DIGITAL GOVERNANCE: RESEARCH DESIGN OF A COMPREHENSIVE RESEARCH PROGRAM TO ANALYSE ICT DRIVEN TRANSFORMATION

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Abstract
The paper presents the theoretical foundations and research design of a comprehensive research program initiated at the National University of Public Service for exploring the complex dynamics of digital transformation of governance and government. In alignment with the Danube Region Strategy the initiative is based on two main pillars: a) concepts of territorial and cross-border governance especially exploring the process from whole-of-government to social participation, and b) information management focusing on ICT ecosystems and project management. Based on these two pillars three drivers of digital transformation are defined which are very tightly intertwined in the research design. The first is what we collectively address as e-services including legal-technical-organizational solutions, citizens´ acceptance and the complex notion of accessibility with trust. The second driver in our model is the appearance of "smartness" in governance both centrally and locally – spanning from knowledge management to smart communities in symbiosis with smart technologies. Finally, the third set of drivers for digital transition is the capability for innovation and change including management and organizations, social impacts of industry 4.0., and a modified Balanced Scorecard system for administration. The paper presents the key research questions in each pillar and maps how institutional collaborations (amongst 7 Hungarian, 3 European and 2 North-American universities) address them methodologically.

Key words: *digital governance, ICT based transformation, e-government research, Hungary.*

1. Introduction

Since the end of 2015, the so called Digital Wellbeing Program (DWP) is the overarching strategy of the Hungarian government for technology based modernization: it has pillars in education, economic development, fast speed network infrastructure, addressing issues of digital era employment and industry 4.0; and very importantly raising awareness for those 21% of Hungarian population (in the age group of 16-74) who are not interested in internet use. A key mechanism to achieve this objective is to lower internet taxes from January 2017.

DWP has given a new thrust to the development of ICT use in the public sphere. By the alignment of other strategies and regulations it very clearly brought a key question to the stage of the Hungarian political theatre: What sort of surprises does the internet hold for governance in Hungary? And stemming from this several other pressing issues come immediately: how does government and governance transform in Hungary (or as a matter of fact generally in other regions) thanks to this immense power of technology? How should the new government model look like? What sort of services, procedures skills and competencies are in demand for this change? How can we prepare decision makers to embracing this transformation?

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This paper introduces and summarizes the research design of a comprehensive, two-year long, research program initiated at the National University of Public Service to investigate this broad problem. Since the Cee E-gov and E-dem conferences are key forums and platforms since 2014, and they plan to be in the following years to come (especially in 2018 and 2019), this submission is structured differently than a classic research report. Firstly, I discuss the environment within which the program has been initiated and with which it has been aligned to. Secondly, I introduce the pillars and research streams with basic arguments for their relevance. Thirdly, the key competencies and knowledge areas of the participating organizations are shown, emphasizing the international element and ambitions to contribute not only to the dilemmas of the Hungarian government, but to the possibilities of broader theoretical extension of transformative governance. Finally, in the summary section, I outline how this program contributes to the Cee E-gov and E-dem conference scheme, to the Danube Region collaboration and how we plan to integrate the contributions of this community into our deliverables.

2. Digital Governance Research Program: strategic environment and objectives

Hungary´s public administration reform is entirely founded from European Social Cohesion and Structural Funds [1], [2]. The Commission has approved the key objectives and deliverables for the absorption of 795mEuro focusing on two key areas: a) reduction of administrative burden and b) enforcing service orientation and ethical operation in public services. ICT deployment, automation, process reengineering and cost reduction are included in the first set of objectives, organized into 31 projects for the value of 400mEuros. This might be considered as the hardware of public reforms in the period of 2014-2020. Software, that is human capacity development, organizational innovation, knowledge transfer and education are incorporated under the service orientation area, where Hungary has planned 15 complex programs for the amount of cc. 200mEuro. This grant entitles the National University of Public Service (NUPS) to define, plan and execute research and development programs, institutional development, and human capacity development for cc. 40 million Euros under the title: KÖFOP 2.1.2 – VEKOP – 15-2016-00001 Public Service Development for Establishing Good Governance. The Digital Governance and Research Program has been designed as part of this endeavour by two academic institutes: the Institute of E-government and the Institute of Governance involving 15 researchers form NUPS and other universities and collaborating organizations (see Table 1).

Hungary´s Public Administration and Public Service Development Strategy (PAPSD) has a dedicated section on the "development objectives for the digital government", particularly to enhance government organizational infrastructure for service orientation; to introduce government services independent from time and space, and to create knowledge intensive organizational capabilities for effective services. Not only the PAPSD strategy, but several other Programs, laws, and decrees establish the importance of using technology for achieving more effective government operations. For instance, Hungary´s Digital Innovation Plan 2014-2020 states the importance of "efficient and secure operation of a service oriented government", and this is in tight alignment with the National Innovation and R+D Strategy 2013-2020 underlining the need to improve the innovation capacity of the public sphere, especially embracing the ICT based adaptive innovation.

Our program was also designed based on apparent need that Hungary has constitutional and very high level legislative commitment to pursuing government transformation. Our constitution in XXVI. section articulates that "The Hungarian State – in order to enhance operational efficiency, the quality of public services, transparency and social inclusion – makes all possible efforts to utilize new technical solutions and scientific achievements." This is a quite enlightening mandate

for NUPS, especially given the fact that several concrete regulations point into these directions: eg. government decree 2012/2015 " the DWP ", which I outlined in the introduction, or the Act L. " on electronic security on central and local government organizations" which is one of the most forward looking Information Security Acts of Europe.

According to the mission of NUPS and its two institutions the Digital Governance Research Program has been set up to support these key strategies and the numerous programs and legal actions with high level intellectual background, knowledge transfer, and in many cases supportive empirical evidence both from Hungarian and international experiences. The concrete topics and their rational is discussed in the following 3rd section.

3. Foundations and research pillars of digital governance

The project has two foundational pillars; assessment of the technology potential what we labelled as "public information management", and related challenges of "governance". Building on these foundations, we determined three drivers of government transformation: e-services, smart governance and the innovation capability of government, as the research model is depicted in figure 1.

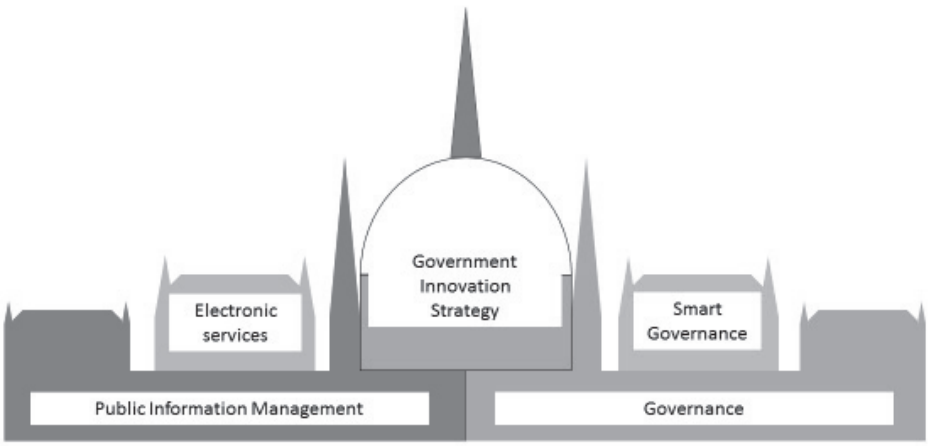

Figure 1: Pillars of the Digital Governance Research Program (DGRP)

3.1 Public Information System Management (PIM)

We classified the research design into three subsections in PIM, which are rooted in information management, technology and science-technology-society disciplines [3]. There is a vast amount of literature on ICT use on public administration, its history goes back almost to the invention time of the computer, yet due to the specialties of public demand and government operations classic business information management results should be deployed with care [4]. Regardless of the fact, that cloud services, big data achievement, business analytics and many other topics of information management have proven great efficiency in business, governments apply them with great concerns due to security reasons, the risks of national sovereignty, taxation, or social inclusion.

3.1.1 Ontology of Public Information Systems and the ICT ecosystem

Our intention is to feed the theory building with empirical data of all sorts, exploring technology and industry drivers in public systems, interrelationships between the ICT ecosystem and administration. This entails a systematic mapping and structuring of the thousands of information systems in Hungarian public administration. In this stream of investigation we would also assess the dominating technology innovations which might be relevant for public administration until 2020.

3.1.2 Success and failour factors of public information system project management

As I referred to this in the introduction, Hungarian government is going to spend 400 million Euros on more than 30 major IT projects modernizing administration. In an earlier study we have shown that in the period of 2007 – 2013, when a similar undertaking took place, result were quite ambiguous, both in deliverables and in absorption of financial resources [1]. Generally, this particular Hungarian problem appears in many other environments, which justifies the need for a thorough investigation in the area of public information project management.

3.1.3 Implications of digitalization

Our previous research experience shows, that deployment of ICT solutions and systems are mainly considered as a legislative and ICT project undertaking. This legal and technology determinism is well established, and produces a vast amount of regulations regarding procedures, and behavioural conduct. In several cases, however, implications on the complex relationships of transparency, public organizations, public policy and politics are overseen [5] – not only in the Hungarian context, - which result in unexpected outcomes. As a third pillar, therefore, we designed a stream of exploratory studies to adjust the "deterministic views" of law and technology with a "constructivist view" of policies.

3.2 Transformative Governance

The second foundational bedding of our research program reaches out to relevant concepts and theories of governance. It is clearly seen, both from the submissions to leading conferences in our field, such as the European Group of Public Administration (EGPA), the International Institute of Administrative Sciences (IIAS), NISPAcee, and the CEE E-gov E-dem, and from the papers of the most respected journals in our field e.g. GIQ or Information Polity, that identity of e-government as a "scientific field" separate from information systems is justified due to its anchoring in political science, public policy and government studies. We classified our activities also into three areas and research directions accordingly.

3.2.1 Transformation of governance from "whole-of-government" to "digital governance".

The theoretical discourse on government´s role is constantly changing [6]. Innovation of technology is one element, but there are other very important aspects from national sovereignty, boosting economic development, respond to challenges of security, ensuring social cohesion and sustainability, just to mention a few. Hungary, as a member of the European Union and as an economically very open country, needs to assess all these governance issues in the context of a complex multilevel web, where "good governance" – which is the dominant approach of the Hungarian government – is basically constantly challenged by the pressure of "doing more with

less" [6]. Systematically going through the technology-governance interplay and duality, in this section we intend to explore these broad drivers of government transformation.

3.2.2 Regional and multilevel governance

History of governments and governing has been conceptualized within national borders and limitations of space. As the role of regions has gained more recognition, the terms of sovereignty, regional governance, governmentality subnational – municipal governance have become utterly important. Governments operating in "soft-space" with multi-level approaches applying the classic proportionality and subsidiarity principles. But how does multi-level governance change with technology? Last year CEEGOV conference topic convincingly argued for the importance of this concept to understand not only the classic dimensions of "levels" such as central government and municipalities but the most recent technology induced problems, such as horizontal networks, expert participations outside administration and/or governing in the age of embedded ubiquitous technology ecosystems of smart cities. Danube Region has a special importance in this respect [7].

3.2.3 Cross-border government

In the European context, one of the greatest obstacle to achieve "regional good governance" is the administrative obstacle at borders [8]. Border regions suffer from their far distance from "government centrals" and also from parallel functionalities on the "other side". These issues are especially problematic to municipalities which are cut across with borders, where citizens´ access to services and institutions is uneven and limited. Hungary, as many European nationalities, has in this aspect great opportunities to enhance and innovate its cross-border collaboration with its neighbours. Conceptualizing "virtual citizenship", similar to the Estonian e-citizenship initiation, is a daring new vision for preserving cultural identities, nurturing relationships, cultivating business collaborations with folks living outside the borders of national states, and to provide a reasonable deployment of government "functionalities" for inhabitants in these regions .

4. Drivers of digital governance

As it is depicted in **Figure** we separated drivers of digital governance from the foundational basics. The first reason for this design approach is, that we wanted avoid the "future prediction" perspective, so instead of forecasting what will happen to government and governance as a result of technology based transformation, we choose to look at dynamics which influence the future. We do this, because, technology trends are not easy to predict from Hungary, and even in the most innovative countries, there is a great difficulty to deal with singularity and exponential rates of ICT development. Our second reason has been, that by building on the foundational areas we can ensure embeddness in theory, and using the drivers we ensure relevance for practice. With this distinction, we intend to maintain both practical relevance and theoretical rigour in our research program.

4.1 Electronic Services

4.1.1 Technology, regulation and the human interface

In order to provide efficient and effective services in the era of digital government, several technology-human interface problems need to be solved [9]. These are for instance secure authentication, identification and maintaining privacy. In the course of this research pillar, our intention is to explore – in many cases through laboratory experiments – how citizens use different

technologies, and how does regulation impact this behaviour. Our scope is not limited only to G2C or G2B directions, but to assess attitudes in relation to the participatory technologies such as social media or electronic voting [10]. The central question in this context is how behaviour, knowledge, technology functionality and regulation interacts to structure effective services.

4.1.2 Citizens view to services

Using the database of the Central Office for Administrative and Electronic Public Services (KEKKH in Hungarian) which contains several thousands of log records, service responses and qualitative assessments, we intend to analyse how citizens view electronic service delivery. In the centre of our inquiry is the false belief that classic digital divide is still prevailing (while the poor and less educated use smart-phones and internet - despite of the mainstream prejudice), and explore how to indoctrinate those 21% of population who are not interested in accessing electronic services [11].

4.1.3 Drivers of use and adoption of services

The third important driver of e-services, according to our design, is the set of soft factors, which have been neglected in the deterministic legal and technology driven IT development programs [12]. In this segment, our research approach investigates the imperative nature of service deployment: that is how active set of actions can influence awareness and motivation for using e-services. Some of the elements in our hypotheses are education, campaigning, marketing etc. and their impact on different citizen groups. Methodologically, we intend to use action research, case analysis and other “clinical” type of research, since our focus is how interventions help influencing service use.

4.2 Smart Governance

The term smartness has two main roots in contemporary thinking about governance [13]. The first, and we can say more traditional, is related to cognition, how knowledge is managed, created and distributed; and how it is supported by technology from knowledge systems, to artificial intelligence applications. The second, and more recent, is in connection with sensor technologies, ubiquitous, pervasive ICT – the so called internet-of-things (IOT) – and powerful analytics of processing the unprecedented amount of information – the so called big data. In our research model we approach this issue from two directions.

4.2.1 Knowledge governance – knowledge based public policy

In corporate setting the idea of “knowledge governance” has been in use for a while. It is partly replacing, partly expanding the classic “knowledge management” ideas. Our main questions in this context are what knowledge governance can do to support better policy design, and how this approach can be institutionalized in government procedures [14]? We focus both on central and local government.

4.2.2 Smartness in cities and in citizen relationships

This second direction exploring smartness takes almost a grassroots approach to examine how the new smart ecosystem is working. This ecosystem emerges from the symbiosis of IOTs, individual citizens, coordinating mechanisms, local governments and entrepreneurship [13]. This special form of multi-level governance, which we empirically witness in smart cities, can be conceptualized as a new platform of collaboration, impacting G2B, G2C but in many aspects C2C relationships as well.

4.3 Government Innovation Strategies and Capabilities

As Figure. shows, the third driver of digital government transformation is the most integrative one, embracing both technology management and public governance streams, aggregating them into strategic, innovation and leadership capabilities. These are crucial for successful transformation. As I argued earlier, governments need to do more with less – they need to continuously develop leadership practices and to adopt innovations.

4.3.1 "Administrategy"

In their breakthrough research, two Polish academics introduce the concept of "administrategy" with the combination of "administration" and "strategy" [15]. They argument is, that if Poland/Hungary/Romania/Ukraine want to move beyond their current state of middle-income development, it is necessary to be critical toward mainstream governance and developmental approaches, which, not so long ago, served as our unquestioned benchmarks. They illustrate with examples that sustainable solutions for local, municipal and even to central governments are to innovate their own focused strategies – their "own stories", as they put. Aministrategy combined with technology leadership might be the new way for Central Europe for catching up in global competition.

4.3.2 Dealing with the "second machine age" - the implication of industry 4.0

ICT development, artificial intelligence, robotics and the demand for advanced manufacturing has institutionalized a new human-machine collaboration era – the so called industry 4.0. This new form of information society raises many broad questions for the future of employment, policies for economic development, education, healthcare and social services at large - especially for industry development [16]. This is pivotal for Hungary, given the fact that machine industry (vehicle and automobile assembly) is a key component of Hungary´s GDP and growth potential.

4.3.3 Public Balance Scorecard and the management requirements

The third pillar of the government strategy research stream examines how management and leadership performs in the Hungarian government in terms of attitudes, motivation and concrete results. For measurement, we intend to use Kaplan and Norton´s balanced scorecard (BSC) model – assessing financial, process, human, and innovation areas – by extending it with appropriate indicators for good governance [17].

5. Partners

Collaborating partners of the research program are listed in Table TableGiven the importance of alignment with Hungary´s e-government strategies, most partners are Hungarian universities,

research centres and associations. International embeddedness and theoretical contributions to political science, information management and public administration are provided by collaboration with research partners outside of Hungary.

In order to ensure that latest technology leadership and change management research is incorporated we work together with two leading US schools in this area, and eminent scholars, who have many years of experience in this field. Alignment to regional and European development strategies are built in by building on the four-years experiences with Cee E-gov and E-Dem Conferences and the Danube Region Strategy partners mainly represented by Ludwisgburg University of Applied Sciences and University of Economics and Management in Vienna. Working together and compering empirical results with similarly developed countries as Hungary is essential to get meaningful results. Therefore, including comparative analysis from neighbouring countries, and from countries with similar historical, economic and cultural development path, we collaborate intensively with organizations in the NISPAcee network as well. Focused and close research plan is developed with one of the leading regional schools in public administration; the College of Political, Administrative and Communication Sciences at the Babes-Bolyai University.

	Institution	Country	Area/Competency
1	National University of Public Service	HU	Public Information Systems Government Theories Public Service Strategy
2	Corvinus University of Budapest	HU	IT Project Management IT cost-benefit Financial analysis of IT investments
3	Budapest Business School	HU	Smart city Digital Antropology Social Media
4	Óbuda University – Center for Digital Culture and Human Technologies	HU	Digitalization Digital Antropology Technology Adoption
5	University of Szeged – Interdiszciplinary Knowledge Management Center	HU	Knowledge mangagement E-government policy Information Society View
6	CESCI	HU	Multi-level governance, Cross-border governance Regional governance

	Institution	Country	Area/Competency
7	Magyary Zoltán E-Government Association	HU	E-services, E-government
8	College of Political, Administrative and Communication Sciences (Babes-Bólyai University)	RO	Public Administration Theory E-government E-participation
9	Department of Information Systems and Operations (WU-Vienna)	AT	ERP systems E-participation Danube-region collaboration
10	Ludwigsburg University of Applied Sciences	DE	ERP systems eID and services Danube-region collaboration
11	Robert A. Fossie School of Business (Worcester Polytechnic Institute)	USA	Technology based innovation Information Systems Management
12	University of Wisconsin, LaCross, College of Business and Administration	USA	Leadership Change management

Table 1: Collaborating partners in the Digital Governance Research Program

6. Conclusions and the way Forward

NUPS´s digital governance research program is rather ambitious regarding its indicators. During its execution time – between 2017 January and 2018 September – targets 85 different publications (papers, monographs, research reports), 10 international conferences and workshops in Budapest, participation in some 20 major international conferences (EGPA, NISPAcee, DEXA/EGOVIS, etc.), and around 15 study trips between research partners.

As for the methodologies, during the program, both quantitative and qualitative methods are planned to be used, form expert Delphi studies, through advanced internet based software development - such as web-crawlers and system dynamics simulation, - all the way to classic empirical surveys. These mix of methods will enable the partners both to explore new phenomena and to test well established hypotheses.

Finally, it is important to emphasize, that the program is open-ended both in its staffing, and its time span. We welcome researchers with ideas and publication initiatives, during the research period and after that as well. The Cee E-gov and E-dem community is a very important testing audience and sounding board to reflect on the results, and to help developing our discipline forward.

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