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Rethinking Public Administration in the Digital Age: Governance, Transformation, and the Role of AI

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Abstract

Public administration is undergoing a profound transformation driven by the integration of digital technologies into governance systems. While earlier phases of administrative modernization were framed around efficiency, simplification, and transparency, the rise of artificial intelligence (AI) introduces a fundamentally different form of transformation—one that reshapes administrative processes, governance norms, accountability mechanisms, and the relationship between the state and its citizens. Drawing on theoretical perspectives from Weberian bureaucracy, New Public Management, Digital-Era Governance, and experimentalist governance, this paper conceptualizes AI as a structural force that reconfigures decision-making authority and institutional logics.

The study employs a qualitative comparative analysis of three internationally recognized cases—Estonia, Finland, and Portugal—contrasted with the Greek experience. The findings indicate that successful AI adoption depends less on technological capacity and more on the degree of institutional embedding. Estonia and Finland demonstrate how algorithmic systems can operate within transparent, interoperable, and accountable governance frameworks, while Portugal highlights the role of gradual institutional learning. In contrast, Greece has made significant progress in digitizing public services (e.g., gov.gr), but this advancement remains primarily technical, lacking institutional consolidation in areas such as algorithmic accountability, regulatory oversight, and cross-agency coordination.

The paper argues that AI constitutes not only a technological innovation but also a normative and institutional challenge. Without mechanisms of transparency, auditability, and public oversight, AI risks becoming a form of "silent legislation" that shapes rights and decisions without democratic scrutiny. Ensuring that AI strengthens—rather than undermines—public trust is therefore a central task for contemporary administrative reform.

JEL Classifications: D72, H83, O33, O38
Keywords: Public Administration, Digital Governance, Algorithmic Accountability, Artificial Intelligence, Institutional Reform, Greece

1. Introduction

This paper examines how artificial intelligence (AI) is transforming public administration by reshaping governance structures, accountability mechanisms, and decision-making processes. Public administration is undergoing a profound transformation driven by the integration of digital technologies into governmental processes and institutional arrangements. While earlier phases of administrative modernization emphasized efficiency, simplification, and cost reduction, recent developments suggest a deeper shift toward the reconfiguration of governance itself. In particular, the growing adoption of artificial intelligence across public sector organizations signals a transition from digitalization as a service-improvement tool to digitalization as a governing mechanism (Wirtz et al., 2018; European Commission, 2022; OECD, 2023).

A key distinction in this transformation is that between digitization and digital transformation. Digitization refers to the conversion of analogue processes into digital formats, whereas digital transformation entails structural changes in organizational arrangements, workflows, and accountability mechanisms (Margetts & Dunleavy, 2013). Artificial intelligence intensifies this shift by introducing automated and data-driven decision-making processes that influence eligibility, prioritization, and risk assessment, thereby acquiring quasi-regulatory functions (Yeung, 2018). Despite the expansion of digital government initiatives, existing research has primarily focused on technological capabilities and service delivery outcomes, leaving underexplored the institutional conditions under which AI reshapes governance, accountability, and legitimacy (Sun & Medaglia, 2019; Valle-Cruz et al., 2019; Tangi et al., 2021). This creates a critical gap in understanding AI not merely as a technological tool, but as a structural and normative force within public administration.

The literature on public administration provides important foundations for understanding this transformation. The Weberian model of bureaucracy emphasizes rule-based authority, hierarchy, and predictability (Weber, 1978), while New Public Management introduced performance orientation, decentralization, and efficiency-driven reforms (Hood, 1991). More recent approaches, such as Digital-Era Governance, highlight the role of integration, interoperability, and user-centered service delivery in digitally enabled states (Dunleavy et al., 2006; Margetts & Dunleavy, 2013). However, while these frameworks explain earlier phases of administrative reform, they do not fully capture the implications of artificial intelligence as a system that not only executes decisions but also participates in defining them. Emerging research on algorithmic governance and AI in the public sector suggests that these systems can reshape institutional logics and governance arrangements, yet comparative and

institutionally grounded analyses remain limited (Yeung, 2018; Wirtz et al., 2018; Valle-Cruz et al., 2020).

To address this gap, the paper investigates the following research questions. First, under what institutional conditions can artificial intelligence enhance accountability in public administration? Second, why do similar digital tools lead to different governance outcomes across administrative systems? Third, why has Greece advanced in digital service provision but not in the institutional consolidation of AI governance? This paper contributes to the literature by demonstrating that artificial intelligence in public administration should be understood not primarily as a technological innovation, but as an institutional and normative transformation. By comparatively examining different national trajectories, it highlights how variations in institutional embedding shape the effectiveness, accountability, and legitimacy of AI-driven governance.

The remainder of the paper is structured as follows. Section 2 reviews the relevant literature on administrative models and the evolution of AI governance. Section 3 outlines the methodological approach, detailing the comparative framework and the analytical dimensions used. Section 4 presents a systematic comparative analysis of the selected cases (Estonia, Finland, Portugal, and Greece). Section 5 provides a discussion of the findings in relation to the research questions, and Section 6 offers concluding remarks, policy implications, and suggestions for future research.

2. Literature Review

The integration of artificial intelligence into public administration must be understood within the broader evolution of administrative thought and governance models. Classical Weberian bureaucracy established the foundations of modern public administration through principles of hierarchy, rule-based decision-making, and procedural rationality, ensuring predictability and accountability in administrative action (Weber, 1978). However, its rigid structures proved increasingly inadequate in addressing complex, dynamic policy environments.

The emergence of New Public Management sought to overcome these limitations by promoting efficiency, performance measurement, and managerial flexibility (Hood, 1991; Pollitt & Bouckaert, 2017). While these reforms enhanced operational efficiency, they also contributed to the fragmentation of administrative coordination and a narrowing of public value to measurable outputs. In response, the Digital-Era Governance framework emphasized

reintegration, interoperability, and user-centered service delivery, positioning digital technologies as core elements shaping governance structures rather than merely supporting administrative processes (Dunleavy et al., 2006; Margetts & Dunleavy, 2013).

Artificial intelligence represents a further stage in this trajectory, introducing automated decision-making and predictive analytics into governance processes. Unlike earlier forms of digitization, AI systems do not merely execute predefined rules but actively participate in shaping decision-making criteria, thereby acquiring quasi-regulatory functions (Yeung, 2018). This transformation reconfigures the locus of administrative authority, raising critical questions about transparency, accountability, and fairness. As Bovens and Zouridis (2002) argue, the increasing reliance on algorithmic systems may shift decision-making authority from human actors to technological infrastructures, fundamentally altering traditional accountability arrangements.

Recent scholarship has further emphasized the risks associated with algorithmic governance, including opacity, bias, and the erosion of democratic oversight (Pasquale, 2015; Kroll et al., 2017; Eubanks, 2018). In particular, the "black box" nature of many algorithmic systems challenges the ability of citizens and institutions to scrutinize decision-making processes (Ananny & Crawford, 2018). At the same time, research on experimentalist governance highlights the potential of AI to support adaptive, iterative, and participatory policy processes when embedded within appropriate institutional frameworks (Sabel & Zeitlin, 2012). From this perspective, the impact of AI is not determined by the technology itself, but by the governance structures within which it operates. This aligns with the perspective of historical and sociological institutionalism, which views administrative systems as complex arrangements of norms and routines that filter any external technological shock (March & Olsen, 1989).

Thus, AI adoption in public administration entails both operational and normative transformation: it reshapes administrative processes, redefines authority relations, and influences how legitimacy is constructed within governance systems. Despite these important contributions, existing literature remains fragmented in explaining how institutional configurations shape the governance outcomes of AI across different administrative systems. While prior studies highlight issues of transparency, accountability, and algorithmic bias, they do not sufficiently account for cross-national variation in institutional embedding. In particular, there is limited comparative evidence on how similar technological tools produce divergent governance effects depending on administrative structures and levels of institutional integration. This gap is particularly evident in cases such as Greece, where rapid

digitalization has not been accompanied by equivalent institutional consolidation in AI governance. As Spanou (2020) observes, administrative modernization in Greece often prioritizes visible digital outputs as a means of 'external compliance', potentially overlooking the deeper structural reforms required for effective back-end coordination."

3. Methodology

This study employs a qualitative comparative research design in order to examine how different public administration systems integrate artificial intelligence within their institutional and governance structures. To address the research questions outlined above, the analysis focuses not on the technical characteristics of AI systems, but on the institutional conditions that shape their governance outcomes. In this sense, the study adopts an interpretive and theory-driven comparative approach, suitable for capturing variation across cases and identifying patterns in how institutional configurations influence accountability, legitimacy, and administrative performance.

To move beyond a techno-centric analysis, the study adopts a Most Similar Systems Design (MSSD) logic. All selected cases—Estonia, Finland, Portugal, and Greece—operate within the overarching European regulatory environment (e.g., GDPR, EU AI Act), yet they exhibit significant variations in their domestic institutional architectures. Estonia is widely considered a benchmark for highly integrated digital governance systems, characterized by strong interoperability and coherent institutional architecture. Finland represents a model of trust-based and participatory governance, emphasizing ethical frameworks and citizen-oriented AI deployment. Portugal illustrates a gradualist pathway, where digital transformation evolves through incremental reforms and administrative learning. Greece is selected as a contrasting case, combining rapid digital service expansion with comparatively weaker institutional consolidation in AI governance. The inclusion of these cases allows for controlled comparison across different levels of institutional maturity and governance capacity.

The comparative analysis is structured around three analytical dimensions that operationalize the concept of institutional embedding. First, institutional integration refers to the degree of interoperability, coordination, and structural coherence across administrative systems. Second, accountability frameworks capture the presence of transparency mechanisms, auditability of algorithmic systems, and the availability of oversight and redress procedures. Third, legitimacy concerns the extent to which AI-driven governance maintains public trust, supports inclusion, and is perceived as fair and acceptable by citizens. These

dimensions provide a common analytical framework through which the cases can be systematically compared.

The cases are compared on the basis of how artificial intelligence is embedded within these three dimensions, allowing the analysis to identify both convergences and divergences in governance outcomes. More specifically, the study examines what is being implemented (types of AI use), how it is governed (institutional and regulatory frameworks), and with what implications (effects on accountability, transparency, and public trust). This comparative strategy enables the identification of underlying causal mechanisms linking institutional configurations to variations in AI governance.

Data sources include official policy documents, national digital and AI strategies, European Commission and OECD reports, and existing academic literature on digital governance and algorithmic administration. These sources provide both descriptive and analytical insights into how different countries design, implement, and regulate AI in the public sector.

Overall, the qualitative comparative approach is appropriate for this study because it allows for an in-depth, context-sensitive analysis of complex institutional phenomena that cannot be adequately captured through purely quantitative methods. By focusing on cross-case variation and institutional context, the methodology enables a more nuanced understanding of the conditions under which artificial intelligence enhances or undermines accountability and democratic governance in public administration systems.

This study is subject to certain limitations. First, the qualitative and comparative nature of the analysis does not allow for causal generalization beyond the selected cases. Second, the reliance on secondary data sources, such as policy documents and institutional reports, may reflect official narratives rather than fully capturing implementation gaps. Third, the rapidly evolving nature of artificial intelligence governance implies that some developments may not yet be fully documented or comparable across cases. Despite these limitations, the study provides analytically robust insights into the institutional conditions shaping AI governance in public administration.

4. Comparative Analysis

The comparative analysis shows that artificial intelligence does not transform public administration in a uniform way. Its effects depend on the institutional environment into which it is introduced. In other words, the same technological tools may produce very different governance outcomes depending on the degree of interoperability, the strength of

accountability mechanisms, and the level of public trust that characterizes each administrative system (Dunleavy et al., 2006; Margetts & Dunleavy, 2013; Yeung, 2018; Wirtz et al., 2018; Valle-Cruz et al., 2020; OECD, 2023). The cases examined here suggest that AI functions less as an autonomous driver of reform and more as an institutional amplifier: where governance structures are coherent, it can enhance administrative capacity; where they are fragmented, it risks reproducing or intensifying existing weaknesses.

4.1 Estonia: AI within a coherent institutional architecture

Estonia represents the most institutionally consolidated case in this comparison. Its digital transformation has been built on a governance architecture that long predates current AI debates, most notably through the X-Road interoperability infrastructure and the Once-Only Principle, which reduced duplication and enabled secure data exchange across public agencies (Kalvet, 2012; Blake Jackson et al., 2021; Dreyling, 2024). This matters for AI because algorithmic systems require not only data availability, but also stable rules governing access, exchange, and responsibility. In the Estonian case, institutional coordination reduces administrative ambiguity and provides the procedural clarity necessary for automated or semi-automated systems to function in a traceable manner (Espinosa & Pino, 2024; Pappel, 2025).

The significance of Estonia therefore lies not simply in being "digitally advanced," but in demonstrating that technological innovation becomes administratively legitimate when it is embedded in pre-existing governance structures. In practical terms, AI does not replace accountability in Estonia; it is inserted into an already institutionalized framework of accountability. This supports the broader argument in digital-era governance that technology strengthens governance only when it is integrated into coherent state structures rather than layered onto fragmented bureaucracies (Dunleavy et al., 2006; Margetts & Dunleavy, 2013). The Estonian case thus answers the first research question directly: AI can enhance transparency and accountability only where the institutional architecture of the state already provides interoperability, traceability, and clear lines of responsibility. This suggests that technological capacity alone is insufficient without prior institutional coherence.

4.2 Finland: legitimacy through trust and participatory governance

Finland illustrates a different pathway. Whereas Estonia's strength lies primarily in infrastructural coherence, Finland's comparative advantage lies in the normative and societal dimension of governance. The AuroraAI programme (Kuziemski & Misuraca, 2020) did not emerge simply as a service optimization initiative; it was framed within a broader concern for user orientation, ethical safeguards, and participatory legitimacy (OECD, 2025). In this model, the effectiveness of AI is not judged only by speed or administrative performance, but by its

compatibility with public trust and democratic values (Sabel & Zeitlin, 2012; Janssen & van den Hoven, 2015).

This distinction is analytically important. A system may be technically sophisticated without being socially legitimate. Finland shows that the institutional embedding of AI also includes public justification, consultation, and a broader culture of trust. In that sense, legitimacy is not treated as an automatic by-product of innovation, but as a condition that must be actively produced. This confirms arguments in the literature that algorithmic systems require not only procedural transparency but also forms of explainability, ethical oversight, and contestability if they are to be accepted within democratic governance (Janssen & van den Hoven, 2015; Yeung, 2018). Thus, the Finnish case suggests that public trust is not a "soft" variable external to AI adoption; it is one of the institutional conditions that shape whether AI can be integrated without generating legitimacy deficits. This indicates that legitimacy operates as a precondition, not a by-product, of AI integration.

4.3 Portugal: gradual reform and the limits of incrementalism

Portugal represents a gradualist model of AI-enabled governance, where digital transformation unfolds through incremental administrative reforms and institutional learning processes rather than disruptive technological shifts. SIMPLEX is the Portuguese flagship simplification and modernisation programme. It follows a citizen-driven approach and has a strong focus on co-creation, with the ultimate goal of simplifying as much as possible citizens and businesses' everyday life as well as their interaction with the public administration. The Simplex reforms initially focused on simplification, administrative burden reduction, and procedural efficiency, (European Commission, 2021) reflecting a legacy associated with New Public Management (Hood, 1991). Over time, however, these reforms expanded toward broader forms of digital integration. AI-related initiatives emerged selectively and incrementally, often at sectoral rather than system-wide level (Secchi et al., 2024).

The Portuguese case is analytically useful because it shows both the strengths and limitations of gradualism. On the one hand, incremental reform reduces the risks associated with abrupt technological imposition. It allows administrative systems to learn, adapt, and experiment. On the other hand, without stronger institutional consolidation, incrementalism may produce reform without coherence. Portugal demonstrates that digital modernization can progress through cumulative institutional learning, but also that such learning does not automatically generate integrated AI governance. In comparative terms, Portugal helps answer the second research question: similar digital tools generate different outcomes not only because of technological capacity, but because they are inserted into different reform

trajectories. Where reform is gradual and adaptive but not fully integrated, AI may remain useful yet limited in scope and transformative effect. This highlights the limits of incrementalism when not accompanied by systemic integration.

4.4 Greece: digital acceleration without institutional depth

The Greek case reveals the central paradox of the paper. Greece has made substantial progress in digital service delivery, especially through the rapid expansion of the gov.gr platform. This achievement is significant and should not be underestimated. It demonstrates that the Greek state can improve accessibility, reduce procedural burden, and modernize the interface between citizens and administration. However, the comparative perspective shows that this progress has occurred primarily at the front-end level of public service delivery, while the back-end institutional structures required for systematic AI governance remain underdeveloped (Advisory Committee on AI, 2024).

This asymmetry is decisive. Unlike Estonia, Greece does not yet operate on the basis of deeply consolidated interoperability frameworks. Unlike Finland, it has not institutionalized broad participatory or trust-based mechanisms around the governance of AI. And unlike even the Portuguese gradualist model, the Greek trajectory has often prioritized visible digital outputs over deeper institutional coordination. The result is a pattern that can be described as front-end digitalization without back-end institutional consolidation. In such a context, the introduction of AI risks occurring in an environment characterized by fragmented information systems, uneven coordination, and limited oversight capacity (Spanou, 2015; European Commission, 2023).

This finding is crucial because it challenges a common assumption in digital reform discourse: that successful digitization naturally leads to broader governance capacity. The Greek case suggests the opposite. Digital service expansion can coexist with institutional weakness. When this happens, AI may become a source not of governance improvement, but of amplified opacity. Algorithmic systems introduced into fragmented administrative settings may reproduce existing silos, obscure responsibility, and complicate accountability rather than improve it (Yeung, 2018; Wirtz et al., 2018). Greece therefore serves as a critical case for the third research question, illustrating how rapid digital modernization can fail to produce equivalent institutional adaptation. This reveals a structural mismatch between digital acceleration and institutional capacity.

4.5 Comparative interpretation

Taken together, the four cases suggest that the decisive variable is not technological advancement itself, but the extent to which AI is embedded in a stable institutional environment. Estonia shows the importance of interoperability and procedural traceability.

Finland highlights the role of trust, participation, and ethical legitimacy. Portugal reveals the possibilities and constraints of incremental reform. Greece exposes the risks of technological acceleration in the absence of institutional depth.

The broader implication is that AI does not "solve" administrative problems by itself. It interacts with institutional realities already in place. Where governance structures are coherent, AI may reinforce coordination, accountability, and trust. Where such structures are weak, AI may deepen fragmentation and legitimacy problems. The comparative analysis therefore supports the central argument of this paper: artificial intelligence in public administration must be analysed primarily as a question of institutional design and democratic governance, not simply as an issue of technological innovation (Dunleavy et al., 2006; Margetts & Dunleavy, 2013; Yeung, 2018).

5. Discussion

The comparative findings of this study highlight that artificial intelligence introduces a fundamental shift in the framing of administrative modernization. While earlier reform paradigms focused on efficiency, performance, and transparency, the integration of AI brings to the forefront questions of governance, legitimacy, and normative authority (Dunleavy et al., 2006; Margetts & Dunleavy, 2013). However, this transformation is not uniform; rather, it is mediated by the institutional environments within which AI is embedded.

The analysis of the four cases demonstrates that institutional embedding constitutes a critical condition for the governance outcomes of artificial intelligence. Estonia illustrates how strong interoperability and coherent administrative architectures enable AI to operate within transparent and accountable frameworks. Finland, in contrast, emphasizes the role of trust, participation, and ethical governance, showing that legitimacy is not an outcome of technological innovation but a precondition for its acceptance (Janssen & van den Hoven, 2015). Portugal highlights the dynamics of gradual institutional adaptation, where AI remains limited in scope when not supported by systemic integration. Greece, finally, reveals a structural asymmetry between rapid digital service expansion and weaker institutional consolidation, illustrating how technological advancement may coexist with governance fragility (Spanou, 2015; European Commission, 2023).

The findings directly address the research questions. First, accountability is not a static feature but is operationalized through institutional integration and procedural clarity (Bovens, 2007). Second, the divergent governance outcomes observed across the cases—from

Finland's ethical registries to Greece's oversight gaps—confirm that similar AI tools are filtered through different administrative trajectories. Third, the Greek case demonstrates that digital progress alone does not ensure institutional transformation, explaining why advancements in service delivery have not been accompanied by equivalent development in AI governance frameworks.

Taken together, these findings suggest that artificial intelligence should not be understood primarily as a technological innovation, but as a mechanism of institutional reconfiguration. AI systems reshape how authority is exercised, how decisions are made, and how rights and obligations are distributed within public administration. In this sense, artificial intelligence may function as a form of "silent legislation," influencing outcomes without being subject to traditional processes of democratic deliberation (Yeung, 2018).

6. Conclusions

This paper examined the integration of artificial intelligence in public administration through a comparative analysis of Estonia, Finland, Portugal, and Greece. The findings demonstrate that AI-driven transformation is fundamentally shaped by institutional architectures rather than technological capacity alone.

Countries that combine interoperability, transparency, and governance frameworks are better positioned to integrate AI in ways that enhance accountability and public trust. In contrast, where institutional development lags behind technological adoption, the benefits of AI remain limited and may be accompanied by risks to legitimacy.

The Greek case illustrates the challenges of achieving institutional consolidation alongside digital innovation. While significant progress has been made in service digitalization, the development of governance frameworks for artificial intelligence remains incomplete.

The findings of this study have distinct implications for public policy, administrative reform, and academic research. First, in terms of public policy, the results suggest that governments should prioritize the development of regulatory and governance frameworks that ensure transparency, auditability, and accountability in AI deployment. For Greece specifically, the transition from 'front-end' success to 'back-end' consolidation represents the primary challenge. Policy-makers should prioritize the institutionalization of Algorithmic Impact Assessments (AIAs) and the creation of horizontal coordination bodies to ensure that digital acceleration does not bypass democratic oversight.

Technological adoption alone is insufficient without mechanisms that safeguard democratic legitimacy and citizens' rights. Second, regarding administrative reform, the analysis highlights the need to move beyond front-end digitalization toward deeper institutional transformation. This includes strengthening interoperability, coordination across agencies, and the establishment of clear responsibility structures for algorithmic decision-making. Without such reforms, AI risks reinforcing existing administrative fragmentation rather than overcoming it. Third, for academic research, the study contributes to the literature on algorithmic governance by demonstrating that AI should be analysed primarily as an institutional and normative phenomenon. Future research should further explore the conditions under which AI can support democratic accountability, as well as the long-term effects of algorithmic systems on administrative discretion and public trust.

Overall, the paper shows that the successful integration of artificial intelligence depends not only on technological capability but on the capacity of public administration systems to adapt institutionally and normatively to the challenges of algorithmic governance.

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