EKOHOMIKA ♦ ECONOMICS

https://doi.org/10.26565/2524-2547-2026-73-01
UDC 351:004.8

Maka Benashvili,
PhD (International Relations), Assistant Professor
Sulkhan-Saba Orbeliani University,
3, Kalistrate Qutateladze Str., Tbilisi, 0186, Georgia
m.benashvili@sabauni.edu.ge
https://orcid.org/0009-0005-5821-2019

Tamar Tsertsvadze,
PhD (Management), Assistant Professor
Caucasus University,
1, Paata Saakadze Str., Tbilisi, 0102, Georgia
ttsertsvadze@cu.edu.ge
https://orcid.org/0009-0008-6329-4989

ARTIFICIAL INTELLIGENCE AS A PUBLIC MANAGEMENT CAPABILITY: INSTITUTIONAL DETERMINANTS OF ADMINISTRATIVE PERFORMANCE IN DIGITAL GOVERNANCE

Abstract. This study examines whether the adoption of national artificial intelligence (AI) strategies improves administrative performance in The Organization for Economic Co-operation and Development (OECD) countries. AI is conceptualized not simply as a technological innovation but as a public management capability embedded in institutional governance systems. The research applies a sequential explanatory mixed-method design combining quantitative panel data analysis with qualitative institutional investigation.

The quantitative analysis covers 38 OECD countries for the period 2016–2023. Administrative performance is measured using the Government Effectiveness indicator from the Worldwide Governance Indicators database. AI adoption is operationalized through a policy-based coding procedure that identifies the official year of national AI strategy adoption and constructs a time-varying binary variable. A fixed effects panel regression model is estimated to control for time-invariant country characteristics. GDP per capita (log-transformed), regulatory quality, and digital infrastructure are included as control variables.

The findings demonstrate a positive and statistically significant association between AI strategy adoption and Government Effectiveness. However, the magnitude of the effect is modest compared to structural determinants such as regulatory quality and economic development. Digital infrastructure also shows a significant positive relationship with administrative performance. Robustness checks suggest that the benefits of AI institutionalization materialize gradually rather than immediately.

Qualitative evidence from Finland, Estonia, Germany, and Italy indicates that AI strategies enhance governance performance when supported by coherent regulation, inter-agency coordination, and digital maturity. The study concludes that AI contributes to administrative effectiveness as part of a broader institutional ecosystem rather than as a standalone technological reform.

Keywords: Artificial Intelligence, Public Administration, Government Effectiveness, Digital Governance, Institutional Capacity.

JEL Classification: H83; O33; O38; C23; D73.

In cites: Benashvili, M., & Tsertsvadze, T. (2026). Artificial Intelligence as a public management capability: institutional determinants of administrative performance in digital governance. *Social Economics*, 73, 5–16. https://doi.org/10.26565/2524-2547-2026-73-01

Introduction. Over the last decade, public administration has entered a new phase of digital transformation. Governments are no longer limited to digitizing paperwork or creating online service portals; instead, they increasingly rely on advanced data systems, algorithmic tools, and artificial intelligence to support policy design, service delivery, regulatory enforcement, and strategic decision-making. Artificial intelligence has become a central element of national digital strategies and is frequently presented as a driver of administrative modernization.

The growing institutionalization of AI in public governance raises a fundamental question: does the adoption of artificial intelligence in public administration lead to measurable improvements in administrative effectiveness? While governments invest substantial resources in AI strategies, digital infrastructure, and innovation programs, empirical evidence on the performance consequences of these reforms remains limited. In many cases, AI policies are evaluated in terms of technological sophistication or ethical governance standards, yet their impact on overall administrative quality is rarely assessed in a systematic and comparative manner.

This study addresses the following research question:

Does the adoption of national artificial intelligence strategies increase administrative effectiveness in public administration?

To answer this question, we conceptualize artificial intelligence as a public management capability embedded within institutional systems. From this perspective, AI does not automatically generate performance gains; rather, its impact depends on how it is integrated into governance frameworks and supported by institutional determinants.

Despite expanding literature, three gaps remain evident:

1. Limited cross-country panel studies linking AI strategy adoption to Government Effectiveness;
2. Insufficient integration of institutional theory with digital governance research;
3. Limited mixed-method designs combining econometric evidence with institutional document analysis.

By constructing a panel dataset of OECD countries and employing a fixed effects model, this study addresses the first gap. By conceptualizing AI as a public management capability conditioned by institutional determinants, it addresses the second. By integrating qualitative case analysis, it addresses the third.

The object of the research is digital governance and administrative performance in OECD countries in the context of ongoing technological transformation.

The subject of the research is the relationship between the adoption of national artificial intelligence strategies and Government Effectiveness, as mediated by institutional determinants such as regulatory quality and digital infrastructure.

From this integrated framework, we derive the central hypothesis:

H1: Adoption of national AI strategies is positively associated with Government Effectiveness. H2: Institutional determinants (regulatory quality, digital infrastructure) moderate this relationship.

Regarding the above-mentioned hypothesis, we focus on OECD countries, which provide a suitable empirical setting for three reasons. First, most OECD members have adopted formal national AI strategies, allowing for comparative policy analysis. Second, these countries exhibit variation in institutional quality and governance outcomes, enabling examination of differential effects. Third, reliable and comparable data on administrative performance and digital infrastructure are available for this group.

Methodologically, we apply a sequential explanatory mixed-method design. In the first stage, we construct a panel dataset for OECD countries covering the period 2016-2023 and estimate fixed effects regression models to evaluate the statistical relationship between AI strategy adoption and Government Effectiveness. In the second stage, we conduct qualitative document analysis of selected case countries to identify institutional mechanisms that explain observed quantitative patterns.

By combining econometric analysis with institutional investigation, this study contributes to understanding whether AI represents merely a technological reform or a structural governance capability capable of enhancing administrative performance.

Literature Review. Digital governance scholarship evolved from early e-government frameworks toward broader models of structural administrative transformation. The concept of digital-era governance emphasizes reintegration of services, needs-based holism, and digitization of core administrative processes (Dunleavy et al., 2006). Subsequent research demonstrates that digital transformation reshapes organizational routines, inter-agency coordination, and accountability structures (Janssen & Kuk, 2016; Mergel et al., 2019).

Studies in public management argue that digital tools can enhance efficiency and reduce transaction costs, yet outcomes

ISSN 2524-2547 *Соціальна економіка / Social Economics*. 2026. Випуск/Issue 73

depend on institutional adaptation (Bekkers & Homburg, 2007; Cordella & Tempini, 2015). Digital transformation is therefore not merely technical modernization but organizational restructuring requiring leadership, coordination, and institutional learning (Lindgren & van Veenstra, 2018).

Administrative performance has been a central concern in public administration research, with frameworks ranging from New Public Management (NPM) efficiency metrics to governance-oriented evaluations of effectiveness, accountability, and citizen-centric outcomes (Pollitt & Bouckaert, 2017). In the context of digital governance, scholars emphasize the role of information and communication technologies (ICTs) in enhancing service delivery, transparency, and policy responsiveness. Indicators such as the World Bank's Government Effectiveness measure reflect this multidimensional understanding by capturing perceptions of public service quality, regulatory quality, and the competence of civil servants.

Big data analytics has further expanded the governance toolkit, enabling predictive decision-making and performance monitoring (Klievink et al., 2022; Meijer & Bolívar, 2016). However, empirical evidence shows heterogeneous outcomes across countries, suggesting that digital maturity alone does not guarantee improved administrative performance (Andersen et al., 2012).

Institutional economics provides a foundational framework for understanding administrative effectiveness. North (1990) argues that institutions structure incentives and shape organizational performance. Governance quality reflects the interaction between formal rules and enforcement mechanisms (Acemoglu & Robinson, 2012).

Government effectiveness depends on bureaucratic professionalism, regulatory clarity, and administrative capacity (Fukuyama, 2013). Kaufmann et al. (2010) conceptualize Government Effectiveness as a multidimensional indicator reflecting public service quality, civil service independence, and policy credibility. Empirical studies confirm that institutional coherence significantly predicts economic and social performance (La Porta et al., 1999; Rodrik et al., 2004).

Public management literature further emphasizes that reforms generate sustainable performance improvements only when embedded within institutional capacity-building processes (Pollitt & Bouckaert, 2017). Strategic management in the public sector requires alignment between technological tools and governance structures (Bryson et al., 2010).

These insights imply that AI adoption is unlikely to independently produce performance gains unless institutional determinants such as regulatory quality and digital infrastructure support its implementation.

Research on artificial intelligence (AI) in the public sector has expanded rapidly over the past decade, shifting from a focus on technical capabilities toward an understanding of AI as a managerial and institutional phenomenon. Early work conceptualized AI primarily as a technological innovation with potential efficiency gains (e.g., Mergel et al., 2019; Janssen et al., 2020), emphasizing automation, data analytics, and decision-support systems. However, recent scholarship highlights that the adoption and impact of AI in public administration depend crucially on governance structures, institutional design, and managerial capacity (Kankanhalli et al., 2021; Scholta et al., 2019). This literature frames AI not merely as a set of tools but as a public management capability that reshapes organizational routines, policy processes, and service delivery models.

Theoretical frameworks on public sector innovation emphasize that the impact of new technologies on performance is mediated through organizational learning, process redesign, and capacity enhancement (Borins, 2001; Walker, 2006). Applied to AI, scholars propose several mechanisms: improved data-driven decision-making, workload optimization, enhanced service customization, and expanded predictive capabilities (Mergel et al., 2019). In addition, scholars identify potential gains in predictive analytics, automated decision support, and risk-based regulation (Wirtz et al., 2019; Sun & Medaglia, 2019). AI systems may improve fraud detection, optimize resource allocation, and enhance policy cycle efficiency (Valle-Cruz et al., 2020).

Margetts and Dorobantu (2019) argue that AI can fundamentally reshape governmental decision architectures. Similarly, Engstrom et al. (2020) highlight AI's potential to augment bureaucratic capacity rather than replace human judgment. Empirical sectoral studies demonstrate AI applications in taxation, social welfare, and law enforcement (Meijer & Wessels, 2019). However, researchers also emphasize governance risks. Algorithmic opacity and accountability deficits may undermine public trust (Veale & Brass, 2019; Pasquale, 2015). Ethical AI frameworks and regulatory oversight are therefore essential to responsible implementation (Floridi et al., 2018) Recent systematic reviews confirm that AI research

ISSN 2524-2547 *Соціальна економіка / Social Economics*. 2026. Випуск/Issue 73

in public administration remains fragmented and predominantly qualitative (Criado et al., 2023). Large-scale cross-national quantitative evaluations remain scarce.

Digital infrastructure constitutes a necessary precondition for AI implementation. Broadband penetration and ICT capacity facilitate data processing, interoperability, and algorithmic deployment[1]. Research shows that digital infrastructure positively correlates with e-government performance and administrative modernization (Andersen et al., 2012).

The GovTech maturity literature argues that digital readiness enhances institutional responsiveness and regulatory innovation. Mikalef et al. (2020) demonstrate that analytics capabilities mediate the relationship between data infrastructure and organizational performance. These findings suggest that AI's effect on governance performance depends on technological absorptive capacity. In addition, AI governance frameworks emphasize transparency, accountability, and risk management. The OECD AI Principles establish normative standards for responsible AI[2]. The European Commission's AI regulatory initiatives highlight the importance of risk-based governance[3]. Scholars argue that whether AI enhances or undermines governance performance depends on regulatory quality, accountability mechanisms, and institutional oversight (Veale & Brass, 2019; Criado et al., 2025).

Institutional determinants therefore moderate AI's impact. Countries with stable regulatory environments and coordinated digital governance systems are more likely to translate AI strategies into performance improvements.

Research Methodology. The presented study applies a sequential explanatory mixed-method design, combining quantitative panel data analysis with qualitative institutional investigation. The research design follows two interconnected stages. In the first stage, we examine the statistical relationship between national AI strategy adoption and administrative effectiveness across OECD countries. In the second stage, we analyze institutional mechanisms in selected case countries to explain and contextualize the quantitative findings.

The present study is based on both quantitative and qualitative research methodologies. Therefore, the mixed-method approach allows us to move beyond purely correlational evidence and to explore how and under what conditions AI contributes to administrative performance.

The quantitative analysis covers OECD member states for the period 2016–2023. The selection of this period reflects the accelerated institutionalization of AI strategies during the late 2010s and early 2020s.

All data are obtained from official international sources to ensure comparability and reliability.

Administrative performance is measured using the Government Effectiveness indicator from the Worldwide Governance Indicators database[4]. This index captures perceptions of public service quality, policy implementation capacity, and bureaucratic professionalism.

Economic development is measured through GDP per capita, obtained from the World Bank's World Development Indicators. To reduce skewness and allow interpretation in elasticity terms, GDP per capita is log-transformed.

Institutional regulatory quality is measured using the Regulatory Quality indicator from the Worldwide Governance Indicators dataset.

Because no harmonized cross-country annual index of AI implementation exists, we operationalize AI adoption through a policy-based coding procedure. For each country, we identify the official year of adoption of a national AI strategy using government policy documents (Estonia[5], Germany[6], Italy[7], Finland[8]) and OECD policy records. Based on

1 Measuring Digital Development: Facts and Figures 2022. International Telecommunication Union. URL: https://www.itu.int/dms_pub/itu-d/opb/ind/d-ind-ict_mdd-2022-pdf-e.pdf (date of access: 15.02.2026).

2 OECD AI Principles. URL: https://www.oecd.org/en/topics/ai-principles.html (date of access: 15.02.2026).

3 Proposal for a Regulation Laying Down Harmonised Rules on Artificial Intelligence (Artificial Intelligence Act). EUR-Lex. European Commission. URL: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52021PC0206 (date of access: 15.02.2026).

4 Dataset | Worldwide Governance Indicators (WGI). World Bank. URL: https://data360.worldbank.org/en/dataset/WB_WGI (accessed: 15.04.2026).

5 National AI Strategy. URL: https://e-estonia.com/nationa-ai-strategy/ (date of access: 15.02.2026).

6 Artificial Intelligence Strategy of the German Federal Government. The Federal Government of Germany. URL: https://www.ki-strategie-deutschland.de/?cid=729&file=files%2Fdownloads%2FNationale_KI-Strategie_engl.pdf (date of access: 15.02.2026).

7 Italian Strategy for Artificial Intelligence 2024–2026. Agency for Digital Italy (AgID). URL: https://www.agid.gov.it/sites/agid/files/2024-07/Italian_strategy_for_artificial_intelligence_2024-2026.pdf (date of access: 15.02.2026).

8 Finland's Age of Artificial Intelligence: Turning Finland into a Leading Country in the Application of Artificial Intelligence. Ministry of Economic Affairs and Employment of Finland. URL: https://julkaisut.valtioneuvosto.fi/items/d8ed801e-24a8-4ec6-8032-350c7eda6a06 (date of access: 15.02.2026).

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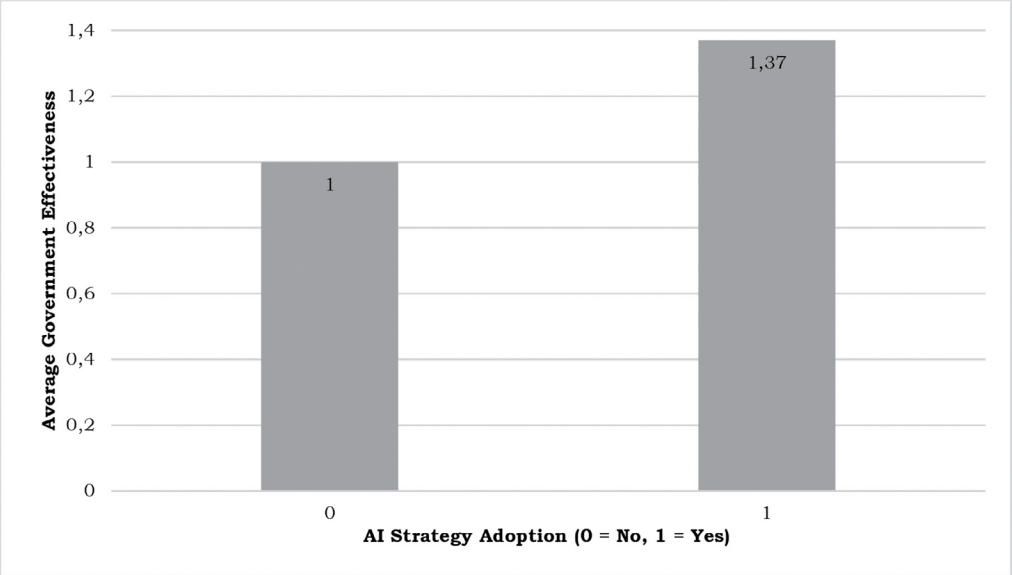

Fig. 1. Average Government Effectiveness By AI Strategy Adoption

Source: Author's calculations based on World Bank WGI and OECD AI Policy Observatory data

this information, we construct a time-varying binary variable:

– AI = 0 for years preceding the official adoption of a national AI strategy;

– AI = 1 for the adoption year and subsequent years.

This approach captures institutional commitment to AI integration rather than technological intensity. The coding procedure ensures transparency and replicability.

To estimate the relationship between AI adoption and administrative performance, we apply a Fixed Effects panel regression model:

$$GE_{\{it\}} = \beta_0 + \beta_1 \, AI_{\{it\}} + \beta_2 \, GDP_{\{it\}} + \\ + \beta_3 \, DIG_{\{it\}} + \beta_4 \, REG_{\{it\}} + \mu_i + \varepsilon_{\{it\}}, \quad (1)$$

where:

– i denotes country;

– t denotes year;

– μ_i captures country-specific time-invariant effects;

– $\varepsilon_{\{it\}}$ is the error term.

The Fixed Effects model is appropriate for this study because it controls for unobserved, time-invariant characteristics such as historical administrative traditions, geographic conditions, or cultural factors. By focusing on within-country variation over time, the model allows us to compare each country to itself before and after AI strategy adoption.

This approach reduces omitted variable bias and strengthens causal interpretation.

To assess robustness, we estimate alternative specifications including lagged AI variables, which test whether the effect of AI adoption materializes gradually over time.

To explain quantitative results, we conduct qualitative analysis of four OECD countries selected according to three criteria:

1. Institutional quality.
2. Depth of AI policy implementation.
3. Variation in administrative outcomes.

Based on these criteria, we select four countries: Finland, Estonia, Germany and Italy. These countries represent variation in digital maturity, governance performance, and institutional capacity.

The qualitative analysis relies on document analysis and content analysis of: National AI strategy documents, Implementation plans and policy roadmaps, Digital governance strategies, Regulatory and ethical AI frameworks.

We analyze institutional mechanisms including: Data governance systems, Inter-agency coordination, Regulatory clarity, Digital infrastructure integration, Public sector capacity-building.

The purpose of the qualitative stage is not to replace statistical analysis, but to interpret observed quantitative relationships and identify causal pathways.

Main Results. The descriptive analysis provides initial insight into the relationship between AI strategy adoption and administrative performance across OECD countries. Using official data from the Worldwide Governance Indicators[1] and

1 Fixed Broadband Subscriptions (per 100 People) (IT.NET.BBND.P2). World Bank. URL: https://data.worldbank.org/indicator/IT.NET.BBND.P2 (date of access: 15.02.2026).

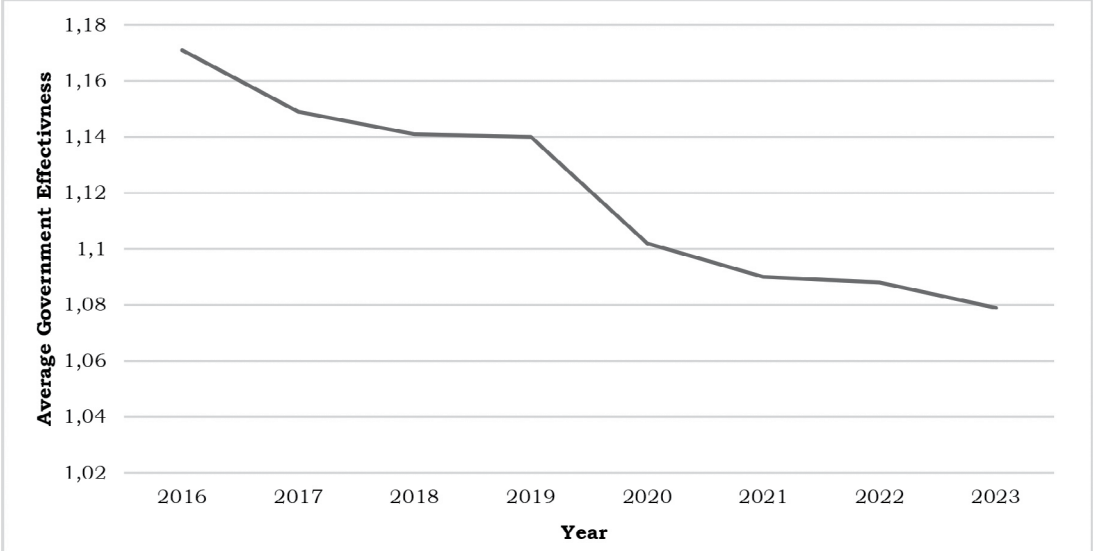

Fig. 2. OECD Average Government Effectiveness (2016-2023)

Source: Author's conceptual visualization based on panel regression results

national AI strategy adoption records compiled from OECD AI Policy Observatory sources (OECD, 2023), this study provides empirical evidence that national AI strategy adoption exhibits a positive but statistically modest association with Government Effectiveness.

As shown in Figure 1, countries that have adopted a national AI strategy demonstrate marginally higher average levels of Government Effectiveness compared to those without formal AI adoption. While the observed difference is relatively small, the positive direction of the association is consistent with theoretical expectations that AI policy frameworks may contribute to institutional strengthening. Nevertheless, the magnitude of the difference suggests that AI adoption alone does not produce substantial short-term governance transformation.

Figure 2 illustrates the OECD-wide average trend in Government Effectiveness over the period 2016–2023[1]. The time series reveals relative stability in the pre-2020 period, followed by temporary fluctuations associated with broader systemic disruptions. Importantly, changes in Government Effectiveness appear gradual rather than abrupt, suggesting that institutional reforms including AI strategies are likely to exert their influence progressively over time rather than through immediate structural shifts.

These descriptive patterns provide preliminary support for a positive association between AI policy adoption and administrative effectiveness, while also indicating that the magnitude of change is not substantial at the aggregate level.

To formally test the relationship between AI strategy adoption and Government Effectiveness, a Fixed Effects panel regression model was estimated using country-year observations covering 38 OECD countries from 2016 to 2023. Government Effectiveness and Regulatory Quality indicators were obtained from the Worldwide Governance Indicators database[2]. GDP per capita and broadband subscription data were sourced from the World Development Indicators[3].

The model demonstrates strong explanatory power ($R^2 \approx 0.90$), indicating that the included variables account for a substantial proportion of cross-country and temporal variation in Government Effectiveness. The joint statistical significance of the model is confirmed by the F-statistic ($p < 0.001$).

The regression results indicate the following:

1. Log GDP per capita is positively and statistically significantly associated with Government Effectiveness. Economically developed countries tend to exhibit stronger administrative performance.

2. Digitalization, measured through fixed broadband subscriptions per 100 people, shows

1 Fixed Broadband Subscriptions (per 100 People) (IT.NET.BBND.P2). World Bank. URL: https://data.worldbank.org/indicator/IT.NET.BBND.P2 (date of access: 15.02.2026).

2 Dataset | Worldwide Governance Indicators (WGI). URL: https://data360.worldbank.org/en/dataset/WB_WGI (date of access: 15.02.2026).

3 Fixed Broadband Subscriptions (per 100 People) (IT.NET.BBND.P2). World Bank. URL: https://data.worldbank.org/indicator/IT.NET.BBND.P2 (date of access: 15.02.2026).

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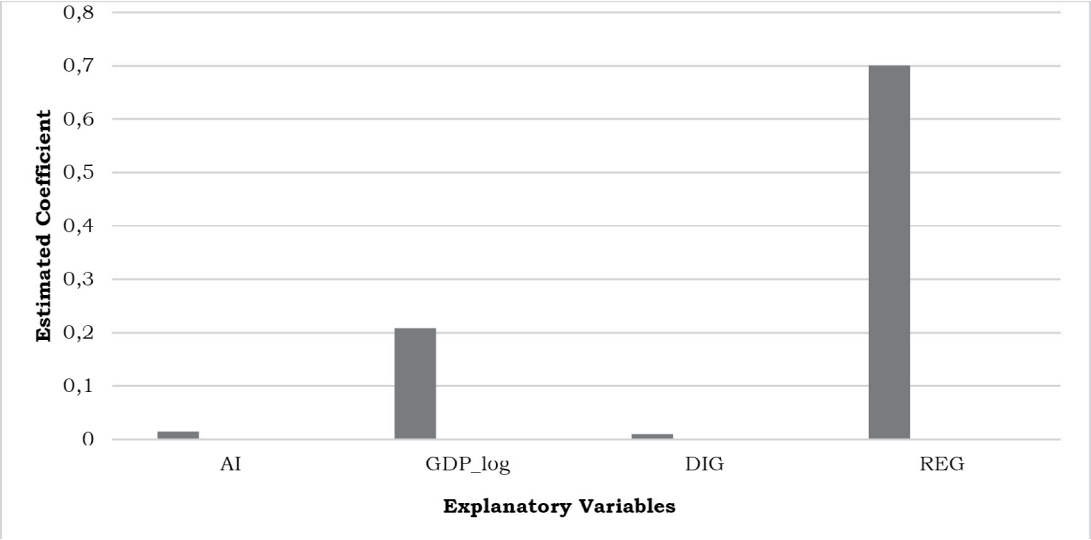

Fig. 3. Estimated Effects of AI Adoption and Institutional Determinants on Government Effectiveness

Source: Author's regression results

a positive
and statistically significant relationship with Government Effectiveness, underscoring the importance of digital infrastructure in contemporary governance systems[1].

3. Regulatory Quality emerges as the strongest predictor in the model, reflecting the close conceptual and empirical linkage between regulatory capacity and administrative effectiveness[2].

4. AI strategy adoption is positively signed, indicating a directionally favorable association with Government Effectiveness. However, the estimated coefficient is comparatively small relative to structural determinants.

Figure 3 visualizes the relative magnitude of regression coefficients and highlights the dominant role of institutional and economic variables in explaining administrative performance. The coefficient for AI adoption remains positive across model specifications, yet its magnitude suggests that AI policy functions as a complementary institutional reform rather than a primary driver of governance performance.

The empirical findings allow for formal evaluation of the proposed hypotheses.

H1: Adoption of national AI strategies is positively associated with Government Effectiveness.

The quantitative results support H1 in directional terms. The coefficient of AI strategy adoption is positive, indicating that countries tend to experience improvements in Government Effectiveness following formal policy adoption. However, the magnitude of the effect is modest, suggesting that while AI institutionalization aligns with improved governance outcomes, it does not independently generate large-scale administrative transformation in the short term.

H2: Institutional determinants (regulatory quality, digital infrastructure) moderate this relationship.

The findings provide strong support for H2. Regulatory Quality and Digital Infrastructure exhibit substantial and statistically significant effects on Government Effectiveness. Their comparatively larger coefficients indicate that AI strategies operate within broader institutional ecosystems. The effectiveness of AI policy depends significantly on regulatory coherence, economic development, and digital maturity.

While the quantitative analysis confirms a positive association between AI strategy adoption and Government Effectiveness, the relatively modest magnitude of the effect raises important explanatory questions. Why does formal AI adoption not translate into stronger immediate improvements in administrative performance? Under what institutional conditions does AI policy generate measurable governance gains?

To address these questions, a qualitative institutional analysis was conducted for four OECD countries: Estonia, Finland, Germany, and Italy. These cases were selected based

1 Fixed Broadband Subscriptions (per 100 People) (IT.NET.BBND.P2). World Bank. URL: https://data.worldbank.org/indicator/IT.NET.BBND.P2 (date of access: 15.02.2026).

2 Dataset | Worldwide Governance Indicators (WGI). World Bank. URL: https://data360.worldbank.org/en/dataset/WB_WGI (date of access: 15.02.2026).

Table 1. Comparative Institutional Mechanisms of AI Strategy Implementation in Selected OECD Countries

Country	Year of AI Strategy Adoption	Digital Infrastructure Maturity	Regulatory & Institutional Coordination	Implementation Depth (Public Sector Use Cases)	Observed Governance Impact
Estonia	2019 (updated cycles 2022–2023)	Very High (interoperability, digital ID, X-Road)	Strong centralized coordination and continuity	and continuity Advanced (AI chatbots, tax automation, compliance monitoring)	Strongest positive effect
Finland	2017	High (open data ecosystem, digital governance maturity)	Strong policy coherence, ecosystem-based model	Moderate (capacity-building, skills development focus)	Gradual positive effect
Germany	2018	High (federal digital transformation framework)	Strong regulatory architecture, multi-level governance	Moderate (research, regulation, incremental integration)	Positive but limited marginal gains
Italy	2021 (updated 2024–2026)	Moderate (digital transition ongoing)	Developing coordination, reform phase	Early-stage operationalization	Modest and time-lagged effect

on variation in institutional quality, digital maturity, and observed quantitative dynamics. The analysis relied on official national AI strategy documents, implementation roadmaps, digital governance frameworks, and regulatory policy materials.

Among the four cases, Estonia represents the strongest positive case. Estonia's AI strategy (KrattAI framework) is embedded within an already highly digitalized governance ecosystem characterized by interoperability (X-Road infrastructure), digital identity systems, and integrated public service platforms.

Unlike purely declarative strategies, Estonia's AI policy has been operationalized through concrete administrative use-cases, including AI-enabled citizen service chatbots (Bürokratt), automated compliance monitoring, and AI-supported tax administration. These applications directly interact with core dimensions measured by Government Effectiveness: service quality, policy implementation capacity, and bureaucratic professionalism.

The Estonian case demonstrates that AI strategies generate measurable administrative gains when they are implemented within a coherent digital infrastructure and supported by strong inter-agency coordination mechanisms. AI is not treated as a technological add-on but as an integrated component of public management processes.

This case strongly supports H2: institutional determinants condition the magnitude of AI's impact. Estonia's digital maturity amplifies the effect of AI strategy adoption.

Finland's AI strategy emphasizes capability-building, open data policies, and human capital development. Rather than focusing exclusively on rapid administrative automation, Finland's approach prioritizes long-term institutional readiness.

The qualitative evidence suggests that Finland's AI strategy functions primarily as a capacity-building instrument. While this approach strengthens governance foundations, its measurable short-term impact on Government Effectiveness is incremental rather than transformative.

This case helps explain why the quantitative AI coefficient is positive but modest: ecosystem-oriented strategies produce gradual institutional returns rather than immediate performance jumps.

Germany's AI strategy is characterized by strong regulatory integration and federal coordination mechanisms. The strategy is embedded in a broader digital transformation agenda and emphasizes ethical governance, research investment, and cross-ministerial alignment.

However, Germany already exhibits high baseline levels of Government Effectiveness. In such contexts, incremental improvements are statistically harder to detect. The qualitative evidence suggests that AI functions more as a reinforcement mechanism than as a structural disruptor.

Thus, Germany illustrates a "high-capacity equilibrium" scenario: AI contributes positively, but marginal gains remain limited due to already advanced institutional

conditions.

Italy's recent AI strategy cycle (2024–2026) reflects growing institutional commitment to AI governance. However, qualitative evidence indicates that operationalization remains in earlier stages compared to Estonia or Finland.

The Italian case highlights the distinction between formal policy adoption and implementation depth. While strategic documents articulate ambitious objectives, measurable administrative improvements depend on downstream institutional capacity, digital infrastructure expansion, and coordination efficiency.

This case reinforces the interpretation that AI adoption alone does not guarantee immediate improvements in Government Effectiveness. Institutional maturity mediates outcomes.

The comparative qualitative analysis clarifies why the quantitative effect of AI strategy adoption remains positive yet modest. First, AI strategies contribute to administrative performance primarily when embedded within mature digital governance ecosystems (strongest in Estonia). Second, regulatory clarity and digital infrastructure significantly condition the magnitude of impact. Third, formal adoption without deep implementation yields limited measurable effects (illustrated by Italy).

Conclusion. This study examined whether the institutionalization of artificial intelligence in public administration enhances administrative performance across OECD countries. By applying a sequential explanatory mixed-method design, the research combined panel regression analysis with comparative institutional case studies in order to move beyond correlational evidence and identify underlying governance mechanisms.

The quantitative analysis demonstrated that national AI strategy adoption is positively associated with Government Effectiveness. However, the magnitude of this relationship remains modest when controlling for economic development, digital infrastructure, and regulatory quality. Structural determinants particularly Regulatory Quality emerged as substantially stronger predictors of administrative performance.

The qualitative findings provided critical explanatory depth. The comparative analysis of Estonia, Finland, Germany, and Italy revealed that AI strategies generate measurable governance gains primarily when embedded in coherent institutional ecosystems. Estonia illustrated how digital maturity, interoperability infrastructure, and coordinated implementation amplify the administrative impact of AI. Finland and Germany demonstrated that AI strategies function effectively when aligned with strong regulatory and governance frameworks. Italy highlighted the importance of implementation depth and temporal lag between policy adoption and institutional outcomes.

Taken together, the integrated findings confirm both hypotheses of the study. H1 is supported: national AI strategy adoption is positively associated with Government Effectiveness. H2 is strongly supported: institutional determinants particularly regulatory quality and digital maturity moderate and amplify this relationship.

The evidence suggests that AI should not be conceptualized as a standalone technological intervention. Rather, AI operates as a public management capability embedded within institutional structures. Its effectiveness depends on governance stability, regulatory coherence, digital integration, and administrative capacity-building.

The findings contribute to the literature on digital governance by reframing AI adoption as an institutional reform process rather than a purely technological innovation. AI policies influence administrative performance not through immediate transformation, but through gradual institutional integration. This perspective helps explain why the statistical effect, while positive, remains moderate. From a policy standpoint, governments seeking to enhance administrative performance through AI should prioritize institutional alignment, data governance systems, regulatory clarity, and cross-agency coordination.

Formal strategy adoption is a necessary but insufficient condition for measurable governance improvement. Future research should extend the temporal scope to assess long-term institutional effects and incorporate more granular measures of AI implementation intensity.

Additionally, micro-level administrative performance indicators may provide deeper insight into sector-specific impacts. In conclusion, artificial intelligence enhances public administration not by replacing institutional structures, but by strengthening them provided that the governance ecosystem is capable of absorbing and operationalizing technological innovation.

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Мака Бенашвілі,
доктор філософії з міжнародних відносин, доцент, Університет Сулхан-Саба Орбеліані, вул. Каліструта Кутателадзе, 3, Тбілісі, 0186, Грузія
m.benashvili@sabauni.edu.ge
https://orcid.org/0009-0005-5821-2019

Тамар Церцвадзе,
доктор філософії з менеджменту, доцент, Кавказький університет, вул. Паата Саакадзе, 1, Тбілісі, 0102, Грузія
ttsertsvadze@cu.edu.ge
https://orcid.org/0009-0008-6329-4989

ШТУЧНИЙ ІНТЕЛЕКТ ЯК ЗАСІБ ДЕРЖАВНОГО УПРАВЛІННЯ: ІНСТИТУЦІЙНІ ДЕТЕРМІНАНТИ АДМІНІСТРАТИВНОЇ ЕФЕКТИВНОСТІ В ЦИФРОВОМУ УПРАВЛІННІ

Це дослідження вивчає, чи покращує впровадження національних стратегій штучного інтелекту (ШІ) адміністративну ефективність у країнах Організації економічного співробітництва та розвитку (ОЕСР). ШІ концептуалізується не просто як технологічна інновація, а як можливість державного управління, вбудована в системи інституційного управління. У дослідженні застосовується послідовний пояснювальний змішаний метод, що поєднує кількісний аналіз панельних даних з якісним інституційним дослідженням.

Кількісний аналіз охоплює 38 країн ОЕСР за період 2016–2023 років. Адміністративна ефективність вимірюється за допомогою показника ефективності уряду з бази даних Worldwide Governance Indicators. Впровадження ШІ операціоналізується за допомогою процедури кодування на основі політики, яка визначає офіційний рік прийняття національної стратегії ШІ та створює змінну в часі бінарну змінну. Оцінюється, що панельна регресійна модель з фіксованими ефектами контролює незмінні в часі характеристики країни. ВВП на душу населення (логарифмічно перетворений), якість регулювання та цифрова інфраструктура включені як контрольні змінні.

Результати демонструють позитивний та статистично значущий зв'язок між прийняттям стратегії ШІ та ефективністю уряду. Однак величина ефекту є помірною порівняно зі структурними детермінантами, такими як якість регулювання та економічний розвиток. Цифрова інфраструктура також демонструє значний позитивний зв'язок з адміністративною ефективністю. Перевірки на надійність свідчать про те, що переваги інституціоналізації ШІ матеріалізуються поступово, а не одразу.

Якісні дані з Фінляндії, Естонії, Німеччини та Італії свідчать про те, що стратегії ШІ покращують ефективність управління, коли вони підтримуються узгодженим регулюванням, міжвідомчою координацією та цифровою зрілістю. Дослідження робить висновок, що ШІ сприяє адміністративній ефективності як частина ширшої інституційної екосистеми, а не як окрема технологічна реформа.

Ключові слова: *штучний інтелект, публічне управління, ефективність уряду, цифрове врядування, інституційна спроможність.*

JEL Classification: H83; O33; O38; C23; D73.

Конфлікт інтересів: автори повідомляють про відсутність конфлікту інтересів.
Автори підтверджують, що при написанні наукової статті ресурс штучного інтелекту не використовувався.

Стаття надійшла до редакції 06.02.2026 р.
Стаття пройшла рецензування 12.03.2026 р.
Стаття рекомендована до друку 20.03.2026 р.
Стаття опублікована 31.03.2026 р.

Conflict of Interest: The authors declare no conflict of interest.
The authors confirm that no artificial intelligence resources were used in the writing of the scientific article

Received: 06 February 2026
Revised: 12 March 2026
Accepted: 20 March 2026
Published: 31 March 2026