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Integrated Public Service Co-Creation: Objectives, Methods and Pilots of inGov project

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Abstract: An increasing number of Public Authorities (PAs) provide or plan to provide electronic public services in an integrated way according to end-users needs. Integrated Public Services (IPS) have been studied in the academic literature however guidelines and roadmaps for PAs are still missing despite relevant European Union efforts, such as the European Interoperability Framework. At the same time, service co-creation is attracting considerable attention. In this paper we outline the aims, methods and pilots of the inGov project. inGov is a 3-year project funded by the European Union under the Horizon 2020 research programme. inGov project aims to merge work on IPS and public service co-creation along with new technologies, particularly mobile and chatbots. The project results will be deployed and evaluated by PAs in four EU Member States.

Keywords: Integrated Public services, Public Service Co-creation, Interoperability, inGov project.

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1. Introduction

The provision of user-centric digital Public Services (PS) is a top political priority for the European Union. This is evident in eGovernment policy documents such as Tallinn and Berlin declarations [1][2]. PS provision at the European but also national level often requires different Public Administrations (PAs) to work together to meet end users' needs and provide public services in an integrated way [3]. However, Integrated Public Services (IPS) provision faces significant challenges. To assist, the European Union has included a relevant conceptual model in the current version of the European Interoperability Framework (EIF) [3].

PS and IPS design, implementation, and delivery are usually perceived as activities performed exclusively by PAs. This however tend to change with the introduction of PS co-creation. It is now widely argued that co-creation can increase PS quality and legitimacy. As a result, governments increasingly share with citizens the responsibility in PS provision in order to improve efficiency and effectiveness, increase responsiveness to users' needs, enhance the democratic level, and restore

trust in government [4]. At the same time, advances in technology make co-creation easier to implement, while cultural shifts – such as a decline of traditional authority – change the position of PS professionals and make it more accepted that citizen-users as non-experts, or rather as experts-by-experience, take up responsibility [5].

Significant research has been performed in the areas of IPS and PS co-creation. These, however, often neglect the European policy context. As a result, there is a need for advancing and combining existing policy and research work on IPS delivery and PS co-creation.

The main objective of this paper is to present inGov, an EU-funded project recently launched to provide inclusive governance models and ICT tools for IPS co-creation and provision.

The rest of this paper is organised as follows. In section 2, related work and motivation for this project is presented and in section 3 the overall project objectives are listed. In section 4, the project components and methodology is outlined while in section 5 the project's foreseen pilots are outlines. Finally, in section 6 conclusions and directions for future work are provided.

2. Related Work and Motivation

For many years, the European Union (EU) is working towards providing policy context and practical support for Integrated Public Service (IPS) delivery. Relevant strategic guidance can be found in Tallinn ministerial declaration on eGovernment and Berlin ministerial declaration on digital society and value-based digital government [1][2]. At the operational level, the European Interoperability Framework (EIF) ver. 3.0 [3] holds a prominent position. At the more technical level, the the European Interoperability Reference Architecture (EIRA) ver. 4 has been recently issued. At the software level Connecting Europe Facility (CEF) building blocks have been released. At the conceptual level, an IPS model is included in EIF while the Core Vocabularies families provide data models for public services (namely CPSV) amongst others.

However, these EU policy documents, guidelines and roadmaps cannot fully capture today's complexity. For example, documents such as EIF and EIRA seem sufficient when assuming that one PA controls all data and services needed for providing IPS. This however might not be the case as data and services are often shared by different PAs while the private sector and NGOs are increasingly contribute in IPS provision.

In addition, a number of co-creation models and methods have been proposed for single PS design and delivery. Currently, however, we are missing IPS co-creation methods and governance models where a number of (public) services are integrated and a multitude of stakeholders are involved with different roles. Additionally, many forms of co-creation copy the ills of traditional PS delivery, emphasizing divisions of tasks and specialized skills [4]. Rather, models are needed that integrate across specializations and provide transversal coordination; thus not only enabling PAs to contribute to integrated, cross-cutting PS programs but also growing a co-creation oriented culture wherein stakeholders – including business, non-profit, and (groups of) citizens – are motivated and empowered to take up responsibility in IPS.

At the same time, technology is advancing at tremendous speed. New technologies, such as mobile communications, chatbots, artificial intelligence, knowledge graphs and linked data provide new opportunities for IPS in a new world where organisations are more connected than ever before and constitute parts of global value chains (e.g. [6][7]). In particular, mobile technologies are particularly promising as they are widely spread across the entire population and are universally used by all social groups. The 2019 EU eGovernment benchmarking report indicates that "Improving mobile friendliness is important to raising User centricity" but also that currently "users accessing eGovernment services through mobile devices encounter barriers in one out of three websites as two-thirds is available on mobile friendly websites"[8].

3. inGov Objectives

The inGov project has been designed to overcome some of the limitations listed in the previous section. The vision of the project is to enable European PAs to co-create user-friendly, integrated PS accessible via mobile devices to all, particularly the disadvantaged, resulting in increased adoption, efficiency, effectiveness, trust and satisfaction. The main aim is to support Integrated Public Service (IPS) co-creation and delivery. The focus is on exploiting co-creation methods and the wide adoption of mobile devices to reap the benefits of eGovernment principles.

For this purpose, inGov will develop a comprehensive IPS Holistic Framework that will include (a) IPS governance (structure), (b) IPS agreements between stakeholders (e.g. interoperability agreements, service level agreements, outsourcing, bilateral agreements etc), (c) stakeholders involvement guidelines, (d) implementation and migration guidelines, and (e) an agile roadmap. This framework will enable identifying and addressing relevant legal, cultural and managerial challenges. The framework will particularly support mobile applications and a relevant mobile reference architecture. In addition, inGov will develop a sustainability plan to safeguard the long-term use of the IPS framework and will provide policy recommendations for enhancing existing EU work with our findings.

In addition, inGov will deploy, operate and evaluate these results in four EU member states targeting more than 160,000 citizens. More specifically, inGov results will be deployed in Malta to modernise the digital family household public service (affecting 200,000 households), in Austria to deploy IPS for collecting tourism tax (affecting 3,200 accommodation providers), in Greece to digitise the disabled card renewal service (benefiting 11,500 disabled, low-income citizens) and in Croatia to create AI-driven virtual assistants and services (affecting 32,000 citizens).

Finally, inGov will evaluate citizens' satisfaction and increase in trust in public institutions and contribute to establishing a culture of co-creation and co-delivery, transparency, accountability and continuous consultation. The project aims to feed its results back to EU policies hence achieving alignment between policies, research and practice.

4. inGov Methods

The inGov main components include [9][10]: (1) Stakeholders Input, (2) IPS Co-creation Conceptual Models, (3) IPS Holistic Framework, (4) ICT Architecture and Tools, (5) Pilots and Evaluation, (6) Sustainability and Policy Recommendations. The methods of work to be used for performing the tasks are outlined.

First, inGov aims to involve stakeholders in all project stages and developments. At the beginning, inGov will elicit the needs of stakeholders in pilots using interviews. Additionally, other methods will be also explored. For example: (a) focus groups discussions or paired interviews especially for engaging with vulnerable/ disadvantaged groups, (b) a two-round participative Delphi interview process, wherein in first stakeholders are asked to provide input (round 1) and then rate this input provided as to their relevance in round 2, (c) at the stage of piloting, living labs may be used, i.e. user friendly environments for open innovation, with an early and continuous involvement of users.

Second, inGov will gather and collect scientific papers and policy documents containing eGovernment principles relevant to IPS co-creation and delivery. These documents will be coded and analysed. The final result will be a list of IPS principles properly organised (e.g. as a taxonomy or ontology). Based on that, CPSV and IPS conceptual model included in EIF [3] will be enhanced to support IPS co-creation and delivery (e.g. [11]). Third, an IPS holistic framework will be developed for IPS co-creation and delivery. This work will involve the use of systematic literature review method and the use of multiple use case research methodology. For the latter, five European IPS best practices identified in the ISA2 IPS Governance study [12] will be in-depth analysed.

Fourth, a novel architecture will be developed capitalising on both established and emerging technologies to support the conceptual work and IPS holistic framework. The development process will be based on an agile model that focuses on 'agility' and 'adaptability' in development. The approach also reflects basic principles of design (science) research methodology. Design research begins by identifying current problems that need to be solved or potential opportunities for improvements in an actual application environment consisting of people, organizational systems and technical systems. Then, it defines the objectives for a solution, designed and develops an artifact, demonstrates and evaluates the use of the artifact, and communicates the results.

Fifth, the holistic framework and ICT tools will be deployed in four member states, which are the project's pilots. In each case, user acceptance will be evaluated using a new acceptance model that will be constructed for that purpose based on previous work such as Technology Acceptance Model [13], E-Government Adoption Model (GAM) [14], and eParticipation acceptance model (ePAM) [15]. Finally, a sustainability plan will be produced to ensure long-term sustainability of the framework and tools. The sustainability of the constructed models and holistic framework is facilitated by its design: instead of constructing new models from scratch, the project aims to enhance existing EU work (e.g. CPSV, EIF IPS model, etc).

5. inGov Pilots

inGov results will be deployed and evaluated in four pilots. These were selected to reflect different end-users (citizens vs businesses), societal groups ephasising the disadvantaged (disabled, low-income etc), authority levels (regional vs local) and eGovernment maturity levels.

Pilot #1: Modernisation and integration of the digital common family household public service in Malta. Currently, IPS that require accessing multiple registries (databases) are cumbersome to implemet. For example, a recent IPS required the identification of family units in households in Malta for issuing an one-time payment to compensate for the increase of bread and milk prices, as announced in the Malta Government Budget 2020. This task required merging three datasets from three different departments, where each used different schemas and language (English and Maltese). This challenge puts at risk the timeliness of implementation of social measures that a dynamic economic scenario may require and hinders the provision of proactive services. To solve these interoperability issues and administrative burden, it is vital to have the capability of extracting and defining family units within households in an agile manner, where information from various entities will be used in line with specific requirements for the provision of IPS. Through this pilot, the project partners will exploit the co-creation roadmaps, guidelines, governance models, and tools that will be developed in the framework of inGov to modernise this family household PS whilst also taking into account stakeholders input and feedback.

Pilot #2: Creating an AI-driven mobile virtual assistant and a common PS platform for citizens of the City of Bjelovar. The City of Bjelovar is a digital champion in Croatia, offering a range of communal services to its citizens, ranging from social services and getting approvals for benefits payments, to the ability to see every payment from the city budget to any other party. However, while citizens are aware of these services, they are not used as frequently as the city administration hoped. This pilot aims to envision, design, and deliver a universal virtual assistant for PS of the City of Bjelovar that would serve as a platform for existing services but also a framework on top of which all future services would be developed and integrated. This pilot will result in a mobile app developed to interact with existing disparate services and encompassing them in a uniform, simple, accessible, and enjoyable to use experience.

Pilot #3: Reengineering and digitalization of the issuing and renewal procedure of the disabled citizens discount cards for public transportation in the Greek Region of Thessaly. In Greece, disabled low-income citizens, suffering over 67% disability, are eligible for a transport card from the Greek Regions in order to travel free with inner-city public transportation and to pay half price in inter-city public transportation. This process is currently performed with physical visits at the relevant PA offices. The aim of this pilot is to use the inGov IPS co-creation roadmaps, guidelines and governance models as well as the foreseen ICT platform and tools, in order to reengineer and simplify this service in collaboration with stakeholders. Ultimately, this PS will be provided proactively as a co-created IPS exploiting emerging technologies, especially mobile apps, thus reducing administrative burden.

Pilot #4: The Lower Austrian integrated web-based solution for Public Geolocation Services. The objective of this pilot is to improve a PS workflow and consequently simplify PA employees' and service

users' everyday work through the use of a web-based solution exploiting geo-spatial data (e.g. tourism tax collection based on the Lower Austrian Tourism Law § 12 NÖ Tourismusgesetz 2010, LGBl. 7400) and mobile communications, in order to provide integrated high-quality services, faster response rates and thus reduce administrative burden. The mobile app, which will be co-created with stakeholders, will recognize the location of the applicant, i.e. the accommodation provider, and subsequently will record the relevant geographical data indicating the location of the service-user.

6. Conclusions and Future Work

Integrated Public Service (IPS) co-creation and delivery is particularly important to advance eGovernment in EU Member States. In this paper, aspects of an EU-funded project, namely inGov, is outlined. The overall approach of inGov is to have ambitious goals but also start from existing EU policies and political priorities. inGov is based on four pillars. The first pillar is an enhanced IPS co-creation conceptual model which explicitly supports co-creation and the EU values and principles. The second pillar is an IPS holistic framework that covers all IPS aspects including IPS governance, IPS agreements between stakeholders, stakeholders involvement, implementation guidelines, an agile roadmap as well as a relevant sustainability plan and policy recommendations. The third pillar is the focus on mobile applications and chatbots thus concentrating on mobile devices as main communication channels. The fourth pillar is learning from existing best practices but also developing and deploying new IPS in diverse areas including IPS for social benefits in Malta, for tourism tax in Austria, for disabled in Greece and for informing the general population in Croatia.

References

[1] European Commission, (2017), Ministerial Declaration on eGovernment - the Tallinn Declaration, available at: https://digital-strategy.ec.europa.eu/en/news/ministerial-declaration-egovernment-tallinn-declaration

[2] European Commission, (2020), Berlin Declaration on Digital Society and Value-based Digital Government, available at: https://digital-strategy.ec.europa.eu/en/news/berlin-declaration-digital-society-and-value-based-digital-government

[3] European Commission, (2017). "New European Interoperability Framework Promoting seamless services and data flows for European public administrations," available at: https://ec.europa.eu/isa2/sites/isa/files/eif_brochure_final.pdf.

[4] Brandsen, T.; Steen, T. & Verschuere, B. (2018). Co-Creation and Co-Production in Public Services: Urgent Issues in Practice and Research, in Brandsen, T.; Steen, T. & Verschuere, B. (eds.) Co-Production and Co-Creation. Engaging Citizens in Public Services, Milton Parks: Routledge, pp.3-8.

[5] Steen, T. & Tuurnas, S. (2018). The Roles of the Professional in Co-Production and Co-Creation Processes, in Brandsen, T.; Steen, T. & Verschuere, B. (eds.) Co-Production and Co-Creation. Engaging Citizens in Public Services, Milton Parks: Routledge, pp.80-92.

[6] Shareef, M.A., Kumar, V., Dwivedi, Y.K., Kumar, U., (2016), Service delivery through mobile-government (mGov): Driving factors and cultural impacts. Information Systems Frontiers, 18 (2), pp. 315-332.

[7] A. Androutsopoulou, N. Karacapilidis, E. Loukis, Y. Charalabidis, (2019) Transforming the communication between citizens and government through AI-guided chatbots, Government Information Quarterly, Vol. 36, No. 2, pp. 358-367.

[8] European Commission, DG Communications Networks, Content & Technology, (2019). "eGovernment Benchmark 2019 Empowering Europeans through trusted digital public services", available at: https://ec.europa.eu/digital-single-market/en/news/egovernment-benchmark-2019-trust-government-increasingly-important-people

[9] Efthimios Tambouris and Konstantinos Tarabanis (2021) "Towards Inclusive Integrated Public Service (IPS) Co-Creation and Provision", 22nd Annual International Conference on Digital Government Research (dg.o 2021), pp. 458-462.

[10] Efthimios Tambouris and Konstantinos Tarabanis (2021) "Inclusive Governance Models and ICT Tools for Integrated Public Service Co-Creation and Provision: The inGov project", 22nd Annual International Conference on Digital Government Research (dg.o 2021), pp. 538-539.

[11] Alexandros Gerontas, Vassilios Peristeras, Efthimios Tambouris, Eleni Kaliva, Ioannis Magnisalis, and Konstaninos Tarabanis (2021) "Public Service Models: a systematic literature review and synthesis". IEEE Transactions on Emerging Topics in Computing, April-June 2021, vol. 9, pp. 637-648.

[12] European Commission. (2020). ISA2 Recommendations for organising and governing integrated public services, available at https://op.europa.eu/en/publication-detail/-/publication/717f26a7-722b-11ea-a07e-01aa75ed71a1/language-en

[13] Davis, F.D., (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly: Management Information Systems, 13 (3), pp. 319-339.

[14] Shareef, M. A., Kumar, V., Kumar, U. and Dwivedi, Y. K. (2011). e-Government Adoption Model (GAM): Differing service maturity levels, Government Information Quarterly, 28 (1), 17-35.

[15] Panopoulou E., Tambouris, E and Tarabanis, K. (2021). An eParticipation acceptance model. IEEE Transactions on Emerging Topics in Computing, 9(1), 188-199, DOI: 10.1109/TETC.2018.2861426.

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