EXPLORING THE MATURITY OF SMART PUBLIC GOVERNANCE: EVIDENCE FROM TWO POLICY SECTORS IN SLOVENIA

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This paper applies a case study approach to test a multi-attribute decision-support model for assessing smart public governance maturity in real-life settings. Developed on prior research, verified through synthetic cases, and validated through expert focus group discussions, the model enables a structured, criteriabased assessment of smart public governance maturity across four dimensions: ICT-enabled innovations for public sector governance, institutional changes, empowered citizens, and outcomes: public value creation. Two public administration organisations in charge of policy making in Slovenia, each operating in a distinct policy sector, were used as case studies for testing the proposed assessment tool. Data were collected through semi-structured interviews with policy makers, and responses were aligned with predefined attribute value scales. The findings confirm that the model can be applied in practice as a useful tool for public sector organisations seeking to assess their smart public governance maturity level and identify areas for further improvement.

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1 Introduction

As a research domain, smart public governance (SPG) is only emerging. Nevertheless, it has received growing scientific and policy attention, particularly due to its potential to address complex socio-economic challenges and public policy issues. A crucial first step for any government striving to advance SPG is to assess its current maturity level. Such an assessment enables public sector institutions, including those responsible for policy making, to understand where they stand and to identify actions that need to be taken to make progress. However, in searching for a suitable assessment tool, we encountered a problem. While a few frameworks, toolboxes, roadmaps, and models for assessing SPG have been proposed by scholars (notably Ruijer et al., 2023; Lin, 2018; Šiugždiniene et al., 2017; Bolívar & Meijer, 2016; Scholl & Scholl, 2014), these efforts have left room for further research, as they remain theoretical and lack empirical validation that would make them applicable in real-life settings. Considering these challenges, a multi-attribute decision-support model (hereinafter referred to as "the model") was developed based on the Decision Expert (DEX) - a qualitative, hierarchical, rule-based method within the Multi-Criteria Decision Analysis (MCDA) family (Berčič et al., 2024; Vrbek & Jukić, 2024; Bohanec, 2022: 2017: 2012; Jukić et al., 2022; Dobnik et al., 2018). Assessing SPG maturity requires the consideration of qualitative criteria, making DEX a suitable method for qualitative multi-attribute modelling. This approach is particularly well-suited for solving less formalised problems and has already been successfully applied in various real-life decision-making contexts (Kljajić Borštnar & Pucihar, 2021). The developed model is briefly outlined in Section 2.1 of this paper.

In this context, the study sets out to test the model in a real-life setting, establishing a "social experiment" aimed at demonstrating its practical usefulness. The main research question this paper seeks to answer is: *Can a previously developed multi-attribute decision-support model be effectively applied to assess and compare SPG maturity levels in public administration organisations in charge of policy making (PAO-PM)?*

This paper is structured as follows. Section 2 outlines the methodology, including the development of the model and the case study design. Section 3 presents the results of the SPG maturity assessment conducted in two PAO-PM, structured around four aggregated attributes (criteria). Finally, Section 4 discusses the key findings and outlines the study's limitations.

2 Methodology

2.1 Development of a multi-attribute decision-support model

The model for assessing SPG maturity was developed following the Design Science Research (DSR) approach (Dresch et al., 2015). The development process included four main steps:

- We conducted a structured literature review, i.e., a content analysis of Web
 of Science and Scopus papers. The analysis focused on the concept of SPG,
 including related terms such as smart city governance, smart urban
 governance, smart local governance, and smart public administration.
 Despite being different concepts, these terms have been used by scholars in
 developing frameworks, toolboxes, roadmaps, or models for measuring
 SPG at both local and national levels.
- 2. We developed the model using the DEX methodology.
- 3. We verified the model using 20 synthetic cases, in which input values for the basic attributes (criteria) were randomly generated using Random.org a true random number generator (Haahr, 2004; 2006; Bigger et al., 2008).
- 4. We validated the model by organizing two focus group discussions with experts, who participated either in face-to-face or online workshops to discuss the model's attributes (criteria), hierarchical structure, and domain values (attribute scales).

Fig. 1 shows the developed model, implemented in DEXi and drawn in a DEXiTree, a companion tool to the DEXi software (Bohanec, 2025: 2024: 2007; Jereb et al., 2003). The model root attribute, "assessment of SPG maturity", serves as the main output, having no parents and representing the highest level of aggregation. It is divided into four aggregated attributes (also known as subtrees): "ICT-enabled innovation for public sector governance," "institutional changes," "empowered citizens," and "outcomes: public value creation." Each of these subtrees has at least one descendant $S(x) \neq \emptyset$, and is therefore considered a partial output of the model. The first subtree is further subdivided into three aggregated attributes ("use of

technology," "use of data," and "privacy and security"), which are then decomposed into basic attributes with no descendants $S(x) = \emptyset$ and serve as model inputs. Overall, the model consists of 20 basic and 8 aggregated attributes, following the DEX method recommendation that complex decision-making occurs at higher hierarchical levels, while the number of attributes (criteria) decreases from lower-level to higher-level (Bohanec, 2012).



Figure 1: Developed model implemented in DEXi and drawn in a DEXiTree – align algorithm

2.2 Case study design

This study applied a qualitative case study approach to assess the maturity of SPG in two PAO-PM in Slovenia. These cases were selected based on their potential to provide rich informational content, as they operate in distinct policy sectors – one PAO-PM is responsible for science, technology and innovation policy, while the other oversees information society.

Interview instrument: the developed model consists of 20 basic attributes (criteria), each operationalised through a structured question with three predefined response options. These options represent ordinal attribute value scales (see Fig. 1) and were randomly ordered to minimise response bias. To encourage deeper reflection, each question also included an open explanation box, where policy makers justified their responses and provided practical examples. The responses from the policy makers

were used to determine the values of the model's basic attributes (criteria), which were then aggregated by the model to assess the overall SPG maturity.

Data collection and analysis: data were collected through in-person, semi-structured interviews with key policy makers from the two PAO-PM. One interview was conducted in October 2024 and the second in November 2024, each lasting approximately two hours. The interviews were conducted in Slovenian, audio-recorded, transcribed, and supplemented with field notes. The author coded the transcripts, aligning the responses with the attribute value scales defined in the model. Preliminary findings were shared with the policy makers in December 2024, followed by a short verification discussion in January 2025 to confirm whether the findings reflected the SPG maturity in their PAO-PM.

3 Results

Based on policy makers' responses, the model derived the final assessment of SPG maturity. As can be seen in Fig. 2, PAO-PM_1 was assessed as "good", while PAO-PM_2 was assessed as "very good" in terms of SPG maturity.



Figure 2: Assessment of SPG maturity, drawn in DEXiWin - linear chart

The remainder of this section presents the results for PAO-PM_1 and PAO-PM_2, structured around the four aggregated attributes (subtrees) of the developed model (see Section 2.1).

3.1 ICT - enabled innovations for public sector governance

The analysis showed that in both PAO-PM, most administrative (bureaucratic) processes, including human tasks, are not automated (see Fig. 3). Civil servants use various information systems (e.g., Krpan, Skrinja), which provide support for the performance of their tasks. However, these information systems, as functional tools, still require human intervention and do not operate in a fully automated manner. Furthermore, neither of the two PAO-PM provides a virtual assistant (chatbot) to citizens on their website (see Fig. 3). According to the policy makers we interviewed, the use of citizen-facing virtual assistants (chatbots) in the state administration is still in its embryonic phase. In addition, decisions taken rely solely on the experience and knowledge of the decision makers, without any support from AI algorithms (see Fig. 3). In PAO-PM_1, to some extent, integration of AI into a computer application improves public service delivery by optimising internal processes through back-end systems. On the other hand, PAO-PM_2 pointed out that AI currently has no impact, since functional tools are not supported by AI (see Fig. 3).

We found that both PAO-PM have in-house data stewards (see Fig. 3). While in PAO-PM_2 data is used in various stages of policy making, and decisions are always data-driven, PAO-PM_1 uses data in some stages of policy making due to the nature of the state administration, which functions as the administrative machinery of the state, reflecting its bureaucratic approaches to decision making (see Fig. 3). Similarly, PAO-PM_2 regularly (systematically) monitors its data re-use by users on the Open Data Portal – OPSI. Meanwhile, PAO-PM_1 monitors data re-use by users only when information on data re-use is requested (see Fig. 3).

Civil servants in both PAO-PM receive regular mandatory educational trainings on IS privacy and security (see Fig. 3), organised by the Administration Academy. In addition, civil servants may attend other non-mandatory workshops which are available according to their needs. In PAO-PM_2 all civil servants (regardless of their role) are aware of regulations governing the handling of sensitive (special categories of personal) data. Meanwhile, in PAO-PM_1 those civil servants who handle sensitive data know how data should be handled when transferred and stored (see Fig. 3). Resilience is a top priority for both PAO-PM, and civil servants are well informed about the security threats and practical guidelines on how to manage them (see Fig. 3).



Figure 3: Assessment of the subtree: ICT – enabled innovations for public sector governance, drawn in DEXiWin – linear chart

3.2 Institutional changes

Information systems in both PAO-PM are interoperable, enable data semantics, and support the seamless distribution of information sources. However, PAO-PM_1 points out that the lack of interoperability among other information systems within the state administration hinders data and information distribution (see Fig. 4). According to the policy makers we interviewed in PAO-PM_2, efforts to break down silo mentality are ongoing and have resulted in a shift towards a different leadership style (switching to coaching). In addition, PAO-PM_1 noted that silo mentality is often perceived as beneficial by groups with a certain level of power and political control, leading to a lack of interest in breaking down silo mentality (see Fig. 4).

While PAO-PM_2 uses the 180-degree method to evaluate digital competence of civil servants, in PAO-PM_1, the digital competences are assessed solely based on employee task performance (see Fig. 4). In both PAO-PM, organisational climate is measured annually using a questionnaire. However, while in PAO-PM_1 the result does not lead to concrete changes, in PAO-PM_2 they are used to plan organisational interventions (see Fig. 4).



Figure 4: Assessment of the subtree: Institutional changes, drawn in DEXiWin - radar chart

3.3 Empowered citizens



Figure 5: Assessment of the subtree: Empowered citizens, drawn in DEXiWin

The analysis showed that both PAO-PM engage with citizens through different channels, including digital platforms for citizen engagement (e.g., eZakonodaja, eDemokracija, Stop birokraciji, Predlagam vladi), as well as public meetings and debates held in physical or digital spaces (see Fig. 5). However, in PAO-PM_1, citizens do not participate in the drafting of the initial rulemaking due to a lack of active citizenship and potential conflict of interests (influencing regulatory processes and outcomes). In addition, in both PAO-PM citizens' voices matter – proposals or

opinions are considered (see Fig. 5), and acquired feedback is provided, even when initiatives cannot be considered.

3.4 Outcomes: public value creation

According to the policy makers we interviewed in PAO-PM, the goals are clearly defined and monitored at the operational level (see Fig. 6). However, setting strategic goals is more challenging due to their political nature. At the tactical level, goals can also be difficult to achieve, as public authorities may lose competencies at the end of their mandate. Both PAO-PM open proposed regulations and drafts policies to the public (see Fig. 6), yet in PAO-PM_1, the standard 30-day public comment period is not always observed. In practice, citizens contribute to the co-production of public policies and services (see Fig. 6) rather than full co-creation. Additionally, both PAO-PMs monitor perceived trustworthiness in government (see Fig. 6), but not citizen trust in their own organization.



Figure 6: Assessment of the subtree: Outcomes: public value creation, drawn in DEXiWin – linear chart

4 Conclusion

The main objective of this study was to explore whether a previously developed model can be effectively applied to assess and compare SPG maturity levels in PAO-PM. The findings revealed several key weak points that PAO-PM need to address to advance their maturity in SPG.

The use of emerging technologies (such as RPA – robotic process automation, and AI-driven processing mechanisms) to automate human tasks, assist in the information provision to users, enhance decision-making processes, support evidence-based policymaking, and improve public service delivery remains largely absent in practice – primarily due to a complex legal and regulatory landscape. Attempts to implement RPA for rule-based routine process automation have failed in the past due to centralized ICT infrastructure, which prevents non-central authorities from intervening in the system. Adopting AI in state administration is a challenging process involving organisational, ethical, and legal barriers. In response, guidelines are being drafted to define the extent to which civil servants may use large language models (LLMs) and other AI-based text-generation tools, given the long-term risks associated with handling sensitive and confidential data. A shortage of data analysts further limits data-driven policymaking, as the volume and variety of collected data often remain underutilised.

Furthermore, the lack of architectural interoperability in state administration hinders information integration and cross-organisational sharing. This directly restrains the full digitization of procurement processes, preventing the sole use of electronic tendering systems. In addition, the fragmentation of digital public services across multiple platforms limits interoperability and user experience. The persistence of silo mentality is not rooted in bureaucratic structure per se but in the mindset of certain groups, which hinder collaboration across departments. Although digital upskilling initiatives exist, low digital self-awareness among civil servants reduces motivation in optional training programmes.

While formal mechanisms for citizen engagement are in place, opportunities for true co-creation of public policies and services with public and private actors remain limited. This is primarily due to strict regulatory frameworks designed to ensure transparency and prevent undue influence on decision-makers. In practice, due to undergo legislative process, emergency situations, or international obligations and commitments, public authorities occasionally provide less than 30 days for public consultation on proposed regulations and draft policies. Citizen trust in public authorities is closely tied to general trust in the political system. The absence of a meritocratic system makes institutional trust more vulnerable to political fluctuations.

Finally, it is important to acknowledge the limitations that characterize this study, as they may represent valuable starting points for further research. First, the maturity of SPG has so far been assessed in only two PAO-PM. Therefore, additional applications are needed to confirm whether the developed model is capable of generating new knowledge and remains context-appropriate across a broader range of policy sectors. Second, as the model was validated by a group of experts in Slovenia, we acknowledge that it may reflect country-specific conditions when assessing SPG maturity. Consequently, this paper leaves the door open for further research, particularly to test the model in different countries, administrative traditions, and organisational settings to ensure its broader applicability.

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