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ICT-Driven Co-Creation in the Public Sector: Drivers, Barriers and Success Strategies

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Abstract. Information and communication technologies (ICTs) seem to offer rich opportunities for engaging citizens and businesses in the co-creation of public policies and services, promising to fundamentally transform the way public decisions are made. However, existing empirical evidence suggests the results of collaborative innovations in public administration tend to be mostly unimpressive and hardly transformational. This doctoral research project asks why this is the case and what factors shape the success and failure of ICT-driven co-creation. These questions are addressed by a qualitative investigation of the various drivers and barriers that affect the development, implementation, diffusion and outcomes of ICT-enabled co-creation initiatives. The thesis also explores the strategies that public sector organizations could employ to avoid failure and feed success.

Keywords. public sector innovation, co-creation, e-participation, drivers and barriers, success and failure

1. Introduction

In the age of e-government, information and communication technologies (ICTs) act both as a source and enabler of innovation in the public sector [1]. Public sector innovation, i.e. the adoption of new processes, products, services and delivery methods in the public sector [2], can have an internal or an external focus, the former referring to new or improved administrative and organizational processes, and the latter to policy and service innovation [3]. Hence, ICTs hold an innovative potential both in terms of giving an impetus for novel public services (such as online tax declarations or e-residency) and providing the means for transforming governance processes, *inter alia* by enabling the development of smarter and more collaborative methods of decision-making.

This PhD research focuses on collaborative innovation in public administration, exploring the ways in which ICTs have been used and could further be used for improving decision-making and service provision in the public sector, in particular through harnessing information, knowledge, skills and perspectives that have traditionally been external to or unavailable for public sector organizations. There are several ways in which new technologies can facilitate access to information. For example, ICT applications enable the collection, analysis and combination of vast amounts of public and private data such as big data, open data, linked data, or data crowdsourced directly from citizens and service users, which can provide governments hard evidence to back up policy decisions and indicate the aspects in which public services can be

improved. ICTs also enable the aggregation of more qualitative kinds of knowledge through direct interaction with citizens, businesses, interest groups and public sector organizations, using methods such as e-consultations, wikis and crowdsourcing platforms, e-petitions, discussions in social media or even simple e-mail communication. In other words, by giving governments access to diverse sources of information and giving diverse societal groups access to decision-making, ICT-enabled co-creation has the potential to produce effective, high-quality policy outcomes and increase the perceived legitimacy of the decisions taken on behalf of the public.

However, the opportunities of technology-driven collaboration have so far scarcely been seized. Existing evidence points to the lack of transformational impact of ICTs on public sector organizations and processes [4, 5]. At the same time, online collaboration and participation initiatives seem to have a hard time delivering the expected outcomes [6-8], mobilizing a sufficient number of active users [9, 10] and engaging the disengaged segments of society [11, 12]. In fact, many of these challenges seem to be characteristic to public sector ICT projects more generally (see, for example, [13, 14]). It is thus no wonder that the technological determinism of early proponents of e-government has become widely criticized as idealistic and erroneous [5, 15], and is now increasingly being replaced by calls for a more sophisticated understanding of the various factors that affect the use and outcomes of technological solutions [16].

In order to contribute to an improved theoretical and empirical understanding of the potential and limitations of ICT-driven collaborative innovations in the public sector, this research project undertakes a study of the factors that affect the success and impact of these innovations in different stages and in different contexts. The study is driven by the following research questions:

1. What factors drive or inhibit the development, implementation, adoption and diffusion of ICT-driven co-creation in the public sector?
2. What factors affect the outcomes and impacts of ICT-driven co-creation?
3. What strategies could governments use to overcome the barriers, capitalize on the drivers and maximize the positive effects of ICT-driven co-creation?

The theoretical framework combines literature from several relevant but complementary disciplines such as public sector innovation, e-participation and information systems management. In order to develop a deeper and more realistic understanding of the issue, the framework will be refined by gathering new empirical data and engaging the perspectives of key stakeholders involved in public sector co-creation processes.

2. Theoretical background

A comprehensive account of the variety of factors that affect the acceptance, outcomes and impact of ICT-based co-creation innovations essentially calls for an interdisciplinary research approach. The research therefore amalgamates and synthesizes literature from several research fields, such as public sector innovation, information system success/failure models, e-participation and e-democracy. Some of the key research streams are briefly introduced in the following sections.

2.1. Public Sector Innovation

Over the past few decades, public sector innovation has evolved into a well-established field of study. Although the concept of public sector innovation has been criticized for a somewhat weak conceptualization in literature, some of its components commonly found in literature include the goal of producing long-lasting solutions to societal problems, breaking path dependencies and changing social relationships, enhancing collaboration and participation, and focusing on the outcomes as well as the process of innovation [1].

A large part of public sector innovation research focuses on the context of innovation, discussing the drivers and barriers that either limit or support the ability of public sector organizations to produce innovative solutions and the ability of these innovations to produce the intended social benefits. The array of potentially important factors that can affect the success of public sector innovations seems to be wide and encompassing different levels of analysis, from individuals to the broader environment. As a fitting example, a recent literature review [17] finds influential antecedents for innovation across four broad categories: environmental level, organization level, individual level and the characteristics of an innovation itself. While there seem to be no sovereign theories of ICT-driven public sector innovation more specifically, some attempts have been made (e.g. [18]) to extract the relevant drivers and barriers from different strands of literature such as public administration, management and e-government.

2.2. Information System Success/Failure

In the context of ICT projects, the issue of success and failure has received abundant attention in academic literature, evolving into a research stream in its own right. Despite varying definitions in literature of what counts as a success or failure, there is a shared understanding that the failure rate of ICT projects continues to be globally high [19]. This comes at a high price in terms of wasted resources, missed opportunities, unrealized benefits and damage to reputation [13, 20].

Therefore, much of information system (IS) management literature is devoted to researching the factors that affect IS success and failure. The issue has predominantly been approached from a rationalist angle, focusing on critical success/failure factors, which purport to predict the outcomes of ICT projects [21]. However, some authors (e.g. [20, 22]) have instead suggested more context- and process-oriented theories to better account for the social and political aspects of information systems. Indeed, IS literature highlights a number of influential factors that help explain the performance and impacts of technological innovations and have to do with environmental, organizational, social, political and cultural contexts [15, 16, 20-22].

2.3. E-Government and e-Participation

Although failure is a common problem in information systems projects both in the private and public sector, the issue has received much less attention in the context of public administration [16]. Several authors [15-16] emphasize the inherent complexity of public sector ICT projects, owing to the environmental constraints specific to the public sector and the wide range of stakeholders involved. Therefore, the challenges seem to be especially complex and stakes particularly high in the public sector. This implies the need to consider the specific context of e-government in addition to broader IS success/failure factors in studying the barriers to ICT-driven co-creation.

However, some studies explicitly point to the need to distinguish between different types of e-government projects. For example, [23] stresses the difference in the factors that matter in the success and failure of e-government projects in general and those that become important in the case of e-democracy and e-participation projects. While the focus of e-government literature has traditionally been more on online service provision and internal processes [24], the democratic functions of e-government are receiving increasing attention from both practitioner and research communities, illustrated by the growth of online participation initiatives and the emerging research fields of e-democracy and e-participation [25].

Part of the existing literature on e-participation and e-democracy also discusses the necessary preconditions for democratic participation and collaboration, which can provide helpful guidance for research on ICT-driven co-creation. However, as studies of the success of ICT-driven co-creation and e-participation projects seem to be much less frequent compared to other e-government initiatives, there is a need to develop a better understanding of the specificities of ICT projects involving citizen participation and democratic goals. An enhanced understanding of what makes for success in ICT-driven co-creation thus calls for asking to what extent the factors that affect the outcomes of collaborative and participatory projects are different from those that typically influence information systems.

Moreover, future studies of ICT projects have been suggested to further examine the relationships between the dependent and independent variables identified in existing research, study the contingencies affecting causal relationships in particular contexts [16] and conduct more interdisciplinary studies of the diverse contextual factors that affect the outcomes of e-government innovations [25].

3. Methodology

The research aims to address the existing gaps in literature by taking an expressly interdisciplinary approach to the issue of ICT-driven innovation and co-creation in the public sector. Particular attention will be devoted to investigating the wide range of contextual factors that may affect the success/failure and impact of these projects, examining the relationship between technology and context, and considering the relationships and interdependencies between different aspects of context. The aim of the research is to develop a better understanding of what factors affect, promote and inhibit the initiation, design, development, implementation, adoption and diffusion of ICT-based participatory innovations and what impact these innovations are likely to have in different contexts and at different levels, from individuals and organizations to societies.

These research objectives, in particular the focus on context, almost naturally call for a qualitative research approach. The exact methodological steps in each stage of the research are still subject to a more detailed elaboration, which will depend on the further evolution of the research. However, three main research methods constitute the backbone of the research: 1) a thorough literature review of existing research in the fields of public sector innovation, e-participation, information systems success/failure and possibly additional relevant disciplines; 2) qualitative structured and semi-structured interviews with managers, participants and target groups of ICT-driven co-creation initiatives; and 3) in-depth studies of selected cases of co-creation. While the literature review helps map the diverse drivers, barriers and success factors that are likely to affect ICT-driven co-creation innovations, qualitative interviews help refine the inventory of influential

factors and assign them relative importance based on practical experiences. Case studies then allow for a deeper study of the ways in which these different factors interact in real-life situations and contribute to the outcomes of innovations.

The key selection criteria for sources of literature include their relevance to the topic of ICT-driven co-creation in the public sector (in particular the drivers, barriers, success factors and related policies and strategies) and language (only English-language sources are included). Both theoretical and empirical studies are included, mainly those published in international academic peer-reviewed journals, with the exception of a smaller number of policy papers and reports by international organizations (OECD, European Commission) that could be considered influential in shaping the research field and public administration practice. The selection of interviewees and case studies will, in addition to relevance, also be shaped by the goal of seeking variety, i.e. the aim is to explore co-creation initiatives that differ in type, goals, scope, level of government, participants, etc. in order to identify the possible commonalities across different contexts and discover the particularities of different kinds of collaborative exercises.

At the current stage, a minor part of the research (the first case study) has been completed, part (literature review and interviews) is under way, and the majority (most of the interviews and case studies) still in planning. The first case study scrutinized the Estonian government's official e-participation platform Osale.ee, which provides an online space for public consultations on draft legislation and the submission of spontaneous policy ideas from citizens to the government. The study was conducted in 2015, motivated by the curious reputation of Osale.ee as an e-participation project that has been live for almost a decade, while being generally perceived as a failure. The study involved a review of existing assessments and analyses, policy documents and media materials, observation of the participation activity on the site and six semi-structured interviews with key stakeholders of the project within and outside the administration.

The various steps of the research have been designed to create positive synergies with ongoing research projects such as PUT773[1] and OpenGovIntelligence[2]. The latter, focusing on public service co-creation driven by the use of linked open data, involves conducting a qualitative survey among key stakeholders in six European countries in order to collect information on the drivers and barriers to open data-driven co-creation of public services, identify the pressing needs and missing capacities in this context and learn what strategies might be successful in promoting data-driven co-creation. In combination with the literature review, the results from these interviews are expected to serve as a good first-hand source of information on open data-driven co-creation as a specific kind of public sector innovation. The results from the different research activities are analyzed using qualitative analysis techniques and developed into scientific articles and conference contributions, including descriptions of specific case studies (success and failure stories) as well as more generalized conclusions on the research topic.

[1] The grant is financed by the Estonian Research and involves comparative empirical research on the governance of identity management viz. the interplay between state, business, and NGOs in the development and acceptance of identity management technologies. An interdisciplinary theoretical framework is used, synthesizing public sector innovation, public procurement and innovation and technology acceptance theories.

[2] The project "Fostering Innovation and Creativity in Europe through Public Administration Modernization towards Supplying and Exploiting Linked Open Statistical Data" involves twelve organizations from seven countries and is funded by the EU through the Horizon 2020 research and innovation program.

4. Preliminary Findings

While the majority of the research still lies ahead, the existing part of the literature review and the case study of the Estonian e-participation project Osale.ee allow for a cautious discussion of some of the possible drivers, barriers and success/failure factors that may turn out to be important for ICT-driven co-creation. However, the following paragraphs do not purport to be anything more than just some very first ideas.

Public sector innovation literature proposes a number of influential factors across different levels, from individuals to organizations to broader environmental enablers and constraints. For example, a recent comprehensive literature review [17] outlines the following drivers and barriers to the generation and diffusion of public sector innovations: environmental pressures (media attention, political demands, public demands), participation in networks and inter-organizational relationships, regulatory aspects, isomorphism, competition with other organizations, slack resources, leadership styles, degree of risk aversion/room for learning, incentives/rewards, conflicts, organizational structures, employee autonomy, organizational position, job-related knowledge and skills, creativity, age and gender, commitment to job, shared norms and innovation acceptance. They also find that the characteristics of the innovation itself become important in the adoption/diffusion phase – this includes ease of use, relative advantage, compatibility, cost, etc. Similarly, more practice-oriented expert reports [3] have emphasized the importance of barriers such as scattered competences, ineffective governance, diverse legal and administrative cultures, resource constraints, inadequate coordination, lack of leadership, rigid rules, risk-aversion, lacking innovation capabilities, lack of collaboration, lack of systematic measurement and monitoring of the outcomes of innovations.

In addition to this extensive inventory of potentially relevant factors, one of the interesting findings so far has been the context-specificity of these factors and their impact on innovation. Several sources [1, 17, 18] claim that one and the same factor can act as a driver in some contexts and as a barrier in others. Moreover, they argue that it is often the specific context that determines whether a factors acts as a driver or barrier in relation to an innovation.

In the narrower domain of ICT-driven public sector innovation, the following factors have been found to be of influence [18]: isomorphism, competitive pressures, economic growth, education and ICT literacy, social trust, organizational slack, inter-institutional collaboration, active innovation leadership by managers, strong political support, employee autonomy, employees' (ICT) skills, proper training and change management strategies as drivers; organizational silos, risk-avoidance, organizational inertia, reluctance to shut down failed projects and political conflict as barriers; and legislation, existing ICT infrastructures, demand-side behavior and the perceptions of the usefulness and benefits of innovation by public sector officials as significant determinants of adoption and diffusion.

Several of these factors reflect the findings from IS success and failure literature. Empirical studies in the IS field have outlined a multitude of factors that can affect the outcomes information systems, from technical flaws to the broader context in which information systems operate. For example, an extensive literature review [14] found far over fifty possible failure factors, related to project content, complexity, technology, management, users, resources, organizational context, broader environment, etc. However, failure much more often tends to be related to social and organizational than technical factors [21].

These conclusions were also confirmed in the case study of Estonia's Osale.ee. While the online environment was found to have several flaws in terms of design and usability, its users and stakeholders did not consider this a major failure factor. Instead, the complexity of the context of e-government and e-participation came into play, including the difficulty of stimulating its take-up by potential users, matching different stakeholder expectations, contested views on where and how democratic dialogue should happen and cultural barriers to collaboration, which were further complicated by lacking political support and administrative leadership, poor integration of the project into policy-making processes, and poor efforts of innovation management.

Against this background and the findings from literature, the drivers, barriers and success factors that could be potentially important for participatory and collaborative innovations in the public sector include broader environmental preconditions such as access to technology, existing ICT infrastructures, social trust and a well-developed civil society [26]; barriers related to the specific complex characteristics of the public sector (see the discussion in section 2.3); political support and innovation leadership [26, 27] as a critical driver; drivers and barriers related to the public sector organizations involved in co-creation initiatives, such as existing organizational routines and inertia, and slow pace of institutional reform as a barrier to impact [16]; culture and attitudes, in particular openness to innovation and citizen engagement [24, 26], risk-aversion and failure-avoidance [28]; demand-side barriers such as lack of take-up of e-participation initiatives [9, 11-12]; the characteristics of the innovation itself, including the extent to which stakeholders' expectations are met in its design, the need for information accessibility, feedback mechanisms and ease of use [25, 26, 29]; and finally, the level of integration of co-creation and participation projects into political and institutional procedures [29, 30]. In addition to political support, the latter seems to be one of the crucial factors in the success or failure of co-creation projects, which deserves particular attention.

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