

# Decision-making modelling in smart public administration: from theory to best practices

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## Abstract

This research examines how public administration utilizes digital solutions to facilitate informed decision-making and the development of effective public policy. The article discusses the theoretical framework of decision-making modelling in public administration, identifies the primary decision-making tools, and evaluates how these tools have enhanced efficiency and transparency in administrative processes. The study examines the primary theoretical models and assesses how digital technologies, including artificial intelligence, are employed to inform policy-making and decision-making. Furthermore, the article identifies key limitations and barriers in integrating digital technologies into decision-making, including ethical considerations and data quality issues.

**Keywords:** decision-making modelling, smart public administration, artificial intelligence, digital governance.

## 1. Introduction

The decision-making process lies at the core of public administration, shaping how policies are formulated, resources are allocated, and public services are delivered. In a context of accelerated digitalization, public administrations are compelled to reconfigure traditional decision-making models to address the growing complexity of social, economic, and technological challenges.

Smart public administration has emerged as a response to the need to modernize institutions and to the pressure to use data, algorithms, and information systems to support decision-making. Technologies such as artificial intelligence (AI), big data, geographic information systems (GIS), and e-governance platforms enable the collection, integration, and analysis of large volumes of data, supporting scenario analysis, trend prediction, public consultation, and process automation.

This transformation has significant implications for shaping the decision-making process:

- decisions become increasingly data-driven rather than intuition-based;
- institutions use predictive tools, simulations, and algorithms;
- citizens can participate directly in decision-making through digital platforms;
- transparency and accountability are enhanced through technologies such as blockchain.

This study aims to analyse the main theoretical models of decision-making in public administration, ranging from rational choice theory to prospect theory and the garbage can model, within the context of digitalization. The central research focuses on how digitalization influences decision-making processes in public administration.

Furthermore, the study seeks to identify and conceptualize the key dimensions of a “smart decision” relevant to digitally enabled administrative environments.

## **2. Literature review**

Contributions from researchers in economics, political science, psychology, and public administration have significantly influenced the study of decision-making. Over time, theories such as bounded rationality (Herbert Simon), incrementalism (Charles Lindblom), Prospect Theory (Daniel Kahneman and Amos Tversky), and the Garbage Can Model (Michael Cohen, James March, and Johan Olsen) have provided solid conceptual frameworks for understanding how decisions are made in real conditions marked by uncertainty, informational constraints, and institutional pressures.

One of the most influential paradigms in decision-making is the Rational Choice Theory (RCT), which assumes that actors seek to maximize utility under conditions of complete information and coherent preferences. Its origins lie in classical economics, strengthened by scholars such as Gary Becker (1976), who extended the utilitarian model to non-economic social behaviours, and James Coleman (1990), who adapted it to explain collective action and social structures. Mancur Olson (1965) further highlights the limits of cooperation within groups by analysing the logic of individual incentives, while Kenneth Arrow (1951) demonstrates the paradoxes of collective decision-making, showing the difficulty of aggregating individual preferences into a coherent social choice [1].

In the view of Herbert A. Simon, the father of bounded rationality, rationality and real human behaviour are connected through the mechanism of decision-making. While classical rational choice theory assumes an entirely rational actor, Simon argues that individuals lack the cognitive, informational, and temporal resources required to make perfectly rational decisions. He therefore defines rationality as the efficiency with which given goals are achieved, based on the alignment between objectives and the means used to attain them. According to Simon, an entirely rational decision would require:

- listing all possible alternatives;
- calculating all the consequences associated with each alternative;
- comparing alternatives based on their consequences, in relation to predefined goals [2].

On this basis, Simon introduces the concept of “bounded rationality,” arguing that decision-makers do not search for the optimal solution, but rather for one that is “good enough” (satisficing). This perspective profoundly influenced the study of decision-making in public administration, underscoring the need to analyse decision-making models in the real context of public organizations.

Charles Lindblom, in his seminal work *The Science of “Muddling Through”*, criticizes rationalist approaches to decision-making by highlighting the opportunity costs of exhaustive analysis required for entirely rational decisions. The incrementalism he proposes acknowledges the practical and political constraints on decision-making,

offering a realistic framework that considers limited resources and the political dimension of policy choices [3].

Similarly, Prospect Theory, developed by Kahneman and Tversky, demonstrates that individuals' decisions do not always follow classical rationality. Actors tend to over- or underestimate probabilities and exhibit loss aversion, leading to choices that appear irrational from a traditional economic perspective. This approach highlights the limitations of rational choice theory and complements Simon's analysis of bounded rationality by providing a more realistic understanding of human decision-making [4].

According to Cohen, March, and Olsen, decisions in organizations do not always follow classical rationality; instead, they are influenced by ambiguous preferences, unclear technologies, and fluctuating participation of actors. In this context, decisions often result from the coincidental intersection of problems, solutions, and participants rather than from a deliberate and optimizing process [5].

### **3. Decision-making modelling in smart public administration**

The digitalization of public administration has profoundly transformed the way institutional decisions are made. The concept of smart governance represents a paradigm that integrates digital technologies, data analytics, citizen engagement, and automated decision-support tools to enhance efficiency, transparency, and the overall quality of public policies [6]. Traditional decision-making models grounded in complete rationality or incremental evaluations are now complemented by digital approaches that leverage big data, artificial intelligence (AI), and e-participation platforms to support policy formulation.

#### ***3.1. The concept of smart public administration***

Smart public administration extends far beyond the simple digitalization of services. It entails a reconfiguration of the decision-making process in which decisions are based on integrated data analyses, algorithmic support, and active citizen involvement. Through these technologies, institutions can more quickly identify emerging issues, assess the impact of various policy options, and adjust administrative strategies in real-time.

Recent studies show that smart governance, an integral component of the broader "smart cities" concept, strengthens institutional accountability and the legitimacy of public decisions by combining data-driven governance, citizen participation, and predictive technologies [7].

#### ***3.2. Key dimensions of smart public decision-making***

Considering the rapid evolution of digital technologies and the development of theoretical frameworks in public administration, a smart decision requires an integrative approach that accounts for multiple interrelated components. Modern public governance increasingly relies on data analytics, artificial intelligence, citizen engagement, and transparency and accountability mechanisms to ensure that decisions are evidence-based, participatory, and effective. In this context, a smart decision should consider the following

dimensions: data-driven governance, citizen-centric governance, AI and automation, and transparency and accountability.

Data-driven governance provides the foundation for an objective, well-informed decision-making process. By collecting and analyzing data from administrative, economic, social, and environmental sources, institutions can identify relevant patterns, estimate trends, and conduct scenario simulations. This allows for better-adapted decisions to current realities and reduces the risk of arbitrary choices, thereby increasing the efficiency and relevance of implemented policies [8].

Furthermore, citizen-centric governance involves active citizen participation in decision-making. Digital platforms facilitate online consultations, participatory budgeting, and the co-creation of public policies, thereby enhancing transparency and institutional accountability. Citizen engagement not only increases public trust but also helps formulate policies better aligned with the community's actual needs.

In the context of the digital transformation of public administration, automation and the use of artificial intelligence (AI) have gradually become fundamental pillars of the decision-making process. Public institutions no longer rely solely on human judgment but increasingly use automated systems that enable rapid scenario analysis, risk assessment, workflow prediction, and optimal resource allocation. Such data-based decision-making accelerates and optimizes administrative processes, enhances efficiency, and reduces bureaucratic delays [8].

However, for these tools to be practical and widely accepted, a governance framework that ensures transparency and accountability is essential. Without such a framework, automation risks becoming opaque, generating mistrust or perceptions of arbitrariness. The literature emphasizes the importance of explainable AI (XAI), providing clear explanations for algorithmically generated decisions, to safeguard the legitimacy of public decisions and maintain democratic oversight [9].

Moreover, integrating AI into public administration can reshape the relationship between citizens and institutions. By enabling auditability, traceability, and broader citizen engagement (e.g., feedback, monitoring, appeals), institutions become more accountable, and decisions are perceived as more justified and fair, reinforcing public trust and governance legitimacy [10].

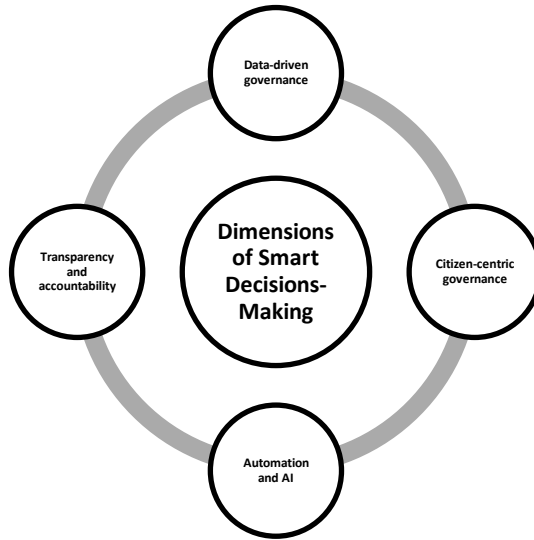


Fig.1. Key dimensions of smart public decision-making  
*Source: the author*

Thus, “smart” decision-making goes beyond simply applying modern technologies; it entails a paradigm shift in how institutions interact with citizens, manage information, and assume responsibility. By combining data analysis, digital tools, automation/AI, and institutional transparency, a modern administrative framework emerges efficient, adaptable, and responsive to societal needs.

Langa and Thakhathi argue that ICT infrastructures and digitalized public services are key elements that enable local administrations to adopt a “smart governance” model. In their view, the transformation of municipalities into smart cities can only be achieved if public decisions and services are mediated by technology, which can lead to a more efficient, sustainable, and responsive administration that better addresses citizens’ needs [11].

The implementation of smart public decision-making offers numerous advantages that collectively enhance both the efficiency and the quality of governance. One of the most significant benefits is the increased efficiency and speed of decision-making, as the rapid analysis of large volumes of data, when combined with automated administrative processes, significantly reduces the time required for decisions and optimizes the allocation of institutional resources, enabling public institutions to respond more swiftly to changes in social, economic, or technological environments and thereby improving overall administrative responsiveness and competitiveness.

In addition to efficiency, smart decision-making also improves the quality of public policies, as decisions grounded in data and predictive models minimize subjectivity and reduce the risk of human error, resulting in policies that are more relevant, impactful, and evidence-based. By integrating advanced algorithms and artificial intelligence systems,

institutions can anticipate potential consequences more accurately, enabling them to design solutions that are both well-founded and practically effective.

Furthermore, transparency and accountability are essential dimensions of smart public decision-making, as the digitalization of administrative processes facilitates monitoring and auditing, enabling citizens to assess institutional performance and hold authorities accountable. This not only enhances public organizations' accountability but also strengthens public trust in governance by ensuring that decisions are perceived as legitimate, justified, and aligned with societal needs.

Civic participation represents another significant advantage of intelligent public decision-making, as the direct involvement of citizens in policy formulation through online consultations, participatory budgeting, and co-creation of decisions enhances both the adaptability and legitimacy of public policies. By integrating citizens into the decision-making process, policies become more closely aligned with communities' actual needs.

Nemțanu and Pinzaru argue that “the participation of citizens in the city management process is also a 'must' and the inclusion of them is important to validate the management decision”. They consider that this inclusion could be done directly or could be facilitated by new technologies [12].

In addition to this framework, participatory models embed citizens directly into the decision-making process through digital platforms and policy co-creation. In contrast, hybrid models combine data-driven analysis with human judgment and institutional oversight to ensure transparency and legitimacy. Such frameworks also enable classical decision-making theories, including Rational Choice, Bounded Rationality, Prospect Theory, Incrementalism, and the Garbage Can Model, to be effectively adapted to the context of smart public administration, providing both theoretical grounding and practical applicability in modern governance.

#### **4. Conclusion**

The integration of digital technologies into public administration has fundamentally transformed traditional decision-making processes by enabling institutions to collect, analyse, and utilize large volumes of data from multiple sources, integrate predictive analytics, and implement automated systems that support evidence-based choices, which allows decision-makers to respond more quickly to complex social, economic, and technological challenges and increases the overall adaptability, agility, and effectiveness of governance structures.

A primary benefit of intelligent decision-making is the significant improvement in the quality of public decisions, as the use of data-driven insights and analytical tools reduces reliance on subjective judgment, minimizes human error, enhances the accuracy and relevance of policy interventions, allows for better allocation of resources, and ensures that decisions are informed by objective evidence while simultaneously increasing the potential impact and societal acceptance of implemented policies.

Citizen engagement represents a fundamental component of effective intelligent decision-making, as the active involvement of stakeholders through consultations, feedback mechanisms, and participatory evaluation ensures that decisions align with societal needs and priorities, fosters public trust in institutions, enhances the perceived legitimacy of decisions, and facilitates broader social acceptance and compliance, thereby reinforcing the effectiveness of policies and strengthening the relationship between citizens and governing institutions.

On the other hand, transparency and accountability constitute essential dimensions of smart decision-making because the digitalization of administrative processes allows for real-time monitoring, tracking, and auditing of decisions, providing institutions with the ability to demonstrate responsibility, openness, and integrity in their actions, which reassures citizens that decisions are fair, justified, and aligned with societal expectations and contributes to increased trust and confidence in public governance while reducing perceptions of arbitrariness or opacity.

Finally, smart decision-making fosters organizational innovation and adaptability by enabling institutions to experiment with alternative strategies, evaluate outcomes in real time, adjust policies according to evolving circumstances, anticipate emerging trends, and continuously improve administrative processes, which not only enhances operational efficiency but also cultivates a culture of learning and flexibility, empowering public administrations to address increasingly complex societal challenges effectively while ensuring that decisions are responsible, transparent, legitimate, and aligned with the long-term needs and expectations of citizens.

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