
- *Redesign*: Through the use of big data analytics such as genetic algorithms, regression analysis, and sentimental analysis tools, processes can be redesigned.

- *Segmentation*: Big data analysis can help government employees read the data from multiple perspectives to reveal new information and better tailor services to meet citizens' needs.
- *Transparency*: Big data tools can readily support reporting on large amounts of data, thus making more information available to the public.

Wise usage of data assets is one of the biggest opportunity for enabling efficient governmental services. As an example the Australian Government published a big data strategy for its public services. [2] In this strategy they emphasize the need of big data usage and underline some key points how to use big data in their governments. This strategy is effective from August 2013 so it's not too late to follow the pioneers.

### 2.3.2 Security

Protecting the electronic data assets and critical information infrastructure is one of the most crucial issues worldwide. All planning, development and operational steps shall include security aspects, such as confidentiality, integrity and availability. Nowadays the hot topic of protection is to handle threats coming from the cyberspace, but we shouldn't forget insider threats as well. As Krasznay and Török writes governments shall maintain countermeasures against the following cyberthreats:[16]

- *Cybercrime*: organized crime is deeply involved into cyberspace. Cybercrime acts can have negative side effects to all governmental institutes and public servants. Such crimes can intertwined with other cyberthreats.
- *Cyberterrorism/hacktivism*: Hacktivist activities usually targets governmental institutes. Cyberterrorists use the same toolset as hacktivists do with very similar goals. That is why governments shall handle both issues with similar countermeasures.
- *Cyber espionage*: most of the information is handled electronically. That is why intelligence services focus on cyberspace. All governments shall count on this threat and try to prevent data leaks.
- *Cyber warfare*: cyberspace is the new battlefield and in this battlefield governmental IT is a major target. In some situations governments shall extremely pay attention to this fact.

To handle the above mentioned issues more and more countries develop regulatory frameworks for ICT systems. One example for this is FISMA regulation from the United States and its technical implementation guidance, NIST Special Publication 800-53. This framework deals with administrative, logical and physical requirements and makes a prime example for all countries how to protect their data assets.

### 2.3.3 Interoperability

"Interoperability is the ability of making systems and organizations to work together (inter-operate)".[24] From ICT perspective that means that both data, infrastructure and applications shall be able to cooperate with each other. Basically standardization can help in enhancing interoperability but in practice this is not enough. Beside security this is the second main planning consideration which should be kept in mind in all phases of the system development and maintenance lifecycle.

Interoperability inclusion to e-government services is one of the basic requirements of the European Union. As European Commission drew up in 2003, interoperability has three aspects (excerpt): [6]

- *Technical interoperability*, which is concerned with the technical issues of linking up computer systems, the definition of open interfaces, data formats and protocols, including telecommunications;
- *Semantic interoperability*, which is concerned with ensuring that the precise meaning of exchanged information is understandable by any other application not initially developed for this purpose; and
- *Organizational interoperability*, which is concerned with modelling business processes, aligning information architectures with organizational goals and helping business processes to co-operate.

European Union is currently running its Interoperability Solutions for European Public Administration (ISA) program, with some main focus points that are necessary for cross-border interoperability.[8] Connecting to security the hottest topic nowadays is the creation of trusted information exchange such as solving identification, authentication, non-repudiation and access control issues. But EU also tries to achieve the spread of interoperable architectures, documents and services. These efforts caused that national interoperability frameworks in the EU are neglected and more and more countries adopt the EU level recommendations.

Interoperability is such a central concept for public service innovation that we devote the entire Chapter 4 for this topic not only to discuss the fundamentals but also to illustrate its working with the Estonian, Portuguese and Hungarian examples.

## **2.4 Basis of IT: infrastructural questions**

### **2.4.1 Changes in IT infrastructure**

It is indisputable that silo thinking in IT is over. Infrastructure elements are converging. That means a new approach in design principles. When an organization is ready to rethink its IT infrastructure it shall keep in mind the following aspects (excerpt): [4]

- Increasing IT speed and agility
- Shifting resources from operations to innovation
- Enabling cloud computing
- Consolidating IT systems and processes
- Protecting mission-critical workloads
- Upgrading or converging applications
- Extending virtualization across the data center
- Improving energy efficiency

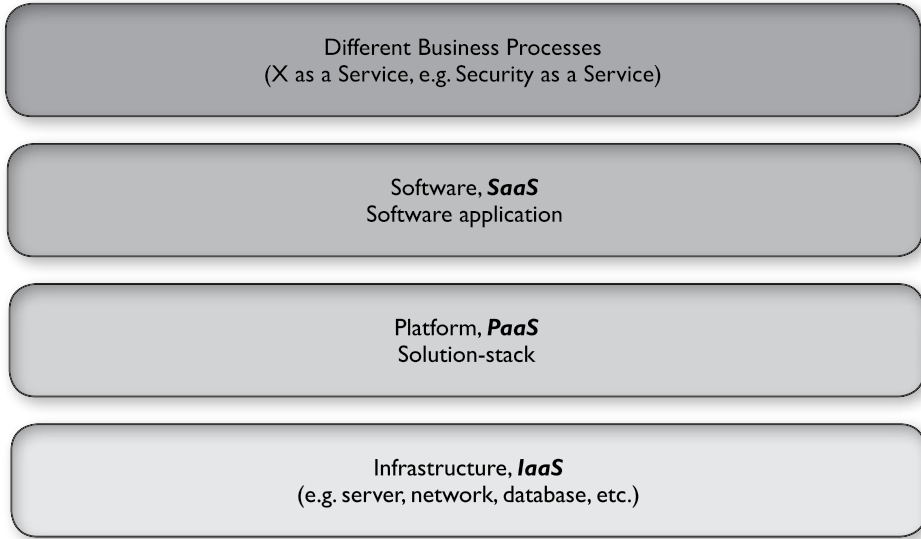
Infrastructure vendors are ready to serve these principals, there are various standards that support these initiatives and year by year there are new innovations that adopt the above mentions requirements. Some design principles for new IT infrastructures (excerpt):

- *Virtualized*: Virtualization separates the applications, data, and network connections from the underlying hardware, making it easier and faster to reallocate resources to match the changing needs of individual applications and virtualization software.
- *Resilient*: Because diverse applications share virtualized resource pools, the infrastructure must have a resilient and highly secure operating environment that automates high-availability policies to meet service level agreements (SLAs) and provides the right level of availability for each business application.
- *Open*: This enables the organization to leverage its existing investments as part of the consolidation and convergence process and adopt new technologies incrementally and at its own pace with the required flexibility to run, support, and optimize its applications.
- *Orchestrated*: This creates an application-aligned infrastructure that can be scaled up or down based on the needs of each application. Orchestration also provides centralized management of the resource pool, including billing, metering, and chargeback for consumption.
- *Modular*: This allows to integrate new, modern technologies with existing investments without having to start over. This approach also allows to extend new capabilities and scale capacity over time with common, modular components across the data center.

As an example Albanian government started to rethink its IT infrastructures in 2013. Albania had 14 ministries that time all with its own server rooms, applications and support. For optimizing this situation the Albanian government established the National Agency for the Information Society (NAIS) sets standards for and coordinates business-critical government IT initiatives. [10]

#### 2.4.2 Cloud

National Institute of Standards and Technology (NIST) defines cloud computing as “a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.”[17] That means organizations shouldn't care about IT assets because they get the necessary resources via the inter/intranet, “from the cloud”. Cloud services can be private (internal), public (external), community (shared) or hybrid solutions. Cloud providers can give the resources as basic IT elements (Infrastructure-as-a-Service), as development platforms (Platform-as-a-Service) or as a software environment (Software-as-a-Service). Of course these are just the basic models, innovation is always produce more phenomena, e.g. security from the cloud, a.k.a. Security-as-a-Service.



## 2.2. Figure Different cloud layers

Extending cloud based solutions across Europe is one the key point in the implementation of EU's "Digital Agenda for Europe". [7] European Cloud Computing Strategy is one of the action point of the Agenda. In this strategy the European Commission requires the following:

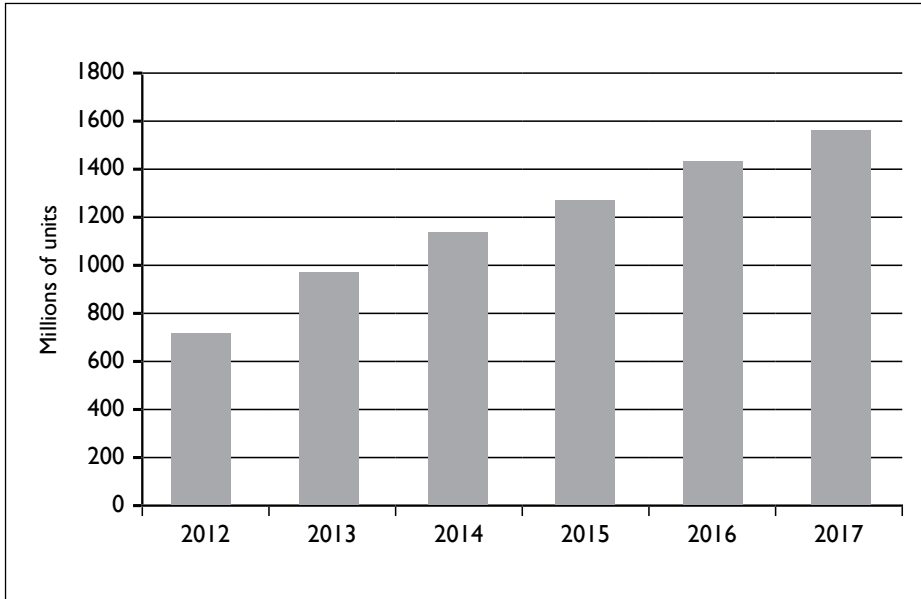
"Europe should also build its innovative advantage in key areas through reinforced e-Infrastructures and [...] should develop an EU-wide strategy on 'cloud computing' notably for government and science. [...] The strategy should consider economic, legal and institutional aspects" "[...] develop further e-Infrastructures and establish an EU strategy for cloud computing notably for government and science".

The European Commission published a study on "Analysis of cloud best practices and pilots for the public sector" at the end of 2013. [3] The study analyses current cloud adoption practice of 10 member states (Austria, Belgium, Denmark, France, Germany, Italy, the Netherlands, Portugal, Spain, the United Kingdom). The result of this study is that the above mentioned countries are in a very early state of cloud adoption.

### 2.4.3 Mobility

Mobility means that users of IT services can be anywhere around the world (or in the space) and they use some kind of mobile computing devices with specialized mobile software. The infrastructure is optimized for mobility that means both data carriers and supporting ICT platforms are ready to serve mobile users and mobile platforms.





2.3. Figure WW Smartphone Shipments (Source: Statista, 2014.)

To highlight the broad interpretation of mobility we can examine the Australian Public Service Mobile Roadmap document from June 2013. [1] The Australian Government wants to achieve the following goals in two years with mobility (excerpt):

- appropriate customer-facing services conveniently available through accessible, personalised, location-aware, and easy to use mobile channels;
- improved workplace productivity through effectively employed mobile technology;
- increased capability to develop and support mobile solutions;
- adoption of a consultative, user-centric design approach with industry that acknowledges and builds on whole-of-government solutions and encourages more consistent but no less innovative use of mobile technology; and
- the establishment of policies, standards and practices to assist the efficient adoption of mobile solutions.

EU's Digital Agenda doesn't explicitly highlight mobility (or not in this context), but many actions refers to this area. One example is Action 101: Look for durable solutions for voice and data roaming by 2012. According to this action EU wants a single market for telecoms services – the difference between roaming and national tariffs should approach zero by 2015. Governments can see a big potential in the exploitation of rapid extension of mobility.

#### 2.4.4 Internet of Everything

Internet of (Every)thing (IoT) has several definitions. Maybe the most expressive is the following: "A radical evolution of the current Internet into a Network of

interconnected objects that not only harvests information from the environment (sensing) and interacts with the physical world (actuation/command/control), but also uses existing Internet standards to provide services for information transfer, analytics, applications, and communications. Fueled by the prevalence of devices enabled by open wireless technology such as Bluetooth, radio frequency identification (RFID), Wi-Fi, and telephonic data services as well as embedded sensor and actuator nodes, IoT has stepped out of its infancy and is on the verge of transforming the current static Internet into a fully integrated Future Internet.” [9] In practice people use more and more devices that can interact with its environment. Wearable computing as the newest hype is a good example for the continuous innovation on this field.



2.4. *Figure.* Example for wearable devices, smart glass and smart watch (Source: Gizmag)

IoT can support better decisions in the public sector. With sensing the change of the surrounding environment and communicating this with a specialized application a public servant can get more information about the relevant process. E.g. with the use of Google Glass in governments' customer service many time saving actions can be implemented from information gathering to document archiving with one blink.

Best known example on this field is Digital Agenda's Action 111: Focus and develop and implement, as appropriate the Smart Cities, Active and Healthy Ageing, Green Cars, Energy Efficient Buildings PPP. All of the mentioned trends build on the IoT technologies. Today it is not clear which consumer technology will spread among citizens, but it is clear that in the near future governments want to utilize the resources hidden into these technologies.

## 2.5 New applications, new users

### 2.5.1 Application transformation

Application developers have a great opportunity to create innovative and effective solutions for end users. They can take advantage on potentials of above mentioned technologies. They can reach their customers anywhere, anytime, on any machines, adapting the changes of user behavior. The only task is to “recreate” legacy applications for the new era. That is the essence of application transformation.

According to Hewlett-Packard’s theory application transformation means the following (excerpt): [11]

- *Relearn*: A discovery process that captures the intellectual property investment in legacy applications over many years and enables that investment to be preserved and carried forward through modernization
- *Refactor*: Code optimization to improve the runtime efficiency of an application
- *Rehost*: Migration of legacy applications to lower-cost modern platforms without significantly changing current features and functions
- *Reinterface*: New screened and non-screened interfaces to leverage and extend application features and value
- *Rearchitect*: Forward engineering applications to Java J2EE or Windows .NET Agile Application Architecture to enable true enterprise agility
- *Replace*: A framework to replace existing legacy applications with standard enterprise applications and industry-standard applications
- *Retire*: Decommissioning legacy applications from the applications portfolio

One example for the need of application transformation in public sector is Action 54 from Digital Agenda: Develop a new generation of web-based applications and services. Under this action EU proposes to “Work with stakeholders to develop a new generation of web-based applications and services, including for multilingual content and services, by supporting standards and open platforms through EU-funded programs.” In conjunction with Action 3: Open up public data resources for re-use which states that “The action aims at reviewing the Directive on re-Use of Public Sector Information, notably its scope and the principles regulating charging for access and use.” it is clear that there is a very big potential in the use of new applications in public administration.

### 2.5.2 New style of collaboration

Sociologists usually give a name for different generations. One of the main differentiator of Generation X (born 1966-1977), Generation Y (born 1977-1994), Generation Z (born 1995-2012) and now Generation Alpha (born from 2013) is their attitude for technology. From Generation Y people have learnt ICT from childhood, from Generation Z people use ICT instinctively and we can call them “digital natives”. Generation Alpha will be unable to imagine the life without ICT. Governments as well as businesses shall adapt to this change of society and enjoy the benefits of this technology addiction.

The main advantage of technology impact on the life of these generations is that they can easily cooperate with each other on ICT platforms. Social networks, virtual reality, internet based communication services characterize the collaboration modes of youngsters. Usage of these technologies in public sector is used to call Government 2.0. According to Wikipedia, "Gov 2.0 combines Web 2.0 fundamentals with e-government and increases citizen participation by using open-source platforms, which allow citizens and innovative companies to develop apps, websites, widgets. The government's role is to provide open data, web services, and platforms as an infrastructure." [23] So this is the ultimate essence of all technologies. Use technologies to enable collaboration for better governance. All governments shall appear at least on Facebook and Twitter, share its basic data (e.g. address of public institutes) with Google to reach the networked generations.

President Obama's administration is the leader in inclusion of citizens through Gov 2.0 technologies. One example for this is "We the People" website where people can initiate decisions directly through online petitions. If one can collect enough supporters (or Likes in Facebook term) Obama's administration must give an answer even for the most absurd petitions, such as "Secure resources and funding, and begin construction of a Death Star by 2016." [20]

## **2.6 ICT developments in Hungarian Public Administration**

On United Nations E-Government Development Database 2012 Hungary is the 31th out of 190 countries that shows how much the country is developed on this field. [21] But it should be emphasized that in 2010 Hungary held the position 27 in this table. As a typical mid-size country with well-structured e-government, Hungary can be a good example for analyzing the adoption of new technologies. One of the most important goals of Hungarian government from 2010 is the modernization of public administration. This goal was included into the government program in 2010 and was promised for the next cycle from 2014. One of the measures to reach this goal is to extend electronic administration. Hungary's National Reform Program 2013 Priority 5 exposes how to do this extension. [13] The most detailed explanation of Hungary's development plan is written in the National ICT Strategy 2014-2020. [12]

The strategy defines four pillars (Digital Infrastructure, Digital Competencies, Digital Economy, Digital State) and three horizontal factors (eInclusion, R&D&I, Security). Although all pillars and horizontal factors have some effects to public administration it is worth to examine the Digital State plans. The strategy defines that the goal is to "provide the background (including security) of internal IT supporting the operation of public administration, electronic public services for citizens and businesses, and other national electronic services such as information sharing related to healthcare, education, library and cultural heritage."

This pillar has several actions to realize. These are the followings:

- Providing IT background that supports internal processes of public administration and electronic public services:
  - Successful closing of EU funded projects;
  - Development of unified IT background;
  - Providing IT background for G2G services;
  - Development of cloud based services;
  - ASP/SaaS based software and services;
  - Development of IT background for regional public administration;
  - Development of municipal IT background and extension of ASP service portfolio.
- Enabling IT in public sector's processes, ICT support of public administration reform:
  - Successful closing of EU funded projects;
  - Enabling IT for G2G services;
  - Stimulate paperless processes inside central public administration institutes;
  - Enabling IT for regional public administration;
  - Coordinate developments related to Regulated Electronic Administration Services;
  - Extension of ASP service portfolio.
- Interoperability and common standards:
  - Providing legal background for ICT interoperability;
  - Providing legal background for cross-border e-authentication technologies;
  - Development of identification and authentication system;
  - Strengthening the interoperability of databases;
  - Supporting the developments using open source technologies.
- Introducing modern e-services for citizens and businesses:
  - Successful closing of EU funded projects;
  - Digitalization of current public services for citizens and businesses;
  - Development of customer service system at regional public administration;
  - Defining the scope of processes which can be done only on electronic way.
- Development of public services and enabling the use of open government data:
  - Development of e-Health Action Plan;
  - Enabling internal and external IT at healthcare institutes;
  - Providing high speed internet access for educational institutes;
  - Starting PC/laptop/tablet program for students;
  - Measuring the scope of collections that should be digitalized (library, archives, cultural, artistic, etc.);
  - Supporting the development and extension of archives that stores digitalized cultural assets and cultural heritage;
  - Full Implementation of EU directive regarding reuse of government data;
  - Creating open access for scientific publications and achievements of Hungarian science;
  - Upgrading educational, academic and research ICT infrastructure.

Some actions are currently under development, some of those are only plans. The National Info-communication Services Company (NISZ) is responsible for ICT developments in Hungary. The NISZ homepage lists those past, current and future projects that can be adjusted for the above mentioned actions. Currently the following concrete projects are listed:[19]

- Past projects:
  - Government Cloud – Grounding government data center and ICT service provision;
  - Development of central electronic document management;
  - Development of Central e-archive;
  - ICT support of development policy;
  - Development of standardized ICT background;
  - Modernization of endpoints at different institutes;
  - Development of standards for e-government and public administration services.
- Current projects:
  - Upgrading the emergency telecommunication system;
  - Development of European emergency call system (112);
  - Development of integrated customer service's interoperable ICT background;
  - Upgrading ICT background of local administration offices;
  - Integrating customer services of local administration offices and central government offices;
  - Development of standardized ICT background Step 2;
  - Modernization of endpoints at different institutes Step 2;
  - Upgrading National Telecommunication Backbone;
  - Development of health insurance connections;
  - National Support Control System;
  - ASP Center for municipalities;
  - Citizen identification system;
  - National e-Health System;
  - GSM-R system.
- Future projects:
  - Upgrading the National e-Health System;
  - Development of fully integrated local administration offices.

Both the pillars and the projects show that Hungarian electronic public administration is currently under a radical change. The country has missed a few years in due to the economic crisis to provide a world class e-government system. Maybe it's not a big issue because now the country can follow the early adopters in new technologies and Hungary can learn from other countries' experiences. So in the next part let's summarize where Hungary is now in the adoption of new technologies and what is the lesson from these examples for other countries.

## 2.7 Challenges and Opportunities of the Next Few Years

Adopting new technologies is a tough issue for everyone. A government can't change its complex infrastructure in a moment but it should reflect to the citizens' needs. With a well-defined IT background these changes are not as difficult as it seems to be at first sight. The Hungarian examples above show the way for other governments in the same situation.

- *Big data:* There is no mention of big data in the official Hungarian governmental strategy. But some investments will create more and more governmental data (e.g. development of digital archives) and the Hungarian government must open its data due to EU legislation. With strengthening the interoperability of databases it will be possible to build efficient big data analysis solutions. All governments produce a large set of usable data and they should prepare strategic decisions how to use this for better governance.
- *Security:* Security appears as a horizontal factor in Hungary's strategy. Hungary has the appropriate legal background to secure public administration's ICT systems (Act L of 2013 on the Electronic Information Security of Central and Local Government Agencies). On this area Hungary follow the most developed countries and it seems that it will be able to handle the challenges coming from the cyberspace in a few years. This legislation step should be followed by others. Security must be the part of all IT systems and related services.
- *Interoperability:* Interoperability is also an emphatic topic in the Hungarian government's strategy, it also has the legal background (Act CCXX of 2013 on General rules of interoperable registers of Central and Local Government Agencies). One of the past NISZ projects produced an e-Standard catalogue that deals with interoperability. Hungary also pursues the adoption of EU recommendations. As an outlook we can say that everything is available for effective interoperability in Europe. But in practice cross-border interoperability is still an issue. More and more EU-wide interoperability tests are needed for proper communication between different services.
- *Changes in IT infrastructure:* Establishment of NISZ and the intention to centralize governmental ICT reflects that Hungarian government wants to change its IT infrastructure. Development of standardized ICT background Step 1 and Step 2 at NISZ is about to provide such infrastructure that is able to fulfill the requirements of modern era. Centralization is a necessary step for all countries. But ICT architects should be extremely careful in this situation because this is the most expensive development phase and if they miss the possibility to plan a flexible infrastructure the central ICT will get back to a silo.
- *Cloud:* First phase of the Hungarian Government Cloud is ready. This is an IaaS solution. The most interesting question is how to step further? How institutes will get the service? How NISZ will expand to SaaS? What will be the connection between the cloud and the ASP center? We can see the right direction but there are many questions regarding the implementation. The strategy has some KPIs for cloud developments so we can trust in the push of cloud based services. In connection with the changes in IT infrastructure all

countries shall consider the use of private clouds. Integration of public cloud environments seems to be unavoidable.

- *Mobility*: Both European and Hungarian strategies missed the opportunity to emphasize the importance of mobility. Of course they mention mobile internet usage, smart devices, mobile employees, but these are hidden separately in the documents. All governments shall consider this issue and may implement the Australian example.
- *Internet of Everything*: The Hungarian strategy discusses the smart things (smart city, smart metering, smart home, etc.) at the eInclusion part but it doesn't mention any direct effect to governmental processes. Together with Big Data, all governments shall keep its eye on IoT penetration and encourage innovative developments not just the mentioned areas but also inside its own processes.
- *Application transformation*: Both the ASP center and government cloud shows the vision of software modernization. In 2014 Microsoft ended the support of Windows XP that raised a serious alarm to Hungarian government because there are some vital application, especially at local level, that is unable to run on later operation systems. Parallel with EU's proposal all countries should start to pursuit new, web based, flexible applications.
- *New style of collaboration*: The Hungarian strategy emphasizes the need of digital competency raising but it doesn't deal with the exploitation of existing competencies and behaviors. More effective public servants, more satisfied citizens, more profitable business can be reached with wise usage of collaborative technologies. All governments shall consider the use of those technologies that are widely used by people, e.g. social networks.

## 2.8 Summary

Possible capability to adopt the Top 10 Strategic Technology Trends for 2014 can show how the public administration ICT is ready for changes. In this chapter we drew up three layers: user dimension, application dimension and infrastructure dimension. Together with long term trends we can summarize the readiness state as follows:

- At the *infrastructure level* countries should follow the international trends and shall be capable to adopt new innovations. The success of ongoing developments depends on the capability of innovative solutions' integration.
- At the *application level* without the proper background (interoperability, clear databases, open data etc.) it is difficult to create successful and flexible applications, but changes in citizens' use of ICT demands this flexibility. So creating this background is a top priority.
- At the *user dimension* wise governments exploit actual hypes. It is clear that without the necessary software background citizens can't be reached but as a minimum strategic vision is needed in this area. Although most governments support the raise of digital competencies it should also benefit on existing competencies.



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# Chapter 3

## Information Systems and Economic Value Added: A Comparative Illustration of Austria and Hungary

### 3.1 Introduction: the concept of added value and ICT development in organizations

Technology investments both in business and in government applications are seen as key sources of innovation (OECD, 2010), (10 Emerging Technologies, 2011, 2011). Value of these investments – both from economical and from social points of view – are defined by the outcomes that these investments generate (Bharadwaj, El Sawy, Pavlou, & Venkatraman, 2013), (Bannister & Remenyi, 2003).

In economics we might conclude that ICT investments generate value if this outcome is economically positive, that is it contributes to such measures which improve growth, productivity, efficiency or effectiveness. On the firm level, these outcomes translate into revenue increase or cost savings but since the internet boom of the 1990's researchers consider more and more significance to the ICT transformational outcomes (Lucas Jr, Agarwal, Clemons, El Sawy, & Weber, 2013). Transformation is closely coupled with radical innovation, or non-incremental change which fundamentally alters traditional ways of doing business. Transformational impacts can result in major disruptions of an industry's competitive structure (like the internet has caused in the music industry), changes in user experience in consumption (such as on-line shopping), altering business processes (developing digital photography), creating brand new organizations (e.g. Facebook) and many more (Melville, Kraemer, & Gurbaxani, 2004). The term "e-business" in this context places this issue in its focus: what kind of economic value is generated by ICT investments and how this value is secured?

In the public sphere, e-government deals with a similar problem as far as value creation is concerned. The outcome, however, is very different: better governance, democratic transparency, improvement in social life. Below the holistic and broad societal values we can also define lower, public service level outcomes of ICT investments such as improved public service delivery, better coordination across government, improved public engagement, and more efficient process management. Recent research also raises the issue of the transformational ambitions of the e-government concept, and we see the ICT deployment strategies in the heart of many public reforms (Lips, 2012), (Halachmi & Greiling, 2013).

The use of ICT applications makes it effective to handle large amounts of administrative tasks. Data transfer will become faster and cheaper, increasing the dynamics of administration. Sharing databases between various institutions will lead to cost reduction, lessened complexity and the avoidance of unnecessary and redundant solutions. Archiving and data retrieval becomes easier and less expensive; the history of different types of administrative cases and matters gets easier to follow.

However, it is possible to talk about efficiency only in the long run as online and offline services have to be maintained side by side as long as it is requested by the public and business enterprises.

Businesses have been using electronic devices to help their operation at some level since the emergence of computers. The development of computers has helped businesses to improve their information and communication processes. Naturally, it, similarly to all technical innovations, was initially only available for large companies that had enough capital and were able to finance their development (Nemeslaki, 2012)

Computers appeared at these companies for the first time and were initially applied only to perform simple computing tasks. Later corporate databases were formed in which data could be stored. This period is called the period of island systems when each corporate module had its own IT support for fast data processing.

However, with the robust development of the internal computer networks and the Internet, it has become almost inevitable to merge these systems in a single interface in the companies' internal and external information flows. That is how a business society has evolved by now in which market share is substantially dependent on the IT support behind business enterprises.

Information technology put a device in the hands of enterprises with which they can achieve things that were previously considered impossible. Nicholas Carr argues that information technology have reached its maturity to the extent that it is now an integral part of every business enterprise's infrastructure. As the performance of the technology was growing and its size and relative price fell, the use of information stored in computers extended to other fields of application: from the organization of e-commerce to the automation of production. It was not simply about performing tasks, which could also be performed by traditional methods, faster and more efficiently by a computer but it also became possible to give answers to questions with the help of computer that had not even arisen before because they simply could not occur. (Cohen, DeLong, & Zysman, 2000)

Our basic assumption is that in countries where the use of IT devices is higher, enterprises have higher capability of manufacturing more complex products, and the production of more complex products leads to higher added value. Added value at basic prices can be simply defined as the difference between gross output (at basic prices) and intermediate consumption (at purchaser prices) and can be decomposed into the following components:

- Compensation of Employees;
- Gross Operating Surplus;
- Mixed Income; and
- Other Taxes on Production less Subsidies on Production (OECD, 2009).

Compared to the EU average of 27 countries, the average added value of the Austrian enterprises was higher by 70% with EUR 530,000 in 2012. In contrast, the average data of the Hungarian enterprises did not exceed EUR 87,000 which was equal to only 27 % of the EU average.

Country /thousand EUR/	Micro-enterprise	Small-sized enterprise	Medium-sized enterprise	Corporation	Average
EU27	71.56	880.52	5,250.82	61,900.78	311.77
Austria	124.19	1,042.24	7,640.42	64,716.60	530.42
Hungary	16.70	315.22	2,269.61	29 495.48	86.58

Table 3. 1 – Average added value by size categories in Austria and Hungary in 2012

The added value of microenterprises in Austria reached 173% and a modest 23% in Hungary in relation to the EU average. It mounted up to only EUR 17,000 thousand in Hungary and EUR 124,000 in Austria per enterprise, which was nearly 7.5 times higher than the Hungarian data in 2012. The added value created by small-sized enterprises was eight times higher in Austria (EUR 1,042,000) and 18 times higher (EUR 315,000) in Hungary compared to microenterprises. The added value generated by the Hungarian medium-sized enterprises was only slightly over 40% of the average of the European Union (EUR 2,270,000). In the meantime, the added value of the medium-sized enterprises in Austria exceeded the EU average by 45%. Regarding the performance of the Hungarian enterprises, the corporations operating in the country lagged behind their Austrian counterparts to the least extent. The added value per enterprise in Austria was three times higher in the case of small- and medium-sized enterprises and two times higher in the case of corporations compared to their peers in Hungary.

### 3.2 The relationship of ICT development and economic performance

The key strategic motive behind Information System applications are to “*make things better*” which means in economical terms that there should be a correlation between the added value created by enterprises in a country and their ICT development. Higher added value means using more complex Information Systems (IS) and employing more information technology specialists. In order to verify this existing relationship, a linear correlation analysis was performed between the NRI and IDI development of a country and the average added value generated by the enterprises operating there. The analysis was conducted by using the data collected in 27 EU countries.

The information society is an elusive process that is difficult to quantify and approach by economic and sociological methods. The measurements and comparisons, however, raise a number of problems. Simple indices of infrastructure can be measured more easily but the more variables are there to work with, the more difficult it becomes to measure appropriately. The indices are the measurements and comparative methods of various segments of the information society. The weight of separate factors in a given index reflects the viewpoint of governments, intergovernmental organizations and academic workshops in terms of the necessary factors for the development of the information society.

The indicators currently in use can be divided into two groups (Botos, 2010). There are some indicators showing the quantitative aspects of ICT development, while other indicators include more complex measures of development such as skills and usage.

By referring to the overall situation, these indicators are useful for indicating general development level but they do not quite express the real situation. Among these indicators, the following ones can be included: the number of subscribers, the number of ICT devices, subscription fees, the number of ICT employees, the rate of ICT revenues, the contribution of ICT to the overall GDP figure, the number of ICT enterprises. These indicators are used for characterizing the general ICT standards of a country on average. They also make it possible to compare the ICT development level of individual countries to one another, however, they can provide only a distorted image to a certain extent.

Integrated indicators, on the other hand, do not only put an emphasis on measuring ICT infrastructure but they also take quality issues into account. The two most important integrated indicators are the following:

- ICT Development Index (IDI) is an index published by the United Nations International Telecommunication Union (ITU) based on internationally agreed information and communication technologies indicators. It is used to measure the ICT development levels in 155 countries. The index itself, which can be used as an evaluation tool at global, regional and country levels alike, combines 11 indicators grouped into three subindices: ICT access, use and skills.
- Networked Readiness Index (NRI) is annually published by the World Economic Forum, is used to measure the propensity for countries to benefit from the opportunities offered by information and communication technology. It examines three major dimensions: the general business, regulatory and infrastructure environment for ICT, the readiness of the three key stakeholder groups in a society individuals, businesses and governments to use and benefit from ICT, and the actual usage of the latest information and communication technologies available (Davis & Olson, 1985).

### **3.2.1 The correlation between IDI and the added value**

Correlation calculations are used to describe the direction and the strength of a linear relationship between variables. In our calculation, the correlation between two variables - the IDI index of a country and the average added value created by enterprises - was examined.

Depending on the individual countries the values of IDI were between 5 and 8.5, the added value per enterprise was between 50,000 and 800,000 Euros. The correlation coefficient is 0.791, which indicates a strong positive relationship. The linear correlation coefficient is the square of the determinant coefficient, which explains the added value with the IDI index by 61%. The standard error of the estimate (SEE) helps to determine the accuracy of the prediction. SEE shows the average standard deviation of the added value from the estimated values, which is a value of 1.39.

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	817,842.426	1	817,842.426	41.911	.000
Residual	487,849.245	25	19,513.970		
Total	1,305,691.672	26			

Table 3. 2 - ANOVA table for IDI regression analysis

The ANOVA table shows a similar division to variance analysis, based on the variance explained by each regression (817,842.426), and non-explained variance (487,849.245). Here, the significance of the *f*-test can also be read, which confirms the existence of the correlation (Sig. <.05).

In addition, it can also be observed by interpreting the *t*-test that the significance of the variable determining steepness is less than 5%, therefore IDI has a real effect on added value.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-1,010.976	205.450		-4.921	.000
IDI	196.450	30.345	.791	6.474	.000

Table 3.3 - Estimation of regression coefficient (IDI)

Based on the Unstandardized Coefficients, it is possible to read the formula of the regression line:

$$\text{Added value} = -1,010.976 + 196.45 * \text{IDI}$$

If we take a closer look at the figures, it becomes clear that the member states of the European Union can be divided into four distinct groups.

- Relatively high added value per enterprise with a comparably higher IT development level. This group of countries includes Austria, Germany, the United Kingdom and Ireland.
- Relatively high added value per enterprise with a comparably lower IT development level. Denmark, the Netherlands, Finland, Sweden and France belong to this group.
- Relatively low added value per enterprise with a comparably higher IT development level. Four countries can be found in this group, namely Slovakia, Cyprus, Romania and Bulgaria.



- Relatively low added value with a comparably low IT development level. This is the most populous group, comprising Lithuania, Latvia, Estonia, Malta, Spain, Italy, Slovenia, Poland, Greece, the Czech Republic, Portugal and Hungary.

Austria is situated above the regression line while Hungary can be found below it. This means that the average added value generated by the enterprises operating in Hungary is lower than they could achieve by benefiting from their actual IT development level. In contrast, the IT development level in Austria is lower than the average added value produced by the country.

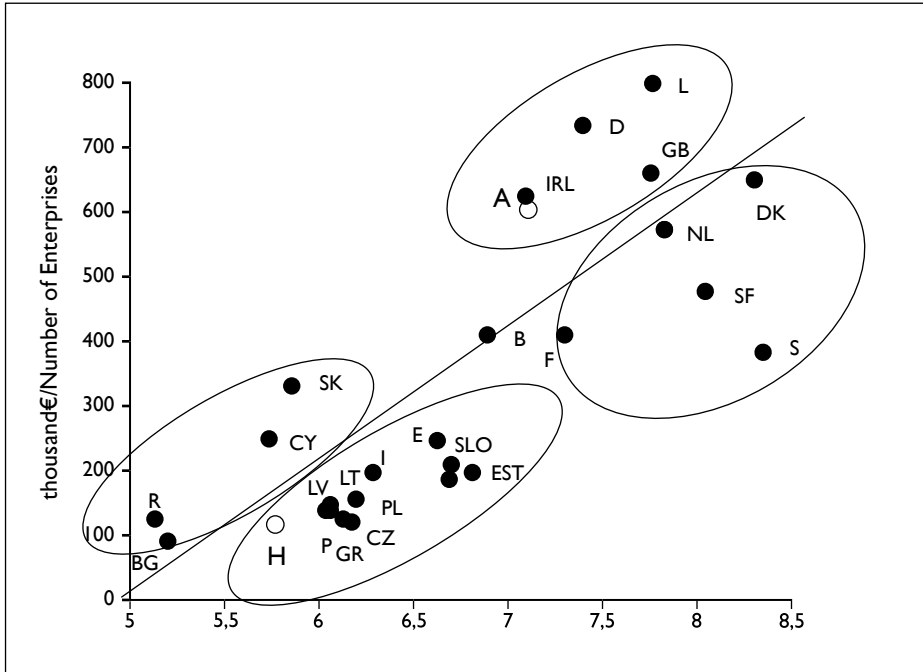


Figure 3. 1 - The correlation between the added value and the ITDI development of the EU countries in 2012<sup>3</sup>

### 3.2.2 The correlation between NRI and the added value

In this calculation, the correlation between two variables - the NRI index of a country and the average added value created by enterprises - was examined. The value of NRI varied between 3.7 and 6.2 in 2012, depending on the individual countries.

3 Abbreviations: A=Austria, B=Belgium, BG=Bulgaria, CY=Cyprus, CZ=Czech Republic, DK=Denmark, EST=Estonia, SF=Finland, F=France, D=Germany, GR=Greece, H=Hungary, IRL=Ireland, I=Italy, LV=Latvia, LT=Lithuania, L=Luxemburg, M=Malta, NL=Netherlands, PL=Poland, P=Portugal, R=Romania, SK=Slovakia, SLO=Slovenia, E=Spain, S=Sweden, GB=United Kingdom

In this case, the correlation coefficient indicates a very strong positive correlation (0.759). The linear correlation coefficient is the square of the determinant coefficient, which explains the added value with the NRI index by 58%. SEE shows the average standard deviation of the added value from the estimated values, which is a value of 1.48.

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	751,272.926	1	751,272.926	33.877	.000
Residual	554,418.746	25	22,176.750		
Total	1,305,691.672	26			

Table 3.4 - ANOVA table for NRI regression analysis

The ANOVA table shows a similar division to variance analysis, based on the variance explained by each regression (751,272.926), and non-explained variance (554,418.746). Here, the significance of the f-test can also be read, which proves the existence of the correlation (Sig. <.05).

In addition, it can also be observed by interpreting the t-test that the significance of the variable determining steepness is less than 5%, therefore NRI has a real effect on added value.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-954.737	218.775		-4.364	.000
NRI	261.582	44.943	.759	5.820	.000

Table 3.5 - Estimation of regression coefficient (NRI)

Based on the Unstandardized Coefficients, it is possible to read the formula of the regression line:

$$\text{Added value} = -954.737 + 261.582 \cdot \text{NRI}$$

It can also be observed following the data provided by the NRI index that Austria is located above whereas Hungary is below the regression line. The previously identified four groups can also be observed here; with the minimum difference that few countries can be found elsewhere in the diagram (for example Italy, Denmark and Belgium).

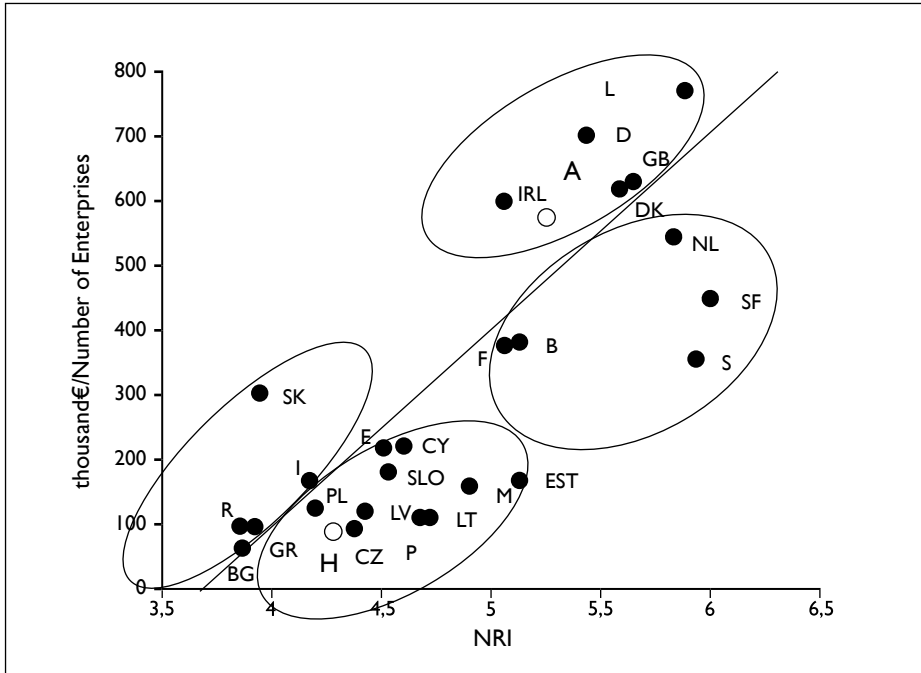


Figure 3. 2 - The correlation between the added value and the NRI development of the EU countries in 2012

The NRI value for Austria was 5.25, while in the case of Hungary it was 4.29. Austria falls into the group of countries where lower average added value belongs to the given IT development level. Hungary's NRI value is behind its average added value.

### 3.2.3 Results of ICT maturity and economic added value connections

The correlation between added value and the ICT development level of a country is close. Nevertheless, the use of ICT has some beneficial effects that are difficult to quantify.

The "Common List of Basic Public Services" is a recommendation for the performance of public services by the European Union which defines obligations for the member states regarding the range and levels of public services provided online.

If businesses and citizens have a higher frequency ICT usage in a country, it also means that they use the services of e-administration to a greater extent.

This is an important message to strategy makers. Also a country's business enterprise ecosystem is a key stakeholder, element of the environment of its public service which determines the demands and very likely the supply sources of its innovation capability.

### 3.3 How does organizational use of ICT contribute to better organizational performance

This is a complex a widely researched question and this chapter intends to show and introduce the first fundamental element of the value creation process, that is how IS is configured.

We summarized in a rudimentary model the elements of ICT drivers and configurations which according to Resource Based Value theories contribute to enterprise value creation in Figure 3. 3. We will discuss these in the following sections as:

- Hardware and Network;
- Information Systems;
- Information Management or IS responsibility.

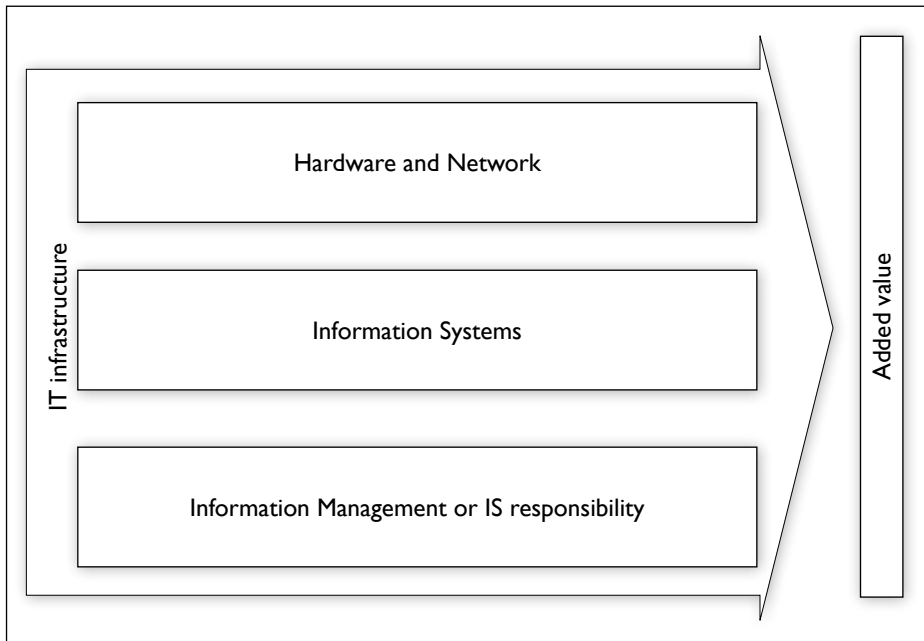


Figure 3. 3. – The logical framework of IT added value and the research model of the chapter.

We will show, that in all aspects we can observe noticeable difference between the high added value performer Austria and the catching up performer Hungary. We did this through sending out questionnaires to companies.

The questionnaire was divided into five blocks. The first part contained questions about the company background information, then issues related to the IT infrastructure. The third group of questions focused on the business issues related to Internet usage habits, while the fourth and longest section was aimed at assessing the usage patterns of IS. The fifth block of questions was investigating information

management practices of the companies, while in the end of this section, we asked about some information on the human resources related to IT.

The primary research was based on a questionnaire that had already been filled out by Hungarian business enterprises. The same questionnaire was used among the Austrian enterprises, providing a good opportunity to compare and analyze the two countries. The questionnaires were sent out randomly, regardless of company size, business activity and regional location. The sample size for comparison was almost identical as 94 enterprises in Hungary and 99 enterprises in Austria completed and returned the questionnaire by the set deadline.

Based on the received questionnaires, an analysis by size categories could be performed because this grouping facilitates the creation of larger sample size in each defined size category. In order to explore the differences in business activities, a larger sample number would have been required in the individual categories of business activities. Therefore the sample of the responding enterprises is not representative, so the results of the survey can be interpreted only within the scope of the responding companies. The evaluation of the received data and the representation of the results were assisted by the application of Excel 2007 and SPSS 16.0 statistical software package. In order to make it easier to interpret the results of our research, diagrams and tables illustrating the course of our analysis as well as the revealed correlations were compiled. The sample of the respondent enterprises is not representative so the results of the survey can only be interpreted within the range of the responding enterprises. Based on the filled-in questionnaires, it can be observed that there is a sample containing at least 12 units only in the size categories of SMEs and corporations in each studied country.

Country	Micro-enterprise	Small-sized enterprise	Medium-sized enterprise	Corporation
Austria	43	28	16	12
Hungary	20	27	27	20

*Table 3.6 - Number of surveyed enterprises by size categories*

### **3.4 The role of IT infrastructure**

IT infrastructure refers to the composite hardware, software, network resources and services required for the existence, operation and management of a business IT environment. It allows an organization to deliver IT solutions and services to its employees, partners and/or customers and is usual internal to an organization and deployed within owned facilities (Janssen, 2013). IT infrastructure consists of all components that somehow play a role in overall IT and IT-enabled operations. It can be used for internal business operations or developing customer IT or business solutions.

Typically, a standard IT infrastructure is distributed according to the following components:

- Network: Server-based network, Internet connectivity, firewall and security.
- Hardware: Servers, computers, data centers, switches, hubs and routers, etc.
- Software: IS, productivity applications and more.
- Meatware: Although conflicting, human users, such as network administrators (NA), developers, designers and generic end users with access to any IT appliance or service are also part of an IT Infrastructure, specifically with the advent of user-centric IT service development (Janssen, 2013).

In information technology, a server is a computer or software that facilitates the access to the data stored or generated on it for other computers or allows the utilization of its hardware resources (such as printers, mass storage devices, CPU).

#### 3.4.1 The number of workstations used by enterprises

On average, 5.74 workstations were used by the Austrian microenterprises, 16.89 were used by small-sized enterprises, 153.86 were used by medium-sized enterprises, and corporations had 2,601 workstations on site.

In Hungary, these numbers are substantially smaller. The great differences can be seen in Table 3.7.

Country	Micro-enterprise	Small-sized enterprise	Medium-sized enterprise	Corporation
Austria	6	17	154	2,601
Hungary	3	7	55	1,105

*Table 3.7. - The average number of workstations used by enterprises in 2012*

Compared with Austria, the Hungarian enterprises are less developed in terms of the number of workstations in use. Austria belongs to the top countries in the European Union when it comes to the general supply and use of workstations, while Hungary's handicap is spectacular in this regard. Therefore, it is understandable that the situation is quite the same in the field of economic organizations. Similar to the penetration of server-based networks, a close relationship can be observed between company size and the use of workstations. This can be explained by the amount of information held and the number of employees as well. At a corporation, hundreds or thousands of employees do work that requires the everyday use of IT tools such as workstations. As the company size decreases, so does the number of employees and workstations together as well as the amount of data to be processed.

A significant correlation can be detected between company size and the penetration of server-based networks in both Austria and Hungary. It can be explained by the fact that the larger an organization is, the more data it has to store and share among users. The huge amount of a corporation's IT resources inevitably require the application of these networks but a microenterprise might be able to manage the available data and information and does not need the support of such networks.

### 3.4.2 The frequency of applying server-based networks

In order to draw a conclusion about the state of the IT infrastructure of the Austrian and Hungarian enterprises, it is necessary to know whether they operate servers on there.

More than half of the Austrian micro-enterprises (56%), and almost all of the small-sized businesses had a server-based network, and 100% of the medium-sized enterprises and corporations answered yes to this question. In Hungary, 30% of microenterprises, a little more than half of the small-sized enterprises and 93% of the medium-sized enterprises reported that they had a server-based network. All of the responding corporations in Hungary stated that they maintained a server-based network.

Country	Micro-enterprise	Small-sized enterprise	Medium-sized enterprise	Corporation
Austria	56	96	100	100
Hungary	30	52	93	100

Table 3. 8 - The frequency rate of server-based networks in percentage in 2012

Seeing these indicators, it can be said that Hungary's western neighbour is more advanced in this respect as microenterprises and medium-sized businesses there applied server-based networks in a much greater proportion. The percentage of these networks in the case of medium-sized enterprises and corporations were similarly high in the two countries. This is not surprising since the effective operation of larger organizations is almost unimaginable without the application of server-based networks.

## 3.5 Information Systems

In order to understand IS, we need to be aware of their general features, functions and key activities, together with their inter-relatedness to one another (Benjamin & Blunt, 1992).

There are several definitions offered on IS in the literature. According to Burt and Taylor's approach, "IS can be regarded as an information source in any combination thereof, or any access to and any recovery of their use or manipulation. Any information system is designed to link the user to an appropriate source of information that the user actually needs, with the expectation that the user will be able to access the information satisfying their needs" (Burt & Taylor, 2003). Davis and Olson define IS as "an integrated user-machine system for providing information to support the operations, management, analysis, and decision-making functions in an organization. The system utilizes computer hardware and software, manual procedures, models for analysis, planning, control, and decision-making by using a database". (Burt & Taylor, 1985)

In a broader sense, an information system is the collection of individuals, activities and equipment employed to collect, process and store information related to the company's environment, its internal activities, together with all transactions between the company and its environment. Beyond giving direct support to operations, its basic task is to provide decision-makers with the necessary information during the whole decision-making process. The system's main components are the following (Bocij, Greasley & Hickie, 2008):

- Individuals: the actual users of technical apparatus. Belong to this group both people who develop, maintain and operate the system and users of information, as top managers who receive information on the factors affecting business operations, and use IS to make decisions in relation to planning, implementation and monitoring business activities.
- Information (processed data on external and internal facts and communication) which – due to its systematized form – can be used directly in the decision-making process.
- Technical apparatus, nowadays usually a computer system (hardware and software) that supports and connects the subsystems applied to achieve corporate objectives.

The computer system standardizes a significant part of the information and communication system, thus making it easier to produce and use information. According to one definition proposed (Csala, Csetényi & Tarlós, 2003) “*IS are systems that use information technology to collect information, transmit, store, retrieve, process, display and transform information in a business organization by using information technology.*”

### 3.5.1 Information systems and corporate decision levels

Depending on the organizational structure of enterprises, management activities are realized in different divisions of labour and at various levels. According to Robert N. Antony's comprehensive framework, there are three types of organizational controlling systems: strategic planning, management control, and operational control (Antony, 1965).

Based on Antony's classification and in line with our assumptions, these systems can be transformed into decision-making and organizational levels of specific activities that are completed with a fourth one. These four levels are associated with the following tasks:

- Top-level management determines the business policy of an enterprise but they should provide guidance for the **strategy** to be implemented as well. In addition to the preparation of plans, they have to ensure their implementation and the correction or modification of their strategy if circumstances and conditions change.
- Middle-level management has to implement a policy specified by the top-level management, elaborating and implementing **tactical** tasks.



- The responsibility of the **operational** level of management is to directly control the implementation of real processes based on the strategy and tactics defined by the upper management levels.
- At the lowest **executive** level, the implementation of simple mass transactions is done. It can also be called the level of **tasks**.

If it is true that certain specific IS can closely be connected to certain decision-making levels, then it is worth examining how each information system is related to the other and exactly what levels of decision-making they are designed to support.

An executive information system (EIS) is a type of management information system (MIS) that facilitates and supports senior executive information and decision-making needs. It provides easy access to internal and external information relevant to organizational goals. It is commonly considered a specialized form of decision support system (DSS) (Power, 2002).

Management information systems (MIS) are distinct from other information systems because they are used to analyze and facilitate strategic and operational activities.

Originally, the term Management Information System „MIS” described applications providing managers with information about sales, inventories, and other data that would help in managing the enterprise. Over time, the term broadened to include: decision support systems, resource management and human resource management, enterprise resource planning (ERP), enterprise performance management (EPM), supply chain management (SCM), customer relationship management (CRM), project management and database retrieval applications (O’Brien 1999).

Transaction processing is a style of computing that divides work into individual, indivisible operations, called transactions. A transaction processing system (TPS) or transaction server is a software system, or software/hardware combination, that supports transaction processing (IBM Corporation, 2012)

According to the traditional structure, MIS, DSS and EIS are based on a TPS system (Rainer, and Cegielski, 2010).

CRM, SRM and SCM systems are basically designed to support decision-making at operational and tactical levels but it is inevitably necessary to have an underlying TPS system that addresses the daily tasks. ERP systems include some important functions of TPS, and be able to support the full operational level. Business Intelligence (BI) systems can include all sorts of decision-support systems used at middle and senior management levels that appear as BI applications. BI systems are always based on some lower-level support systems, mostly on ERP systems. ERP and BI systems can also be found in a complex package (Guo, Sun & Zhong, 2008).

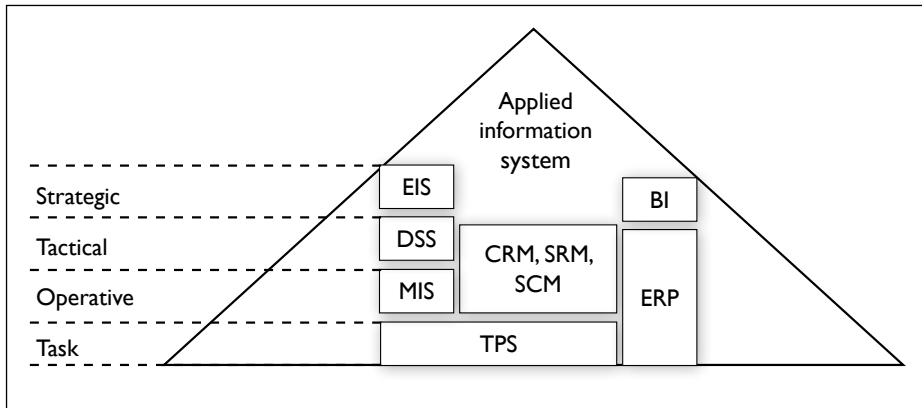


Figure 3.4 - Corporate decision-making levels with the supporting IS (Kacsukné Bruckner & Kiss, 2007)

It is needed to emphasize that this categorization should not be regarded as a rule, it describes only the current major trends. There are instances showing that some systems also extend to other levels of decision-making, and general shifts between these levels are also possible due to the continuous development (Sasvári, Rauch & Szabó, 2014).

### 3.2.5 The use of IS in Austria and Hungary

Nearly two-thirds of the Austrian microenterprises used TPS systems. The proportion of ERP systems (both used and planned to use) was up to 27% in 2012. Using MIS systems reached 23%, their planned use was 3%. Less than one-tenth of the Austrian microenterprises reported using SCM and SRM systems. The proportion of the intended use of CRM systems reached 17%, although the rate of their actual use was only 5%. Using DSS did not exceed 1% in Austria. The use of such strategic systems as BI and EIS affected only one-tenth of the microenterprises in Austria in 2012.

A quarter of the Hungarian microenterprises were using or planning to use TPS systems. The intended use of ERP systems did not exceed 10% in this size category. The planned use of MIS and SRM reached 15%, it was the second highest rate following the intended use of CRM which was 35%. The use of strategic systems was less than 5%. The use of SCM systems did not exceed 5%, either, their intended use was around 15% in 2012. It can be stated that none of the Hungarian microenterprises used IS at a higher frequency rate of 5%.

Small-sized enterprises in Austria used TPS systems in the largest proportion, their usage rate was 75%, respectively. ERP systems were used by 46% of them. At operational level, MIS systems were used by nearly a quarter of the Austrian enterprises in 2012. The use of different tactical IS in the case of CRM and SRM affected the fifth of small-sized enterprises. Using DSS and SCM systems was not typical of Austrian enterprises.

Small-sized enterprises in Hungary most commonly used TPS systems (30%) followed by ERP (15%) and CRM (15%) systems. 15% of them reported using SRM systems. Based on the responses, none of the small-sized enterprises in Hungary

used any kind of decision support systems. 7% of them used BI and only 4% of them reported using EIS systems.

Country		Austria			Hungary		
Levels	IS	Used	Not used, introduction is planned	Not used, introduction is not planned, either	Used	Not used, introduction is planned	Not used, introduction is not planned, either
<b>Micro-enterprise</b>							
Strategic	BI	8%	8%	84%	0%	5%	95%
	EIS	2%	0%	98%	0%	5%	95%
Tactical	DSS	0%	5%	95%	0%	5%	95%
	SCM	0%	8%	92%	5%	10%	85%
	SRM	7%	10%	83%	5%	15%	80%
	CRM	5%	17%	78%	5%	35%	60%
Operative	MIS	23%	3%	74%	0%	15%	85%
Task	ERP	20%	7%	73%	0%	10%	90%
	TPS	60%	2%	38%	5%	20%	75%
<b>Small-sized enterprise</b>							
Strategic	BI	29%	4%	67%	7%	11%	82%
	EIS	4%	7%	89%	4%	11%	85%
Tactical	DSS	0%	4%	96%	0%	30%	70%
	SCM	4%	11%	85%	11%	19%	70%
	SRM	22%	4%	74%	15%	15%	70%
	CRM	22%	4%	74%	15%	19%	66%
Operative	MIS	43%	4%	53%	7%	26%	67%
Task	ERP	46%	4%	50%	15%	22%	63%
	TPS	75%	7%	28%	30%	19%	51%

Table 3.9. - The penetration rate of IS among micro-enterprises and small-sized enterprises in Austria and Hungary in 2012<sup>4</sup>

Nearly 90 % of the Austrian medium-sized enterprises used TPS systems. The proportion of using ERP reached 80% in 2012. The use of MIS systems approached 70%, and their planned use was 6%. Over a fifth of the medium-sized enterprises reported using SCM and SRM systems in Austria. The rate of using CRM exceeded 37 %, being the highest frequency rate among the IS used at a tactical level. The use of DSS was not typical in this size category. The use of strategic systems, including the use of B, affected more than a third of the Austrian medium-sized enterprises.

4 I=Task; II=Operative; III=Tactical, IV=Strategic

More than half of the Hungarian medium-sized enterprises used or planned to use the TPS systems. Using ERP systems was more than 40% in this size category. The intended use of MIS and SRM was nearly 40%, and 44% in the case of CRM systems which was the highest rate in the group of IS used at a tactical level. The use of EIS systems was used by nearly a quarter of the medium-sized enterprises. Although, the use of SCM systems affected a quarter of medium-sized enterprises, their intended use was up to 26% in 2012.

Country		Austria			Hungary		
Levels	IS	Used	Not used, introduction is planned	Not used, introduction is not planned, either	Used	Not used, introduction is planned	Not used, introduction is not planned, either
<b>Medium-sized enterprises</b>							
Strategic	BI	38%	6%	56%	7%	19%	74%
	EIS	7%	7%	86%	26%	4%	70%
Tactical	DSS	0%	14%	86%	19%	18%	63%
	SCM	19%	0%	81%	26%	26%	48%
	SRM	25%	0%	75%	37%	19%	44%
	CRM	37%	12%	51%	44%	15%	41%
Operative	MIS	69%	6%	25%	41%	15%	44%
Task	ERP	81%	0%	19%	41%	7%	52%
	TPS	88%	6%	6%	52%	7%	41%
<b>Corporation</b>							
Strategic	BI	92%	8%	0.00%	20%	15%	65%
	EIS	67%	8%	25%	45%	10%	45%
Tactical	DSS	33%	17%	50%	35%	20%	45%
	SCM	55%	18%	27%	40%	0%	60%
	SRM	64%	18%	18%	60%	5%	35%
	CRM	75%	17%	8%	50%	10%	40%
Operative	MIS	92%	8%	0%	60%	5%	35%
Task	ERP	92%	8%	0%	60%	10%	30%
	TPS	100%	0%	0%	75%	10%	15%

Table 3. 10. - The penetration rate of IS among medium-sized enterprises and corporations in Austria and Hungary in 2012

Every responding corporation in Austria reported using TPS systems. The use of ERP by corporations was almost 90%. Nine out of ten corporations used MIS systems at the operational level. In the case of CRM, the use of various IS at a tactical level affected three-fourths of the Austrian corporations. With a usage rate of more than 60%, the use of SRM was the second most commonly used tactical system in Austria. The use of SCM systems was typical of every second, the use of DSS was typical of every third corporation in Austria. The use of BI systems reached an impressive 90%

and the use of EIS was also high, affecting more than two-thirds of the enterprises belonging to this size category.

The most frequently used information system was TPS among the Hungarian corporations, reaching 75%. It was followed by the use of ERP (60%) and MIS (60%) systems. CRM systems were used by 50% of them. Based on the responses, six Hungarian corporations out of ten used SRM systems. It was also remarkable that only a fifth of the Hungarian corporations used any kind of BI systems and nearly half of them used EIS systems during their daily operations.

### 3.6 Information Systems management – responsibility for ICT

Among the Hungarian **microenterprises**, IT functions were performed by the owners or by the appointed senior management at almost half of the businesses. It is very similar to the Austrian microenterprises where a third of them also appointed the owner or a member of the senior management to perform this task.

Based on the results of our survey, in the group of the Hungarian **small-sized enterprises**, their executive director or external service providers were responsible for executing the operation of IT functions in the largest proportion. Operating IT functions by an employee at a lower, departmental position was the least significant in Hungary. Contrary to this, the most frequently appointed person in this size category was an employee at a lower position in the case of the Austrian small-sized enterprises.

Country	Micro-enterprise		Small-sized enterprise		Medium-sized enterprise		Corporation	
	Austria	Hungary	Austria	Hungary	Austria	Hungary	Austria	Hungary
Chief Information Officer	3%	5%	0%	15%	19%	48%	84%	80%
Chief Executive Officer	33%	45%	14%	30%	0%	11%	8%	0%
An appointed employee working at a departmental level	28%	20%	71%	10%	81%	19%	8%	10%
An external service provider	15%	5%	11%	30%	0%	22%	0%	10%
Other	21%	25%	4%	15%	0%	0%	0%	0%

Table 3. 11 – Persons responsible for operating IT functions in Austria and Hungary in 2012

In terms of the **medium-sized enterprises**, IT functions were operated by IT managers in Hungary in the largest proportion. It was also significant to entrust an external service provider in this size category. More than 80% of the Austrian medium-sized enterprises appointed IT managers to perform this task.

In the category of **corporations**, IT managers were responsible for operating IT function in the highest proportion in each of the studied countries.

### 3.7 Conclusions

As it is increasingly visible, the information society creates a new type of state, a digital state that becomes, at least partially, a network state following the model of network economy and network society. This is no longer a single or multi-centered, not a centralized or decentralized state. Therefore, regional and local government administrations become more and more equal players to the central government, which is the traditional holder of the highest executive power. Their primary task is to create an atmosphere for citizens and business enterprises to participate rather than being subjects or subordinates. In parallel, the next step is when local societies also gain their, at least partial, equal rights to take part in the processes of e-administration. In order to achieve this, the stakeholders (such as citizens, private sector and state) must have adequate technical infrastructure and personnel. This chapter demonstrated what levels of development enterprises operating in Austria and Hungary were able to reach in the fields of hardware, network, software and meatware.

The greatest handicap was measured in the size category of the Hungarian microenterprises and small-sized enterprises since only half of them reported using server-based networks, compared to their Austrian counterparts in the same size categories. In contrast, in the groups of medium-sized enterprises and corporations the difference in frequency rates could hardly be observed. In terms of the number of workstations, the Hungarian enterprises used half as many workstations as their Austrian peers in every size category.

The frequency rate of using IS by microenterprises in Austria exceeded the same rate in Hungary. In fact, the same result was found in the case of using IS both at operational and strategic levels. In the case of the surveyed 9 IS it was found that the Hungarian microenterprises hardly used or did not use any of them at all. It can be explained by the complexity of the products and services offered by those enterprises, which, in turn, might affect the added value created by them. There was a more than seven-times difference between Austria and Hungary in this respect in 2012.

The use of IS among the Austrian small-sized enterprises was twice as high at the level of performing tasks and six times as high at the operational level as it was found in the case of their Hungarian peers. A 30% handicap could be observed only at the tactical level while the Hungarian added value was barely a third of the Austrian one.

The use of IS by medium-sized enterprises at the tactical level was very similar both in Austria and Hungary. It was remarkable, however, that the Hungarian data showed

a 30% decrease at the level of tasks and at the operational level while the added value was still only about a third compared to the Austrian figures.

The average added value generated by the Hungarian corporations was nearly half of their Austrian counterparts while there was a narrow gap in terms of operational and tactical levels and a more robust difference could be found at the strategic level.

Both in Austria and Hungary, the same persons were appointed to be responsible for operating IT functions in the size category of microenterprises and corporations. In the case of microenterprises, usually the owner or another member of the senior management was in charge while IT managers were entrusted with this task in the group of corporations. The persons in charge of operating IT functions varied in the group of small and medium-sized enterprises, they could be managed by owners, employees in a lower position, external service providers or IT managers alike.

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## Chapter 4

# E-government: Efficiency Enabled by Interoperability

### 4.1 The interoperability challenge – past, present and future

Since the mid-1990's, the provision of public administration services by electronic means has been a major part of public service development. After the first "static" governmental websites and portals of the early internet, electronic government came into being. The use of information and communication technology (ICT) in the public sector promises a better provision of public services to the "customers" – citizens and businesses through the exploitation of digital tools. From a techno-optimistic point of view, investment in technology makes the whole system more efficient and transparent at a significantly lower cost. After the first enthusiasm waned, it became clear that technology investments were not automatically leading to better public services and better governmental procedures [21]. Among others, the lack of interoperability is a fundamental obstacle to realizing the benefits of eGovernment [16].

### 4.2 History and definition(s) the European context

Interoperability in a wide sense means the ability of a system to cooperate with another system. In the context of eGovernment, the European Interoperability Framework for pan-European eGovernment Services [11] defines interoperability as "...*the ability of information and communication technology (ICT) systems and of the business processes they support to exchange data and to enable the sharing of information and knowledge.*" There are a great number of other definitions in use which have also evolved in the last 15 years.

The European Union has been propagating the concept of interoperability from the beginning, especially at the pan-European level. One of the first major moves in this direction was the adoption of the Interoperability Decision (1720/1999/EC) of the European Parliament and Council in July 1999 [11]. The decision establishes the legal background of the second phase of the IDA (Interchange of Data between Administrations) programme. IDA started in 1995 with the aim of promoting the development and operation of trans-European telematic networks for data interchange between Member State administrations and/or the Community institutions. IDA II has been redirected towards the market and interoperability. Its aim was to increase the efficiency of the delivery of on-line eGovernment services to European businesses and citizens. The e-Europe Action Plan 2005, which was adopted in the middle of 2002, calls upon the European Commission "...*to issue an agreed interoperability framework to support the delivery of pan-European eGovernment services to citizens and enterprises*". [11] The abovementioned framework was adopted in 2004 and it addresses information

content and recommends technical policies and specifications to help connect public administration information systems across the EU.

The follow-up of the IDA programme was the Interoperable Delivery of pan-European eGovernment Services to Public Administrations, Businesses and Citizens (IDABC) programme, adopted in 2004. The aim of the IDABC was to continue the work on improving cooperation between public administrations and on supporting the delivery of pan-European eGovernment services to citizens and businesses. In 2010, the Digital Agenda for Europe once again emphasized the importance of interoperability, and the topic became the second pillar (out of seven) of the Agenda<sup>5</sup>, which is part of the Europe 2020 initiative. The European Interoperability Framework 2.0 was also adopted in 2010.

At the end of the IDABC programme, the European Commission approved a new eGovernment programme for the period 2010-2015: Interoperability Solutions for European Public Administrations or ISA. The ISA programme mainly focuses on back-office solutions supporting the interaction between European public administrations. Some of the main instruments supporting the programme are the large scale pilot projects (LSP). The LSPs develop practical solutions tested in real government service cases across Europe in five main areas; eID, eProcurement, eBusiness, eHealth and eJustice. Seven LSPs are piloting a number of solutions, or building blocks, that enable cross-border digital services. Each block consists of a number of components (common code), uses a number of standards and specifications, and all share a key characteristic: they are intended to be taken up as part of online services which make these online services 'cross-border enabled'. Four such LSPs are still currently running and three have been completed (STORK has a follow-up project, STORK 2.0):

- e-SENS (Electronic Simple European Networked Services): moving services forward
- epSOS (European Patients Smart Open Services): improving healthcare
- e-Codex (e-Justice Communication via Online Data Exchange): speeding up the process of justice
- STORK (completed) and STORK 2. (Secure identity across borders linked): making access smarter through a single European electronic identification and authentication area
- PEPPOL (Pan-European Public eProcurement On-Line): improving procurement (completed)
- SPOCS (Simple Procedures Online for Cross-border Services): making business easier (completed)

Another important initiative is the Joinup platform<sup>6</sup>: Joinup is a collaborative platform funded by the ISA Programme. It offers several services that aim to help eGovernment professionals share their experience with interoperability solutions and support them in finding, choosing, re-using, developing and implementing open source software and semantic interoperability assets.

5 <http://ec.europa.eu/digital-agenda/en/our-goals/pillar-ii-interoperability-standards>

6 <https://joinup.ec.europa.eu/>

This short overview shows that after almost 20 years, interoperability remains a crucial and unsolved part of the eGovernment agenda. There are two different explanations for this relative lack of success despite the huge and continuous efforts of European institutions and organizations. On the one hand, the majority of such efforts have been directed at cross-border issues and this has resulted in the local dimension remaining underdeveloped, however the local dimension of interoperability has a critical and specific role that should be fully recognized [15]. On the other hand, interoperability in the eGovernment context is complex: in addition to technical, semantical and organizational questions, it also raises legal, policy, and sociocultural issues [6]. This brings us back to the definition of interoperability.

Ford et al. [10] have collected and separated more than 30 different definitions of interoperability. This lends credence to the view that interoperability is situation dependent [16], and its meaning can cover different areas, ranging from strictly technical ones to nontechnical, depending on the context. The majority of the definitions usually restrict interoperability to a technical challenge [16]. Chen and Vernadat [7] describe interoperability as the ability of systems to work together at various levels of cooperation. Novakouski and Lewis identify three primary goals connected with achieving interoperability in any system: data exchange, meaning exchange and process agreement [16]:

- 1) Data exchange: this goal is restricted to the possibility of data exchange, without the meaning of the data (i.e. the type, the form or the size of the data)
- 2) Meaning exchange: a more difficult aspect than data exchange, it requires every participant in the data exchange to interpret the meaning of the data in the same way
- 3) Process agreement: this aspect is about the question of how all the participants in a communication act once they have exchanged information. It differs from the previous types because it focuses on the actions of the participants rather than on the data exchanged.

Similarly to this distinction, the first European Interoperability Framework (EIF) defines three “dimensions” of interoperability [11]:

- Technical interoperability: this concerns the technical issues of linking computer systems and services (i.e. open interfaces, interconnection services, data integration and middleware, data presentation and exchange, accessibility and security services).
- Semantic interoperability: the aim of this aspect is to ensure that the precise meaning of exchanged information can be understood through any other application. It enables systems to combine received information with other information resources and to process it.
- Organizational interoperability: this means the definition of business goals, modelling business processes and bringing about the collaboration of administrations that need to exchange information but which have different internal structures and processes.

Figure 4. 1. shows the connection between these goals and the levels of interoperability.

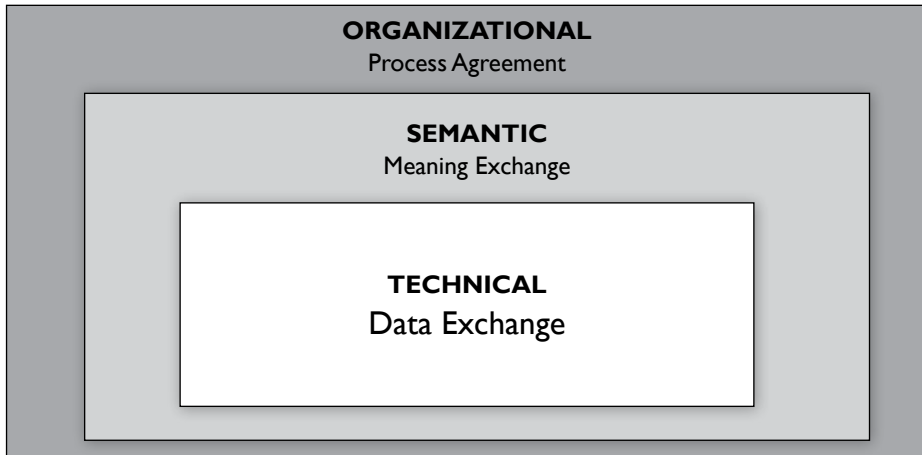


Figure 4. 1. The basic levels of interoperability with their main goals [16]

These basic dimensions show that interoperability is not only a technical issue, and that other aspects (organizational, legal, political, social) may turn out to be a bigger challenge [20]. Many additional aspects of interoperability have already been identified, for example Miller [14] separated technical, semantic, political/human (organizational aspects, including worker and user specific variables as well), inter-community (among different domains), legal and international interoperability.

The 2.0 version of the EIF [8] defines two additional levels of interoperability: legal and political interoperability. EIF 2.0 defines the levels in a hierarchical way from technical interoperability at the bottom to political interoperability, which is at the top of the “pyramid”. The latter is much more a “context” than a dimension, and means that all the stakeholders involved must share visions, agree on objectives and align priorities in order to realize interoperability (Figure 4. 2.). Legal interoperability in the EIF refers to the international level, and basically to the incompatibilities between legislation in different Member States as a problem as it makes working together more complex or even impossible. But it is also valid at the state level. As Baird puts it, interoperability can only be realized when relevant laws and public policies are designed to facilitate the desired interaction or exchange [5]. As Novakouskis and Lewis emphasize, recognizing the impact of legal concerns in the eGovernment context of interoperability is an important step. They also raise another aspect of legal interoperability, which is the assignment of responsibility: government systems must comply with all the relevant regulation. This can be a significant burden in terms of design, development and maintenance [16].

This maturity level-based or framework-like approach in the eGovernment context can be misleading [18]. Introducing a new levels of interoperability may not be the best way to demonstrate the role of these new aspects because they do not address new interoperability goals, but are rather influencing factors together with some

socio-cultural issues (social and cultural factors can affect the basic dimensions of interoperability which also contains user perception and adoption) [16]. There is also some overlap between cultural and political aspects as they influence the approaches with which a government chooses to address the interoperability problem [5].

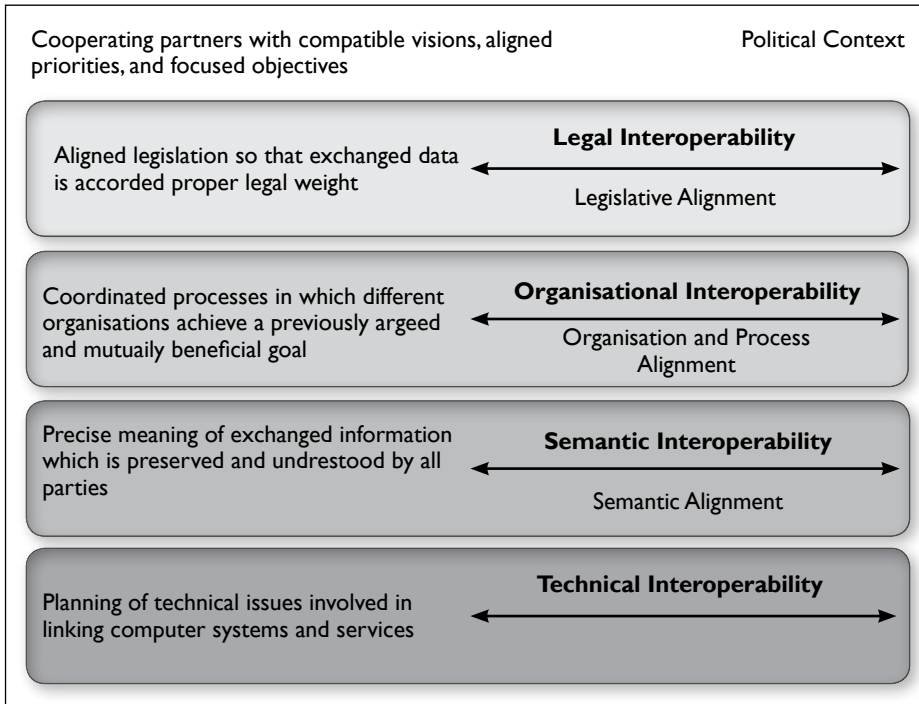


Figure 4. 2. Levels of interoperability in the eGIF 2.0 [8]

The impact of the influencing factors is different and depends on the situation and how they affect the eGovernment system regardless of the interoperability level [16]. This approach can be seen in Figure 4.3. The successful implementation requires that the appropriate level of interoperability for the eGovernment system be found, especially because of the fact that in eGovernment, interoperability is not necessarily machine to machine, but can be human to machine or even human to human [16]. As Braid summarizes, "Meaningful interoperability means addressing each aspect of an interoperability ecosystem (...) only a holistic approach to the entire interoperability ecosystem, beginning with the appropriate public policy decisions, will achieve the intended ends". [5]

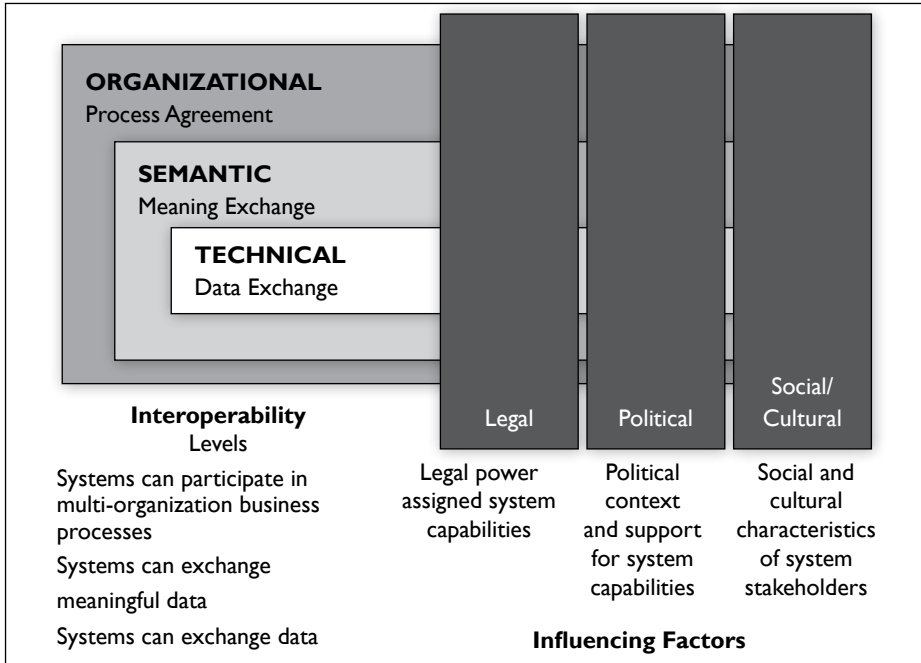


Figure 4. 3. Every level and influencing factor of interoperability – a different approach [16]

### 4.3 Why is interoperability important?

The history of interoperability shows that the benefits relating to eGovernment interoperability must be numerous. One of the main aims of eGovernment development is to provide government services online without sending citizens to different authorities: interoperability is a prerequisite to the one-stop-shop vision of eGovernment and needs horizontal and vertical integration [12].

Besides the improved efficiency of service delivery and access to the service, interoperability allows governments to manage their internal operations better. The enhanced flow of information can increase transparency and accountability. Administration can also avoid vendor lock-in (and the huge costs this incurs) [21]. Interoperability also promotes international cooperation.

Laskaridis et al. summarize the benefits of interoperability as follows [12]:

- reduced costs of information collection and management through streamlined collection, processing and storage;
- improved decision making for policy and business processes, resulting in more integrated planning and enhanced government service delivery;
- improved timeliness, consistency and quality of government responses information will be easily accessible, relevant, accurate, and complete;

- improved accountability and transparency for citizens;
- reduced costs and added value for government through reusing existing information, sharing infrastructure and designing integrated, collaborative methods of delivering services;
- improved fraud detection and national security.

The EIF 2.0 states that the result of interoperability is improved public service delivery to citizens and businesses by facilitating the one-stop-shop delivery of public services and lower costs for public administrations, businesses and citizens due to the efficient delivery of public services [8].

In the EIF 2.0, one can also find general principles of good administration that are relevant to the process of establishing European public services. They describe the context in which European public services are decided and implemented. They complement one another regardless of their different natures, e.g. political, legal or technical and basically summarizing up the areas where interoperability can be beneficial [8]:

- 1) *Subsidiarity and proportionality*: The subsidiarity principle requires EU decisions to be taken as closely as possible to the citizen. In other words, the EU does not take action unless this is more effective than action taken at national, regional or local level. This means that the EU will opt for solutions that leave the greatest possible freedom to Member States.
- 2) *User-centricity*: Public services are intended to serve the needs of citizens and businesses and those needs should determine what public services are provided and how public services are delivered. This means user friendly services, multichannel delivery, single point of contact-approach, the provision of only the necessary information and the respect of privacy.
- 3) *Inclusion and accessibility*: The use of ICT should create equal opportunities for all citizens and businesses through inclusive services that are publicly accessible without discrimination. Inclusion means allowing everyone to take full advantage of the opportunities offered by new technologies to overcome social and economic disadvantages and exclusion. Accessibility ensures that people with disabilities and the elderly can use public services with the same service levels as all other citizens.
- 4) *Security and privacy*: Citizens and businesses must be assured that they interact with public administrations in an environment of trust and in full compliance with the relevant regulations, e.g. on privacy and data protection. This means that public administrations must guarantee the privacy of citizens and the confidentiality of information provided by businesses.
- 5) *Multilingualism*: Multilingualism needs to be carefully considered when designing European public services. A balance needs to be found between the expectations of citizens and businesses to be served in their own language(s) and Member State public administrations' ability to offer services in all official EU languages.
- 6) *Administrative simplification*: Businesses compile large amounts of information, often solely due to legal obligations, which is of no direct benefit to them and not necessary for achieving the objectives of the legislation imposing the



obligations. This creates a considerable administrative burden, which can be expressed as a cost incurred by businesses.

- 7) *Transparency*: Citizens and businesses should be able to understand administrative processes. They should have the right to track administrative procedures that involve them, and have insight into the rationale behind decisions that could affect them.
- 8) *Preservation of information*: Records and information in electronic form held by administrations for the purpose of documenting procedures and decisions must be preserved. The goal is to ensure that records and other forms of information retain their legibility, reliability and integrity and can be accessed as long as needed, taking into account security and privacy.
- 9) *Openness*: In the context of the EIF, openness is the willingness of persons, organisations or other members of a community of interest to share knowledge and stimulate debate within that community, the ultimate goal being to advance knowledge and the use of this knowledge to solve problems. While respecting data protection and privacy, interoperability involves sharing information among interacting organisations, and hence implies openness.
- 10) *Reusability*: Reuse means that public administrations confronted with a specific problem seek to benefit from the work of others by looking at what is available, assessing its usefulness or relevance to the problem at hand, and deciding to use solutions that have proven their value elsewhere. This implies that public administrations must be willing to share with others their solutions, concepts, frameworks, specifications, tools and components.
- 11) *Technological neutrality and adaptability*: Public administrations should focus on functional needs and defer decisions on technology as long as possible in order to avoid imposing specific technologies or products on their partners and to be able to adapt to the rapidly evolving technological environment. Public administrations should render access to public services independent of any specific technology or product.
- 12) *Effectiveness and efficiency*: Public administrations should ensure that solutions serve businesses and citizens in the most effective and efficient way and provide the best value for taxpayer money. There are many ways to take stock of the value brought by public service solutions, including considerations such as return on investment, total cost of ownership, increased flexibility and adaptability, reduced administrative burden, increased efficiency, reduced risk, transparency, simplification, improved working methods, and recognition of public administration achievements and competencies.

At the moment, only a few states have moved forward to realize the majority of these benefits. The reality is the emergence of islands of eGovernment that are not able to cooperate [12], but governments continue to move towards higher levels of interoperability. In the next chapter we present the results of two leading nations in Europe in the field of interoperability (Estonia and Portugal) and also summarize Hungary's efforts in this field in recent years.

## 4.4 Case studies: interoperability under power

In the following, through the example of Estonia and Portugal we show the examples of European countries whose results in the field of eGovernment development are widely recognized over the world. These results mainly based on an approach that puts interoperability issues in the center eGovernment development. We also present the case of Hungary where in the last few years the “new deal” of eGovernment development has been also interoperability-focused.

### 4.4.1 Estonia – the quantum leap

Estonia is one of the European leaders in the development of eGovernment, partly thanks to the country’s continuous efforts on interoperability (e.g. the Estonian IT Interoperability Framework 2.0 was published in 2006). The Estonian eGovernment journey began in 2001, when the Estonian government (with the contribution of private companies) started to develop an Information and Communication Technology framework in order to create a common system for eGovernment services. A completely new, comprehensive environment of service management and service delivery was developed, based on the main elements of a secure data transport backbone called X-Road, distributed software systems and different hardware components like portals, elements of public key infrastructure (PKI), governmental databases and information systems. The environment architecture was built on separated customer-centered front and back offices and on seamless connections between organizations. [13]

The architecture of eGovernment was mainly developed in the framework of the before mentioned X-Road project. The project (started in 2001) originally aimed for interconnecting Estonian governmental databases to the common data resource accessible over the Internet, and later was expanded to send all kinds of XML-format electronic documents securely over the Internet. The X-Road became the foundation of all Estonian eGovernment services. X-Road is a middleware solution for secure message exchange between public or private organizations with a great emphasis on security [13].

The X-Road<sup>7</sup> allows institutions/people to securely exchange data as well as to ensure people’s access to the data maintained and processed in state databases. Public and private sector enterprises and institutions can also connect their information system with the X-Road. This enables them to use X-Road services in their own electronic environment or offer their e-services via the X-Road. In order to use the services, the end users must first authenticate themselves with an ID card or via an Internet bank account.

The entrepreneur’s right of representation is authenticated on the basis of the data of the Commercial Register. In case of citizens, the X-Road enables using the services of the X-Road via different portals. That includes making enquiries from state databases and to control the information related to the person himself/herself. Officials can use the services intended for them (for instance document exchange center) in the information systems of their own institutions. In a nutshell, XRoad is basically an integration tool of government information systems.

<sup>7</sup> <https://www.ria.ee/x-road/>

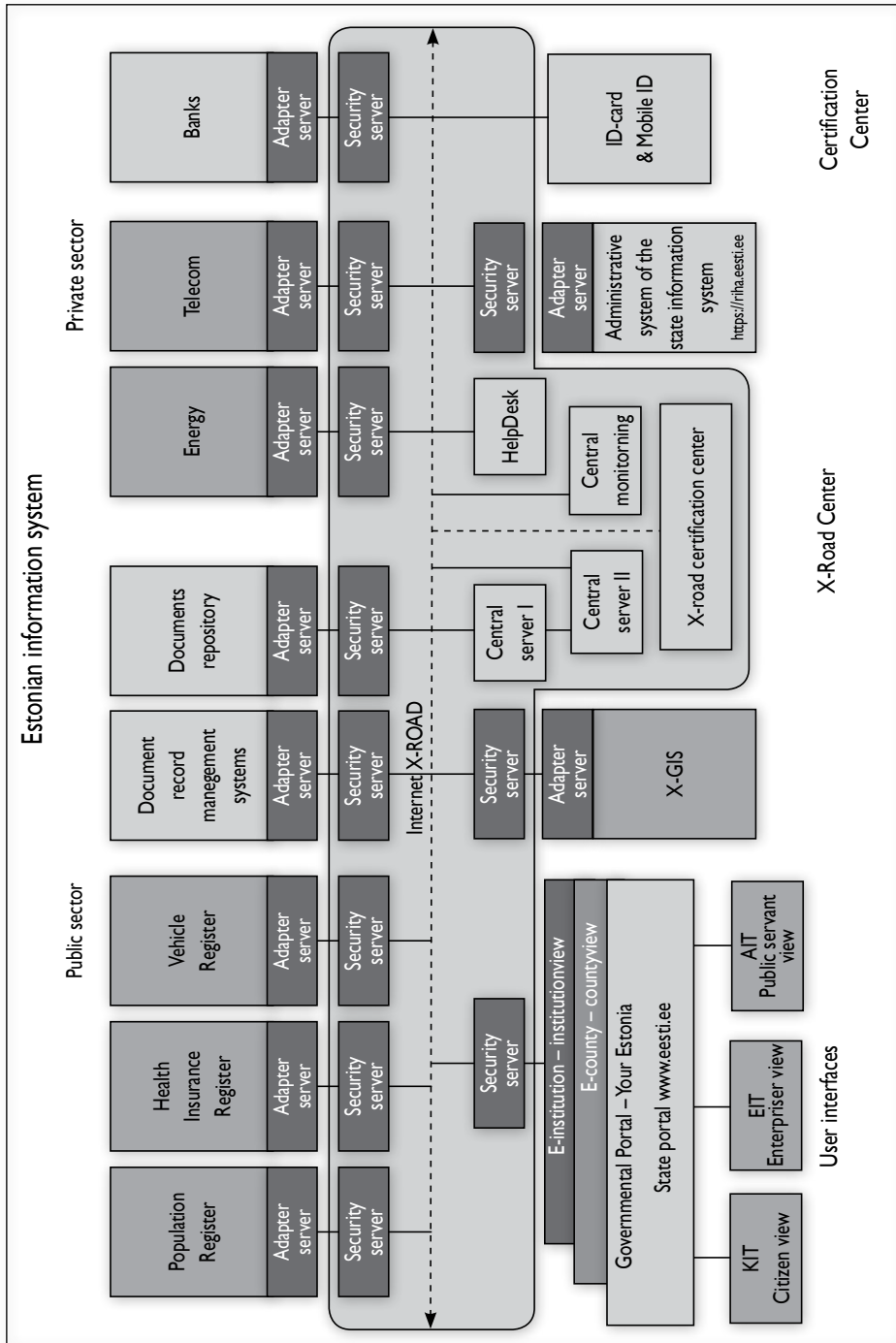


Figure 4. 4. The Estonian eGovernment architecture with the X-Road at the center

Another fundamental Estonian national ICT-development is the ID-card project, which uses Public Key Infrastructure<sup>8</sup>. As it was mentioned, the national ID card is used to access the services offered with the help of X-Road. The card was implemented according to the decision of the Estonian parliament at the end of 2001, the first cards were issued in 2002. User authentication is a major success factor in eGovernment and a large scale implementation of such an e-ID card was unique in Europe. On the top of this, X-Road is also capable of using the authentication service of Estonian commercial banks [13].

The implementation of X-Road-like solution needed handling of great number of aspects, and almost all of them were listed before: legislative environment, organizational procedures, mechanisms of identification and authentication, technical solutions. Estonia created an eGovernment environment that has taken account almost every aspects of interoperability at the beginning of the 2000's – just at the rise of the pan-European interoperability tenor. The country's main aim is to maintain and further development of an interoperable eGovernment environment in harmony with the European principles. It is also reflected in the Estonian Information Society Strategy (2007-2013) contained basic principles regarding to interoperability [9]:

- The public sector employs the already existing technological solutions (i.e. the eID card, the data exchange layer X-Road) and avoids duplicating IT solutions;
- The public sector re-organizes its business processes so as to ensure a one-off collection of data from citizens, entrepreneurs and public bodies;
- The public sector gives equal treatment to different hardware and software platforms and ensures interoperability of information systems by using open standards;
- The collection of data and the development of ICT solutions proceed from the principle of reusability.

Realizing interoperability usually requires high level of coordination and leadership. Estonia created the Estonian Information System Authority (RIA) to fulfill this task. RIA coordinates the development and administration of the state's information system, organizes activities related to information security, and handles the security incidents that have occurred in Estonian computer networks. RIA also advises the providers of public services on how to manage their information systems as per requirements and monitors them.

#### 4.4.2 Portugal – eGovernment as a tool of simplification

E-Government in Portugal is mainly perceived as an important tool to support administrative simplification initiatives. Most of the measures of the Simplex

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8 A public key infrastructure allows users (individuals or organizations) of a public network (as the Internet) to securely exchange data and/or money. It is assured through the use of a public and a private cryptographic key pair that is obtained and shared through a trusted authority or the certificate authority (CA). The PKI is using a private key (given to the person requesting it) and a public key (which is made public). The private key is used for proving user identity and encrypting the digital certificate, while the certificate is decrypted by the public key.

programme (the government-wide public administration simplification programme in Portugal) depend on effective and efficient front and back-offices to allow the development and implementation of coherent e-government services across the entire public sector. E-government supports and enhances simplification by eliminating:

- the necessity for rules and regulation through automation of business process value;
- redundant procedures and regulations through resource sharing;
- unnecessary regulation of semi-automatic or manual processes and procedures by linking services and data together through electronic networks [17].

The Simplex programme - started in March 2006 - involved a number of administrative and legislative initiatives to reduce bureaucracy, increase authorities' transparency and public administration's efficiency. It collected the existing commitments and objectives regarding simplification into a single strategy. This approach made its mark on the basic principles of Portugal's e-Government development [19]. Sharing resources is one of the prerequisites for transformation, and e-government enables governments to better achieve their simplification goals, and a great number of e-government initiatives were launched as part of the Simplex programme in the second half of the 2000's.

The most important element was an interoperability platform for the public sector, developed by the Knowledge Society Agency (UMIC). The platform now has been managed by the Agency for Administrative Modernisation (AMA) since 2007. The platform defines an architectural standard with rules and procedures that enable interconnectivity and interoperability between e-government services. The platform is built on a systems integration approach using open standards and therefore independent of proprietary technological solutions [17].

The Interoperability Platform for the Public Administration (AP) is a system which facilitates the multiple operation of different information systems, based on principles of interoperability and security<sup>9</sup>. The platform ensures:

- 1) the electronic accreditation, authentication and authorisation of users with federated identity
- 2) directing processes and the combination of services and public administration information systems (ensuring that the user is provided with an integrated vision of the services provided by the Public Administration);
- 3) integrating an Electronic Payments Platform;
- 4) data privacy, confidentiality and security (ensuring that events are recorded, and monitoring and detecting security occurrences, storage of users and their accreditation, encrypting, storage of permissions, time synchronisation, and secure transmission).

The platform is supported by a Common Services Framework which includes [17]:

- an authentication system guaranteeing security and compatibility among several agents ;
- identity federation ensuring that no system or public body knows all the different identities of citizens and businesses; i.e. private individuals and public

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9 [http://www.english.unic.pt/index.php?option=com\\_content&task=view&id=2687&Itemid=112](http://www.english.unic.pt/index.php?option=com_content&task=view&id=2687&Itemid=112)

authorities will both be guaranteed privacy, confidentiality and security of their data;

- electronic services and workflow management;
- transaction, message and e-payment engines.

The Interoperable Platform and the Common Services Framework together could constitute the content of enterprise architecture – they provide both the technical foundation for communication among government agencies and also open possibilities for rearranging and changing organisational structures and workflows.

A national Citizen's Card (an electronic ID card) was also introduced in March 2007. It replaced five identification cards: the civil identification card, the taxpayer card, the National Health Service users' card, the social security card and also the voter's card. The card is also a digital document that allows the citizen to identify himself/herself and to electronically sign documents. The citizen card is a basic element of the Portuguese eGovernment environment, operating with an ICT security infrastructure supporting the use of the electronic ID card and digital signatures.

Just like in Estonia, the Portuguese government created an institution to coordinate the development of government related information technology. The Agency for the Modernization of the Public Administration tasks are related with planning, coordinating, and developing projects that support an information society, including electronic government services. The AMA operates within the Portuguese Presidency of the Council of Ministers, and has a supervising role in every governmental ICT project that exceeds a certain amount.

#### **4.5 Initiatives supporting interoperability in Hungary**

Hungarian eGovernment had a promising start in the early 2000's, but there was a priority of technologies to the cost of real services. The beginning of a major public administration reform in 2011 represented a moment to rethink the concept of eGovernment as well. The Magyar Zoltán Public Administration Development Programme<sup>10</sup> contains the current situation of various public administration issues, actual problems to be solved, obstacles as well as strengths, potentials and real client needs. It initiates measures for interventions and several tools of development, such as one-stop-shops, redistribution of local and central powers, eGovernment, and human resource management. The Magyar Simplification Programme was also part of the reform. It created a good climate to reorient eGovernment development and can be used as an enabler to achieve political interoperability. The new direction of eGovernment is based on the services' higher priority over IT technologies. The measures of the last three years were mainly aimed at legal and organizational levels of interoperability.

<sup>10</sup> <http://magyaryprogram.kormany.hu>

#### **4.5.1 The amendments of Act CXL of 2004 on the general rules of public administrative procedures and services**

First of all, there was a review of the legal environment for eGovernment processes. At the end of 2011 the Hungarian Parliament adopted amendments to the Law on Administrative Procedures [2], and execution resolutions have also been accepted in eGovernment regulation (82-85/2012). The aim of this framework approach is to provide the system with the flexibility it needs. The new legislation focuses on useful services and excludes the definition of any given technology from the regulation level.

As a novelty, new building blocks have been introduced, the „regulated electronic administrative service” (Hungarian abbreviation: SZEÜSZ). SZEÜSZs are essential electronic services (front or even back office) from which complex electronic procedures and cases can be built. The governmental resolution 83/2012 contains the definition and basic requirements of the regulated electronic administration services [1], and also the list of the ones that the state (avoiding parallel developments) has to establish centrally. The mandatory SZEÜSZs are basically run by three major state organizations: the Central Office for Administrative and Electronic Public Services (KEKKH), the National Information and Communications Service Ltd. (NISZ Zrt.) and the Hungarian Post. Public administration institutions can use these services and integrate them into their own procedures. Some examples of regulated electronic administration services:

- Central Office for Administrative and Electronic Public Services: central authentication agent, timed client notification on electronic administration procedures, file validity register
- National Information and Communications Service Ltd.: government certificate authority (GOV CA), storage of e-documents, central form filling application
- Hungarian Post: secure delivery service, authentic conversion of paper documents into electronic form and vice versa

To ensure interoperability between all the services and to protect the interests of the clients, the governmental resolution calls for the setting up of the Electronic Administration Authority. Its main task is to permit and to harmonize the development and the cooperation of the regulated electronic administration services. The complete SZEÜSZ environment can be seen as an “interoperability platform” as well, because its major functions are the same as the X-Road or the iAP.

#### **4.5.2 The Electronic Administration Authority**

Strong leadership is one of the crucial factors in the successful development of eGovernment. The creation of a top level supervisor entity is an important step in this direction. The primary goal of setting up the Electronic Administration Authority is to ensure the monitoring, quality and security of the measures based on the new legislative environment.

The authority is a supervisory, monitoring and licensing body which issues recommendations, supports the service providers (which can be private sector entities as well) and also monitors their actions in order to streamline all of the (regulated)

electronic administration processes in harmony with the current legislation. The authority plays an important role in policy making, in the creation and development of strategies and also supports regulation activities. The authority registers service providers, permits service providers to provide a regulated electronic administration service and enforces the rules on regulated electronic administration services. The Authority responsible for the following activities:

- initiating measures in connection with certain regulated electronic administrative services
- commenting draft eGovernment-related legislation
- issuing recommendations for each SZEÜSZ
- handling the announcement and permitting of SZEÜSZs
- supervision of SZEÜSZs
- describing the requirements for governmental IT interoperability, especially for data transfer and data structure
- creating and maintaining the register of regulated and other electronic administration services

In chapter 5 Szilárd Molnár will explain more details about the social inclusion aspects of the SZEÜSZ regulation.

#### **4.5.3 Act L of 2013 on the Electronic Information Security of Central and Local Government Agencies**

Another important legal step was the act on the electronic information security of central and local government agencies, which was passed by Parliament at its session on 15 April 2013 [3]. Its starting point is the fact that the security of national electronic data assets as a part of national assets, of the information systems managing such assets and of other vital information systems and system elements is a top priority in the interest of the nation. Society also expects arrangements for the protection of the confidentiality, integrity and availability of data and information managed in electronic information systems that are indispensable for the state and its citizens, as well as the integrity and availability of the relevant system elements on a comprehensive and continuous basis.

To achieve this goal the act defines basic electronic information security requirements. Throughout the life cycle of electronic information systems arrangements shall be made to achieve and ensure the closed, comprehensive and continuous protection of

- the confidentiality, integrity and availability of data and information managed in the electronic information system, and
- the integrity and availability of the electronic information system and its elements commensurately with risks.

In order to develop cost-efficient protection commensurately with risks, the organization shall be classified in security levels according to its ability to protect its information systems against the statutorily defined criteria. Based on the security level different actions have to be taken.

Due its importance and relevance the IT security regulations are discussed in a historical context and with substantial detail in chapter 6 by Tamás Szádeczky.



#### 4.5.4 Act CCXX of 2013 on the general rules of co-operation between registries of the national and local governments (“interoperability act”)

The Hungarian Parliament adopted an act on the co-operation between the registers of national and local governments at the end of 2013 [4]. The main goals of the act are to establish and increase co-operation between registries of national and local governments kept by bodies performing public duties to increase the cost-efficiency of state operations and to promote co-operation between national and international bodies.

The act defines mandatory tasks for data controllers: they shall manage registries in an (secure) electronic information system. Data controllers shall also perform simple (involving human interaction) data transfer and automatic (machine-to-machine communication) data transfer between registries by electronic means. In order to ensure the proper order of a data connection service established to support simple and automatic data transfer between registries the data controller shall adopt a data connection service code. The data connection service shall not be commenced prior to the approval of the data connection service agreement by the authority responsible for the supervision of the security of information systems. The supervisory authority is the Electronic Administration Authority, which shall issue guidelines especially on how to provide the data connection service, as well as on the content of the code. The authority shall also maintain a Registry of the registries kept by data controllers falling under the scope of the act. The Act shall enter into force on 1, January, 2015.

## 4.6 Summary

In the last decade, it became clear that technology investments were not automatically leading to better public services and better governmental procedures. Among others, the lack of interoperability is a fundamental obstacle to realizing the benefits of eGovernment. The European Interoperability Framework for pan-European eGovernment Services defines interoperability as “...*the ability of information and communication technology (ICT) systems and of the business processes they support to exchange data and to enable the sharing of information and knowledge.*” Besides the improved efficiency of service delivery and access to the service, interoperability allows governments to manage their internal operations better. The enhanced flow of information can increase transparency and accountability. Administration can also avoid vendor lock-in (and the huge costs this incurs). Interoperability also promotes international cooperation.

In the last 20 years or so interoperability has been remained a crucial and unsolved part of the eGovernment agenda, because interoperability in the eGovernment context is complex: in addition to technical, semantical and organizational questions, it also raises legal, policy, and sociocultural issues. Three primary goals connected with achieving interoperability in any system: data exchange, meaning exchange and process agreement. These basic dimensions show that interoperability is not only a technical issue, and that other aspects (organizational, legal, political, social) may turn out to

be a bigger challenge Meaningful interoperability means addressing each aspect of an interoperability ecosystem.

The example of Estonia and Portugal shows widely acknowledged eGovernment ecosystems whose results mainly based on an approach that puts interoperability issues in the center eGovernment development. The focal points of the developments of these countries are mainly similar and are reasoning the before mentioned dimensions of interoperability: an interoperability platform, a firm legal background legal, strong leadership and an electronic ID card, among others. These bits and pieces ensure that the political, legal, organisational, semantical, and technical dimensions are all taken into account. In the last couple of years Hungary is following the footsteps of Estonia and Portugal, with a “new deal” of eGovernment development which is also interoperability-focused. The measures of the last three years were mainly aimed at legal and organizational levels of interoperability in Hungary. Among several laws and governmental resolutions, to ensure interoperability between all the services and to protect the interests of the clients, Hungary called for the setting up of the Electronic Administration Authority. Its main task is to permit and to harmonize the development and the cooperation of the regulated electronic administration services. The complete SZEÜSZ environment can be seen as an “interoperability platform” as well.

To follow the future of interoperability-related developments, it is highly recommended to visit the Joinup platform (<https://joinup.ec.europa.eu/>): Joinup is a collaborative platform funded by the ISA Programme. It offers several services that aim to help eGovernment professionals share their experience with interoperability solutions and support them in finding, choosing, re-using, developing and implementing open source software and semantic interoperability assets.

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## Chapter 5

# E-Inclusiveness and Its Importance in the Digital Age

### 5.1 Introduction: e-Government is a key factor in competitiveness and good governance

Peter Orszag, Hungarian-rooted former director of the Office of Management and Budget in the US said some years ago that public administration was not efficient and professional because its employees use out-of-date technical devices and methods. Public administrators meet much more modern tools in their homes – public administration is not the field for innovations or innovative environment.

In our days, though, there is no doubt that the improvement of governmental efficiency (e.g. the reduction of administrative burdens) and effectiveness (maximal utilization of socio-economic benefits) and the support of governmental and administrative tasks require the introduction and application of ICT-based solutions. Today the development of public administration is necessarily related to the questions of the competitiveness of an economy or society. The efficiency, transparency, simplicity and in many cases the cost effectiveness of public administration may considerably contribute to fighting back the economic crisis and to the evolution of a more inclusive and integrated society.

Thus, thinking about public administration is undergoing important changes: new paradigms and values – openness, transparency and efficiency – are appearing. The economic crisis shook the trust in the operation of markets and the global financial system which have been evolving in the millennium. Parallel with this process the role of the state, as the final warrantor of the common good spanning over space and time and have been existing for centuries, has been raised in value.

Public administration exerts much stronger impacts on certain fields influencing competitiveness than ever before – some of these are factors also measured by various competitiveness indicators: public trust, transparency of governmental decision making, public procurement, rate of redistribution, etc.

The EU member states must reduce administrative burdens by 25 percent by the year 2015<sup>11</sup>, at the same time in Hungary the bureaucratic burdens are still outstandingly high: for example, the administrative expenses of the enterprises amount to 10.5 percent of the GDP<sup>12</sup>.

11 See Action Programme for Reducing Administrative Burdens in the European Union, COM(2007) 23 final, Brussels, 24.1.2007 and The European eGovernment Action Plan 2011-2015. Harnessing ICT to promote smart, sustainable & innovative Government, COM(2010) 743 final, Brussels, 15.12.2010

12 See Deloitte (2010): Áttekintő vizsgálat az államigazgatási szabályozásból fakadó vállalkozói adminisztratív terhek teljes köréről, illetve egyes fókuszterületekkel kapcsolatosan részletes felmérések elkészítése. Deloitte Zrt.

At an annual level, only the administrative costs related to the state amounted up to about EUR 2.7 billion. In average, 65 hours of a company leaders' worktime are spent on various administrative tasks each year which is three times higher than the average of the EU and twice as much as the average in the Visegrad countries. So bureaucracy burdens app. EUR 1.700 on each of the 1.5 million enterprises operating in Hungary. This is 3.1 percent of the GDP while this number is between 1.9 and 2.6 percent in the EU<sup>13</sup>.

In Hungary, the efficiency of public administration is not growing at the rate otherwise allowed by the digitalization of administration. In our former study, we referred to the World Competitiveness Annual<sup>14</sup> published by the IMD competitiveness research institute situated in Switzerland which ranks the countries according to the fact whether they are able to provide a sustainable business, economic and political environment for the enterprises and by doing so how they can improve their competitiveness. The ranking order is determined by four factors: economic performance, governmental efficiency, economic efficiency and infrastructure. According to the results of the previous six years (2007-2012), efficiency of public administration had the highest weight and the most determining impact amongst for evaluation criteria. Hungary fell behind 12 places from 2007, and so was permanently showing a declining tendency.

As we have argued in the earlier chapters, in the 21<sup>st</sup> century a really efficient public administration requires the use of infocommunication technologies:

- e-Government is faster and more comfortable than traditional public administration,
- we argue that the modernization of public administration, the introduction and dissemination of infocommunication technologies by improving the accessibility of the services and also by reducing the administration costs contribute to the strengthening of social trust in governments,
- e-Government addresses all citizens, independent of their income, their personal capabilities or life situation.

Accountable and predictable operation and the growing trust and safety are all basic conditions of a balanced and strong society, and so economic growth, so efficient public administration is one of the crucial indicators of a country's economic strength. Thus, in this process it is inevitable that the former role of the state will be changed and will take up new roles.

In developed countries, enormous amounts of money are spent<sup>15</sup> on modernizing public administration and making the services available through electronic channels. Despite this fact, the number of the users of e-Government services is below the

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13 See HÉTFA Kutatóintézet (2010): Jó Kormányzás Program Szakmai Háttér II. – Az adminisztratív terhek meghatározása és a mérés módszerei

14 <https://www.worldcompetitiveness.com>

15 See Central government ICT spending. In: [http://www.oecd-ilibrary.org/sites/gov\\_glance-2013-en/03/12/index.html?contentType=&itemId=%2fcontent%2fchapter%2fgov\\_glance-2013-25-en&mimeType=text%2fhtml&containerItemId=%2fcontent%2fserial%2f22214399&accessItemIds=%2fcontent%2fbook%2fgov\\_glance-2013-en](http://www.oecd-ilibrary.org/sites/gov_glance-2013-en/03/12/index.html?contentType=&itemId=%2fcontent%2fchapter%2fgov_glance-2013-25-en&mimeType=text%2fhtml&containerItemId=%2fcontent%2fserial%2f22214399&accessItemIds=%2fcontent%2fbook%2fgov_glance-2013-en)

expected level. The objective of European Commission<sup>16</sup> is to increase the take-up of eGovernment services: the target is that by 2015, 50 percent of citizens and 80 percent of businesses should use e-Government services.

Therefore, e-Government must reflect on the clients', i.e. the citizens', needs much more sensibly. This attitude is represented by the concept of inclusive e-Government which has been present in the European Union for about a decade now, and the most important task of which is to promote the access of socially disadvantaged people to e-Government services, and so facilitate their integration into information society.

Thus, it is important to be aware of the role e-Government services play in the development of information society as well as the ways in which the usage of online public services can be promoted and the ways of understanding the users' demands and expectations.

## 5.2 Usage of e-Government services

European societies have always been sensitive to unfair and fragmented development originating from big social distances. Unfortunately, the current crisis and the drastic reduction of employment, which have revealed many sides of the structural weaknesses of the European economy, do not support this tradition. For this reason, the new action plans and strategies strive to achieve a double aim: initiating economic growth as well as reducing poverty and strengthening social integration. Therefore, the new action plans are focused on eliminating the inhibiting factors for the maximum utilization of the opportunities offered by ICT tools.

Access and use of internet-based services is a fundamental first step for achieving social inclusion in this area. In Hungary for instance, 24 percent of the adult population have never used the Internet<sup>17</sup> so far, and furthermore, only half of the Internet users use e-Government services at least once a year, while this rate amounted to 37 percent within the total adult population in 2013.

In compliance with the objectives of the Digital Agenda<sup>18</sup>, this low rate of Internet usage must be halved and during this process, the service opportunities offered by e-Government have to be given a higher status.

The usage rates of e-Government services within some disadvantaged groups are presented in the Table 4. 1.:

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16 See The European eGovernment Action Plan 2011-2015. In: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:0743:FIN:EN:PDF>

17 Eurostat 2014

18 See Digital Agenda for Europe, <http://ec.europa.eu/digital-agenda/en/news/digital-do-list-new-digital-priorities-2013-2014>



	2008	2011	2013
Adult population			
EU27	36	41	42
HU	29	38	37
Unemployed			
EU27	29	34	39
HU	16	29	27
Households belonging to the lowest income quarter (poorest) <sup>19</sup>			
EU27	21	25	29
HU	8	13	12
Low educational level within the age-group of 25-64			
EU27	N/D	20	22
HU	N/D	13	10
Students			
EU27	40	45	42
HU	32	34	36
Pensioners and other inactive groups			
EU27	15	21	23
HU	12	19	19

*Table 5. 1. Having implemented online interaction with an e-Government institution during latest 12 months (in percentage of the indicated target groups) Source: Eurostat, 2014*

The data series indicate two important phenomena:

- 1) Concerning the average of using e-Government within the total population, Hungary takes a relatively good place, being rather close to the EU's average. The reason for this phenomenon is that the usage of e-Government is, relatively, so high within certain social groups that classical digital divide is less obvious in this respect.<sup>20</sup> However, it is clear that within some social groups (the elderly, the young and the unemployed) it is necessary that the usage of e-Government is increased. All of these draw the attention to an important dimension of reducing the digital gap which is the efficiency of inclusive e-Government tools.

<sup>19</sup> It must be remarked here that 56 percent of the members of the households belonging to the richest quarter use e-Government services in Hungary, while the average of the EU27 members amounts to only 54 percent which refers to the fact that in Hungary the social inequalities exert a greater impact on digital divide. Disregarding the reasons of this phenomenon it can be stated that the reduction of the digital gap is an actual issue for Hungary which, with respect to some indicators, gives us a greater problem to face than for the EU in average.

<sup>20</sup> For instance, half of the Hungarian citizens aged 45-54 use PCs against the students' more than 90 percent. However, 45 percent of the age group of 45-54 use e-Government services while this rate is only 34 percent with students. See Eurostat.

- 2) The second conclusion is that the dissemination and popularization of e-Government services must be given special attention in respect of the degree of the PC supply and Internet usage of the households which have been stagnating since the economic crisis. Half of the households lacking possession of a PC<sup>21</sup> still say that they simply do not need it and another quarter say that their income positions do not allow them to own one. The first inhibiting argument can be turned down by propagating the e-Government services and the second by increasing the number of the community access points.

It is a surprising research experience that the service opportunities offered by e-Government are mainly used by those who are otherwise sub-represented in the information society. In Hungary (too) it is an existing tendency that the eldest, those aged over 65, visit an e-Government web page twice more often than those in their 20s<sup>22</sup>; also, the people living in small settlements are most active in searching such information which means that the traditional gaps in the information society: the age and the settlement gradient are less relevant in the field of e-Government.

More than half of the users of public administration still demand direct human contact when using the services. According to a research by the eUSER, the users of governmental services still prefer personal administration, although there are considerable differences between certain countries, see Table 4. 2.

Type of contact	European sample average	Hungarian sample average
Personal	80,9	89,0
Telephone	42,4	36,5
Post	39,1	22,5
Internet or e-mail	17,1	7,9
Fax	5,1	3,6
SMS	2,6	0,7

Table 5.2. Source: eUSER, 2006

Also, it is obvious that in most cases the people not using the internet but using the governmental services get into contact with those services in only one way, i.e. personally, while the internet users manage their affairs in multi-channels (personally, by post, phone or text messages). This research has also pointed out the fact that in cases where during the first-use of e-Government services a personal help is given to overcome the difficulties of usage, then the cognitive barriers and attitudes of rejection will decrease drastically. All this refers to the fact that the community access points play an outstanding role in the introduction and spread of e-Government services.

21 Their number reaches 1.8 million (still 45 percent of all of the households).

22 See the results of the eUser survey, <http://www.euser-eu.org/Document.asp?MenuID=6>

### 5.3 Barriers of using e-Government

The rate of non-users is still high in Hungary, so the improvement of the integrative power of information society must be continuously taken as a priority objective: the number of the Hungarian adults who never have used the Internet is around 2 million<sup>23</sup>.

Non-usage may have several reasons. These are generally organized by the researchers in the following categories:

- lack of adequate infrastructure and tools,
- high prices of the devices and investments necessary to become a user,
- lack of abilities and skills connected to the use of ICT tools and the Internet,
- lack of knowledge on why these are advantageous and useful for the user,
- uninteresting and attitudes of refusal,
- fear of safety risks and the loss of personal data,
- high level of distrust in online contents and services,
- lack of easy-to-use online services and contents fulfilling the demands of the non-users.

All these indicate the fact that we are facing a complex phenomenon in the management of which none of the elements can be neglected. In case development is focused only at certain elements, the expected results will fail to happen. Geographical inequalities are still common in Hungary: there are several disadvantaged settlements where the rate of the citizens using the Internet is below 40 percent, while digital illiteracy is mainly typical of the inhabitants of small settlements.

The domestic research institutes have been unable to provide new information leading beyond and specifying our existing knowledge on non-usage, thus we still only see that rejection is yet primarily backed by the cognitive reasons connected to the lack of motivation.

It is very important to understand why citizens are unwilling or unable to use e-Government services. Half of the non-user Hungarian citizens prefer personal administration, however, one-third of the non-users say that it is in vain to use electronic services because they must visit some office personally anyway, for example to submit a document.

Unfortunately, many people, one-fifth of the non-users, say that they are not aware of the relevant websites and online services or they think that administration is easier to be managed in some other channels.

So a considerable part of the Hungarian citizens think that:

- the online channels do not provide comfortable and complex possibilities of administration,
- the online services and information contents are not commonly known and they do not reach the users, and
- they do not offer easier ways of administration than other channels do.

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23 In the EU28, 21 percent of individuals reported in 2013 that they have never used the internet. See Eurostat.

That is why Capgemini highlight in their e-Government report<sup>24</sup> of 2012 that it is not the needs of the service provider that should serve as the starting point of new public administration developments but the aspects of the users (citizens and entrepreneurs), i.e. an “inside-out” thinking must be introduced.

	HU	SLO	AT	SK	CZ
Preferred to have personal contact	55	63	58	66	68
Services will require personal visits/paper submission anyway	32	34	32	46	45
Expected to have things done more easily by using other channels	20	30	13	18	23
Not aware of existence relevant websites/online services	20	14	27	26	17
Concerns about protection and security of personal data	14	18	12	8	6
Could not find or access the information or services	10	12	10	14	11
No skills/knowledge to get what I wanted/needed via the Internet	7	6	6	6	15
Did not expect to save time by using the Internet	7	18	8	13	18
Abandoned the service because too difficult to use	3	3	2	3	3
Abandoned the service because of technical failures	3	4	2	4	3
Other reason	10	18	13	8	7

*Table 5. 3. The reasons of non-usage of e-Government in Hungary and some neighbouring countries, in percentage of non-users: Source: Capgemini et. al., 2012*

Concerning the transparent operation of the state, Hungary performs worse than the EU27 average as well as in building a client-focused and cooperative state or the services available and used online. In Hungary 59 percent of the administration activities connected to employment, studying or starting an enterprise are available electronically against the 74 percent EU average, and only 47 percent of the citizens use these against the EU’s average of 70 percent.

Besides availability and usage, usability has become an important indicator as well, since it reflects the adaption of public administration to the users’ needs and expectations. In this respect, Hungary’s performance is rather bad, for example, in the field of starting an enterprise we take the last place in the ranking of the EU.

24 See Capgemini et. al. (2012): Public Services Online – Digital by Default or by Detour, European Commission

The rate of those trusting and regularly using e-Government services is 6 percent lower than the average of the EU members (32 percent), while the proportion of those preferring offline administrations is 11 percent higher than the Union average (38 percent).

The latest eGovernment Benchmark<sup>25</sup> report of the European Commission, which examined the usage of 19 public administration services, states that the Hungarian usage data are almost 41 percent lower than the European average. Concerning this indicator, Hungary took the 30<sup>th</sup> of the 32 places in the European ranking.

Efficiency is not a strength of Hungary's domestic e-Government, either, according to a new European index of the eGovernment Benchmark report, Hungary takes one of the last places<sup>26</sup> in this respect.

All in all, we may state that Hungarian e-Government is not sufficiently client-focused and transparent.

## 5.4 Building the basic infrastructure of e-Government

We will show how Hungary's strategy has been built up to create e-government usage.

Although Hungary had been quite late in placing the basic milestones of electronic government, after joining the eEurope programs there were important steps and developments made from the 2000s.

The most important technical, technological, infrastructural, procedural, standardization and legal foundations necessary for the wide-range introduction of e-Government were laid. These created the ground for the introduction of the most important applications and services on both the clients' and the service providers' sides. During this period, however, electronic public administration basically meant the digitalization of government, and within that, developments typically aimed at technical aspects – lacking any expected positive economic or social impacts.

This period, which ended around 2010, was characterized by the establishment and maintenance of the central electronic service system. In the field of electronic services the main stress was put on big, complex and central solutions of administration. As part of the central system, it was the magyarorszag.hu portal which was to provide all information and administration possibilities. The development strategy of this complex one-stop-shop system had two main reasons:

- it was thought to be a cost-effective solution because it only had to be developed once, and operations were managed in one place,
- the obligatory use of central solutions was thought to be a suitable driver to enable cooperation capability and motivation for interoperability of the professional back-office subsystems which are all inevitable for client-friendly administration.

25 See eGovernment Benchmark 2012 background report (SMART 2012/0034-2)

26 Ibid, p. 83

As a result of the mandatory legal transactions which had to be executed exclusively on the platform, today there are app. 1.3 million registered users about 300 thousand of which are regular users. However, this number has not considerably grown during the latest years, and also, the monolith central system has failed to prove to be cost effective in the long run. It has become clear that the central system lacking “competitors” and building on the contribution of always the same suppliers is not only inflexible and a barrier to improvement but its development and maintenance requires enormous amounts of money each year. Experiences have shown that it is just impossible to develop a system which is perfectly able to fulfil the multifaceted requirements – including interoperability – of public administration.

Retrospectively, we can say that the approach focusing on a central system was suitable for a leap forward, the rapid introduction of web-based communication with the clients in some target fields (e.g. taxation). At the same time, this strategy had all the negative characteristics of big, monolith systems: inflexibility and the inability to adapt to the users’ needs; thus the number of governmental services and institutions unable to use the central solutions kept growing continuously. It has become apparent, that e-Government could exert really positive socio-economic impacts and become an influencing factor in competitiveness, if new tools, new approaches and a new service model are introduced in the future.

In the next phase of e-Government development, efforts were necessarily focused on the clients, on creating services accessible by anyone and usable in an easier and simpler way as well as paying higher attention to the establishment of inclusive e-Government. These conceptual changes were primarily provided in Hungary between 2011 and 2014 not by strategic documents but legal regulations.

In chapter 4 we have outlined the nature of this strategic shift from the interoperability point of view, in this context we highlight how these changes can be interpreted from the user inclusion points.

Legal framework on electronic government (LFEG) in Hungary was radically reformed by the end of 2011. The amendment of the LFEG in 2004 brought about a considerable step forward in the field of applying ICT solutions in public administration. In general, it stated: in lack of a law, or a governmental or municipality measure authorities manage public administration affairs in an electronic way, too. Section X of the LFEG and the implementation measures issued by authorization of the LFEG provided detailed regulation of electronic administration and electronic contacts.

The amendment of the LFEG in 2011 terminated the centralized model mentioned above and instead of a new technological-like regulation, it focused on regulating the process itself. Some of the most important objectives of the new and efficient regulations are:

- flexibility and the competence of the authorities to decide concerning developments,
- possibility of unique, client-focused developments in the spirit of austerity and cost efficiency,
- adoption of tested market solutions while assuring technological neutrality,
- promotion of the usage of electronic tools,
- vindication of the client’s needs and right of disposal as widely as possible.

The flexible frames provided by the LFEG are filled with detailed content by the implementation measures issued by authorization of the LFEG, thus primarily:

- the Government order No. 85/2012 (21. 04.) on the detailed rules of electronic administration, and
- the Government order No. 83/2012 (21. 04.) on the regulated electronic administration services and the services obligatorily provided by state (REAS).

Concerning the widening range of inclusive e-Government opportunities, one of the most important amendments assured the client's right of disposal. The primary objective of regulating electronic administration is to offer proper tools easy to use by the clients, and to adapt the administration to the clients' needs as much as possible. Therefore, it has an outstanding importance that the client has the disposal of their procedures and data as completely as possible, including the free choice of the ways of keeping contacts. Besides the general declaration of the right of disposal the amendments in the LFEG in 2011 introduced several new legal institutions which served the accomplishment of the right of disposal. Some of these are:

- the client's disposal of their electronic administration,
- recurrent information of the client on the electronic administration activities done, and
- registration of the client's changes of data.

During the last 2 or 3 years, all these have had to be completed by the modernization and consolidation of the governmental basic infrastructure. The main elements of this task were the consolidation of the governmental network (National Telecommunications Network) and the computer rooms and applications (governmental cloud), by authorization of the act on the protection of national data property, the critical data bases and the relevant applications were again brought into governmental management and operation.

## **5.5 Legal foundations for increased use: new administration model for ICT based services**

The legal pillars of forming the new e-administration model can be summarized as follows:

- the act on electronic administration which, according to the original plans, primarily defines the concept and procedural rules to be followed in keeping electronic contacts,
- the act on harmonizing data bases which intends to put an end to the disorder of being present in more data registries at one moment
- amending and completing at the same time the act on national data property, and finally
- the act on information security.

In 2011 the government revised the rules on public administration procedures (modification of LFEG<sup>27</sup>), in order to improve the compliance with the new priorities of public administration developments. Consequently, the regulation of e-administration was considerably changed, technologically neutral solutions have been enforced, capable of assuring the durability of the legal regulations providing future proof structures independent from the actual technology artefacts.

In the new regulation model implemented by the LFEG electronic administration was put on a new foundation. The law defines new notions (especially in the field of regulated electronic administration services which are a basis for lower level regulations), and defines the services which have fundamental necessity for establishing ICT supported processes and by doing so lead to the real attainment of e-Government.

The central element of the renewed regulation is “regulated electronic administration service” (REAS) which is in fact rather a kind of e-administration function, not a service in the market sense: the services offered by the authorities for their clients<sup>28</sup> and those offered by a third, market party on market bases for one or more authorities or clients<sup>29</sup> are both regulated electronic administration services.

From the user perspective, the new regulation prescribes uniform rules for functions like identification, data provision irrespective of its being provided by the authorities for their clients or subcontracted to an informatics supplier, or any other public administration office providing this kind of service.

The connection between the client and the authority and the better access to official administration are supported by several institutions, but the prime role player in this field is the so called Governmental Window since the clients still prefer personal channels of administration. Some of the services provided here are available at the so called affiliated administration points, as well, which are maintained by the Hungarian Post, under the name of Postal Agora points in small settlements, and the Central Office of Public Administration and Electronic Services, as we describe in chapter 4.

A very important feature of the new service model is that it contains indicators which increase the users’ trust in the online administration possibilities. These indicators or warrants are provided by the regulation by naming the following services:

- Client’s recurrent information on the electronic administration acts: the citizens periodically receive a notification on his administrative affairs via e-mail.
- Keeping registration of document validity: the REAS regulating the management of registrations verifying document validity by a third (independent) partner.
- Identification service: the service providing the electronic identification of (natural and not natural) persons (including identification by phone).

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27 Act no. CXL, 2004 on the general rules of public administration authority procedures and services.

28 For example, identification of own clients as a necessary identification service.

29 For example, safe delivery service is typically a service useful in market operation, as well, and possible to be provided by a market supplier, too.



- Delivery service: the service assuring delivery from the sender of the electronic document to the addressee; its distinctly indicated form is secure (electronic) delivery service in the case of which presumption of delivery can be applied.

According to this, the original central system model is being replaced by the new electronic administration model; this has been accepted by Hungarian public administration,<sup>30</sup> since this is the way how internal administration procedures can be turned electronic, even if keeping contacts with the clients will not always change.

In Hungary, 37 percent of the total adult population used e-Government services in 2013; however, it is surprising that even within the group of the Internet users this rate amounted to only 50 percent<sup>31</sup>.

Hopefully, after an intense promotion of the new services and the extension of the awareness of their existence, hundreds of thousands of citizens never ever having tried this possibility will choose electronic contacts and so the group of the users of e-Government services might grow at a considerable rate. This is what we discuss in the next section.

## 5.6 Increasing user inclusion by the new e-administration model

As we have seen, the amended LFEG introduced governmental endeavours focused on rationalizing the system of public administration, reducing the unreasonable social burdens represented by bureaucracy and on gradually increasing the standard of public services.

People's opinions reflect the acceptance of these efforts<sup>32</sup>. 70 percent of the citizens think that public administration should prioritize the possibilities of keeping electronic contacts with the clients and citizens, even if this does not apply to the whole process of administration.

Even more (85 percent) agree that the municipalities must make efforts to create the circumstances of using electronic administration services for the citizens living in their settlements. Despite the fact that the clients make no direct advantages of this field, 41 percent of the interviewees agree that public administration should manage administration processes in an electronic way even if the client keeps contacts with them on a paper base.

All these facts indicate the sound popular support and acceptance of the main principles of the modified LFEG.

30 See eGov Ltd. (2013): An impact survey of the act on electronic administration

31 Eurostat, 2014

32 See more details in: eGov Ltd. (2013): An impact survey of the act on electronic administration. Within the frames of the project there was a nation-wide data survey made by telephone which involved 1000 adult Hungarian inhabitants (aged 18-74). The sample was representative by gender, age, type of settlement and region. After the survey the sample contained the answers of 1 022 persons.

Another surprising fact is the consciousness of the citizens in supporting the services regulated in the certain REASs. 53 percent of the respondents would be glad if public administration used personal identification methods already tried in business life. The population is similarly open to the innovative solutions in these services: for example, 61 percent of the respondents would be happy to get an SMS on their mobiles each time an authority starts delivering an official document for them, and they would be glad to get informed about the Internet link where they could download a certain document from; another 6-7 percent would even pay for such a service.

There is considerable interest in the main REASs relevant for the citizens. Concerning the registry of the client's administrative orders, 81 percent of the respondents would be glad to have the possibility to decide whether they want to be informed on a paper base or electronically about certain official affairs.

Also, the acceptance of the REAS on the client's recurrent information about the electronic administration acts is very high within the population: 81 percent of the interviewees would like to be informed from time to time by the authorities about the steps made by the governmental organizations in managing their official affairs.

Concerning the REAS on registering the changes in the client's data, we have experienced a high rate of acceptance, as well. 74 percent of the respondents would be glad to have to report on the changes in their personal data only in one place, and then all the other public administration organizations would be informed automatically.

The most important expected results of these changes are:

- an increase in the demand for e-Government possibilities of growing standard,
- improvement in the citizens' consciousness and attitudes,
- the spread of the innovations in the society and
- the strengthening of trust in public administration.

The REASs considerably contribute to the implementation of a client-focused and inclusive e-Government which has been a debt of the Hungarian e-administration development so far. The new LFEG keeps the model of public administration's pure electronic operations, which is essential for faster response times, simplification and transparency.

But during the presentation of the Hungarian case, we wanted to illustrate that the most important factor of this model is that it also allows the possibility of choice for the clients who are unable or unwilling to use the tools of the digital era.

## **5.7 Summary**

The factors exerting impact on the further spread of the usage of e-Government can be arranged into the following main groups:

- 1) lack of adequate infrastructure and tools and high prices of the devices and investments necessary for becoming a user,
- 2) lack of abilities and skills connected to the use of ICT tools and the Internet,
- 3) lack of awareness of the advantages and benefits offered by online services for the end-users,

- 4) high rate of distrust in Internet contents and services,
- 5) lack of easy-to-use online services, contents, training and information programs and campaigns serving the demands of non-users.

According to researches by social sciences, these obstructing factors appear and strengthen during each process of technological change of greater importance, so information society, and within that public administration, must continuously keep reflecting on these challenges.

Dealing with all these problems needs complex interventions comprising several sectors such as infrastructure, education and training and the media. Experiences show that the socio-economic benefits of non-user-centric public administration developments are insufficient as compared to the measure of the investment.

According to our opinion, this is a compound issue during the management of which none of its elements can be neglected. In case development is focused merely on unique elements, the expected results will fail to happen and the invested resources are lost.

The long-term advantages of the enormous infrastructural state investments can only be exploited in case quality and value-added services, digital contents and applications are also developed in a coordinated and centralized way. According to the international experiences, digital divide cannot be eliminated; it is the continuous renewal of mitigating policies and tools which are necessary. It is reasonable to provide permanent governmental contribution which can be efficiently served by the tool system of inclusive e-Government. ICT tools are suitable to support the easing of certain socio-political issues and problems. However, because of the complexity of this process, this needs adaptive planning and implementation permanently observing the impacts.

According to the experiences of the countries standing in the front row in e-Governmental developments, the digitalization of public administration processes does not automatically bring about a growth in the number of users. Nevertheless, the socio-economic returns of the investments and developments can only be realized in case the e-services are used by a considerable proportion of the citizens and the enterprises.

In Hungary, the latest years' e-Government developments provide a good chance of widening the range of the tools of inclusive e-Government and improving the adaption capability of public administration. The adoption of digital processes and applications already tested and daily used in the market sector into public administration, realization of the profits deriving from specialization and the standard procedures on the client-side, improvement of the users' content and trust and the reduction of the administrative burdens - all these factors extend the tool system of e-Government.

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# Chapter 6

## Information Security - Strategy, Codification and Awareness

### 6.1 Security implied by technology

During the last seven decades there was a huge advance in information technology. From the time Konrad Zuse made the first Turing complete computer in 1941 and the building of ENIAC, the first really universal computer in 1946, information security has continuously been a part of information technology. [1] In the beginning, they had a narrow joint focus but it has been gradually widened.

We should notice that computers have been processing sensitive data from their early application, for example ENIAC was used to solve numerical problems regarding US military operations such as the calculation of artillery firing tables. At that time, physical security measures were enough to prevent unauthorized access. The general use of computers began with the implementation of multi-user mainframe computers from the 1950s mostly by IBM. Due to the fact that multiple users had access to those mainframe systems, access control measures had to be implemented. Universities were real playgrounds for hackers who were testing the boundaries of those systems. Soon, interconnecting of standalone systems became a usual solution to increase efficiency and collaborations. The first point-to-point serial cable-based connections were inefficient, thus the Advanced Research Projects Agency (ARPA) started the 'Intergalactic Network' initiative to use the existing telex network for computer communication in 1962. [2] Later ARPA started the ARPANET network in 1969 which connected University of California, Los Angeles (UCLA), Stanford Research Institute's Augmentation Research Center, University of California, Santa Barbara (UCSB), University of Utah's Computer Science Department in the beginning, but later it was broadened and its name was changed into 'the Internet' in 1998. As a consequence, networking technologies triggered the development of a new branch of information security: network security.

Network security had to deal with such issues as eavesdropping and man-in-the-middle attacks, and at the same time the importance of cryptographic measures became more important than in the case of the defence of a standalone computer.

With the usage of portable computers, notebooks, mobile phones, smartphones and tablets and especially with the concept of 'bring your own device' (BYOD), the integration and secure connection to protected networks and security of data on the move have become new issues recently. Cloud computing technologies solved some problems of reliability and business continuity while at the same time they also generated new issues in outsourcing security, data portability and segregation.

A whole virtual world or cyberspace has emerged on the basis of the technologies described earlier in Chapter 2. No matter how strange they are but real world phenomena

occur in this virtual world with more or less the same symptoms as it is seen in “off-line crimes”. Criminologists and lawyers can debate whether the perpetration of certain crimes in the virtual and real world differs or not, but the method of protection and security technology is unanimously differs from the real world because you do not have to set up firewall rules or ACLs in real life. Information security absorbs elements from the traditional security areas such as military defense, burglar alarm or fire prevention but it also has new attributes as well.

New technologies appear every year. Most of them cause new problems, open new vulnerabilities which should be solved by information security, indicating a major professional problem. That is, information security solutions always follow controls by nature because there is a natural delay between the implementation of the technology and the implementation of the effective and adequate security control. One of the main reasons for this is that at the time of development, developers find out some security issues and implement some security controls against them but more problems and vulnerabilities become apparent afterwards, namely when hackers challenge those systems. At this point, we have to implement newer and newer controls to protect systems. This is a never-ending story which needs continuous awareness on security.

Intensive improvement of technology, high business demands and low time-to-market times do not urge the application development industry to enhance security controls with the same speed as functional features so security of network-based activities did not reach a reassuring level. Improvement and legal application of public key cryptography and strong secret key algorithms gave way to computer users for secure communication but it is still not enough. Security of computer hardware elements, computer systems or networks depends on the full architecture, thus the weakest link determines the security level of the overall system.

In those early decades, the security profession fought for legitimacy of cyber security, and attention for high level management which was more or less aware of the importance of this field. The question at the beginning of the 21st century is not the *why* but the *how* and the *how much*. In the business sector, especially in times of economic crisis, cost constraint cannot be severe and we cannot imagine any compulsory expenditure that managers do not want to cut off a bit. Management's objective is to devote usually minimal efforts to IT security elements, systems and networks. Goals for citizens, shareholders, stakeholders and the government are the same: adequate information security level should be established and maintained. We can find every day that the decrease in IT budget implies much more decrease in security budgets, and while in the case of a major telecom company it is hard to find serious deficiencies, home computer users often do not install minimum applications for protection such as free security tools. Obviously, this happens because of many reasons: for example, the lack of technical knowledge, experience, information, money or interest. But the most important reason is that most users do not draw enough attention to this area despite of the fact that later they might be liable for consequences.

By the legislator's point of view, everything can be improved and the main goal is to reach the highest possible level of perfection in the area. Therefore, the field of information security also deals with this more general problem of security awareness.

## 6.2 Early strategies and legislation 1989-2008

Technology development, as we described above, made local system security improvements indispensable. In the case of e-government systems a higher level of problem also exists: attack against multiple systems or against a full infrastructure. This can take part of a conventional war as cyberwar or maybe an unconventional event which is called a cyberterrorist attack.

*Cyberterrorism* is a rather debated term, more scientific papers analyse this topic, so we should take an important note on the issue. According to Gorge [3], the word 'cyberterrorism' should be interpreted by its syllables, where cyberspace is the mass of computer communication networks. The term was created by William Gibson and was first used in science fiction novel *Neuromancer*, which was written in 1984, describing a collective hallucination by billions of people. The term cyberspace emphasizes the close relationship between networks, relationships between people and networks and social networks in contrast to the earlier concept of network which had a primarily technical meaning. According to Benjamin Netanyahu, "terrorism is the deliberate and systematic murder, maiming, and menacing of the innocent to inspire fear for political ends." [4] According to the U.S. Federal Bureau of Investigation, cyberterrorism is any "premeditated, politically motivated attack against information, computer systems, computer programs, and data which results in violence against non-combatant targets by sub-national groups or clandestine agents." [5]

But what kind of technical steps a cyber-terrorist does? The same or very similar as an "ordinary" online criminal does and differences can be found only in the impact and the effort. This is why we have to defend all individual systems in order to protect the entire infrastructure.

From the government's viewpoint, we generally have to plan and prepare the national defence system against such actions. The first comprehensive security and defence policy system of Hungary after the political change in 1989 did not recognise cyber threats. Neither the National Assembly resolution no. 94/1998 (XII. 29.) on the security and defence policy principles of the Republic of Hungary nor the Government resolution no. 2073/2004. (IV. 15.) on the National Security Strategy of the Republic of Hungary nor the Government resolution no. 1009/2009. (I. 30.) on the National Military Strategy of the Republic of Hungary included cyber defence as an objective. According to these policies and strategies, the defence against cyber attacks are treated individually, even in the legal regulation.

We may find, however, an example of information security regulation in Hungary in the field of personal data protection (privacy or personally identifiable information protection in US law). [6]

As a general obligation, all institutions managing and processing personal data, except private users has fallen under Act LXIII of 1992 on the Protection of Personal Data and the Disclosure of Information of Public Interest or later Act CXII of 2011 on informational self-determination and freedom of information. The security requirements were almost the same.

Section 7 (2) about data security requirements says that "data managers, and within their sphere of competence, data processors must implement adequate safeguards and



appropriate technical and organizational measures to protect personal data as well as adequate procedural rules to enforce the provisions of this Act and other regulations concerning confidentiality and security of data processing.” [7] Relying on the analysis by András Jóri in his handbook [8], it can be claimed that data security and so a slice of informational security falls under the scope of the statutory regulation pertaining to data protection. According to subsection (3), “data must be protected by means of suitable measures against unauthorized access, alteration, transmission, public disclosure, deletion or destruction as well as damage and accidental loss, and to ensure that stored data cannot be corrupted and rendered inaccessible due to any changes in or modification of the applied technique.” The legislator gives examples of threats which, in general, correspond to standards. It is recommended to perform a risk analysis about risks threatening the system and process of handling and processing data and about their occurrence. It is not required by the act on data protection but it is normally required by all standards, so it is also a professional expectation.

This codification is not detailed nor it is explanatory and there are no controls built into it. Parliamentary Commissioner for Data Protection and Freedom of Information (later the Hungarian National Authority for Data Protection and Freedom of Information) supervised data management and data processing but has no coercive measures; despite of a part of data security is subject of personal data regulation. [8] The publicity is effective only in governmental cases. The Act IV of 1978 on the Criminal Code specified Misuse of Personal Data in Section 177/A. statement of facts:

*(1) Any person who, in violation of the statutory provisions governing the protection and processing of personal data:*

- a) is engaged in the unauthorized and inappropriate processing of personal data;*
- b) fails to notify the data subject as required by law;*
- c) fails to take measures to ensure the security of data;*

*and thereby imposes significant injury to the interests of another person or persons is guilty of a misdemeanour punishable by imprisonment for up to one year, community service, or a fine.*

*(2) The acts described under Subsection (1) shall be upgraded to felonies and punishable by imprisonment for up to three years if they are committed by a public official in the course of discharging a public duty or in the pursuit of unlawful financial gain or advantage.*

*(3) Any misuse of special personal data shall be treated as a felony punishable by imprisonment for up to three years.*

Another example for the lack of detailed regulations is the ICT sector.

Due to Act C of 2003 on Electronic Communications Section 156:

*(1) Service providers shall take appropriate technical and organizational measures - jointly with other service providers if necessary - in order to safeguard security of their services.*

The focal point of this paragraph is intended on cooperation between service providers for security reasons. This means mostly access control measures.

*(2) The technical and organizational measures shall be sufficient - with regard to best practices and the costs of the proposed measures - to afford a level of security appropriate to the risk presented in connection with the services provided.*

This requirement suggests risk assessment and appropriate security measures. Despite the significance and sensitivity of the ICT area, the regulation and detailed requirements are scanty, even in the decree-level regulations.

At the same time, there were well-detailed laws of information security in this period. For instance, regular audit was done by authorities similar to the regulation of the financial sector. The financial sector is regulated by Act CXII of 1996 on Credit Institutions and Financial Enterprises (Hpt.), Act LXXXII of 1997 on Private Pensions and Private Pension Funds (Mpt.), Act XCVI of 1993 on Voluntary Mutual Insurance Funds (Öpt.), Act CXX of 2001 on the Capital Market (Tpt.) and Act LX of 2003 on Insurance Companies and Insurance Activity (Bit.).

Before 2004, the regulation of this field was similar to data protection act. Hpt. section 13. The only obligation on security was about Personnel and Material Requirements: “Financial service activities may be only commenced or performed if the requirements pertaining to the technological, informatics, technical, and security background and the premises are suitable for carrying out the activities, information and control system for reducing operating risks, and a plan for handling extraordinary situations” [9]

More details and a more precise requirement list were introduced by Act XXII of 2004 on Amendment of Acts Related to Increased Defence of Investors and Depositors and Act CI of 2004 on Amendment of Acts Related to Taxes, Contributions and Other Budget Payments. The acts embodied the similar requirements of Protection of Information Systems to Hpt. 13/B. §, Mpt. 77/A. §, Öpt. 40/C. § and Tpt. 101/A. §. In the case of Tpt. 101/A currently the requirements changed and moved to Government Decree No. 283/2001. (XII. 26.) of the Cabinet. Bit. was not amended, but same controls are recommended by the Hungarian Financial Supervisory Authority [10]. *“Financial institutions are required to set up a regulatory regime concerning the security of their information systems used for providing financial services and financial mediation, and to provide adequate protection for the information system consistent with existing security risks. The regulatory regime shall contain provisions concerning requirements of information technology, the assessment and handling of security risks in the fields of planning, purchasing, operations and control.”*

The regulatory regime refers to the system of regulations as IT security policy, IT security laws and IT operational regulations. These regulations should be made and regularly (for example, yearly) updated by the management. All users must know the relevant regulation.

*“Financial institutions shall review and update the security risk assessment profile of the information system whenever necessary, or at least every other year.”* The organisation must implement a risk assessment procedure and regular assessments. In the case of usage of outsourced services, the organization must include the outsourced areas to the assessment as well. *“The organizational and operating rules shall be drawn up in light of the security risks inherent in the use of information technology, as well as the rules governing responsibilities, records and the disclosure of information, and the control procedures and regulations integrated into the system.”*

Roles, tasks and responsibilities have to be clearly defined without any incongruity. The scope of authority of workers has to be adequate to the role and responsibility.

A Chief Information Officer (CIO) position should be formed as a position responsible for IT operations.

According to subsection 4, *“Financial institutions shall install an information technology control system to monitor the information system for security considerations, and shall keep this system operational at all times.”* This requirement does not refer to a computer system or application but to a set of controls and an effective internal audit system. This control system has to be regularly revised; activity and effectiveness should be measured. Keeping these controls up to date is a requirement in more standards. *“Based on the findings of the security risk analysis, the following utilities shall be implemented as consistent with the existing security risks”*

Risk assessment in paragraph (2) is the starting point of the followings. *“Clear identification of major system constituents (tools, processes, persons) and keeping logs and records accordingly.”* The organisation has to make an inventory of configuration. The actual state and all previous states have to be accessible and all time up to date. *“Self-protect function of the information technology security system, checks and procedures to ensure the closure and complexity of the protection of critical components.”* At this point the most important is the conformity of security measures with business and organizational requirements. This conformity conducts to proportionate defence. [11] According to bullet c, *“frequently monitored user administration system operating in a regulated, managed environment (access levels, special entitlements and authorizations, powers and responsibilities, entry log, extraordinary events)”*

Identity and access management procedures and rules have to be created, with rules responsible for databases. Changes in position or responsibility have to appear immediately in access levels. In d), *“a security platform designed to keep logs of processes which are deemed critical for the operation of the information system and that is capable to process and evaluate these log entries regularly (and automatically if possible), or is capable of managing irregular events.”* Application of log analysers used widely in the industry should be implemented. If not, log saving, secure archiving and manual analysis are the minimum requirements to meet. *“Modules to ensure the confidentiality, integrity and authenticity of data transfer.”*

Secure channels or protocols have to be used for communication such as HTTPS, SSL, SSH, SFTP. [12] *“Modules for handling data carriers in a regulated and safe environment.”* Data storage media, like DVDs or magnetic tapes have to be stored securely. It is necessary to protect them against disaster losses, incidents because of deficiency of technical requirements, electromagnetic disturbances, and technical reliability problems, protect against intentional damage and access management. Point g) requires *“virus protection consistent with the security risks inherent in the system.”*

Protection against malicious programs is necessary in servers, desktops and also in mobile devices. According to (6), *“Based on their security risk assessment profile financial institutions shall implement protection measures to best accommodate their activities and to keep their records safe and current, and shall have adopted the following.”* Requirements declared in this point are minimum requirements, all of them are obligatory. *“Instructions and specifications for using their information system, and plans for future improvements”* means every system and application has to be documented.

All services must have Service Level Agreement (SLA). *“All such documents which enable the users to operate the information system designed to support business operations, whether directly or indirectly, independent of the status of the supplier or developer of the system (whether existing or defunct)”*, so within the scope of the availability plan, all of these acts are included. *“An information system that is necessary to provide services and equipment kept in reserve to ensure that services can be provided without any interruption, or in the absence of such equipment, solutions used in their stead to ensure the continuity of activities and/or services.”* Disaster Management Plan and Business Continuity Plan are eligible for this requirement. *“An information system that allows running applications to be safely separated from the environment used for development and testing, as well as proper management and monitoring of upgrades and changes.”* The separation of working and test environments is an industrial common necessity. [13] Also, the personnel of these systems should be different. *“The software modules of the information system (applications, data, operating system and their environment) with backup and save features (type of backups, saving mode, reload and restore tests, procedure), to allow the system to be restored within the restoration time limit deemed critical in terms of the services provided. These backup files must be stored in a fireproof location separately according to risk factors, and the protection of access in the same levels as the source files must be provided for.”*

System backup operations should be regularly tested. *“A data storage system capable of frequent retrieval of records specified by law to provide sufficient facilities to ensure that archived materials are stored for the period defined by legal regulation, or for at least five years, and that they can be retrieved and restored any time”*. Retrieving of data is necessary in many cases, for example tax revenue, anti-terrorism or data protection. A complex solution to them must be implemented like a well-secured magnetic tape data storage system. *“An emergency response plan for extraordinary events which are capable of causing any interruption in services.”* Disaster Management Plan and Business Continuity Plan mentioned at paragraph c) are eligible for this function. According to para 7 *“Financial institutions shall have available at all times: operating instructions and models for the inspection of the structure and operation of the information system they have developed themselves or that was developed by others on a contract basis.”* Available at all times means before authorisation of financial service and after that at 24/7.

According to the above, all software documentations must be present and up to date. *“The syntactical rules and storage structure of data in the information system they have developed themselves or that was developed by others on a contract basis”* Software documentations, especially database documentations must contain data definition. *“The scheme of classification of information system components into categories is defined by the financial institution.”*

The computers, systems and networks have to be classified on their sensitivity. These rules have to be documented. They shall have available *“description of the order of access to data.”* Written rules of access control must be present. They shall have *“the documents for the designation of the data manager and the system administrator.”* These documents have to be present in order to ascertain personal responsibilities. They shall have available *“proof of purchase of the software used.”* Also as a tax revenue requirement, all software licenses and invoices must be present. A software inventory is also necessary. They shall have available *“complex and updated records of administration*

*and business software tools comprising the information system.*” With a software inventory, this requirement will be satisfied. *“All software shall comprise an integrated system, that is capable of keeping records of the data and information required for regular operations and as prescribed by law.”* This paragraph defines software minimum requirements. As it was mentioned above, long-time preservation is required in more fields. The software also has to facilitate this. *“That is capable of keeping reliable records of moneys and securities”* Since money is nowadays mostly account money (having no physical form), reliable records of that is essential for trust in the financial system. *“That has facilities to connect, directly or indirectly, to national information systems appropriate for the activities of the financial institution.”*

Most administrative data such as data on tax revenue or other statistical information are exchanged via computer systems. Implementing and maintaining interfaces to them is the responsibility of the organisation. *“That is designed for the use of checking stored data and information.”* Embedded controls for data self-correction and correction is imperative in such large databases. *“That has facilities for logic protection consistent with security risks and for preventing tampering.”* Value and sensitivity of stored data need endeavour on hardening logical security. According to para 7, *“the internal regulations of the financial institution shall contain provisions concerning the knowledge required in the field of information technology for filling certain positions.”* In other fields, job descriptions contain required IT knowledge but financial institutions have to specify them in regulations.

As the mass of requirements shows, the financial sector has much more regulations than the others, mainly because of the importance and significance of this field. Most citizens keep their savings in those organizations, and a defect in the financial institution drastically would decrease trust in the industry and the financial system as a whole, inducing significant losses.

Before the Act on Electronic Public Service (before 29 June, 2009), there were no acts dealing with information security in public or governmental networks. [14]

Only the following Government decrees regulated the field:

- 195/2005 (IX. 22) Government Decree on security, interoperability and uniform use of electronic administration systems
- 84/2007 (IV. 25) Government Decree on security requirements of the Central Electronic Service System and related systems
- 193/2005 (IX. 22) Government Decree on Detailed rules for the electronic filing
- 194/2005 (IX. 22) Government Decree on requirements for electronic signatures and the associated certificates used in the administrative proceedings, as well as requirements for certification service providers issuing the certificates
- 182/2007 (VII. 10) on the regulation of the central electronic service provider system

These decrees provided security rules sporadically to some systems but lacked any general framework.

As a result we may say that a relatively low awareness of the legislator and the business are observable in the usage of international IT security standards despite of their significance and the high risk in some areas. No obligations were found in the acts

passed by the Hungarian Parliament for enforcing those standards in IT security. There have been built-in self-control procedures in some acts but in practice those procedures actually have not worked efficiently.

### **6.3 Interim strategy of 2009-2012**

In 2009, a small change commenced with the adoption of Act LX of 2009 on electronic public services (abbreviated as Ekszt.). It has highlighted the requirement of security as a basic principle.

Organizations providing ICT-based public services ensure the publicity of data of public interest (according to the Act on data protection and freedom of information) and protection of personal and any other data during the provision of services. [15]

During the provision of services, particular attention must also be paid to the fulfilment of realization of information rights, protection of classified information, business secrets and other protected data groups. Service providers ensure IT security, including the integrity of electronic records and the applicability of electronic signature technology. The legislator refers to the application of electronic signature technology and the importance of compliance with the relevant security requirements.

The use of electronic signatures, according to Act on electronic signature (hereinafter Eat.) can greatly assist in maintaining the integrity of data. However, a huge discrepancy is noticeable between theoretical principles and practice. Despite the above rules, electronic signatures are still not widely adopted and rarely usable in such systems.

Service providers shall also ensure the operation continuity and the enforcement of information system collaboration requirements. As we have shown in chapter 4 and chapter 5, interoperability, i.e. cooperation between the various systems has particular importance in the government information technology, as island-like systems have been developed, and over time, the demand for integration increased fairly. Negative impacts of island-like development are still being felt in the area of interoperation. The continuity of operation, as one of the main requirements for IT security, including disaster and business continuity planning, is an important feature for large government databases where data loss could and would be catastrophic.

Data transmitted to the central system profiling (analysis of user habits, personal information and direct access to meaningful case data) is not allowed according to these regulations. Compliance is ensured with the central system operator by means of technical solution. Profiling, one of the most challenging privacy issue in recent years, is declared to be prohibited by a principle in Ekszt, and the information system must ensure this technically (e.g. through Privacy by Design technologies).

The use of remote services requires a face-to-face pre-registration or an equivalent measure and, given that a significant number of electronic public services are administrative procedures, they need proper identification. Personal appearance and identification means a registration in governmental offices or registration by electronic signature.

Authenticity, quality, operational security and confidentiality of the data processed in electronic public services operate under the Central System must comply with defined rules. Here the act refers to Government decree no. 223/2009 (X. 14) about the security of electronic public services. In that, the requirements and procedures were determined in sections from 11 to 32. Requirements set out in the Act are detailed in the following regulations:

- Government decree 223/2009 (X. 14) on the security of electronic public services
- Government decree 224/2009 (X. 14) on the central electronic system service's recipient identification and authentication services
- Government decree 225/2009 (X. 14) on electronic public services and their use
- Government decree 78/2010 (III. 25) on requirements of electronic signatures in administration and certain rules for electronic communication

There was a bill on information security in 2009 which never came to force but had a remarkable impact on the area. [16] The proposal was a draft legislation framework, a so-called "lex specialis".

The bill's scope was all IT systems and services in the Republic of Hungary, including private computers. It was also applied to the operators and users.

According to this, information systems are to be divided into 5 separate security levels. One of the factors of the grouping was storage of personal data. The groups were as follows:

- Level 1: home computer networks and individual computers connected to the Internet
- Level 2: information systems used by every legal relationship between employer and employee, internal IT network, limited internal access, non-public electronic communications services or internal network or individual computer capable of using public electronic services
- Level 3: any public electronic services that do not handle, store, process or transfer personal identifiable information, including anonymous registration services
- Level 4: organizations providing public electronic services, application service providers and their public electronic services, regardless of personal data processing; any public electronic services that handle, store, process or transfer personal identifiable information
- Level 5: critical infrastructure sector's computer system, closed-circuit, and public electronic network or services and information technology

One of the most interesting questions is the mandatory audit required at level 4-5 as a means of control. According to the original intention, this control would have been conducted by audit firms accredited previously by the National Accreditation Body for Certification Activity. Creators of the legislation could not specify whether that responsibility belonged to management systems or product certification.

Most importantly, the social impact of the law would have been significant, at least because of its wide scope. Critics had said there was lack of audit control in level 1 to 3, which made it a redundant regulation. In contrast to that, the legislation could have set the level of security requirements under other laws, because of its 'lex specialis'

character. For example, in Criminal Code Section 423 *adequate protection* is required in the case of hacking but it was not defined earlier. The new law might have given meaningful content to it and, by doing so, it might have increased legal unambiguity.

## **6.4 Latest information security strategy from 2012**

Government Decision no. 1035/2012 (II.21.) on Hungary's National Security Strategy requires the strengthening of the security of electronic information systems to enhance the protection of critical national information infrastructure and the development of adequate cyber defence.

Stemming from this statement of the National Security Strategy, the Government adopted a National Cyber Security Strategy of Hungary as well. [17] The legislator took the view that recently experienced cyber wars worldwide justified the coding of a modern Hungarian Information Security Act and on 25th April, 2013 was a huge milestone for the administrative control of information when Act L of 2013 on electronic security of state and local government organizations was published.

The scope of the act, despite its title and scope definition in Section 2, is significantly wider as it seems to be, [18] mainly because of the following extensions: data processors of national data assets, European critical infrastructure system elements, national critical infrastructure system elements as defined by law. These bodies can significantly extend the scope (even with private companies), so typically the public utility providers, electronic communications services, financial organizations could be included. An itemized list was published at the time of writing this manuscript. The law prescribes the essential items known as CIA triad in the field of information security [19]: confidentiality, integrity and availability as information security requirements in electronic information systems and data.

The Act requires the integrity and the availability of information systems in a closed, complete and consistent way, proportionate to the risks for the electronic system and its components. It is important to explicitly include the security control implementation's proportionality to risks and the usage of risk assessment in the state information security requirements because security measures are typically implemented in an ad-hoc manner to minimize security budgets.

In order to protect electronic information systems and data proportionally to the risks, the Act states that the electronic information systems must be allocated to particular security classes. This classification is based on confidentiality, integrity and availability properties in a scale of 1 to 5 where 5 is the highest security level. From this section of the Act it seems that each part of CIA factors (confidentiality, integrity and availability) has to be evaluated separately but in other parts of the Act we cannot find this distinction.

Although the security classification depends primarily on the security classification of information, the law, in contrast to the earlier one, does not specify what minimal security controls should be applied to data. In contrast, in Section 9 (2), it determines the minimum security level classification for a variety of organizations. This probably



will have the consequence that the security needs of data are not evaluated, instead, they will be adjusted to the security levels according to the minimum-list, since public sector tries to invest as little as possible in security. According to the Act Section 7 para 5, in *exceptional circumstances*, the manager of the organization may set a lower security class, which is another easier way to avoid spending on security. The only thing that can stop this expected downward bidding is the strictness of National Electronic Information Security Authority based on Section 9 Para 4. The authority is formed by Act Section 14 Para 1.

The minimum grades in the Act per organization according to Section 9 Para 2 are the following:

- Level 1: no organizations (no requirements at this level)
- Level 2: Office of the President, Office of the National Assembly, the Constitutional Court's Office, Office of the Commissioner for Fundamental Rights, local and national self-governmental bodies, the administrative authority associations
- Level 3: central state administration bodies, the National Judicial Office, courts, prosecutors' offices, the State Audit Office, National Bank of Hungary, the capital city and county government offices
- Level 4: Hungarian Defence Forces
- Level 5: data processors of national data assets, European critical infrastructure system elements, national critical infrastructure system elements, as defined by law

As we mentioned earlier, the law does not define what these security levels are or how should the classification be conducted and what the detailed rules for the levels are.

According to Section 11 Para 1 (c), the head of the organization is obliged to appoint a person in charge of the electronic information system security, who is responsible for tasks related to the protection of electronic information systems. The list of tasks includes responsibilities of a conventional chief information security officer (CISO). Its name and definition suggests that this person exempt the head of the organization and its employees from their security-related task but this must not be the case.

The Act set up the National Electronic Information Security Authority under the Ministry of National Development. As a specialized authority, National Security Authority is involved in their activities with forensic log analysis and vulnerability testing. The responsibilities of the existing Government Computer Emergency Response Team (GovCERT) were handed over to different authorities. According to Section 23, the National University of Public Service develops training for those responsible for the security of electronic information systems and staff organizations.

## 6.5 Consequences

This chapter showed the major issues of information security with historical background. It also showed the trend for more definite legal regulation, even with the inception of technical standards in legal regulations. Due to the wide range of important legislation,

wide social effects and improvement of information security awareness are expected to happen in the long term. It is probable that standard-based (e.g. ISO 27001 or COBIT) systems will multiply, given the fact that the organizations will comply with the security rules. This trend is also perceptible in the Hungarian legislation which was also detailed in the article with the alignment of the national cybersecurity strategy. This had three phases until now: early strategies and legislation of 1989-2008, Interim strategy of 2009-2012 and the latest information security strategy from 2012. This last one was a huge milestone in 2013 when the Hungarian Act L of 2013 on Electronic Security of State and Local Government Bodies was introduced.

This change in strategy and regulations will result in greater security and the national security risk in the area of information and communication technologies will decrease in the long term. The Act is a good step in the direction of the appropriate level of government information security but it still contains some loopholes during the application of the rules.

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# Chapter 7 – ICT Enabled Cross-Border Governance

## 7.1 Introduction

There is a funny video shared on the Internet about the need for studying English. In the video titled ‘German Coast guard trainee’ the young German officer misunderstands the emergency message of an English captain when he hears the distress call with a distinct British accent: “We are sinking!” After a short hesitation he nervously asks the English captain with his strong German accent: “What are you thinking about?”

As being a stakeholder of cross-border cooperation since 15 years I had the opportunity to meet similar cases. After the Mária Valéria bridge was open at the Hungarian-Slovak border between Esztergom (HU) and Štúrovo (SK) a flat on the 9<sup>th</sup> floor bursted into flames on Slovak side. The fire brigade in Štúrovo had no ladder long enough for putting out the fire. They needed the help of their Hungarian colleagues. Also, when a young Slovakian couple visited their relatives in Esztergom and the child-birth started at the young lady they did not choose the closest Slovak hospital situated in a distance of 60 km from Esztergom but the Hungarian one.

People living in border regions must know many such daily-life stories. These stories justify the real need for institutionalized cross-border cooperation, a well-managed cross-border governance model.

In our study we try to give a short overview on the issue of cross-border governance, on its theoretical background, its opportunities and limitations. The term ‘cross-border’ will be used in its stricter sense referring to direct cooperation across state borders.

For a better understanding, we have divided our study into four sections gradually widening the field of investigations which we start with by the definition of ‘governance’.

## 7.2 Theoretical background of governance: modernity and the nation states

Governance is an innovation of modernity. As in his famous lecture given at Collège de France (titled *Governmentality*) Michel Foucault points out, in the Middle Ages the Prince was in a transcendent relationship with his subjects : “there is no fundamental, essential, natural and juridical connection between the Prince and his principality” [6.]. The Prince acquired his power over the territory and the population living there through occupation, heredity or accession but there was no immanent togetherness between the population and him. Consequently, the Prince’s main aim was to maintain his power over the territory considered as an external mark of his sovereignty and to secure his relationship with it. From the point of view of the subjects this transcendent relationship meant a kind of eventuality: it did not have high significance who the King was personally. The subjects’ lives did not changed much when a new King took over the power.

According to Foucault's theory the big change was made during the 16<sup>th</sup> and 17<sup>th</sup> centuries when the new ideology of *government* arose. He argued that the difference between medieval and modern approach is marked by the smush 'governmentality'. The unified word contains the idea that in the heart of the new approach instead of guarding and maintaining a given territory there is a mental orientation toward *governing things* which are "men in their relationships, bonds, and complex involvements with things like wealth, resources, means of subsistence, and, of course, the territory with its borders, qualities, climate, dryness, fertility, and so on. 'Things' are men in their relationships with things like customs, habits, ways of acting and thinking. Finally, they are men in their relationships with things like accidents, misfortunes, famine, epidemics, and death." [6.]

*Govern-mentality* means a way of thinking the *Leitmotiv*, which is the improvement of living conditions of the population, amelioration of the health care system, enhancing the level of education, strengthening the capacity of work of the people and expanding average life expectancy within the country. As we see, it is very similar to our present concept of the so called "welfare state". It is not accidental that the new way of wielding of power has developed in parallel with the new idea of "*policia*" which meant at the beginning a particular technology of government (not exceptionally a means of criminal investigation) and modern bureaucratic / administrative state.

As Foucault highlights, Plato and Aristotle separated three forms of 'government': the principles of government of ourselves were defined by morals, those of government of family (oikos) were defined by economy and those of government of the state (polis) were described by politics. Later, in the modernity era, economy has become political economy by shifting the concept of family to the level of politics (nation).

During this process Kingship (principauté) has been removed by the Nation State with its own reality, own rationality and internal rules. How this process went through?

It is evident that when concentrating on realms *immanent with population* (to govern) instead of maintaining superficial power over a given territory (to reign), the nature and the behaviour of the Sovereign will perform a drastic change. This change can be described through the presentation of the change of the nature of sovereignty.

When investigating living conditions in the USA in the 1830s, Alexis de Tocqueville foremost identified the process of the development of equality of living conditions. "Aristocracy had made a chain of all the members of the community, from the peasant to the king, democracy breaks that chain and severs link of it." [20.] Two centuries later, Charles Taylor describes the same phenomenon by the following wording: "We have moved from a hierarchical order of personalized links to an impersonal egalitarian one, from a vertical world of mediated access to horizontal, direct-access societies." [19.] Previously existing mediating powers (one can call them as 'local autonomies') have disappeared, the individuum is confronting with impersonal State. In parallel with the disappearance of hierarchy from the society the way of exertion of power is changing, too. Sovereignty becomes immanent with people, the government is functioning by the mandate given by the people

It is disputed whether nationalism is a product of modernity or it is the return of an atavistic tribal phenomenon. According to the interpretation of Ernest Gellner [8.] (and earlier Lord John Acton [1.]), nationalism cannot be separated from the

development of the modern principle of sovereignty of people and the social contract theory.

In this new system sovereignty is connected not to a (not-permanent) personality but to a certain, more or less permanent unity of territory (see Bodin [4.]) or a political body (Rousseau [18.]) creating rules for itself. In parallel, loyalty of the subjects is connected not to a royal family or a local autonomy but to the nation as a whole composed by people similar to them. The way of wielding of power proper to nationalism is the bureaucratic nation state : ideal and practical realisation of immanence. Consequently, governance is a product of modernity, and it cannot be separated from the model of nation state.

### 7.3 Theoretical background of borders

When the book titled *La production de l'espace* of French historian Henri Lefebvre came up in France it had no big impact on scientific discourse [12.]. But in 1991 when it was published in English, the book gave ammunition to the geographers defending the relativist / relationist theory of space and became known world-wide.

In his work Lefebvre states that the space is a social product, and he distinguishes three forms of it,. At the first level, perception in the mind creates space composing the pictures of things and objects around us in one totality (*espace perçu*). At the second, representations of space are made by human beings (e.g. a country is not a nature-given reality, in this case things and objects are interpreted in the way a new concept of space is made : *espace conçu*). Finally, these representations become the spatial representation of time (*espace vécu*). The last form means that the space produced by us react on our daily lives (or identity). If the space is a product of society, the narratives on the space can be changed according to the changes arisen within the society. (It is enough for better comprehension to compare the mental map of an old woman who has never left the territory of her village and that of a businessman flying three times per week between different continents. It is clear that space has profoundly different meanings for them regardless of the fixedness of physical objects.)

From our point of view, Lefebvre's theory of space has two implications.

For unfolding the first one we invite again Michel Foucault to help us. In his lecture given at the Collège de France in 1970 he summarised what he is thinking about politics (*L'ordre de discours*) [7.]. According to his viewpoint each political regime limits the number of potential discourses: it is not allowed to produce discourses to everyone, everywhere, anytime, any way, etc. Political power determines the place, time, the person, the topics, the way etc. of speaking, of writing, of *word-ing*.

Similarly, Lefebvre thinks that each regime produces a particular form of spatialty. The society creates borders inside and outside the community. Social behaviour, traditions, cultural identity are summarised in different discourses ruled by different socio-cultural and political structures. When the political regime or the deep social structure is changing (quickly or slowly) the discourse on space is changing as well.

The last centuries in Western world have been defined by the discourse of nation state which has produced gradually its representations: official language, national currency,

democratic parliament, national provisions and state borders. This discourse has been expanded during the 20<sup>th</sup> century to the remaining territory of the world in parallel of the diffusion of large colonial empires. Since 1945 the number of nation states has almost tripled and the process is still continuing. Mill's thesis on the coincidence of the borders of the state with the nation spread over the world has been producing new narratives on the space following the modern European model.<sup>33</sup>

The second implication of Lefebvre's theory is that politics has the capacity to influence the discourse on the space defining a common identity (*espace vécu*) of the community. This capacity is represented by the laws, rules, the normativity created by nation state in our case. Border is a sign of normativity. Those crossing the borders they offend the borderline, injure normativity in a special sense.

Contemporary scholars of borderlands studies consider state borders as products and not givens by nature. "A line is geometry, a border is interpretation" – states Henk van Houtum [10.]. David Newman describes the process of border production in a very similar way to that of Lefebvre's theory on space: "Borders are created by those who have the power to *keep out* those people and influences which are perceived, at any point in time, as being undesirable or detrimental to the home territory or group. [...] Once created, borders become transformed into reality, a default situation which impacts upon daily life patterns and social morals, determine the parameters of exclusion and inclusion, and creates the categories through which social and spatial compartmentalization is perpetuated." [16.]

John Agnew calls this phenomenon as the '*territorial trap*': state is a container of social relations; state determines the notions of 'internal' and 'external' and exerts its total power over everything which belongs to former one. At the same time the world ends on the other side of the border: inside there is order, outside there is chaos.

Territorial games are always zero-sum: the narratives on space and borders rivalry against each other have no win-win solution within the framework of the nation state paradigm. Conflict is encoded in the discourse of nation state: "If expressed in territorial terms (as in national border conflicts), the fact that territory (unlike other 'goods' such as democracy or development) has a finite and fixed total directly encourages 'zero-sum' thinking, where gains for one side are typically seen as losses for the other, and vice-versa." [2.]

## 7.4 Cross-border governance

From the point of view of the reflections above, cross-border cooperation is something ab-normal, something which is against normativity and can be interpreted as injury, violence against the official discourse. Cross-border governance is even worse since borders are the most transparent signs of nation state that governance is belonging

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33 "... it is in general a necessary condition of free institutions, that the boundaries of governments should coincide in the main with those of nationalities" [14.]

to. Governance is something which seems to be inseparable from nation state model and it can be identified by listing the ministries of a democratic state: all functions performed (*ministered*) by the ministries form the frame of the notion of governance.

However, all what we can see now in the world demonstrate that there are no longer problems which can be solved at national level. Not only fields like foreign affairs or national security presuppose external relations : controlling of big contagious diseases; environment protection; criminal investigation; or even the development of education and health care system are considered as inter-*national* issues.

The European Union's main objective is to develop a Single Market and to create a secure and peaceful continent. In this process borders are considered as obstacles. In the history of the European integration a tendency of homogenization continuously can be identified : more and more issues and competences are removed from national to European level (Brussels's level). The EU institutions pull topics belonged previously to the self-definition of the nation states : national currency, national legislation, the control over border crossing. At the same time issues which were managed by national ministries before (governance) become common matters of the European community (cross-border governance).

In parallel with the evolution of new (network) economy where globality and locality obtain added value compared to the state level, the EU aims at strengthening local and regional level actors by stressing the importance of the principle of subsidiarity and by promoting the development of new forms of governance. Structural reform of the European Community and emerging of Cohesion Policy gave birth to the theory of multi-level governance (MLG). Albeit the decisions are still made by the representatives of the member states, it seems that share of competences between different levels of EU's political body cannot be stopped. Maybe the most innovative and most exciting forms of MLG are produced by local stakeholders in borderlands. Institutionalised cross-border cooperation challenges the traditional narratives on space and border, it overturns conventional topics and discourses and casts doubts on the evidence of former model of governance managed by nation states, exceptionally.

At the same time, it is not self-evident that cross-border governance can function without the contribution of nation states which are still strong enough for hindering cooperation crossing the border. Nevertheless, the EU's efforts made towards an integrated Single Market make necessary the acceptance of different ways of cooperation.

During the last 50 years cross-border cooperation has undergone a unique evolution within the European Community. In the very early ages, cross-border cooperation meant an *informal*, potential partnership without steady institutional background. The cooperation was defined by geographical proximity and common historic and cultural heritage. The activities aimed at strengthening personal relations mainly through joint events and ad-hoc actions. Approximately 25-30 years ago some started to use this geographical proximity and complementarity in many fields for the sake of common development. A *functional* level has emerged in addition to informal cooperation. Due to their peripheral situation these regions often lack several public institutions or the standard of the services provided by those are not satisfactory. Consequently, the local stakeholders kept seeking for the opportunities of the cooperation in the field of risk prevention, fire services, public transport, health care etc.

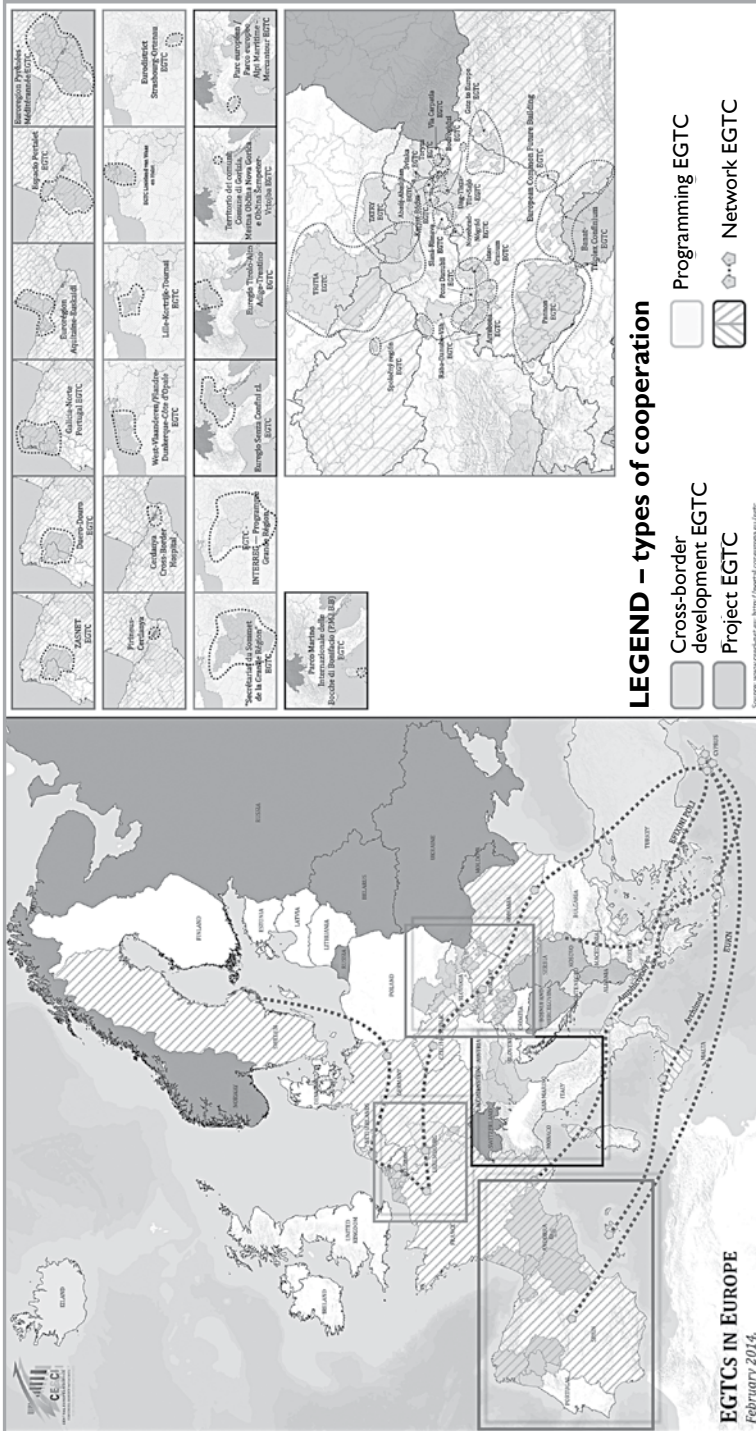


The fulfilment of these functions has been hindered by the lack of proper rules and bridges between the differences of relevant national legislations. So, the functional level of cooperation needed the emergence of *normative* level cross-border cooperation, the level of regulated institutional cooperation. This is the level of the EGTC, the European Grouping of Territorial Cooperation which was inaugurated in 2007 according to the 1082/2006 EC regulation.

According to the original intentions of the initiators, EGTC is a tool for managing cross-border, transnational and interregional projects and programmes. However, regarding the main potential areas for cooperation, most of them need a stable institutional background and a management capacity with appropriate legal competences. This means that there is no project or programme management without a certain level of governance capacity. Thus EGTC is a subject of multi-level governance at the same time. From this point of view EGTC is not the lonely legal-institutional solution on the field. Following the adoption of the Madrid Outline Convention and its Protocols in 1980 by the Council of Europe diverse models of institutionalisation appeared in Europe. The background of these initiatives was ensured by bilateral agreements according international law between different states. Benelux Convention, Karlsruhe Convention, Bajonne Treaty etc. made possible to establish cross-border organisations with independent legal entity the existence of which was recognised by the authorities of the neighbouring country. The consortium set up along Spanish law; the eurodistrict, the innovation of French legislations; legal capacity of particular euroregions etc. have shown the need at local level to exceed boundaries built up by nation states and nationalism.

Despite all these complexities, EGTC represents the most advanced form of institutionalised cross-border cooperation because it is established by Community law and it gains legal entity on both sides of the border. An EGTC has the opportunity to hire employees in the neighbouring country, to set up and function own institutions and to run own businesses in every affected country. The functions lacking in a border region can be fulfilled and developed by institutions owned by an EGTC.

At time of writing this manuscript, 46 EGTCs registered (April 2014) and they can be divided functionally into four groups. Most of the EGTCs form the type of *spatial development initiatives* that follow former euroregions. They are geographically continuous cross-border development areas, generally reaching into the territory of two states. The aim of these EGTCs is to create and operate permanent common institutions and to develop the territory in question in an integrated way. The majority of the EGTCs established so far can be enumerated under this type. The Lille-Kortrijk-Tournai EGTC (the first one on the Continent) and the Ister-Granum EGTC (second one) can be the typical examples.



Map 1: EGTCs in Europe in February 2014

Source: [www.ceeci-net.eu](http://www.ceeci-net.eu)

We can classify the *network EGTCs* as another group. This cooperation is not based on geographical but thematic “proximity” where the base of cooperation stands in the thematization of common problems, aims and interests. Network EGTC can be built up in transnational and interregional level as well. The ArchiMed EGTC aims to unite the islands situated in the Mediterranean basin. There are characteristic problems which these islands are faced and also the solutions for those can be elaborated commonly.

The third group contains models of *project EGTC*. The Pyrenees-Cerdagne EGTC’s aim is to build up a hospital and to create a hospital service which will give medical treatment to patients from both sides of the French-Spanish border. The building of the hospital is ready but the services are not launched yet.

We know only one single example of the final model of *programming EGTC*. The Greater Region EGTC has set that its aim is to manage the European Territorial Cooperation programme on the French-German-Belgian-Luxemburg border area. According to preliminary intentions, from the beginning of the new budgetary period ESPON programme will be managed by an EGTC, as well..

The expected proliferation of EGTCs all over Europe will produce fundamental changes in the field of governance. In Europe where approximately half million people are commuting every day, where thousands of students visit the lectures in another country, where the free movement of goods, capital, persons and services became the part of daily life, borders as well as space gain new meanings.

Referring back to our theories of border and in the wider sense governance, we can safely say that supporting new forms of cross-border cooperation and enabling the creation of governance structures cross-cutting traditional state-ruled systems the EU contributes to the re-identification of things around us, to re-wording the discourse on space and border and to shaping a new way of governance relatively independent of nation state model.

## 7.5 ICT enabled cross-border governance

It is obvious that in the form of EGTC normativity has gained new aspects. By raising cross-border cooperation to normative level (where also the statistical regions within a state are), the normativity of the border has lost its sense. From now cross-border cooperation and its tools have the same normality and normativity like nation state borders.

ICT can play a decisive role in creating this new normativity in two sense: as a tool of information provision and as a tool of integrated service provision (new form of governance). This role is underpinned by the modification of terminology of spatial studies produced by the birth of virtual space. As a result of the progress in ICT our life-world is fragmented by different perceptions on space producing proliferation of local identities. But locality here does not necessarily mean anymore a geographic locality : within the human society (considered as a kind of quasi-space) new identities are developing which can geographically be discontinued (just think about fan clubs of

a football team or ad-hoc groups set up very short time on social sites etc.). What we see now it is the multitude of “local” narratives instead of comprehensive metanarratives where the identity of Self is fluctuating among different space-structures produced by themselves or other people. National narrative, national discourse has lost its exclusiveness: the today’s men use different narratives, different identities, different definitions successively or simultaneously. It is the reason why scholars of human geography use terms such as liquid modernity [3.], fluidity [9.], mobile identity [17.], de-territorialisation [5.] when describing today’s processes where the *world of spaces* give its role to the *world of flows*.

In this sense, traditional definitions like centre and periphery change their meanings. As György Enyedi stated : those connected with Internet are always in centre regardless of their physical position [21.]. Freedom and competitiveness is in close relationship with digital literacy including information literacy and Internet or hyper-literacy as well.

All above mentioned processes can gradually re-define the term and the content of governance as well. We terminate our reflections on cross-border governance by taking examples of two types of ICT innovations influencing the progress of this new definition.

### 7.5.1 Providing information

At the initial situation the world on the other side of the border is something wrong, something insecure, mysterious, strange, dangerous or even hostile. Fear from the *other-world* is always nourished by the lack of proper information. Consequently, in a world where info-communication has an increasing influence on daily life, ICT tools can contribute to a better understanding and to mutual rapprochement of the neighbours.

Numerous *best practices* are known Europe-wide on informing about different questions related to the other side. Most often it these are information portals helping job-seekers, setting up of new businesses, finding education opportunities, travelling etc.

One of the best practices is the website of the GTE (Groupement Transfrontalier Européen) in Geneva (<http://www.frontalier.org/>). The initiative eminently aims at facilitating the flow of labour force at the French-Swiss border but the portal provides plenty of information necessary to work, to travel, to live in the metropolitan region.

Another good example is the Border People Project at the Irish - Northern Irish border ([www.borderpeople.info](http://www.borderpeople.info)). The portal developed within this project gives information and examples on issues related to different status of life, from commuting through marital status changes all the way to studying, where specific case studies help the better understanding. The list of subjects can be searched by category, by target group and by life event, and the stored problems can be listed in an alphabetic order as well. In the case of Border People Project the used language is the same what is a big advantage.

In other cases language barrier is to be exceeded. It sometime requires the creation of an artificial or semi-artificial common language. It was the situation between France and the UK after the Channel Tunnel had been inaugurated. The PoliceSpeak and

Intacom projects aimed at improving the conditions of communication and “to provide linguistic stability” [11.]. The second project resulted in a French-English parity lexicon with agreed terms. The next step was the project called ‘LinguaNet’ which originally was a bi-national initiative aiming to develop a communication software based on the results of previous projects. Since its launch it has become an international tool used in 7 countries for communication between law enforcement institutions like police, fire brigade, ambulance, coast guard, disaster management organisations etc. (It is not the lonely example when answers given to needs occurred in a particular cross-border region are transforming to international solutions.)

Similar projects have been implemented at the Hungarian-Slovak border area with the participation of the experts in water management. As floods and pollution do not take into account borders, in case of emergency Slovak and Hungarian stakeholders must work together intensively. Language barriers can hinder understanding in a situation when there is a need for fast and prompt actions. In order to avoid misunderstandings which can even result in loss of human lives the partners have built up a trilingual professional dictionary and organised training courses to better know each other’s information systems and to use English vocabulary on a common platform.

The project launched by the ISIG (Institute of International Sociology, Italy) in 2013 aims at enumerating all the obstacles hindering cross-border cooperation in Europe, taking good examples of solutions for those obstacles in a digital encyclopaedia style. The planned platform will serve as a tool-kit for breaking down administrative boundaries.

The Pons Danubii EGTC has united different means of communication within the framework of a media project. 8 municipalities participating in the project financed by Hungary-Slovakia CBC programme have their own local television agencies. Agencies are exchanging reports regularly which are available on the home page of the EGTC, as well. Within the framework of the project a tv studio has been set to produce reports on the EGTC and compiling series of news of local televisions. These news are also published on the site of the Grouping. The EGTC contributes not only to a better knowledge about each other with this special solution but also ensures the development of a common (virtual) space and identity in the cross-border area.

There are more specialised portals providing territorial statistics on border regions. The Örestat page gives information on the Öresund region around the Öresund bridge ([www.orestat.de](http://www.orestat.de)); the Atlas Statistiques des Pyrénées facilitates obtaining information on both sides of the Pyrenees (<http://atlas.ctp.org/>); the region of Upper Rhine is well presented at the portal SIGRS-SIGOR which contains a very rich statistical database (<http://sigrs-gisor.org/?q=en/Homepage>) etc. These portals enable the local stakeholders to build up common visions and objectives based on data gained from statistical analysis.

By using these ICT enabled innovations, by providing information on borderlands as quasi-independent units the project owners show and create new form of normativity of space. Statistics has been always related to the administration of modern nation states, and when cross-cutting nation-based discourses, project owners query the self-evidence of former data process model. Also, this form of information provision can be

considered as a further step toward a higher level of institutionalization, whereat this stage numerous problems can occur.

Until we provide overall juridicial, practical information on the *other-world* which are common and public, no difficulties occur notwithstanding language barriers. But when trying to share private information for the sake of cross-border service provision, problems related to information privacy and information security occur, immediately.

### 7.5.2 Providing services

The most advanced ICT-based cross-border services are provided in the field of public transportation. Mainly those individuals who live in cross-border (polycentric) metropolitan areas, or around larger cities can profit from ICT solutions providing harmonised schedules using mobile applications, e-ticketing or CRM solutions. Eurostar railway system operated jointly by the French SNCF, the British LCR and the Belgian SNCB, the EgroNet network built up and run at the Czech-German border area or the integrated public transport system around Vienna can be mentioned among best examples. The standard of services provided can be compared to those of cross-border business activities.

Recent innovative initiatives have been made in the field of health care. In the case of an accident or a heart attack the patient should be treated at the nearest hospital regardless of his nationality and the location of the hospital in question. Due to the fact, that handling of personal data is ruled differently in each country and the financing of treatments is ensured through *national* social security institutions, consequently, cross-border health-care service provision induces administrative and financial problems. Despite of these difficulties, numerous good examples can be mentioned where health care services are available in a cross-border manner.

In the case of the French-Belgian border there is a bilateral inter-state agreement in force which was resulted by the initiative of two neighbouring hospitals in Torucoing and Mouscron starting to cooperate in the 90's. Up today, according to the agreement the mutual service provision has been expanded to the entire borderland. Also one of the EGTCs intends to function a hospital at the French-Spanish border area in the Pyrenees. The Cerdanya hospital is situated in Spain but the employees and the patients will come from both sides of the border.

In addition to service provision health care is a field where the most advanced technologies are utilised within the framework of cross-border eHealth and telemedicine. The latter one is mostly used in the UK, Denmark and Sweden.

According to the 2011/24 EU Directive on patients' rights in cross-border health care since the end of 2013 there is a theoretical opportunity to have resort to health care services provided in every EU member state the price of which should be financed by the relevant national security system – with particular restrictions. The legal conditions guaranteed by the EU should be strengthened by national institutions but the tendency is clear and it indicates the weakening of national competences in this field, as well. In parallel with the ageing of the European population the treatments provided to pensioners living abroad will enforce these tendencies.

The most intriguing problems, however, in each of these cases are the exchange of personal medical data which should be available and understandable for all the doctors

in the EU should at the same time not be available for third parties. [13.] Europe-wide project called epSOS aimed at answering this multi-faceted problem (legal, organisational, semantic and technical interoperability). The future (set by the EU through further Recommendations and Directives) seems to be that of independent use of medical services in the EU based on high-developed ICT applications.

While there are a few fields where ICT solutions are used in cross-border relations serving the development of cross-border governance structures and EGTC as a legal framework is given for managing those structures we cannot speak about cross-border governance in the sense of administration. It is a matter of fact that more and more public services provided previously exclusively by national level institutions are available at international or community level but administrative competences are strongly bound to nation states.

How could ICT help to access those services for neighbours?

Well, ICT creates a new dimension of space (virtual or cyber space) which matches better new (fluid) forms of identity than traditional geographic spaces. A big advantage of the virtual space is its independence from physical space. Second Life models make possible to create so-called synthetic spaces where virtual representation of the Self (virtual identity or avatar) manages (*administers*) its own affairs [15, 21] As information functions by using artificial languages the difficulties produced by cultural variety of Europe can be managed, too. Daily life will enforce the opening of state borders for new forms of cross-border governance. It might happen in the near future – hopefully before we will have sunk...

## 7.6 Conclusion and Summary

To summarize, our aim was to point out the consequences of the process when borders become more and more permeable. Taking into account that borders are discursive facts (it means that the terms and qualifications related to them are produced by politics and society) new narratives, new discourses can modify our approach towards the role of those borders. Thus, borders which previously were considered as obstacles can be transformed to bridges between nations.

In our study, we tried to draw the attention to Michel Foucault's theory on governance and the immanent relation of this method of government with the nation state model. To overcome the borders identified as barriers, that model is to be overwritten by new forms of governance.

The tool of the EGTC provided by the European Union can be a first step toward the creation of cross-border forms of governance which matches better the new reality of cyber space and the new identity of the Self in a world of flows.

Cross-border governance might seem now like a new and foreign idea which is not in harmony with the realm of nation states. As more and more ICT solutions are utilized offering services we actually experience that the real need for a better territorial use of resources is justified. These ICT enabled services coupled with common governance structures guarantee the right for using these opportunities.

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# Chapter 8 – Social media and emergency – new models and policies enhancing disaster management

## 8.1 Introduction - not only life changer, but also lifesaver?

The ICT tools become more and more important in our life. Among changing cultural and social habits, in the next decades will re-write a lot of working mechanism in our everyday life: learning, working, being available, being healthy, gathering information, the communication, the expression of our feelings and so on. After the revolution of communication and pleasure nowadays the ICT tools become more real - the goal is to upgrade the life quality of information society's members. The task is "simple": to live longer and safer more cosily. With the social media the human condition has been transformed.

There are lot of unforeseen situations in our lives. During the moments, hours and maybe days of necessity (for example during disasters) helping each other, surviving, gathering information about recent situation or about our loved ones becomes crucial. The high need for instant, accurate and practical information is unquestionable. Being informed raises our chances to survive and to remain calm; being uninformed in hard situations drives everybody into panic, what leads to commit mistakes and finally suffering losses.

There are a lot of very different situations during emergency management: alerting the given organizations and individuals in the case of accident, helping to find people each other, to prepare local citizens for an incoming natural crisis, to help them during crisis, to coordinate and lead official organizations etc., the list is near never-ending. But the scope is clear: during crisis the need for information grows by leaps and bounds very rapidly. During the time of crisis there is never enough information. Where, who, what type of problem and when – these are is all fundamental communication issues, and social media is very good in automated, targeted communication.

Not surprisingly, social media will be an important tool in emergency management. What are opportunities, the limitations and the practical solutions of using social media during disasters? In this chapter we are searching answers for these questions, using a practical approach to discover the topic.

Social media is the interaction among people in which they create, share or exchange information and ideas in virtual communities and networks. Social media is built on mobile and web-based technologies it forms highly interactive platforms through which individuals and communities share, co-create, discuss, and modify user-generated content. They introduce substantial and pervasive changes to communication between organizations, communities, and individuals.<sup>34</sup>

There are a lot of very different forms of social media: blogs, microblogs (for example Twitter), social news networking sites, collaborative projects (for example Wikipedia),

34 AHLQVIST, Toni; BÄCK, A., HALONEN, M., HEINONEN, S 2008

content sharing communities (for example YouTube), social networking sites (for example Facebook, LinkedIn). In this chapter we will not talk about the nature of social media generally, only from the side of disasters and emergency management. Those who are interested in social media, they will recognize a new face of this phenomenon; while those who are interested in emergency management they might learn about new solutions in social media and Web 2.0 tools during handling disasters.

## 8.2 Social media in Information Society

It can be a never-ending story to cite actual ICT tool penetration data from around the world. There are a lot of sources, methodologies, and the recent numbers change rapidly. Below we will take a very short tour about recent trends in the world of social media, and conclude three important conclusions from that.

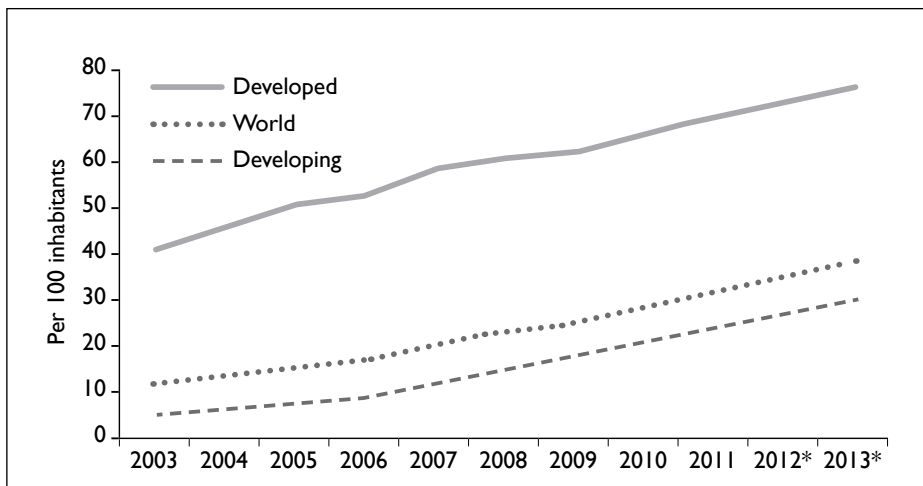


Figure 8.1.: Internet users worldwide<sup>35</sup>

In 2013, over 2.7 billion people were using the Internet, which corresponds to 39% of the world's population. In the developing world, 31% of the population is online, compared with 77% in the developed world. Europe is the region with the highest Internet penetration rate in the world (75%), followed by the Americas (61%). In Africa, 16% of people are using the Internet – only half the penetration rate of Asia and the Pacific.<sup>36</sup>

<sup>35</sup> Source: ITU World Telecommunication /ICT Indicators database

<sup>36</sup> Source: ITU Facts and figures 2013 <http://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFactsFigures2013-e.pdf>

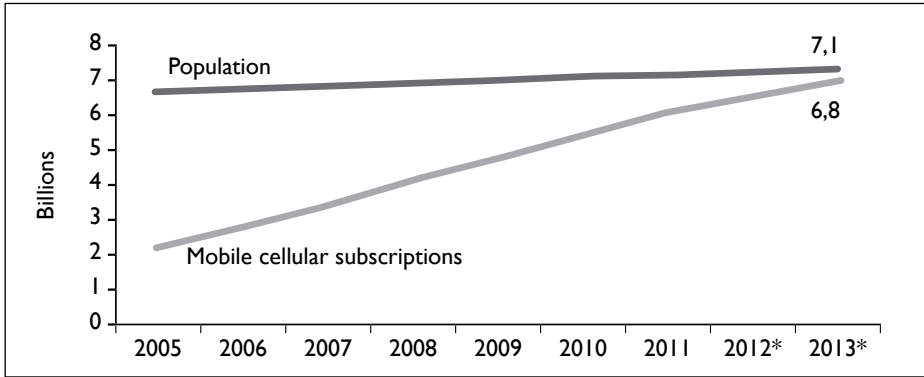


Figure 8.2.: Mobile cellular subscriptions around the world<sup>37</sup>

Figure 8.2. shows very simple, but very likely the most essential achievement of the global society: basically that the mobile cellular technology will reach every people in the world. There are almost as many mobile-cellular subscriptions as people in the world.

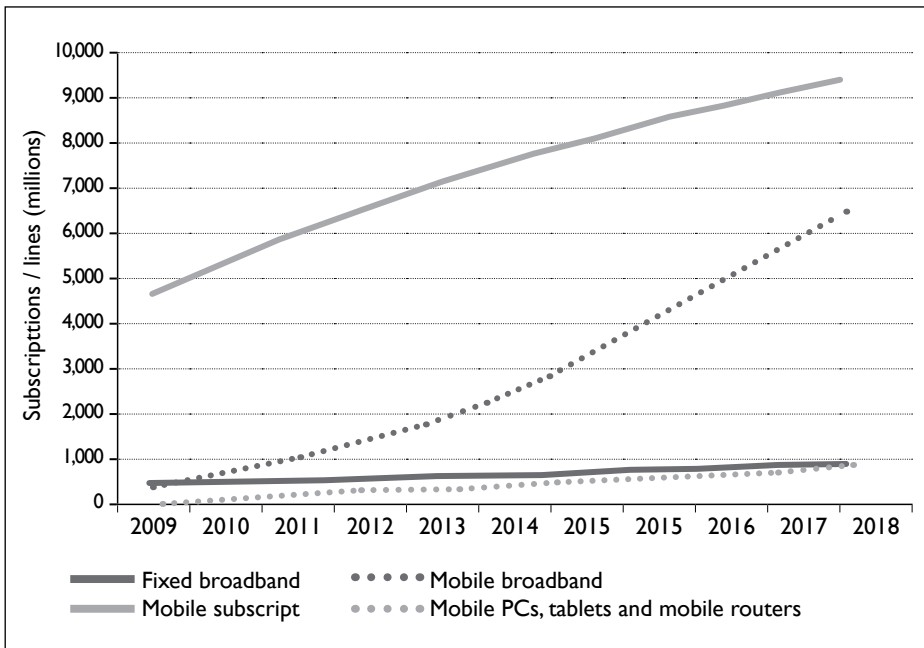


Figure 8.3.: The mobile broadband bridges the fix and mobile internet gap<sup>38</sup>

37 Source: ITU World Telecommunication /ICT Indicators database

38 Source: Ericsson Mobility Report, June 2013.

In January, 2014:

Facebook

- Total number of monthly active Facebook users: 1,310,000,000
- Total number of mobile Facebook users: 680,000,000
- Increase in Facebook users from 2012 to 2013: 22 %

Twitter

- Total number of active registered Twitter users: 645,750,000
- Average number of tweets per day: 58 million
- Number of new Twitter users signing up everyday: 135,000

Google+

- 400 million active users
- 925,000 new users every day<sup>39</sup>

So the three important conclusions about the global information society, which we consider, of utmost importance are the following:

- The real revolution is not in the personal computers any more but rather in the personal devices (especially mobile phone): there is a vital and ultimate demand in every people to own a personal intelligent device
- With these devices everybody reaches a new level of interactivity and new forms of information collection and sharing
- Social media, being (online) in (at least) several virtual communities is an inevitable trend, the future of communication with mass of people will move into this direction.

### 8.3 Working solutions - experiences and directions

In Haiti, 2010, during the earthquake, US government agencies employed social media technologies such as wikis and collaborative workspaces as the main knowledge sharing mechanisms. Dave Yates and Scott Paquette describe this pioneering action in great detail in their article.<sup>40</sup> The authors were in the field during the actions, and in this article they describe how social media were initially introduced in the response. In Haiti the main goal of social media was knowledge management and during this process they applied crisis-specific and non-crisis specific ICT tools as well. Naturally, the e-mail and file system servers had crucial importance but they were non-specific, solutions. Specific solutions were the server-based disaster management software Sahana Disaster Management System.<sup>41</sup> The core module of the system was a SharePoint server and

39 <http://www.statisticbrain.com/facebook-statistics/>, <https://leveragenewagemedia.com/blog/social-media-infographic/>

40 YATES, D., & PAQUETTE, S. (2011). Emergency knowledge management and social media technologies: A case study of the 2010 Haitian earthquake. *International Journal Of Information Management*, 31(1), 6-13. doi:10.1016/j.ijinfomgt.2010.10.001

41 free and open source, <http://www.sahanafoundation.org>

several wiki pages. The whole system was developed in the field, “on the fly”, and the participants gathered experience right there. Social media tools during the Hawaiian earthquake knowledge management proved themselves very good. We might consider this as the breakthrough application of social media (Web 2.0) in the field, which then was followed by significant upgrades in policies and experiences.

### **Individual stories - or how social media saved my life?**

We believe real stories are the best proof how effectively social media can be used in cases of accidents or emergency. As smart phones become more and more important part of our communication, these stories will become more and more frequent.

In March 2009, 29-year-olds Rob Williams and Jason Tavarria went on a ski trip in the Swiss Alps and became separated from their group during a snowstorm. A member of their team used Twitter to get phone numbers for the missing snowboarders. Tavarria was contacted on his mobile phone and used his Google Maps application to send rescuers the longitude and latitude of his location.<sup>42</sup>

While competing in a July 2010 mini-triathlon, 36-year-old Leigh Fazzino was separated from the pack when her front bike wheel hit tree roots and she flew over the handlebars. Lost, injured and unable to walk, she tried calling for help on her phone but didn't have a strong enough signal to dial out. The athlete then tweeted: “I've had a serious injury and NEED Help! Can someone please call Winding Trails in Farmington, CT tell them I'm stuck bike crash in woods.” According to rescuers, at least six people called them, and within minutes ambulances were dispatched to help her.<sup>43</sup>

In January 2010, when a massive earthquake hit Haiti, Colorado Springs native Dan Woolley was trapped under the rubble of the Hotel Montana in Port-au-Prince. After losing his glasses in the quake, he used the focusing light from his iPhone's camera to find a safe place to relocate to. Then, he used an iPhone application to diagnose and treat his injuries. Finally, he used the phone's alarm clock to keep him awake in case he was going into shock. He was eventually rescued, after spending 65 hours in the hotel's elevator shaft.<sup>44</sup>

Good example for the unprompted mass use of Facebook during crisis time was the snowstorm in Hungary, 15-16 March 2013. Not surprisingly, but underestimated a very big snowstorm arrived in the mid of March. A lot of people lodged in highways, in their car, the main roads were impassable. The Facebook activity was growing very rapidly, thousands of volunteers helped the people, who were in trouble with food, hot drink, place for sleeping and resting and so on. Beside the straight help, the Facebook was for hours the main channel for information gathering for citizens in the region.

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42 Mountain rescue in Alps played out on Twitter <http://www.theguardian.com/technology/2009/mar/04/twitter-death-entrepreneur-rob-william>

43 „NEED Help!”: Biker's Twitter followers call for ambulance [http://usatoday30.usatoday.com/news/health/2010-08-03-twitterrescue03\\_st\\_N.htm](http://usatoday30.usatoday.com/news/health/2010-08-03-twitterrescue03_st_N.htm)

44 He wrote a full book about his experiences: Unshaken <http://www.amazon.com/Unshaken-Rising-Ruins-Haitis-Montana/dp/B0057D9V1Y>

## **8.4 The Ushahidi platform - professional solution for crowdsourcing crisis information near real-time**

“Ushahidi”<sup>45</sup>, which means “testimony” in Swahili, was a website that was initially developed to map reports of violence in Kenya after the post-election fallout at the beginning of 2008. Since then, the name “Ushahidi” has become the representation forum of the people behind the “Ushahidi Platform”. The original website was used to map incidents of violence and peace efforts throughout the country based on reports submitted via the web and mobile phone.

The core platform is built on the premise that gathering crisis information from the general public provides new insights into events happening in near real-time. It is also expected to help organizations marshal efforts to assist areas that are not well covered in the mainstream media. The Ushahidi platform is a collaborative project created by volunteers and managed by a core team. Most of the development team comes from different countries in Africa, including Kenya, Ghana, South Africa and Malawi, but there are also contributors in US and Europe. The core team is made up of Ory Okolloh, Erik Hersman, David Kobia and Juliana Rotich who originally started Ushahidi in Kenya in their free time, and have since moved to work on the platform full-time.

The project team during past four year developed different solutions, which can seamlessly work together:

- Ushahidi platform: a tool to easily crowd source information using multiple channels, including SMS, email, Twitter and the web. The hosted version is the Crowdmap.
- Crowdmap: is for anyone wanting to tell a story with a map – not only through location but sharing photos, videos, and stories tied to a specific locations or entire regions.
- BRCK: a device that brings the web to everywhere from remote and rugged locations
- Ping: simple, but very important service: you can check your family members or people important for you, if they are OK. For smartphone users there are a lot of ways to do it, but this development is general, based on SMS technology (personal SMS check-in app)
- SwiftRiver: enables the filtering and verification of real-time data from channels like Twitter, SMS, Email and RSS feeds. Practically search for given keywords and manage social media campaigns (e.g. Twitter, SMS, email) from one dashboard. With using semantic analysis the tool auto-categorizes and classifies email, twitter, text messages or news articles based on keywords.
- SMSSync: is an SMS to HTTP sync utility that turns any Android phone into a local SMS gateway by sending incoming messages (SMS) to a configured URL (web service).

<sup>45</sup> <http://ushahidi.com/>

All these applications are developed using open source code, which both technically and philosophically enables and emphasizes the inclusiveness of the platform.

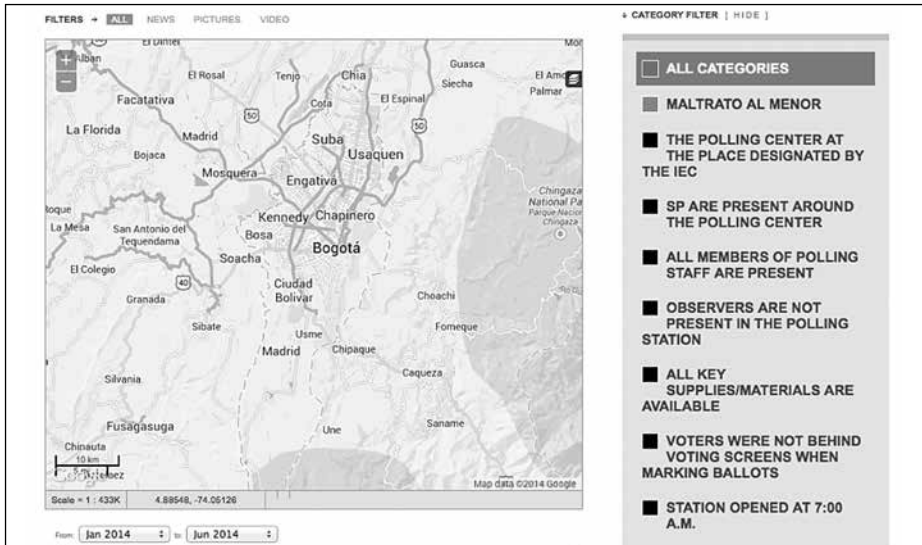


Figure 8.4.: Ushahidi in work – screenshot from demo site<sup>46</sup>

Connecting the real geo-location with virtual communities is a natural idea in the social media world. Nowadays at the preparation of this manuscript, there are a lot of signs indicating that this is the future: Facebook, and Google the two giants both try to connect geographical reality with virtual reality. There are several working solutions for this; for example, Nextdoor attempts to be a private network of neighbourhoods, creating an ideal base of emergency social media.<sup>47</sup>

## 8.5 Nextdoor - private neighbourhood social network

Nextdoor is a free private social network (only in USA), started in 2011. The individual sites are password-protected and can be accessed only by residents, who must verify their locations and sign in with their real names. Among other verification methods, Nextdoor checks addresses through a credit-card billing number or home-phone number. Nextdoor allows users to see which nearby residents are registered on the site, and to send postcards advertising the site to non-registered neighbours. The presence

<sup>46</sup> <http://demo.ushahidi.com>

<sup>47</sup> <https://nextdoor.com>



of real names helps maintain civil behaviour among users. Nextdoor's business plan is based on selling advertising to local businesses.

From 2014 Nextdoor application is available both on iOS and Android platforms. The service is being used in 17.881 neighbourhoods around the United States in 2013, but this number is growing continuously. Five of the top city governments have also chosen to use the service to communicate with their constituents: New York, Houston, Dallas, San Diego, and San Jose.

In 2012, the local municipality of San Jose started to use Nextdoor to distribute local information, for example information on things like utility shutdowns, volunteering opportunities, emergency preparedness etc.. Nowadays, Nextdoor has formally partnered with 150 different cities nationwide, including major police departments in places like Dallas, San Jose, and Cincinnati. The so called "Nextdoor City Program" allows various government entities including cities, counties, police departments, and fire departments to launch Nextdoor neighbourhoods across their municipality. The Nextdoor City Program requires no technical integration and costs nothing to the city or its residents. Nextdoor works well with local police departments in cities from San Jose to Dallas to Charlotte.<sup>48</sup>

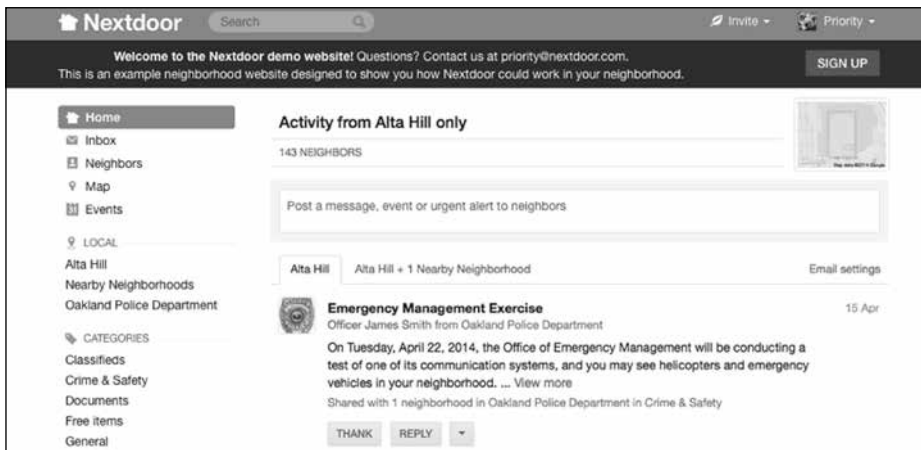


Figure 8.5.: Nextdoor in action – screenshot from demo site of Nextdoor<sup>49</sup>

<sup>48</sup> Private neighborhood social network Nextdoor makes the leap from iOS to Android <http://thenextweb.com/apps/2013/08/21/private-neighborhood-social-network-nextdoor-makes-the-leap-from-ios-to-android/>, Nextdoor.com Creates A Private Social Network for Your Neighborhood <http://www.parenting.com/blogs/children-and-technology-blog/jeana-lee-tahnk/nextdoorcom-creates-private-social-network-your-n>, "Nextdoor" social network aims to strengthen neighborhoods, safety <http://www.sltrib.com/sltrib/politics/57406736-90/com-neighborhood-neighborhoods-network.html.csp>, Nextdoor: First private social network for neighborhoods <http://www.cnet.com/news/nextdoor-first-private-social-network-for-neighborhoods/>, Nextdoor, the Private Social Network, Hooks Up With the City of San Jose <http://allthingsd.com/20120807/nextdoor-the-private-social-network-hooks-up-with-the-city-of-san-jose/>

<sup>49</sup> [http://demo.trynextdoor.com/news\\_feed/](http://demo.trynextdoor.com/news_feed/)

Interactive communication between governmental organizations and the people has become smooth this way, informative, timely, circumstantial and validated. In case of emergency, or during fight against criminality such information rich conversations become very important and useful.

Sahana Software Foundation develops free and open source software and provides services that help to solve concrete problems and brings efficiencies to disaster response coordination between governments, aid organizations, civil society and the survivors themselves. They have two products: Eden and Vesuvius. Eden is a flexible humanitarian platform with a rich feature set which can be rapidly customized, Vesuvius is focused on the disaster preparedness and response needs of the medical community, contributing to family reunification and assisting with hospital triage.

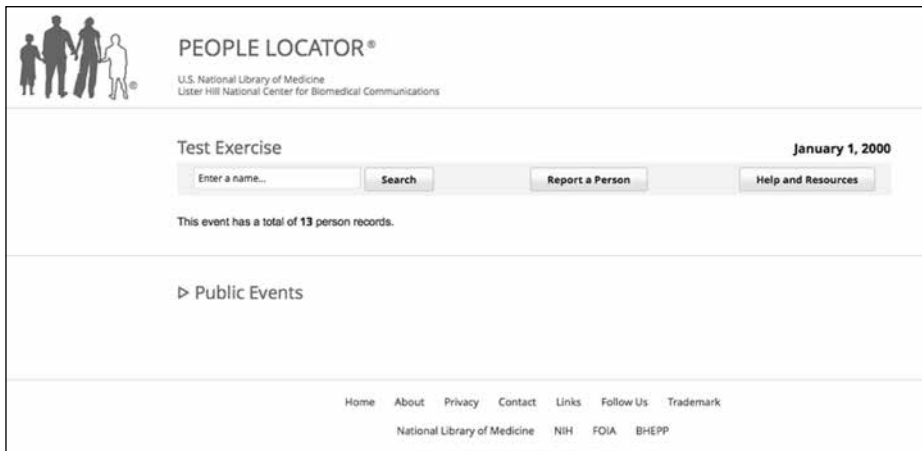


Figure 8.6.: Demo site of Vesuvius people locator<sup>50</sup>

## 8.6 Lifeline - innovative Twitter geo-local accounting

Lifeline is a feature presently only available for Japanese Twitter users, which started in 2012. This solution allows users in Japan to more easily locate Twitter accounts that deliver pertinent local information in the case of another disaster.

If somebody wants to find and follow essential local accounts in Japan, people simply search their postal code on twitter.com. Lifeline lets users find and follow local accounts that upload important information during emergencies. The postal code must be typed into the service, and Twitter will create a list of resources, which could be accounts that are maintained by city, district or prefecture governments, and

<sup>50</sup> <https://pl.nlm.nih.gov>, hosted by U.S. National Library of Medicine Lister Hill National Center for Biomedical Communications

which accounts will be updated in the event of natural disasters or emergencies. These accounts could also include local media and utility companies, which inform citizen/customers about electricity outages or other basic services.

For instance, if there's an earthquake in the Aobadai district of Yokohama, people can use Lifeline to find a variety of timely accounts — those tweeting about the earthquake and sharing updates from the district (Aobadai), city (Yokohama), and prefecture (Kanagawa) governments; they can also find accounts from local media and utility companies providing information about gas, water or electricity. Naturally, Japanese users can also set up notifications to receive Tweets from these accounts on their mobile devices.<sup>51</sup>

In March 2014 another Twitter and Ushahidi tool was used in crisis time, during search and rescue efforts following the massive mudslide in Washington State. FirstToSee uses the Ushahidi Platform, where responders use the technology to view large amounts of data from popular social media sites. Data is then compiled and placed into filterable and editable categories. A tabular view lists abbreviated data in expandable columns and gives the status and priority of each listing while a map view provides a real-time overview of locations and incident types. An integral part of FirstToSee is a mobile app, which allows users to communicate directly with first responders. During times of crisis, general public is often the first to witness an incident and mobile technology enables rapid reporting. The app allows users to send emergency reports and photos via smartphone or tablet. These reports are available near real time in the FirstToSee portal.<sup>52</sup>

## 8.7 Facebook - Disaster Message Board

The Disaster Message Board<sup>53</sup> is a solution for friends to let each other know if they are safe during an emergency. This feature is still under development and is currently only available in Japan, and only during a crisis.

In the case of emergency (for example a disaster in the home addresses area) there will be an announcement on personal Facebook homepage with a link to the disaster page. Here everybody can search for friends and can mark himself as being safe. There are various privacy levels of seeing the check-in and marking (for instance friends can see everything, groups only being safe, strangers can't see nothing etc.). The "safe" mark

51 A new lifeline in Japan <https://blog.twitter.com/2012/a-new-lifeline-in-japan>, Twitter Throws Japan a Lifeline <http://allthingsd.com/20120921/twitter-throws-japan-a-lifeline/>, Twitter's new Lifeline feature helps users in Japan access emergency information <http://www.digitaltrends.com/social-media/twitters-lifeline-feature-helps-japan-access-emergency-information>, Twitter's new Lifeline feature in Japan helps people find relevant accounts quickly during emergencies <http://thenextweb.com/twitter/2012/09/22/twitters-new-lifeline-feature-japan-helps-people-find-relevant-accounts-quickly-emergencies-disasters/>

52 Social Media Analysis Aids in Washington Mudslide Response <http://www.govtech.com/internet/Using-Social-Media-to-Aid-in-the-Oso-Mudslide-.html>

53 <https://www.facebook.com/help/disaster>

located on the top-right corner of a person’s safety status is indicated with different colours depending on who marked the person as safe. If a friend has marked this person safe, the “safe” mark will appear in light blue. If this particular person marked himself safe, the “safe” mark will appear in dark blue.

## 8.8 Challenges of the next generation emergency management - factors influencing the new emergency management

### 8.8.1 Expanding opportunities

The rapidly expanding opportunities of using ICT tools in emergency management can be seen easily through the Next Generation 9-1-1 project. Next Generation 9-1-1 (abbreviated NG9-1-1) refers to an initiative aimed at updating the 9-1-1 service infrastructure in the United States and Canada to improve public emergency communications services in a growingly wireless mobile society. In addition to calling 9-1-1 from a phone, it intends<sup>54</sup> to enable people to transmit texts, images, video and other data to the 9-1-1 centre.

The range of outcomes indicate that changing over to an NG9-1-1 deployment scenario could result in lifecycle cost savings of \$20.6 billion, in the best case, to a lifecycle cost increase of \$4.3 billion, in the worst.<sup>55</sup>

Current 9-1-1 capabilities	Next Generation 9-1-1 capabilities
Virtually all calls are voice callers via telephones over analog lines	Voice, text, or video information from many types of communication devices, sent over internet protocol (IP) networks
Data transferred via voice	Advanced data sharing is automatically performed
Callers manually routed through legacy selective routers, limited forwarding/backup ability	Physical location of PSAP becomes immaterial, callers routed automatically based on geographic location, enhanced backup abilities
Limited ability to handle overflow situations, leading to callers potentially receiving a busy signal	PSAPs able to control call congestion treatment, including dynamically rerouting callers

Table 8.1: Expanding opportunities in communication<sup>56</sup>

54 U.S. Department of Transportation Research and Innovative Technology Administration Next Generation 9-1-1 research overview <http://www.its.dot.gov/ng911/index.htm>

55 Final Analysis of Cost, Value, and Risk - Executive Summary [http://www.its.dot.gov/ng911/pdf/USDOT\\_NG911\\_4A2ES\\_FINAL\\_FinalCostValueRiskAnalysis\\_ExecSum.pdf](http://www.its.dot.gov/ng911/pdf/USDOT_NG911_4A2ES_FINAL_FinalCostValueRiskAnalysis_ExecSum.pdf)

56 The U.S. Department of Transportation Next Generation 9-1-1- Initiative. U.S. Department of Transportation, 2007. <http://www.its.dot.gov/ng911/docs/NG2007.ppt>

Beside the growing number of channels, and growing solutions of data transfer, the nature of change in crises management is not only quantity, but quality, as well.. For example there are two latest solutions worth mentioning:

- Deaf and hearing-impaired persons: hearing and speech impaired individuals will be able to place such a call by sending a text message from their cell phone.
- In the event of a major highway accident everyone in the vicinity with an internet-connected device can be automatically notified to avoid the area.

### 8.8.2 Who controls? – The starfish and spider problem

Ori Brafman and Rod A. Beckstrom introduced the starfish and spider approach.<sup>57</sup> The starfish and the spider are two paradigms of organizational structure. The spider model described centralized organizations as controlled by hierarchal management with an ultimate head of the organization. The starfish model described decentralized organizations that were structured around models of mutual independence. The spider and starfish analogy refers to the contrasting biological nature of the respective organisms, starfish having a decentralized neural structure permitting regeneration. In the book the authors describe ten rules, five legs and the major principles of decentralization.

The major principles of decentralization are important in understanding the nature of using social media:

- When attacked, a decentralized organization tends to become even more open and decentralized.
- It's easy to mistake starfish for spiders.
- An open system doesn't have central intelligence; the intelligence is spread throughout the system.
- Open systems can easily mutate.
- The decentralized organization sneaks up on you.
- As industries become decentralized, overall profits decrease.
- Put people into an open system and they'll automatically want to contribute.
- When attacked,<sup>58</sup> centralized organizations tend to become even more centralized.

Centralized organizations tend to become even more centralized when challenged by systems or circumstances that are not initially controllable within standard hierarchal systems. In these circumstances using social media during emergency situations can become bigger problem, than possible solution (for example during policy execution, resource allocations, personnel availabilities etc.).<sup>59</sup>

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57 Ori BRAFMAN - Rod A. BECKSTROM (2006) *The Starfish and the Spider: The Unstoppable Power of Leaderless Organizations* ISBN 1591841836

58 Ori BRAFMAN - Rod A. BECKSTROM (2006) *The Starfish and the Spider: The Unstoppable Power of Leaderless Organizations* ISBN 1591841836 pages 21, 36, 39, 40, 41, 45, 74, 139

59 Adam S. CROWE (2012) *Disasters 2.0 : the application of social media systems for modern emergency management* Taylor & Francis ISBN 9781439874424

Naturally, the social media works in starfish-model. To use it efficiently and effectively governmental organizations must change their thinking to starfish model – at least in the topic of collecting and sharing information via social media.

### 8.8.3 When does the social media work well during crisis?

Due to the fact that the use of social media in emergency situations is a new phenomenon, there are only few valid data about the behavioural characteristics. Yong Lu and Dan Yang<sup>60</sup> made a good primer data collection in this topic. The context of the data collected for this study were the web forum activities in the immediate aftermath of a massive earthquake that struck Wenchuan, Sichuan province of China on May 12, 2008.

Structural capital reflects the overall pattern of interactions among individuals, and it is characterized by the centrality, connectivity, and hierarchy of relationships among individuals.. Relational capital involves social actors trusting other actors within the group and willing to reciprocate favours or other social resources in the community. Trust is a set of specific beliefs related to benevolence, integrity, and reliability with respect to another party. Social capital is defined as resources embedded in a social structure that are accessed and/or mobilized in purposive action. The essence of social capital is quality social relations, which affects the capacity of people to come together to collectively resolve problems they face in common and achieve outcomes of mutual benefit.<sup>61</sup>

During the research they examined each of the three dimensions of social capital that influences the quality and quantity of information exchange.

Results suggest that structural capital has a significant effect on cognitive capital, but it has no effect on relational capital. Cognitive capital shows a significant effect on relational capital. This research also finds that structural capital increases information quantity, whereas relational capital and cognitive capital increase information quality.

Important result is that while structural capital has a significant and positive influence on information quantity, it has almost no influence on information quality. Information quantity has no impact on information quality. The result indicates that an individual who, while sending out many messages in a VC, does not necessarily provide high quality of information. Relational capital and cognitive capital have significant and positive impacts on information quality, but have no significant impacts on information quantity.

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60 LU, Y., & YANG, D. (2011). Information exchange in virtual communities under extreme disaster conditions. *Decision Support Systems*, 50(2), 529-538. doi:10.1016/j.dss.2010.11.011

61 N. LIN, *Social Capital: A Theory of Social Structure and Action*, Cambridge University Press, Cambridge, 2001.

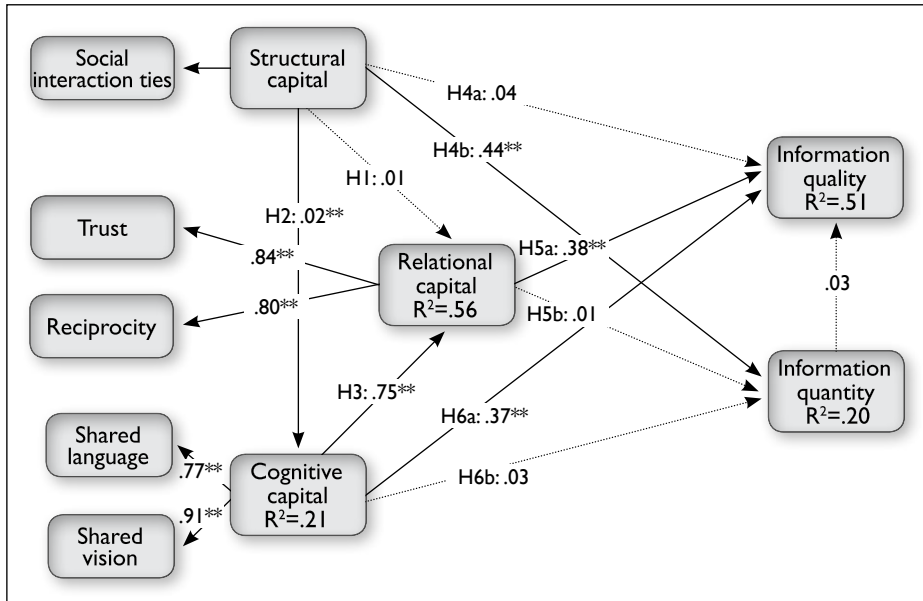


Figure 8.7: Results of research model (solid lines indicate significant paths, dashed lines indicate non-significant paths)<sup>62</sup>

As the result of this research we can highlight two very important factors. Although the social media can improve easily the information flow, we must calculate with two troubles: the information overload and the misinformation. The symptom of information overload shows up when there is too much information available, and people cannot assimilate it all or feels too overwhelmed. The information overload weakens the chance to send valid information for a targeted people. Secondly, during crisis time people share information without knowing the validity of the content and the risk of misinformation. They have no time to control or check information, and they want to help, or ask for help. It is natural – but it is a venture.

These are difficulties, but they can be handled. During the development of crisis management the control of information overload must be built in the system design. And – with automatic text analysis processes – must grow, and keep high the percentage of valid information in system (challenge: to develop the information literacy of artificial intelligence).

#### 8.8.4 Information gathering via social media

There are a lot of ways to gather information via social media without communicating directly with people. These systems are capable of gathering information related to

62 Lu, Y., & Yang, D. (2011). Information exchange in virtual communities under extreme disaster conditions. *Decision Support Systems*, 50(2), 529-538. doi:10.1016/j.dss.2010.11.011 p. 534

a topic, category, event, name, or other incident-related information at any given moment. Effective monitoring of social media may help address public issues that can more quickly be resolved than traditional monitoring.

The Twitter-specific sites which perform real-time instantaneous monitoring include Monitter (web-based Twitter monitoring tool that allows users to insert keywords or phrases and a geographic search parameter, <http://monitter.com>), Topsy (<http://topsy.com>), Trendsmap (Trendsmap looks for popular hashtags and presents them on a map, <http://trendsmap.com>), BackTweets (search for links on Twitter, <http://backtweets.com>), Twubs (discover conversations <http://twubs.com>), and Twitter's Advanced Search (built-in search, allows for searching by words, people, places, dates, attitude, etc, each of these search parameters has multiple entry capabilities).

A Facebook specific information collector site is: Social Mention (real-time search engine, what search in blogs, microblogs, bookmarks, images, videos and questions). There were a lot of another solutions (Kurrently, Open Facebook Search, Openbook) but they closed down due to legal reasons.

## 8.9 Conclusions

With the spread of ICT tools more and more people have turned to the world of social media to get vital information fast. With easy searches and instant updates, the social media become popular and used during times of crisis.

Not surprisingly, the main role of social media during disasters is the communication. Communication from official organizations to local, concerned people not only during disaster, but more pre- and after it. With the help of social media there can be made very useful, targeted, valid information for who are interested in. The communication works from people to official organizations, too. Asking for information, asking for help, to make as visible for rescuing teams is very easily nowadays, if the channels are open. Last, but not least, naturally the communication works between every individual, family members, neighbours, and friends. To know information about who is important for us, to keep in touch, and maybe to help him or her – these are vital needs of every human.

Main insistent topics:

- Changing model of controlling - from a very top-down to a more interactive, open networked, starfish model. Emergency management has long been firmly rooted in a traditional top-down model. But with the growing role of social media this model must be changed.
- Responsibility for the information - using responsible the social media is a hard task during peaceful times, too, but in the time of crisis is too easy to mistake. But emergency managers must be aware of: using information posted by more sources, don't violate privacy, don't use trademarked or copyrighted materials, do not divulge incident-critical (aka classified) information etc. On the other side, citizens may or may not completely understand the impacts of their choices when it comes to the use of social media during emergencies.



- To filter the information overload, to gather the most precious information from it, and to share it instantly - this challenge must be solved with semantic, automatized software and hardware tool, it can't be done only with human workforce - or it isn't worthing so much human workforce on the field.
- There is currently no industry norm for the consideration and adaptation of social media.
- Knowledge management systems that will be useful in a disaster response must be flexible enough to handle unexpected situations yet robust enough to be reliable in degraded or complex environments.

The emergency management with the help of social media is a very young knowledge. First observations of social media being used during a disaster were during the 2004 East Asia tsunami, while the first use of social media by emergency managers was the Los Angeles Fire Department's (LAFD) use of Twitter in 2006 in response to Hurricane Katrina. With the very speedily penetration of smartphones and mobile Internet nowadays we can see an opening of a very new way: geo-located, real-time, automatized data sharing and collecting with a lot of various members (officials, individuals, volunteers etc.). We've seen some very promising project in this chapter. I am sure, that in the next ten years the emergency information management will based predominantly on social media and mobile ICT tools.

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# Chapter 9

## Social Media Innovation in Political Communication: Alternative or Mainstream?<sup>63</sup>

### 9.1 Introduction

To date, a majority of research around social networking is based on youth and how young people interact with new technologies. There is a strong sub-text of ‘marketing’ and business-oriented approaches that include research around ‘choice’ and how people develop choices around their interactions with social media. This is mostly superficial ‘cause-effect’ research and while it is used regularly for marketing purposes by companies around the world, social scientists are becoming increasingly wary of the numbers produced by these sorts of surveys and data-mining tools. The research for the most part is based on what ‘consumers’ of technology seek to use to further facilitate the convenience and/or ease of their lives. Here we are measuring something entirely new in terms of examining how this technology changes (or not) political communication. This sort of political engagement, the communicative aspect in particular (neither the activist nor the policy aspect), in which representatives engage in delivering and receiving messages from constituents (multipoint-to-multipoint communication). We examine the literature of ‘old’ media in order to see changes of the new media landscape in the next two sections of the chapter. We understand new media as a tool for social engagement of the electorate in political communication, therefore the terms ‘social media’ and ‘new media’ are considered to be synonyms. Following the literature review we introduce findings from our empirical research of Australian and Hungarian members of the parliaments’ (MPs’) use of Facebook social networking site. In the final part of the chapter we argue that the social media is still an alternative media for the world of politics.

### 9.2 Manipulated ‘Old’ Media

Politicians’ role in the environment of old media is a well-known phenomenon. (1) They lead stories in political, sometimes the tabloid news. (2) They are in constant competition with newsmakers to have the best place in news feeds. (3) Also, they are

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in protracted conflict with other politicians to make dominant their point of view in news feeds. And finally, (4) politicians are continuously trying to set their own agendas. The first three elements aid politicians to construct the news for the audience, while the fourth aims to help in perceiving the information. In this sense the media is not only the channel, their formats could provide the grammar, syntax and stylistic considerations for media competence and for the public [3] [4]. Meanwhile, the media system has its own effect on political actors. The politics are more spectacular and more personalized than it was nearly 50 years ago. ‘Horse-race politics’ or ‘video-clip politics’ [1] [6] are the main organizing element of the news about the political scene. The arguments are shorter and more compact, the visual components come to the forefront, while sound bites are essential, and they determine the political happenings for the public. As such political actors appear to have ‘cracked the code’ of media. Using this knowledge of media logic, politicians are able to place their news and comments on the most effective part of the media industry. This phenomenon has the result of making political actors look like ‘media jugglers’ who can manipulate journalists and editors and even appear to be ‘tricking’ news media whenever they want.

The political communication techniques are quite similar on old and new media, the logic behind politicians’ use of new media is quite different. According to Manovich, two cultural expressions can be distinct in comparing old and new media: the narrative and the database [23]. The narrative is chronological. It must have a well-defined context and audience. If the politician does the homework, clearly defines the context and the audience, then s/he will be able to successfully persuade or manipulate its voters. In the new media, the database is hierarchical, and politicians need to have a totally different approach from the old media. “The database organizes and presents data according to a preset value structure and algorithm” [22]. These features generate different landscape than it was in old media and the representatives need to define themselves in this new scene.

### **9.3 New Media Landscape**

New media has changed a previously well-known landscape. The new communication technologies affect the relationship between the actors of political communication. While in the past there was a hierarchy between the different actors, where the political system, media system, citizens/voters order could be set up, today’s political system opening towards the citizens and the new networking techniques of civilians has brought the two actors to almost the same level as that of the media.

The starting point for this section is that political communication can be connected with the emergence of mass democracy and mass communication, and here we further assert that new communication technologies lead to the democratization of the practice of political communication [19] [26]. These changes have taken place without any revolutionary change in the hallmarks of societies that forced the political system to give up its original role. Under ideal conditions, if we assume high and predictable economic and cultural development, for the change of political communication it is not

necessary to change the socio-political arrangements, it is enough if the technologies are changing, which are specifically affecting the daily lives of people [11]. It should be noted that the previous claim is only theoretical, and it is true only under ideal conditions. The practice is somewhat inconsistent with the theory, often accompanied by changes in socio-political factors, as well.

Where can we find these changes? Five general trends could be found, which express the change of political communication actors: decentralization (reminding us that the commonly expressed “there is no political campaign without media campaign” thesis seems to be disproved), openness (the statement that communication is created by the political system, where the media mediates between a political institution, the state and the citizens, is plainly incorrect), mobilization (plays an important role in efficiency), pro-am’s (the appearance of civilians who are able to generate professional results themselves and they do not need the help of former professionals), multipoint communication (a small group of citizens/voters also can communicate to a large publicity in such forms of communications) [24]. Altogether, these trends create a database-like network, where the communication and the interconnection work much faster as it worked in the environment of old media. Multiple channels, feedback and conversation are in the middle of this network, where the parties and politicians do not differ from movie stars, musicians or internet celebrities.

The new technology has a greater impact on stakeholders, different than the media. The mediums are converging with each other, which leads to a horizontal media. This means that news and events appear in the horizontal media, like newspapers, TV channels and recently mobile phones and all of this is enabled by the internet. In the horizontal media citizens can remix or mash-up the various pieces of information. With this view, we have arrived at the qualitative difference of today’s media [9]. The remixed or mashed-up version of the news might be different from what it was originally supposed to mean. Experts of political communication have to be aware of the reality of ‘remix’ or ‘mash-up culture’, and they have to adapt to the new challenges they generate. This does not mean the total disappearance of the pre-set agendas, but rather it means that the media system moves closer to citizens. There is no longer a sharp border between the two entities. Citizens are merging with the media system, having taken their first steps to take charge of it. This process, together with information remixes and mash-ups, lead us to a situation where a monopoly on agenda-setting ceases to exist and is replaced by ‘agenda melding’. This ‘agenda melding’ means groups of citizens who organize themselves around certain types of agendas, which may represent ways of seeing things, ways of doing things, or other unique ways of relating to the world. Basically, all groups have agendas of issues, some formal, some more loosely structured [27].

The changes in the communication technologies can also affect the media, but the changes do not have the same direction as in the case of the political actor or the civilians. The role of the media is still important, it still supplies various groups with information, but it does not have the well known genres that we were previously accustomed to.

Citizens expect political parties to have their own web appearance, where different pieces of information are available about the party and its candidates. One of the most important expectations is probably that the programme of the party is freely available

on the website. Yet, it has to be emphasized, that this is only an expectation, and it does not mean that the voters are reading these party programmes. Nowadays, the situation is similar in case of their presence outside the official online channels. People find those parties or candidates more sympathetic, who are representing themselves on social networking sites [7]. In the two countries of Austria and Hungary which we will examine in detail, these sites are Facebook, Twitter and YouTube, yet at the same time, compared to the overall internet penetration, only a small number of users follow the political news. Nevertheless, we can safely say that the political system is gradually being moved to the internet. One can explore a number of different reasons behind politics' partial move to the internet, but one of the most important reasons is that the citizens simply expect them to be there. At the same time, we must not forget that new technologies enable politicians to take up the quick and flexible refilling of news 24 hours a day. With the appearance of the information and communication technologies, political communication has also gone through certain changes. "ICTs make enormous quantities of information available to the public. This change in quantity may result in a change in quality" [30]. This means that large volumes of data have to be under control of parties or politicians to know how to reach out for their voters.

In this landscape, the citizens have a more important role in political communication through the application of new communication technologies. Nowadays, with the help of information networks, civilian networks are able to send immediate reactions to politicians and to economic entities, offices, celebrities, etc. This is also true in the other direction, which means that everybody and everything, from politics to economy and culture, can belong to a network and create interactions with other networks. In the case of the users of new ICTs we can talk about inactive–active networks [24].

With the help of information networks individuals can easily participate in the formation of politics as actively as the media. The way in which users use the networks, determines to which group they will belong to. Active participants (or networks) are internet citizens, also known as 'netizens', who are familiar with the working methods of the social networks within their fields of interest, and in some cases they are also able to manipulate them. Inactive participants (or networks) are, on the other hand, more familiar with the offline sphere, which they can influence better. In the case of inactive participants, social networks are extensions of their offline lives. Thus they use the new technology primarily as a tool which helps them reach their external goals. Besides using them as tools, active participants also have goals within the networks themselves. We have begun learning the forms of online activity only just recently, but it seems that the rules of political communication are changing. There is a greater emphasis on civilians in the new political communication and in the era of new communication technologies.

The role of civilians means political activity in today's political communication, where the activity is online or offline political participation, demonstrations and in the worst case riots (see connection between the social media and the Arab Spring or the latest happenings in Egypt also [21]). The value of these types of communications is that it fits everything, which brings them closer to their 'destination'.

## 9.4 Research: Australian and Hungarian representatives on the Facebook

This chapter is informed by a portion of research completed on sitting members of parliament (MPs) in a variety of countries. Here, we are selecting two countries as a point of comparison in order to develop our framework for examining the changing dynamics of social media and political communication. Our justification for a comparison of Australia and Hungary is threefold. First, the authors were living in the respective countries at the time of data collection, and our reasoning was that this was important to keep a 'check' on the day-to-day politics as we are quite close to analysing this on a regular basis. Second, we could then do a 'test case' of two dissimilar countries to see if the data diverged a great deal or if we were getting some anomalous results. With a distinct difference in historical development, paths to democracy, and in quite different regional contexts politically, Australia and Hungary provide an interesting point of comparison in terms of social media usage and here, we can test the assumptions of the difference between countries and examine our primary interest in question of the 'levelling effect' of social media technologies. The third justification for the point of comparison, related to the first two, but taking our assumptions further, is to examine structurally difference countries to see if we get radically different, or indeed radically similar, results. Unicameral and bicameral parliaments, constitutional monarchy vs a post-socialist republic, and several socio-political differences such as GDP wealth, and so on, means that the two countries are structurally different in a myriad of ways. As a result this study should give us a good indication of where future studies and future data will possibly take us.

The following part of the chapter presents Facebook usage of Australian and Hungarian politicians who were elected members of the parliaments' of the two countries in 2012/2013. During the research we were scanning the representatives' posts through three months. We purposely kept ourselves from campaign periods and elections because in these terms the politicians' communications usually intensify towards the voters. We examined ordinary weekdays. The examined period was from November 2012 to January 2013. This period contains legislature, intermission and holidays, too. In this period we were able to observe their post-writing frequency and country specifics.

We could not examine all the members of the two parliaments' because not every MP has Facebook page. This is the reason that politicians in our study were chosen by simple random sampling. We were looking for representatives who are active on Facebook. This criterion means that they post several times a week (at least two-three posts a week).

We took 10 percent of the members of the parliaments. From 226 we analyzed 23 representatives from the Australian Parliament (8 members from the Senate and 15 members from the House of Representatives) and from 386 we studied 39 politicians from the Hungarian National Assembly. The both sample consists prime ministers during the time of the research (Julia Gillard and Viktor Orbán), party leaders and representatives who are members of the government and politicians from the opposition, as well.

The generally known representatives – like party leaders – usually have Facebook profiles but we found some party leaders who have not, for example Antal Rogán who



is the leader of the biggest party faction in the Hungarian Parliament, Fidesz, has not got Facebook profile or official page during our research.

During the three months of scanning we examined 4070 posts. The following diagrams represent data in different states and months. From the diagrams the dark lines show that how many posts are published on one day and the lighter lines introduce how many representatives were active on that specific day.

First, we introduce the Australian results (figures 1–3): the 23 Australian representatives shared 1048 posts during the mentioned months. In November 2012 they published 400 posts, in December over the same year they shared 323 posts and finally, in January 2013 Australian politicians did 325 posts. This means that there are 11.4 posts a day. We can determine from our sample that the not all the representatives post every day. Preferably, they do a post or more posts every other or third day.

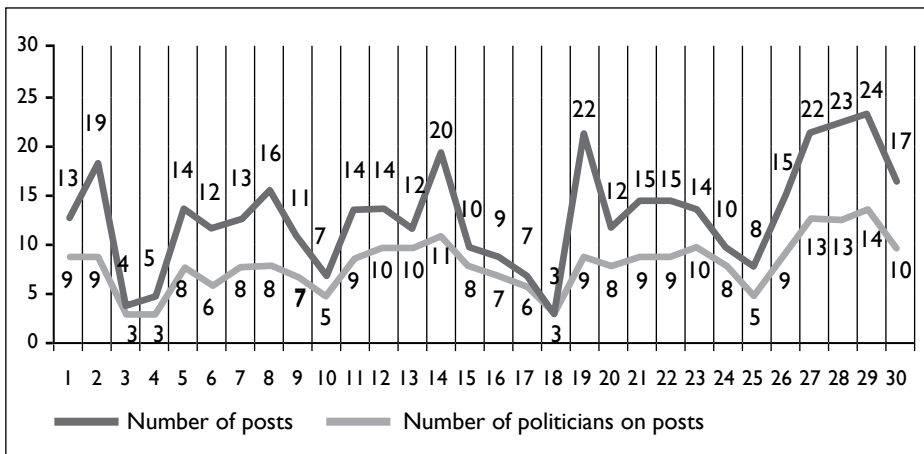


Figure 9. 1. Facebook posts of Australian MPs in November 2012

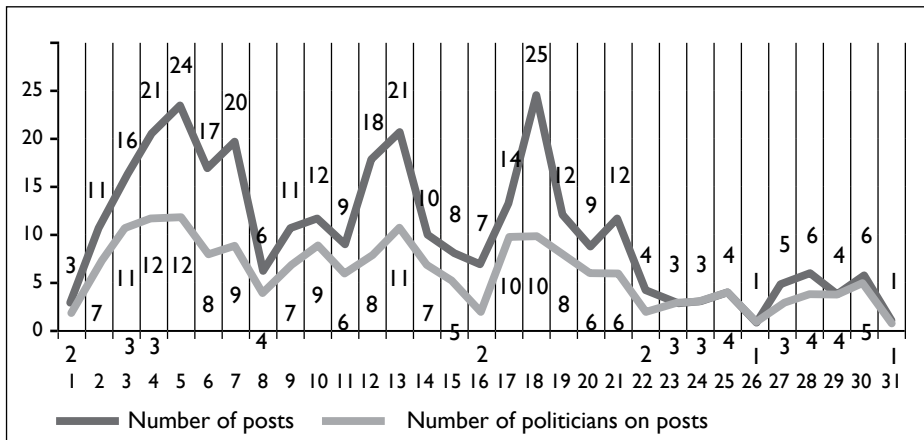


Figure 9. 2. Facebook posts of Australian MPs in December 2012

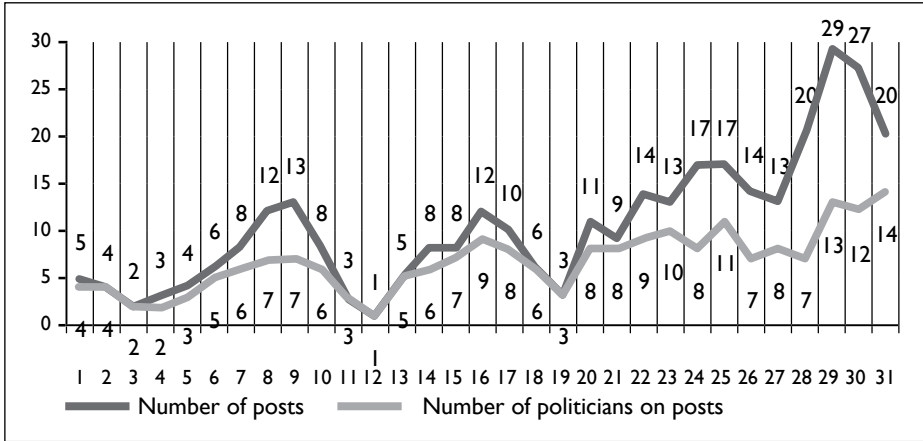


Figure 9. 3. Facebook posts of Australian MPs in January 2013

According to the Australian summaries the representatives were most active before the holidays, especially before Christmas. In this term they had got lots of official programs and this powerful activity slowed down on the beginning of the holiday. In this period (from the last ten days of December to the first weekend of January) politicians were less active during the holidays. Over this same period the posts were more personal.

After the Australian report we introduce the Hungarian results (figures 4–6): the Hungarian representatives did 3022 posts over the same period (from December 2012 to January 2013). This means that the average is 32.8 posts on one day. The difference may seem large but the two parliaments cannot be compared because they have different sizes.

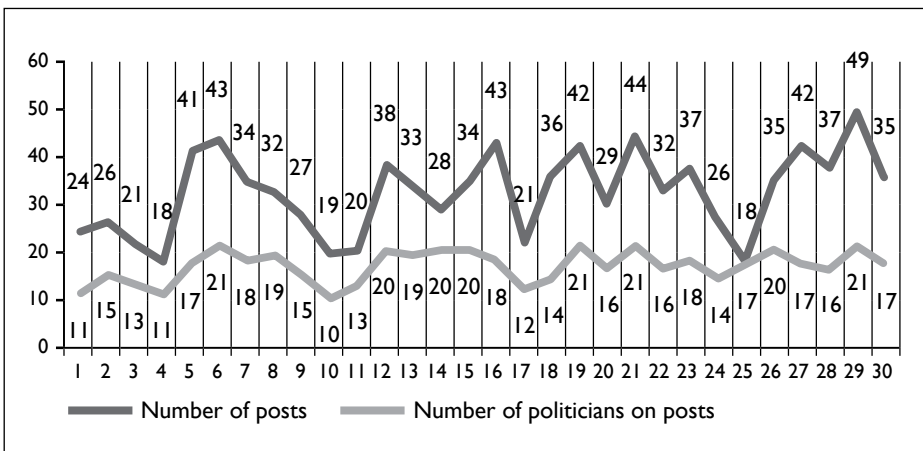


Figure 9. 4. Facebook posts of Hungarian MPs in November 2012

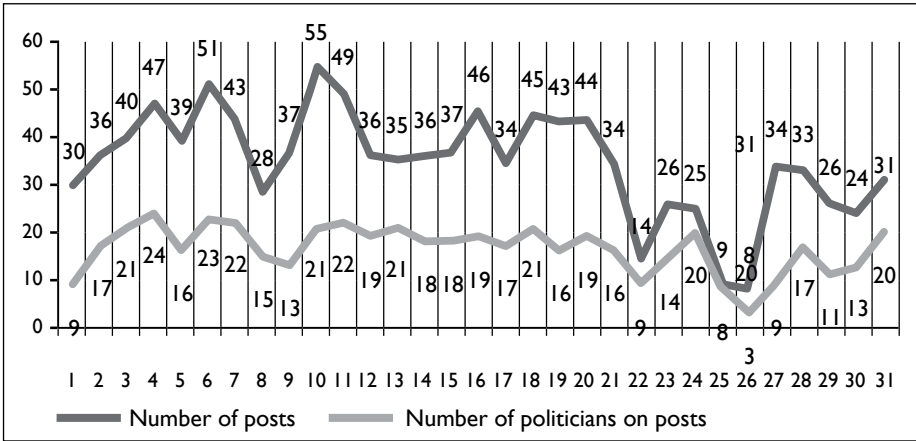


Figure 9. 5. Facebook posts of Hungarian MPs in December 2012

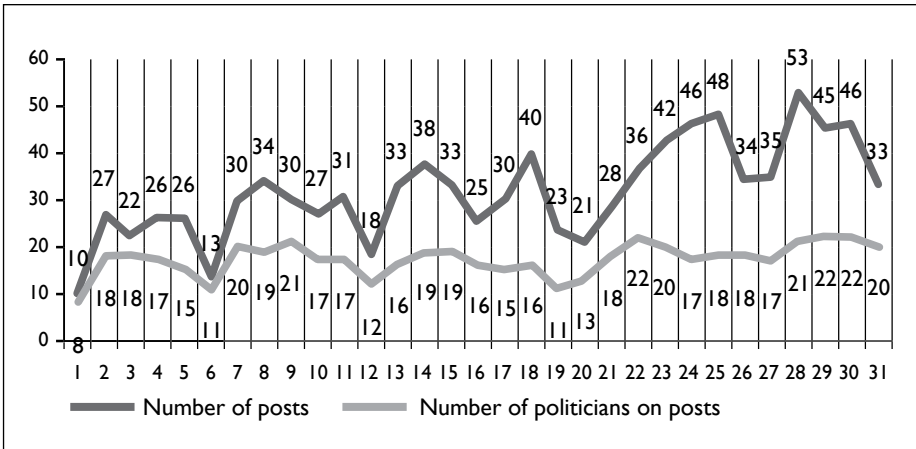


Figure 9. 6. Facebook posts of Hungarian MPs in January 2013

In the case of the Hungarian politicians we do not see the Australian phenomenon: in November 2012 the representatives shared 964 posts and after that they were more active. In December 2012 they published 1075 posts and in January 2013 they did 983 posts.

The autumn sitting session was until 15 December in the Hungarian Parliament, but it is not visible on the diagram, the number of the posts and the number of the politicians who posted remained high. The activity only reduced during the holiday session (25-26 December). The Hungarian representatives rested in the first weeks of January, too. In this period they were less active than before.

We examined the frequency of the posts and their nature, too. It means that we created categories and after collection of the data we ranked the posts. Our categories were: *private sphere* (shares on private life or family), *informational* (posts on events,

interviews, official releases, etc.), *subjective* (the representative's opinion on a topic), *offensive* (insulting or hurtful remarks), *link* (shared link without any remarks) and finally *photo* (photos and photo gallery without any remarks). With this method we were able to represent how politicians communicate towards their voters on the Facebook. The following two diagrams show that which categories are used by representatives.

The most Australian posts are informational, 63 percent. This result means that 23 politician shared 656 posts which connect their public life. The other five categories consist of the rest 37 percent: they posts 148 subjective messages, 85 photo posts, 64 private sphere notes, 47 links and 47 offensive comments. Figure 7 shows the percentages.

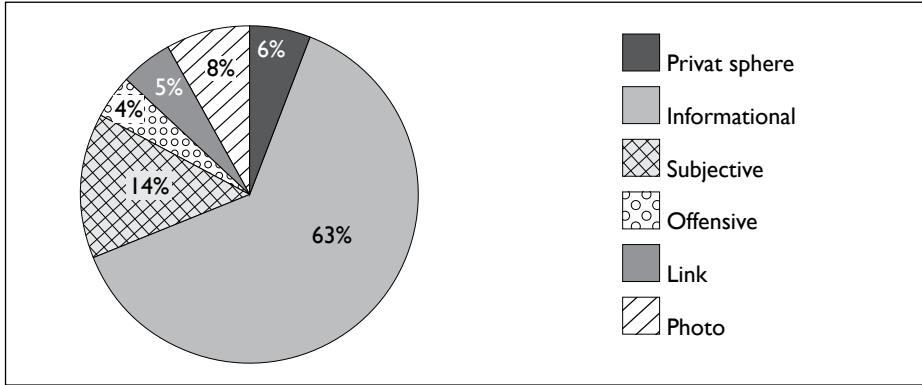


Figure 9. 7. Distribution of Australian MPs' posts categories

In the Hungarian case (figure 9. 8) we can see that the proportion of the public life posts are less than in Australia but this 41 percent covers 1242 informational posts. The second largest is the link category; the Hungarian politicians shared 912 links. Many of representatives use subjective and photo posts, we collected 356 subjective and 326 photo posts. The least categories are private sphere with 131 notes and finally, the offensive grade with 55 comments.

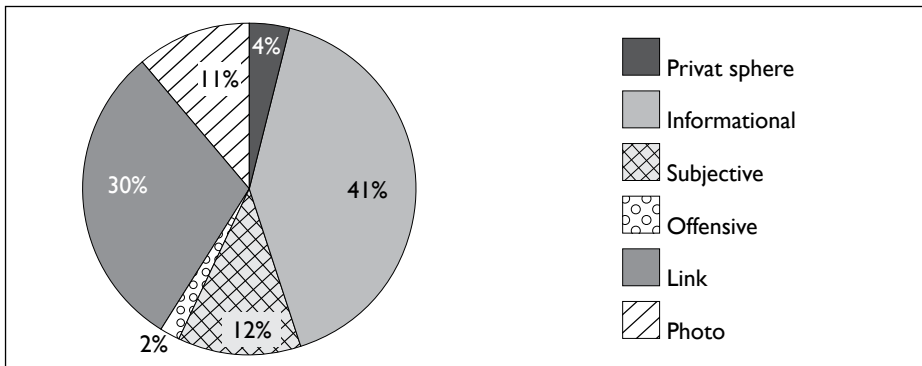


Figure 9. 8. Distribution of Hungarian MPs' posts categories

Finally, we introduce the Facebook usage of the prime ministers (figure 9). The following figure shows that how Julia Gillard and Viktor Orbán communicated towards their voters on the social network from November 2012 to January 2013.

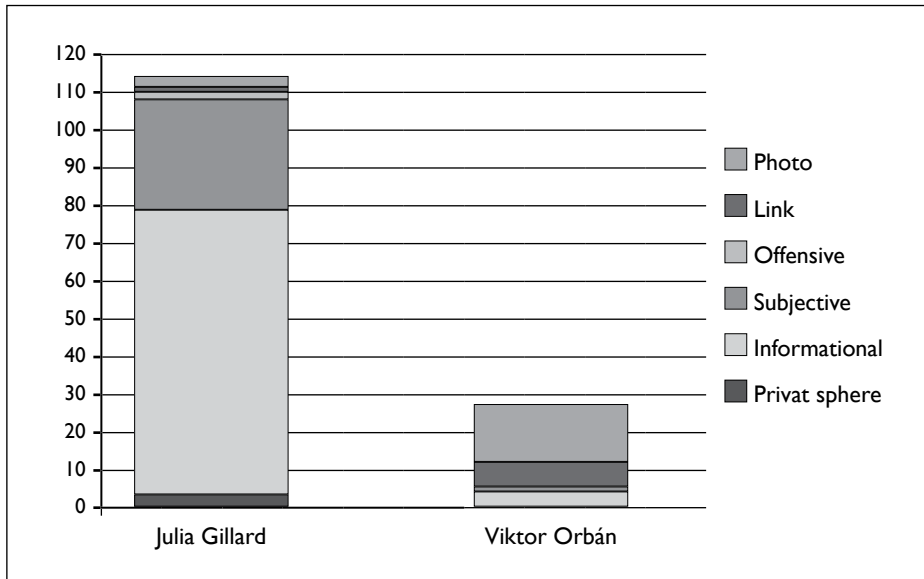


Figure 9. 9. Prime ministers Facebook usage

The Australian and the Hungarian prime minister communicate in very different ways on Facebook. We can read from the figure that the Australian prime minister had much more posts than the Hungarian prime minister during the examined period. Julia Gillard shared posts about her private life but Viktor Orbán never shares similar text notes (the posts on private life are usually shared as photos). The Australian representative usually posted informational messages. 66.6 percent of her all posts are informational. The other category which is often used by Julia Gillard is the subjective type posts. 25.4 percent of her all posts are very personal. She occasionally posts links or photos, however, Viktor Orbán often use links and photos. 25.9 percent of his all posts are links and 55.6 percent of his all messages are photos.

### 9.5 Possible expectations of Australian and Hungarian MPs regarding the new media

Many researchers are arguing that social media reconstructs political capital [2] [31]. This could mean that social networking sites could be the perfect tools for political capital. However, the public might see this in another way. Since the emergence of social networking sites the political capital has not reconstructed but has instead

crumbled further. As such it is imperative that we find other elements that are the main reasons and goals behind the politicians' use of social networking sites like Facebook.

Here we have developed a set of possibilities. First, as Blumler and Coleman stated: "The Internet has expanded the range of political sources. On the one hand, agenda setting is no longer a politician–journalist duopoly; on the other hand, the commentariat is no longer an exclusive club" [9]. The political elite have to figure out the way how to communicate its agenda to the public. Facebook is one of many platforms for this. Although this communication channel is more interactive than old media channels, it appears that members of the parliaments – at least most of them – are closing down the paths of bidirectional interactivity. In many cases this means quasi-intermediation between the world of information and the public, this can be seen from the heavy use of informational and link or photo sharing posts. Most of these entries do not expect comments or 'likes', and these are status updates that were written with the intention to focus attention. Using this opportunity, politicians are able to set the agenda. This also means that MPs have recognized the possibility of traditional agenda-setting on Facebook and probably on other social networking sites. Party websites are no longer the only tools to reach out to potential voters [16], social networking sites such as Facebook have even more important tools to reach voters and to influence the news feed. We can unequivocally state that Australian and the Hungarian MPs are using Facebook as a tool of persuasion in setting the agenda among the public.

Second, Foot and Schneider [14] distinguished four web campaigning practices: informing, involving, connecting and mobilizing. Although we analyzed the Australian and Hungarian MPs' Facebook posts between two election campaigns, we found that the above-mentioned four elements could be discovered on the profiles of analyzed politicians. The informing and involving elements are interrelated. As we stated earlier, the intention to write informational posts could be discovered in MPs posts. In most cases the written informational – not subjective – posts contain information about politicians' media appearance, exhibition or factory openings and other events where the representative will have some kind of role. Sometimes they directly post the electronic format of the invitation, sometimes they just write a short notice, but never forget to draw attention to the fact, that the happening is open to everyone. In case of media appearance, after an interview the MPs often share a direct link with their followers where they can reach the video.

The element of connecting is coded in the nature of social networking sites. Some of the MPs do not forget to greet their followers on Christmas or to thank them for birthday greetings. These posts are typically only for the Facebook followers. The mobilizing element – during two campaigns – is observable when politicians are joining humanitarian, social or political campaigns.

Third, Bimber and Davis in their research article found that "the main message of candidate Web content is reinforcement" [8]. However, it must be stated that the 'reinforcement' cannot substitute changing of attitudes [29]. This could mean that the views stated that political parties and politicians should not worry about their secure electorate, and should instead work on reaching the undecided voters, are wrong because loyalty to politician or party "cannot be assumed, but must be constantly

reinforced” [15]. It is sure that on Facebook the followers of MPs are mainly those citizens, who sympathize with the MPs and eventually would vote for her or him. This could be seen from the number of likes and the tone of comments. If a follower draws up a critique of the MP, the other followers would protect the politicians as a group. These are the types of occasions when the politician’s profile could work as a tool for reinforcement. Another possibility occurs when the MP states their (subjective) opinion on an issue. Posts written with the intention of making a statement or to attack someone or something (*subjective* and *offensive* categories) are the best opportunity to create an environment when loyal followers have to defend their MP against offensive behavior. Using social networking sites as a tool for reinforcement by the politicians is one of the most visible device in the environment of secure electorate. It could create a real community among her of his followers.

The fourth reason and goal comes from ‘reinforcement’ and it is a building of a community. Tyler suggests that the internet “has given people new ways to approach traditional concerns about how to initiate and develop relationships” [28]. The internet opens an online space for creating relationships. Forums, blogs or social networking sites confirm this idea, because their aim is to connect even unfamiliar users with each other to build different types of networks. These sites work as catalysts in networking and the theme of these interconnections are various from cute kittens to automobiles, from green environment to party politics. Tyler reviewed a number of empirical studies and he stated that “the internet provides people with a technology that allows them to engage in activities that they have already had ways to engage in but provides them with some added efficiencies and opportunities to tailor their interactions to better meet their needs. However, there is nothing fundamentally different about the internet that transforms basic psychological or social life.” [28]. According to our study, one possible aim of Australian and Hungarian MPs on Facebook is to create a community around them, which may create those opinion leaders, who could represent politicians’ views in voters’ micro-communities. This purpose could be seen in most of the posts, when one MP tries to reinforce its followers or when the politician shares pictures from their private life. Hyun [20] comes to similar conclusion regarding the political blogospheres in the United States, the United Kingdom, and Germany. He thinks that a strong political blogging community could foster a shared identity, that “distinguishing bloggers from other communication actors is predicted to lead to greater interaction among its members, which should manifest itself in dense interconnection among its members in a network” [20]. This could be the situation with the MPs in our study, as well. The only difference is that the nature of Facebook provides the opportunity to highlight the leader – in our case the MP – who can start to build its own community through various persuasive techniques.

## **9.6 Social media as alternative media in political communication**

In connection with the changing political sphere, Steven Barnett wrote in 1997 that the new media means the rapid development of the new communication technology.

Due to its nature it will join the audiovisual entertainment and news, that is the television and the radio, the online information bases and databases (which can be reached through teletext, for example), voice transfer (telephone), and the possibility of the manipulation of data stored on the computers. Looking at the changes from the viewpoint of democracy, the next four outcomes that can be expected include:

- An almost infinite volume of information can be made available;
- Potentially, every individual can communicate with every other individual, not just in a single town, region or state, but ultimately throughout the world;
- Access to information, data and people will be available to citizens at their fingertips and at their convenience;
- Access is potentially universal [5].

More than a decade after Barnett's study we can declare that his prediction has proven to be potentially right if we accept the standpoint that claims that financial, cognitive, physical, linguistic and other factors do not matter at all. Academics and the media talk about virtual communities that are sometimes growing, sometimes are being bought up, sometimes are split, and other times they are merging. The debate has not yet been about to what extent the media is the fourth branch of power, but we have already been talking about a fifth branch, the blogs, the microblogs and other sort of social networking sites [17] [18]. Their function is to control the traditional media, to criticize it and to protect it from political influence. The buzzword is similar every time: 'networking'. But at the same time there is a question about it, namely, whether the blogosphere exists at all, when the number of those blogs that are in interaction with each other – networking – is very small, and the majority of them are characterized by the idea of 'writing for myself'. We could also question the social networking sites potential of political engagement in democracies (for example in authoritarian regimes [21] [25]). In spite of this, blog writers from different political sites and blogs written by politicians, talk about political social-networking instead of the uniting of individuals. Even the spread of urban legends is characterized by the connection between cultures and communities, but networks would be better to explain urban legends and the spread of any other information, as well.<sup>64</sup>

On the other hand, a part of the media system is slowly dissolving in to citizens' networks, because professional journalists are becoming more 'civilian' and the amateur 'journalists' are becoming more sophisticated. The other part of the media network, which is controlled by the politics, is dissolving in the political network. This means that on one side we see journalist-bloggers, while on the other professional 'agenda-setters'.

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<sup>64</sup> We do not discuss it in the study, but with the spread of urban legends the network logic of computer mediated communication and the changes of oral culture are very well traceable. We can see that mediated human communication is getting to be more and more non-linear, decentralized, and the multimedia becomes its foundation. The distinction between orality and literacy becomes less important [13]. This should mean that those linguistic codes which are known by everyone will disappear, and that the linguistic codes used by a community are highly different from those used by another community. We know, however, that it is not true. Then, we cannot help thinking that the communities do not differ from each other regarding their codes. This statement also does not stand its ground. But the importance of the different code features could well be explained by networks.



If the media does not respond to the challenges of the new political communication as I wrote above, it is quite possible that future political communication would have only two relevant actors, the networks of politics and citizens.

James Druckman, Martin Kifer and Michael Parkin [12] think that during the election campaigns the internet is in the focus of modern political communication research. They are approaching this question from the politicians' side, how and why the candidates use the novelty of the web? Druckman et al. argue that self-representation and the interactivity are the two motives, which makes the candidate use the digital space. The politicians are able – with the help of multimedia tools – to grab citizen's attention and be able to make sympathetic his person and policy by the representation. Thus the candidates' websites are similar to an electronic brochure, an important aspect of which will be how frequently information is updated, and how relevant the information is. Interactivity provides bidirectional communication. The site visitors' attention can be influenced by the interactivity and it may be achieved that the voters learn new things about the candidate. The risk is that the voters could inquire about issues that are irrelevant for politicians. Interactivity includes personalization as well since the candidate appears during the communication process.

However, the political communication of the information society is not merely a continuation of post-industrial methods, but by integrated use of old techniques it also means development of new methods. The new ways of political communication are also implying traditional door-to-door campaigns, as well as mobilization on web-based digital networks. It is important to note that these are functional networks linked to various processes and work. The networks could recreate themselves if they have faded for some reason, thus their structure is changing continuously [10]. The researcher can only track political trends on digital networks, it is impossible to follow the movement of networks as an outsider on a daily basis. Therefore the scholars can only state the new methods of political communication as a current direction of a tendency. As we could see from the research the current direction of a tendency is that MPs are using Facebook as an 'old' media.

Yet, politics and politicians should be interested in setting the agenda of social media, since it is what guarantees its own existence. This could be a goal even if not all its members share this idea. Agenda setting can be best realized if politics recognizes the civilian networks and puts them under obligation by means of different economic, political, sometimes cultural tools. However, we could see from the research that MPs are using social media mostly for informational communication. Informational communication does not differ significantly from the communication method of 'old' media, therefore this would mean that social media is still a tool for the well-known interaction in political communication, where one could discover the signs of media logic and traditional agenda-setting. The possibilities of social media like bidirectional communication, social networking and agenda melding are alternative ways of interaction for the political actors of political communication.

## 9.7 Conclusion

Our conclusion here is that: (a) the new ICTs have pluralized social communication therefore effecting not only citizens but the entire world of politics as well (although we have only indirect evidence of this). Research needs to be conducted on politicians' Facebook use in other countries as well in order to find direct evidence; (b) new political behaviors, institutional challenges themselves are forming the ever-changing information and communication environment. This statement is true from the aspect of globalization and the changing media logic and agenda setting of political communication, but from the aspect of evolution and low interactivity rate together with uni-directional communication, the statement is false. Further research should be made on politicians' use of social networking sites like Facebook or Twitter to find direct evidence; (c) new theoretical dilemmas emerge, that requires new methodological approaches towards the thorough research of the field. This statement would mean the developing of 'new' political communication theory examining the three effects of networking technologies on political communication: globalization, changing media logic and new political communication. These are the emerging theoretical dilemmas that we hope to examine in the near future.

The research has not been finished yet. We will get more accurate answers to our questions – and hopefully to other questions as well – when we complete analyzes on other countries. The research team's expectation is that the rate of interaction would not change significantly, and it will prove the tendencies from the first half of the research. Further comparison should be made to validate this statement.

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## Chapter 10

# The Quest for ICT Innovation Opportunities: Using Futures Studies Approach in Digital Government

### 10.1 Introduction: Connection of Futures Studies and Digital Government

In our final chapter we present the argument that ICT enabled innovation opportunities can be more successfully exploited in public services, if these opportunities are systematically scanned, analysed, tested and creatively motivated. We will explore in this context an already proven theoretical approach – *futures studies* – which has not been widely used in the ICT –based modernization of public services, regardless of its applicability in other areas, such as strategic planning or policy making.

We attempt to show in this chapter, that futures studies both as a theoretical concept and as a methodological approach is a useful, applicable, trans-disciplinary field for exploring public service modernization at large. In order to stay aligned with the ICT context of our text, in the following we will refer to this complex modernization as digital government, having in mind, that digitization is way more complex than the installation of networks and computers. For defining the minimum scope of digital government, at this point we just refer to the previous nine chapters of this volume which spans from ICT technologies, through economic value added, interoperability, inclusion, to customer service models, social media applications and the new forms of ICT enabled political communication. *Digital* or “Electronic” *government* refers to government’s use of technology, particularly web-based Internet applications to enhance the access to and delivery of government information and service to citizens, business partners, employees, other agencies, and government entities.” [19].

*Future studies* is a *trans-disciplinary approach* through which many skills can be developed e.g. strong strategic thinking, creativity, open-minded attitude, out of box and non-linear thinking, basically abilities to develop creative interactive systems.

We use the phrase *trans-disciplinary* as an extension of *inter-, and multi-disciplinary* [23], in order to express that future studies is a so-called synthesizing field which collects data from two or more disciplines and by combining them intends to create new meanings. With this new meaning of existing information, futures studies pragmatically attempts to help decision makers to cognizes about the many alternative scenarios of future states, i.e. futures. This alternative nature is expressed in the plural use of future, summing up the scientific orientation as “future studies”, and referring to this very important feature as “*alternativity*”, indicating that there is no one way of discussing about future outcomes. It is interesting to note, that not every translation expresses this characteristics and sometimes the future is in singular as for instance in Hungarian: the field is called „Jövőkutatás” (research of future) while the real meaning is rather “Jövők kutatása” (research of futures).

We can say that the main purpose of futures studies is to support individual and collective decision-making and enabling a conscious, responsible way of thinking about the future. By using futures studies a *complex and creative strategy can be built and developed* to support actions and interventions regarding our present systems.

Creativity and the elevated future consciousness are very much related to each other. The following qualities are relevant to creativity which very often are used in futures studies as well [20]:

- open-mindedness,
- curiosity,
- ability to deal with uncertainty,
- constructive attitude toward the future,
- a well-developed understanding of contemporary trends and affairs,
- synthetic and integrative “Big Picture” understanding of the world,
- an expansive and integrative sense of time (of past and future) – awareness of trends,
- challenges, and future possibilities,
- open and imaginative mindset about future possibilities.

One enormously huge benefit of this creativity orientation in futures studies is that it offers techniques to deal with the issues of non-linearity regarding future predictions. This is an important distinction of future studies from other modelling approaches about forthcoming events such as econometrics, trend-analysis and others which inherently project historical knowledge into the future and assume that past patterns will repeat again from time to time.

For instance, by applying expert platforms which are open to creative discussions, expert opinions, and voices of many stakeholders, we might better prepare for different unforeseeable events and processes than by only singling out one or two key institutional trends which might hide weak signals or future “non-linearities”. Especially, in the case of government initiatives expert platforms might create more informed strategies based on wide range of data resulting in broader citizens’ acceptance.

The fast paced and often non-linear developments in ICT strengthen futures studies for instance in the applications of online expert platforms, which might prove to be useful to share the knowledge, experience and opinion of citizens to support collective decision-making, similarly as the disaster management examples were shown in chapter 8. In this chapter we focus on futures studies-specific online expert platforms. First we introduce the futures studies approach, and conceptual background. Thereafter, we describe the functions of futures studies oriented expert platforms which provide useful discussion forum on digital government. Finally, we close with a summary concluding possibilities and boundaries of expert platforms.

Eventually, the purpose of this chapter is to motivate develop and support creative thinking about innovation in public services, and specifically about digital government

## 10.2 Introduction to Future Studies

The predecessors of future studies were prognosis-type analyses such as one of the cornerstone economic prognosis which appeared in 1928 from Oskar Morgenstern. (its title was originally “Wirtschaftsprognose” in German, “Economic forecasting” in English). It was the first large prognosis-type studies which we consider the forerunner of future studies.

Based on this heritage, there is a common belief that the concept of futures studies is similar to futurology or science fiction (sci-fi). Futurology was created by Ossip Fleichtheim in the 1940s [9] and it elaborates on the utopistic part of the future which is almost impossible to realize. In this context we consider the so called “achievable future” as the part of utopia. The utopian thinking has two distinct parts: a desirable part which is utopia and feared part which we call dystopia. [14]. Sci-fi on the other hand is the complex description of images of the future. Science fiction is a genre of fiction in which the stories often talk about science and technology narratives of the future [14]. For instance, we can refer to two of the most well known sci-fi gurus Isaac Asimov and Stanislaw Lem, who are perfect examples of visionaries of the far future, building on our present knowledge and challenging our creativity to construct complex images of the future. Both - sci-fi and futurology - are useful narratives for futures studies because they help to extend the mind for creating alternative images of the future and to demonstrate how non-linearity works in forecasting.

Futures studies as a scientific discipline was born in the United States in the 1950s and it started to spread very quickly in Europe, mainly in France [23]. Firstly it was used in the field of military aeronautics in United States, then later in technological forecasting. Research groups such as RAND (Research and Development) Corporation, the Hudson Institute<sup>65</sup>, and research groups in universities (University of Minnesota, Portland State University, State University of New York) applied futures studies. This was the time when international organizations were established, a lot of them are still active nowadays. For instance the World Future Society was established in Bethesda, near Washington D.C., World Futures Studies Federation whose members are professionals and organizations from futures studies were established in 1967. University programs and courses had been developed focusing on different aspects of future studies: forecasting, foresight, scenario building, business futures studies, technological foresight, etc. Practical or business use of futures studies had also appeared, for instance at IBM, Exxon, Shell, General Electric and Bell. Due to the unprecedented economic growth after the second world war, the arms race during the cold war era, and the shocking energy crisis in 1970s the interest emerged in futures studies to search for new ways to solve complex problems.

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65 “The Hudson Institute is an independent research organization promoting new ideas for the advancement of global security, prosperity and freedom.” (Source: Official Homepage of Hudson Institute: <http://www.hudson.org/>)



One of the most well known organizations of future studies is the Club of Rome. It is a non-profit international organization which was founded in 1968 by Aurelio Peccei and Alexander King with about one hundred members in Rome. The Club of Rome belongs to the international groups working on complex global problems and big issues of mankind. In Hungary futures studies were developed very fast. Already in 1968 the Hungarian Futurology Group was established and the Committee on Futures Research, within Section IX. of the Hungarian Academy of Sciences was inaugurated in 1976. The first university based independent futures studies department was created in 1992 as Futures Studies Department at the predecessor of Corvinus University of Budapest.

Futures studies have had two main challenges to become a discipline. The first one has been an ontological question: How can we analyze the topic of a scientific field, if it does not exist? Yes, the future cannot be present, but if we want to create something, the first phase is planning and creating strategy. If we think, for instance, about changing the law, build a house, or create any physical object, we have to plan for something which does not exist yet but will in the future. From this point of view, we can say a lot of people have future-sense, meaning that they do things because they want to achieve results in the future. For example we want to acquire degree at a university and we are ready to study many years for this future “state”. In this context we should consider futures studies as a tool to support planning.

The second dilemma is how can we develop knowledge about the future? It is an epistemological question, for which futures studies have been offering special methodologies.

For instance one of the most widely known modelling techniques of complex systems – system dynamics - had been developed at MIT in the early 60s by the research team of Jay Forrester. With the growth and increasing availability of simulation computing power, this has become more and more important to analyse global interrelations. The first such global model was described in the book titled “Limits to Growth” published in 1972 [25] by Club of Rome. This research contained a complex computer model simulating the impacts of exponential economic and population growth limited by the Earth finite resource supplies

Figure 10.1. shows several other methodologies and techniques categorized according to several dimensions. There are four main categories into which we divided techniques and methods - quantitative, qualitative, normative and exploratory - but looking into the fundamental differences between them they belong to two distinct groups: the forecasting and foresight groups.

<b>Table 1:AC/UNU Millennium project taxonomy of Features Research Methodology –V2.0</b>				
<b>Method</b>	<b>Quantitative</b>	<b>Qualitative</b>	<b>Normative</b>	<b>Exploratory</b>
Environmental scanning		x		x
Delphi		x	x	x
Futures wheel		x	x	x
Trend impact analysis	x			x
Cross-impact analysis	x			x
Structural analysis	x	x		x
Systems perspective	x			x
Decision modeling	x			x
Statistical modeling	x			x
Technology sequence analysis		x	x	
Relevance trees and morphological analysis		x	x	x
Scenarios	x	x	x	x
Participatory methods		x	x	
Simulation and games		x		x
Genius forecasting, vision, intuition		x	x	x
S&T road-mapping		x	x	x
Field anomaly relaxation		x		x
Text mining		x	x	x
Agent modeling		x		x
SOFI index	x	x	x	x
Multiple perspective concept		x	x	x
Causal layered analysis		x		x

Source: Glenn and Gordon (2003)

*Figure 10. 1 - Methods of Futures studies (Source: [10, p 10])*

Forecasting methods are based on quantitative data, figures, numbers and they try to predict the probable future [4] [22]. The concept of probability is pivotal in forecasting methods. We have to highlight that there are requirements and limitations of using forecasting in futures studies [18]. For instance, processes become more instable if we go far away into the future, and naturally more uncertain factors emerge. This particular uncertainty, raise the need to consider other approaches than forecasting as well.

Foresight and methods of a more qualitative nature of describing future states are becoming more and more relevant besides forecasting. These methods support the involvement of various groups of stakeholders to handle and control uncertainty as much as possible. The goal of foresight is to find alternative futures which differ in

quality, and these different alternatives are found by mapping attitudes, qualities, motivations and actions of stakeholders. Foresight methods are not interested in probability because they accept uncertainty by default.

Well-known futurists such as Wendell Bell from USA, and Tuomo Kuosa from Finland, or Ziauddin Sardar from Britain define and capture the essence of future studies as follows:

„The futures field is an action science, holistic, integrative, and cross-disciplinary, potentially relying on specific knowledge from all the sciences and social sciences. For example, futurists draw on one set of experts and their knowledge when dealing with the possible future for nuclear waste and on others when dealing with the future of population growth, environment, oil production, communication, delivery of health care, ethnic conflicts or education. The futures field is, thus, significantly dependent on the sciences.” [2, p 43]

„...futures studies seek to connect together various change factors, such as driving forces, trends, emerging issues and conditioning factors in order to envisage alternative futures (rather than predict the future). As discussed in the Handbook of Foresight, futures studies has waxed and waned in terms of fashions in methods and popularity, and has been strongly influenced by the rise of issues such as environmental problems and new technologies. [17, p 14]

“Futures studies is “wicked” (they deal largely with complex, interconnected problems), MAD (Mutually Assured Diversity), sceptical (questions dominant axioms and assumptions) and futureless (bear fruit largely in the present).” [31, p 1]

As a summary we pragmatically conclude, that futures studies is a discipline which includes all forms of looking into the future from trend extrapolation to all the way to utopia [24].

There are three important characteristics of futures studies which, although appear separately in other scientific fields, together define the field as a whole. These are the followings: trans-disciplinary, complexity and participation.

### **Trans-disciplinary**

Trans-disciplinary means not only a relationship among different disciplines, but also the contribution of different fields [8]. For example, when we analyse the digital government's future from the technological point of view, we realize quickly that we need to bring in *information technology* as a discipline to understand information system, online platform, development of technology; then *public administration* as another one to detect purposes of government, but *sociology* also to recognize the importance of social needs, *political science* because of political culture and mechanisms. The trans-disciplinary approach goes beyond juxtaposing information and knowledge of the above mentioned fields, it attempts to create new meaning from the relationships and impacts on each other.

As we showed earlier one category of these methods are based on forecasting. “Forecasting, however is about making more or less linear systematic estimations, statements, extrapolations, projections or predictions of future events, rate or value of change whose actual outcomes have not yet been observed and of which are not fully sure,” [17, p 23-24].

Trans-disciplinary assumes, however, that the future is already here in today's drivers, trends, values, and objectives. This can be captured by the foresight methods, which "refers to a process of visioning alternative futures through a combination of hindsight, insight and forecasting. That kind of foresight attempts to say something about future probabilities and options for actions. (Hind)sight is about systematically understanding the past, (In)sight is about systematically understanding the true nature of the present, and (Fore)sight is about systematically understanding the future." [17, p 5].

Foresight has many participatory methods to enquire the values and objectives of stakeholders. We collected 44 methods in a framework which is called the Futures Diamond (see Figure 10.2.). This framework updates the Foresight Diamond developed by Popper in *The Handbook of Technology Foresight* [30]. There are three font styles in the Diamond which indicate the type of technique: qualitative (using normal style), semi-quantitative (using strong style), and quantitative (using italic style) and the type of tools and knowledge sources (based on creativity, expertise, interaction or evidence).

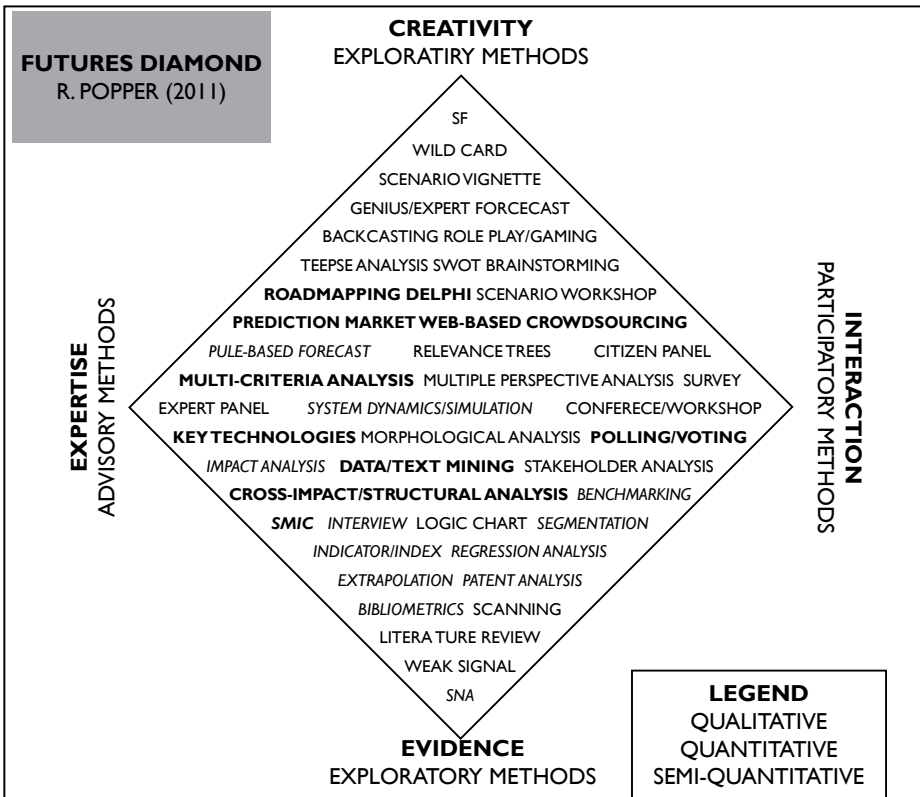


Figure 10.2 Foresight Diamond [30]<sup>66</sup>

66 <http://www.futuresdiamond.com/en/the-diamond>

### **Complexity**

“Complexity is in some way connected to trans-disciplinary, but while the latter is more an approach, complexity refers more to content.” [23, p 19].

*Complexity* for our further arguments means that one particular problem should not be analyzed only from one viewpoint but from several for instance using the political, environmental, societal, technological, economical, legal (PESTEL acronym) model, aspect or adding Ethics and Demographic factors (STEEPLED acronym). During the research titled „Hungary 2025” complexity appeared in synthesizing the knowledge of experts who belonged to different fields. [28]

Experts are able to give complex approach through their many years of experience. They are able to see the interrelated factors of the given problem in complex system and that is why futures studies has more sophisticated methods for collecting expert views.

### **Participation**

Participation - as important characteristic of futures studies – emerges during the contribution of stakeholders who have relevant knowledge in the given topic. The necessity of participation lies in the fact that the future is defined not just by past, but by people whose activities are relevant, who will shape the future. Non-experts can also participate with their exploration and contribution in planning the future. Experts working in different fields can naturally describe the complexity not seen by others.

Participation reflects the notion of constructivism, providing a pragmatic solution to the theoretical background of social structuration which happens both through institutions and emergent behaviour of actors. In chapter one we have given a detailed explanation of the importance of technological and social constructivism when we need rich theories of explaining technology adoption and innovation diffusion.

Not every, but many futurists accept participation as a characteristic [23], as Robert Jungke, Erzsébet Nováky and Jim Dator. According to participation anyone who is to be part of the future must participate in decisions related to the future and the building thereof [29]. This view definitely supported the democracy approach where citizens have right to participate somehow in decision-making and building of their own futures.

In the following sections we describe how the application of future studies concepts may contribute to the development of digital government.

## **10.3 Using Futures Studies approach in digital government**

### **10.3.1 Development of digital government**

The main tasks of a government are to administer public tasks and to execute laws. „E-government refers to the use of information and communication technologies (ICT) by governments to provide digital services to citizens and businesses over the Internet, at local, national or international level.” [33, p 1] e-Government (digital government) supports the administration provided for citizens, and according to the maturity concepts we can identify four stages of e-Government sophistication: (1)

cataloguing, (2) transaction, (3) vertical integration, and (4) horizontal integration [19] (Figure 10.3).

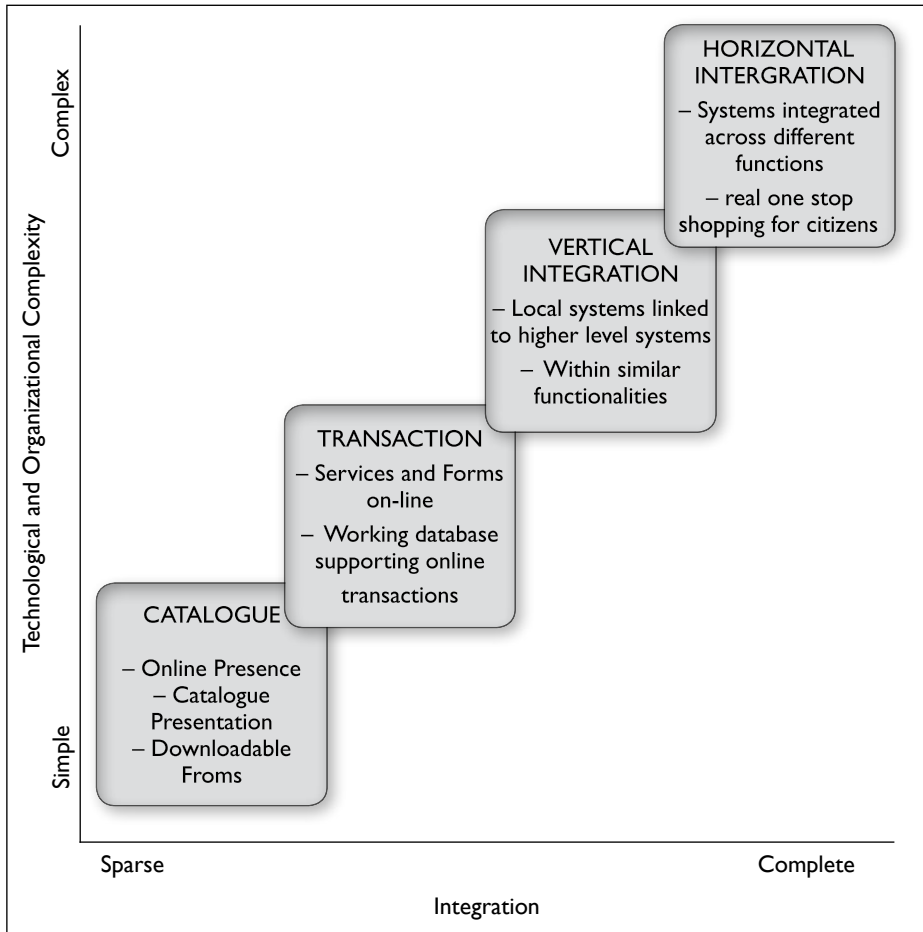


Figure 10.3 - Dimensions and stages of e-government development (Source: [19, p 124])

It is particularly important to highlight the concept of *citizen sourcing* which is a special form of social media application in the field of e-Governance, parts of it described in our previous chapter. As it is shown in chapter nine “... new ICTs are characterized by their bi- and multidirectional digital connections, which enable citizens to engage in collective decision-making and to collaborate on a task via online networks.” Some government agencies now base policymaking and service production on input from the public. This phenomenon as a new trend is called *citizen sourcing*, where sourcing refers to how government departments and agencies obtain the services they need to solve their mission delivery requirements and how those decisions are reached (Breul, 2010: S193)”. [3] [21] [26, p 1] [34]. Citizen sourcing, e-democracy

applications are illustrative examples of participation and are becoming more and more popular research topics [16] [7]. Citizens have the potential to be experts in specific matters, so their initiating their involvement allows information sharing information (documents, data), contribution of ideas (with opinions, strategic concepts), and co-creation (reaction to action, interaction, finding shared goals).

An illustration for crowd sourcing solutions we refer to the American „We the people” initiative which is a portal where citizens submit petitions with the headline: “Giving all Americans a way to engage their government on the issues that matter to them.” (<https://petitions.whitehouse.gov/>). Similar attempts of governments are all based on the effort to involve citizens in public administration. “Public administration, as the apparatus through which decisions are executed, has long been considered a constituent part of government activity.” [5] As in the American example, these initiatives are bottom-up participations and show emergent patterns. For instance, in Hungary there is the similar [www.peticio.hu](http://www.peticio.hu) Facebook page. If we check the publicly available statistics it can be seen that the number of likes was 86 at the beginning and has gradually decreased in average, and in last few days before preparing this manuscript almost nobody pushed the „Like” icon. The most popular age group of the site is the one between 55-64 years, which is rather an old group of Facebook users. At the time of preparing our manuscript [www.peticio.hu](http://www.peticio.hu) contains 600 likes, which is a rather low representation of the Facebook community.



Figure 10.4 - Activity of Peticio initiative on Facebook (Source: <https://www.facebook.com/peticio.hu>)

The Hungarian government has launched a top-down participation a portal<sup>67</sup> about e-democracy which contains more user discussion rooms and forums. Citizens who have user logins to the forums may request information about formal cases.

<sup>67</sup> <https://edemokracia.magyarorszag.hu/edemokracia>

Similarly, the European Parliament has a website<sup>68</sup> where petitions can be submitted to the European Union. This is different than the previously mentioned Hungarian example because responses to the inquiries come directly from European Union organizations. There are other illustrations of crowd sourcing citizen cooperation in larger programmes e.g. GOV<sup>69</sup> or ÁROP<sup>70</sup>. According to the e-Government action plan, the Hungarian government plans to offer all of its citizen services online from the year 2018<sup>71</sup>. To achieve this goal it is very important to develop the digital literacy of citizens as we have seen in chapter 4. By 2016 the percentage of digital illiterates has to be under 40% and by 2020 under 30%. The number of regular internet user at the same time has to grow up to 65% by 2016. In this strategy 90% of the small and medium enterprises should have internet by 2016 and 99% by 2020.

### 10.3.2 Futures Studies-specific expert platforms

The *definition of an expert platform* means that this platform is able to provide relevant information and knowledge of a given complex topic and this is achieved by the contribution of users who might be expert or non-expert stakeholders of the complex problem. No matter how strange, the contributions of non-experts are also valuable since they have such experience of the topic which in future studies is referred to as inner experience and consequently non-experts as inner experts. The typical experts analyze the topic of discussion in longer and more outside perspective. So both, inner and outside perspectives are important at the same time to get a complex picture about the questions explored on the platforms. In the following we use the term expert group supported system or expert platform where users can be inner or outside experts as well.

In order to differentiate expert platforms from expert systems we need to clarify that expert systems are applications which contain coded knowledge of a narrowly defined special area, and their objective is to eventually substitute human experts by the ICT expert system solutions. “Expert systems are sophisticated computer programs that manipulate knowledge to solve problems” [36, p xvii]. Expert systems are decision support tools, which can be consulted before decision making, they also reveal previously unknown relationships between input variables and output findings [32] [33]. Expert systems are worth using in knowledge intensive, narrowly defined problems where normative model cannot be given and where the competence is the result of many years of experience and education. [16]

Typical examples of futures studies-specific expert platform are for instance the COST A22 programme<sup>72</sup>, Association of Professional Futurists<sup>73</sup>, Millennium project,

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68 <http://www.europarl.europa.eu/aboutparliament/hu/00533cec74/Petitions.html>

69 <http://www.gop.gov>

70 <http://magyaryprogram.kormany.hu/arop-projektek>

71 <http://www.kormany.hu/hu/nemzeti-fejlesztési-miniszterium/infokommunikacioert-felelos-allam-titkarsag/hirek/nemzeti-infokommunikacios-strategia-negy-even-belul-teljes-elektronikus-ugyintezes-a-kozigazgatasban>

72 <http://www.cost.eu>

73 [www.profuturists.org/APF](http://www.profuturists.org/APF)



Futurium, or iKnow project. The Future SME<sup>74</sup> started as an interesting initiative for interactive foresight in Hungary. It is a platform with an online interactive surface where users have to register, and discuss concepts and developments in SMEs future [15]. In order to show the functionalities of future studies-specific expert platforms we introduce three systems: the Millennium project, the Futurium and iKnow. We analyze these according to the following criteria: user profile, content, design, contribution possibilities of participants, sharing possibilities as a social media solutions and special functions. We highlight benefits, disadvantages and describe developmental recommendations.

The *Millennium project*<sup>75</sup> exists since 1996 and nowadays there are 49 member countries around the world, which are organized as Nodes. Until the time of writing our manuscript 3500 members joined this initiative where only outside experts can be members. The user interface of the homepage is not very transparent and user-friendly. In Figure 10.5. we show the main menu items:

- „Home”: with the following headlines „15 Global Challenges”, „Research”, „Nodes”, „Projects”,
- “FAQs” (frequently asked questions),
- „Participate”: with the following headlines „Groups”, „Manage users”, „Real-time Delphis”, „Nodes”.

From these menu items just the Groups and Nodes are available, and when we tried the searching function was not very effective. It is not user-friendly because it requires too much scrolling by the mouse to read everything on the page. Under the headline „Node” we can see the project.

- „About”: it is about information of the project.
- „Interact”: it contains Hangout video possibility.



Figure 10.5 - Millennium Homepage (Source: <http://www.millennium-project.org>)

74 [http://futuresme.uni-corvinus.hu/?page\\_id=14](http://futuresme.uni-corvinus.hu/?page_id=14)

75 <http://www.millennium-project.org/>

The site contains pictures, studies, book references, reports and other sources of useful information for future studies. At the same time its interface is neither interactive enough nor intuitive in design and logic of use. Regardless of the fact, that it contains lot of useful information, the user profile, search functions, design and manoeuvrability of the portal should be further developed.

The *Futurium*<sup>76</sup> is created by the European Commission. Its purpose is to enable outside and inner experts to add knowledge and engage in dialogues about „Digital futures by 2050“. Before the creation of this portal a workshop was held in March 2012 with the title “Digital Futures 2050”. During this workshop 60 experts were working together for several days who later were invited as the funding members of the online system. Later these members could recommend further experts and basically a snowball effect had been created when nowadays, everybody can register on the site. Registered users need to provide the following information: contact information, internet connected links, short CV, and based on these the system shows their activities, and contributions. We think there are some missing elements: professional data, geographical location, the distinction of outside and inner experts (see Figure 10.6), and it would also be useful if each active user could be seen at one screen and different stakeholders could also be identified.

The structure of the page is user-friendly and easy to use. It contains following menu items:

- “Themes”,
- “Futures” (with time period and evaluation possibility as desired or probable, commenting possibility, Twitter and Facebook sharing function),
- “Policy Ideas” (with time period, type, impact, probability, support, comment, Twitter),
- “Interviews” (pdf, videos, general description, comment and Twitter sharing function),
- “Events” (date, video, comment possibility, Twitter on the edge of page, calendar with events, linked Futures and Policy Ideas, links, keywords),
- “Library”: (keywords with links, searching according to approach),
- “Blogs” (Twitter),
- “Polls” (three freely given choices, comments),
- “What’s up”: the newest comments.

It is apparent that the most important developing direction should be the distinction of experts and non-experts (outside and inner experts) according to their profiles.

76 <http://ec.europa.eu/digital-agenda/futurium>



Figure 10.6- Futurium homepage (Source: <http://ec.europa/digital-agenda/futurium/en>)

The European Commission created the *iKnow*<sup>77</sup> expert platform within the FP7 (Seventh Framework Programme for Research and Technology Development) programme. We show the structure of the site in Figure 10.7. The beginning („Home”) page has a menu bar on the left side about the basic data of the project. There is a top bar and its headlines are the followings:

- iNews: there are news.
- iDephi: there are possibilities to participate in expert interviews or survey.
- iBank: there are wild cards and weak signals accessible and searchable.
- iScan: effective search interface according to more viewpoints and the visual design is very attractive.
- iCommunity: members can be searched according to countries on a visual map. The profile of users with their pictures, personal data and contribution is accessible. Topics can be shared on typical social media surfaces.
- iLibrary: uploaded documents, news can be searched and found effectively on this surface
- iOracle: this headline diverts to FLA (forward-looking activities) mapping and its purpose to share innovation and research initiatives. The site contains so much information that it would be useful to provide a link at the beginning of the page connecting to a summary video for better orientation. It is also a problem that the page opens up new contents in the same tab so it is circumstantial to step back to the original page.
- iProject: it takes back to (beginning) Home page.

<sup>77</sup> <http://wiwe.iknowfutures.eu/iknow-description/>

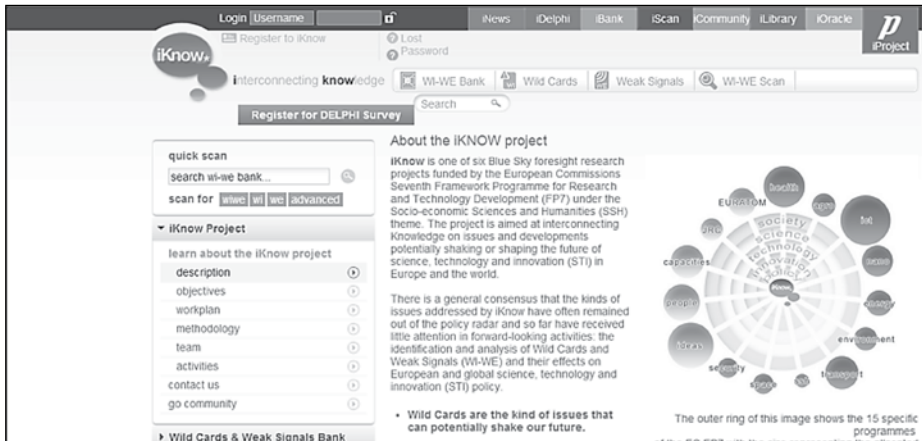


Figure 10.7 - iKnow homepage (Source: <http://wiwe.iknowfutures.eu/iknow-description/>)

We also believe it would be useful to ask for more obligatory fields from users and the search functions could also be more sophisticate.

In the following we look at the three key characteristics of future studies such as *trans-disciplinary*, *complexity* and *participation* and particularly how they appear in the online platforms.

#### 10.4 Trans-disciplinary, complexity and participation characteristics

Trans-disciplinary characteristic appears mainly in the methodological functions. Earlier we mentioned two main categories within future studies methodology: forecasting and foresight. Forecasting appears in data and objective information, as user upload forecast into the system. Foresight is in connection with values, hopes and fears, interests, activities and expectations of users.

The following functions of the platforms support foresight approach: forums, wikis, online meetings and workshops, expression of opinions through comments, definitions of trends, wild cards or weak signals and those evaluations by other users.

The trans-disciplinary approach means using not just methods, but special terms of futures studies as wild cards, weak signals and trends. Weak signals are events which have low probabilities to come true but if they do, their impact is relevant. It is hard to perceive a weak signal and its concentration is very low, but experts might conclude that they to become trends [35]. In futures studies-specific expert systems the users can give examples for these definitions, and therefore the wild cards and weak signal should be built into the platforms.

As far as weak signals are concerned, we should note that when a new event emerges timeframes might have to be labelled carefully. For example it is not probable within the IT that trend stays dominant 10-20 years long. The IT devices – if we think about

one given type - usually run out after 2-3 years, maximum 5 years, so the life cycle of a product is short. If we analyze other asset groups – personal computers or tablet PCs – then the time perspective will be longer.

Complexity appears in different functions of expert platform, when giving topics and labelling them. When we post topics, it is important to tag them with labels of the categories they belong to. The benefit of labelling (tagging) is that we can assign one topic to more categories. It is important that the search function for topics works based on these labels as well.

It is worth to think structurally on which level is the topic, e.g. micro- mezo-, macro level. Information technology can help in determining the elements and their relationships. It is optimal if the structure is created according to tags and labels, because in such structures users can search and filter effectively. We can significantly increase the ease use of our expert system if we use hyperlinks and comments. The purpose is to think ahead at planning how structured information could be produced, and how the users can teach the expert platform by systematic tagging and labelling.

We think that it would be important to synthesise the objective and subjective contributions where the objective dimension could be the reference to the scientifically acknowledged survey and articles. This dimension could be weighted for instance according to number of given references.

The subjective dimensions on the other hand can be the opinion of users. The opinion about an event is usually commenting on how much it is desirable or probable („desirability”, „likelihood”) as we show it in Figure 10.8. Users have possibility to see the collective evaluation, where it is important to see how many people evaluated a given event. For instance if an event is evaluated just by ten users, maybe this information has to be treated with care due to the low numbers of evaluation responses.

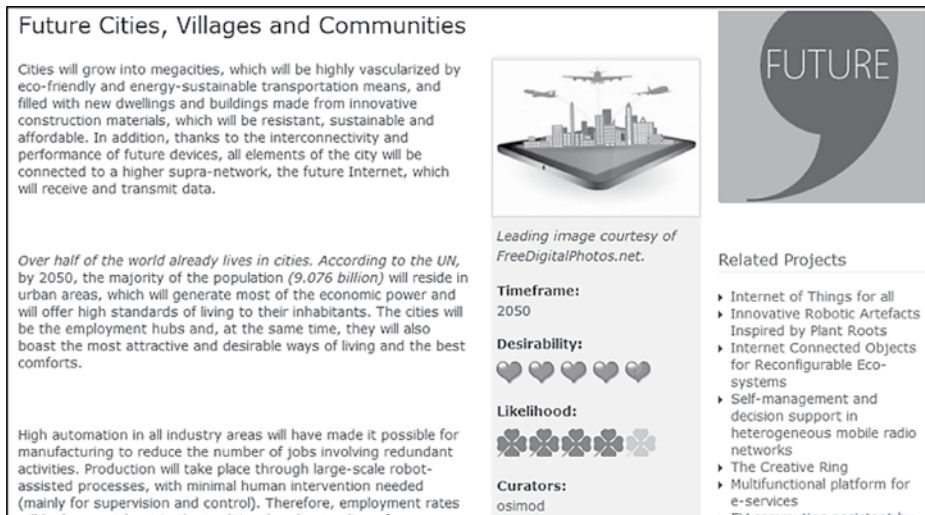


Figure 10.8 - Desirability and Likelihood functions (Source: <http://ec.europa.eu/digital-agenda/futurium/en/listfutures>)

Furthermore, *complexity* can appear in the user's profile as well. If we filter for instance user profiles according to different dimensions then the difference of user groups can be visualised and easily compared. By having enough evaluations about a particular event in that case it is worth to compare the distinct opinions of users.

The taxonomy has an important role because of avoidance of misunderstandings. The definitions of taxonomy should be unequivocal and if users can extend the words of taxonomy, we can increase the effectiveness of the platform.

By participation we pragmatically mean the number of user interactions on expert platform. The first step to achieve this is the registration (Figure 10.9), where in an optimal situation there are obligatory fields to fill out, which serve as a base for categorization according to competency of field, work place, interest, basic information (gender, age), job experience, scientific degree and other fields optionally. Figure.10.9. contains the registration profile of the chapter author in the Futurium online platform.

The screenshot displays the user profile for Eszter Monda on the Futurium platform. The header includes the European Commission logo and navigation links. The user's profile information is as follows:

- First name: Eszter
- Last name: Monda
- Futurizen since: 1 year 3 months
- Country: HUNGARY
- Organisation: Corvinus University of Budapest
- Link: Doctoral researcher
- Topics: No topics provided
- Personal vision: No personal vision provided
- Contact
- Biography

The 'My content' section shows three categories: FUTURES (Submitted, Curated, Contributed), POLICY IDEAS (Submitted), and LIBRARY ENTRIES (Submitted). The 'Events' section features a calendar grid for 2012, 2013, and 2014, with a specific event titled 'Consumer internet - economy brainstorm' on Wed, 04/09/2014.

Figure 10.9 - User profile of Futurium system (Source: <https://ec.europa.eu/digital-agenda/futurium/en/user-search>)

Some systems show *profile publicly* (Figure 10.10) and it is possible to search for a user according to more attributes, while in some others it is not allowed. We think it is worth to give the possibility for visibility of users but naturally it depends on the purpose of the system. The participants should be differentiated at least into two parts: experts and non-experts (outside and inner experts as we defined earlier). The expert is the person who works on the relevant field, where it is worth sometime to distinguish between theoretical and practical experts as well. The category might have other attributes such as sectors of work place as non-profit organization, enterprise, employment. One user can be inner or outer expert of more fields, therefore it is better to give the possibility of dynamic labelling and tagging.

Displaying 1 - 10 of 1679 Futurizens

PICTURE	NICKNAME	FULL NAME	FUTURIZE N SINCE	CONTACT
	iovan	razvan iovan	Mar 2014	
	bxl1040	Alexander Rose	Mar 2014	
	doylejn	John Doyle	Mar 2014	
	chantalbarbon	Chantal Barbon	Mar 2014	
	annarusso	anna russo	Mar 2014	
	jmbelot	Jean-Marc BELOT	Mar 2014	
	idaalessioverni	IDA ALESSIO VERNI	Mar 2014	

**Name**  
is one of

Enter a comma separated list of user names.

**Firstname**  
is equal to

eszter

**Last Name**  
is equal to

**Registration date**  
is greater than

E.g., 2014-03-27

**Items per page**  
10

**Apply**

Figure 10.10 - User publicity (Source: <https://ec.europa.eu/digital-agenda/futurium/en/user-search>)

The users can give topics, use blogs, write comments, add video links, upload studies and documents, extend taxonomy and give opinions, viewpoints (e.g. deserved, threatened,...) (Figure 10.11).

Home Themes Futures **Policy Ideas** Interviews Events Library Blogs Polls

What's up  
View Edit Revisions

### Enable network-powered policy-making in the EU

The emergence of civic movements online shows us that thanks to digital means participation can be massively scaled up. Well-designed digital spaces can create a flourishing environment for civic participation in the decision making.

But how can we move from the stakeholder model to the open participatory model of public consultation?

Following on from the insightful webinar that took place on Friday 12 April, entitled Designing collective intelligence: The future of civic collaboration, we have now created this "nucleus" for a policy idea to enable network-powered policy-making in the EU.

The new policy should focus on:

- Enhancing citizens' **skills essential for participation** such as digital literacy, persuasive writing skills, attitude toward knowledge sharing in a life-long learning approach.
- Building awareness of **the emergent collective problem solving method approach** (e.g. the benefit of asynchronous conversation is that it is difficult to hijack, participation threshold is much lower, conversation streams can bifurcate and merge again).
- Increasing applied research on **sense-making tools for understanding collective intelligence processes**, e.g. social network analysis, opinion mining.
- Continuous **experimentation of network**

**Policy Timeframe:**  
Beyond 2020

**Policy Type:**  
Policy action

**Impact:**  
Average: 3.8 (4 votes)

**Plausibility:**  
Average: 3.3 (4 votes)

**Support:**  
Average: 4.2 (4 votes)

**Policy structure**  
Make a link

**Supporting evidence**

- Interplay of Adaptive Selection and Synergistic Performance: As an example of natural selection and self-organization
- The Where-How of Leadership Emergence (WHOLE) Landscape: Charting Emergent Collective Leadership

Make a link

Figure 10.11 - A policy idea and the interactions of users in Futurium

## 10.5 Scenario building in future studies

Scenarios are defined as consistent and coherent descriptions of alternative hypothetical futures that reflect different perspectives on past, present, and future development, which can serve as a basis for action [27].

The steps of scenario writing are the followings [1] [18]:

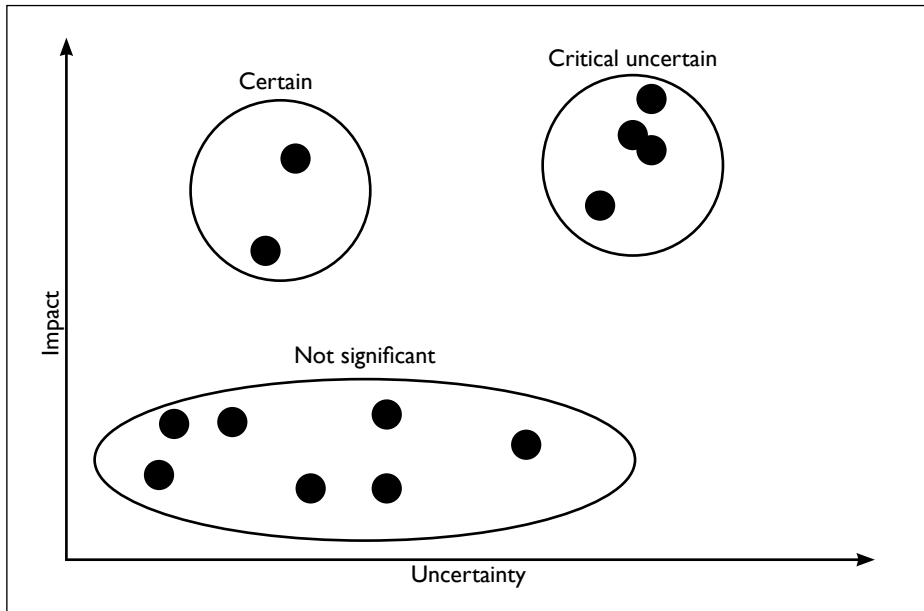
- 1) Setup scenario team
- 2) Finding the purposes of the scenario
- 3) Creating task lists.
- 4) Scenario writing in details.
- 5) Finding alternatives
- 6) Describing alternatives
- 7) Feedback and learning.

As we can see firstly the scenario team is selected, which team is eventually responsible for achieving defined purpose and task. They setup alternatives after writing scenarios, build a feedback system and define their acceptable and preferable domain of futures in foresight communication process [13]. In this section we mainly concentrate on the "scenario writing" phase.



The key ingredient of scenario writing phase is the finding of the most relevant factors. These factors – the so called driving forces - which influence the future event are explored on the platforms given the trends, wild cards and weak signals.

After finding the driving forces they are usually evaluated according to their impact and probability of occurrence. Those driving forces which have huge impact and which are very uncertain occur, those will be very important to be differentiated from others (see Figure 10.12).



10.12 Figure - Evaluation of driving forces according to impact and uncertainty, Sources: own compilation according to Kristóf, 2002

One given future image can be built just as one coherent description of future. To describe coherent images of the future we have to build a new obligatory field into the system. This obligatory field provides information whether the described trend can emerge at the same time with other ones or not. The result of this new field is the tabular relationship of driving forces shown in Figure 10.13.

- 1A: Increasing use of technology (as trend)
- 1B: Refusing digital government (as wild card)
- 1C: Development of digital government (as trend)

and four possible type of their relationships:

- X: It is not applicable.
- Y: Two driving forces can exist at the same time.
- N: Two driving forces cannot exist at the same time.
- S: One driving force support to emergence or existence of other one.

	Driving forces											
	IA	IB	IC	2A	2B	2C	3A	3B	3C	4A	4B	4C
IA	X	Y	S									
IB	Y	X	N									
IC	S	N	X									
2A												
2B												
2C												
3A												
3B												
3C												
4A												
4B												
4C												

**Driving forces:**

**IA:** Increasing use of technology (as trend)

**IB:** Refusing digital government (as wild card)

**IC:** Development of digital government (as trend)

**Which relationships are between two driving forces?**

**X:** It is not understandable.

**Y:** Yes, those can exist at the same time.

**N:** No, those can't exist at the same time.

**S:** those Support to emerge/exist together.

*10.13 Figure - Table about relationship between driving forces*

If we filter which topic and which timeframe is relevant in our analysis then the system will find driving forces, check their impact, probability, relationships, and then could draw different alternatives.

We could use the so called “backcasting” approach as well. Backcasting starts with defining an imagined future which can be value oriented, e. g. desirable, threatening, or outcome oriented, e. g. four generic alternative futures as continued growth, collapse, disciplined society and transformational society [6]. (Growth means business as usual scenario where every factor stays the same as earlier. Collapse means the future of our nightmares and growing concerns. Disciplined society refers to the increasing sustaining fundamental values and activities to avoid collapse. In transformational society every important factor changes and our entire life is transformed totally into

something new.) Then backcasting works backwards to identify steps, activities, policies and programs that will connect the future to the present [12].

## 10.6 Summary and conclusions

In order to improve our understanding of digital government it would be important to strengthen expert participation through futures studies-specific expert platforms. The development of these platforms has a special role because structured information can be created from unstructured data easily with the help of ICT. Moreover, the bridging among geographical regions, international networks and trans-disciplinary approach could be supported. As we have shown, information systems are able to deliver information from more sources and convert them into relevant knowledge. With the help of automatic mechanisms and tools communications on the platforms can be shaped into a semantic ecosystem which supports complex decisions..

Furthermore future studies platforms could extend the involvement and knowledge of citizens, while exploring their intentions. Governments, experts and non-experts would also benefit from the active use of one futures studies-specific expert system platforms in e-Government. Naturally, to make these platforms work effectively governments have not only to create and maintain it, but also to motivate citizens to participate, to give continuous feedback and reactions.

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