REPORTING AND IMPROVED EFFICIENCY THROUGH ARTIFICIAL INTELLIGENCE

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Abstract

This paper examines the use of artificial intelligence (AI) to improve the reporting and administration efficiency of the National Recovery and Resilience Plan (NRRP). Focused on a performance-based financing model, it shifts from tracking expenses to achieving tangible results. AI automates data collection and analysis, detects fraud and ensures regulatory compliance, thus improving transparency and effectiveness. It also addresses challenges like maintaining data quality and clear decision-making using AI, highlighting the need for appropriate regulatory frameworks. This study will deepen the understanding of technology adoption in the public sector and offer insights into using AI to modernize public administrations and optimize control processes.

Keywords: Artificial Intelligence, Performance Monitoring, Administrative Reporting

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1. INTRODUCTION

In the recent period, the incorporation of artificial intelligence (AI) into public administration has raised many concerns and revealed many opportunities.

Some studies in the literature have expressed doubts and concerns, suggesting that the adoption of AI in public administrations could lead to overly technocratic management, compromise privacy, exacerbate inequality, and threaten democracy (Janssen & Kuk, 2016; Maciejewski, 2017; Eubanks, 2017; O'Neil, 2016).

In the European context, the adoption of the AI Act[1] (Regulation (EU) 2024/1689 establishing harmonized rules regarding AI), the world's first on AI, has defined an essential regulatory framework to ensure that AI systems adopted in the European market are secure and respect fundamental rights and the values of the European Union (EU). This regulation is set to have a profound impact on the ethical and safe adoption of AI in public administrations, enhancing their ability to address complex challenges and innovate in public services.

The literature on the subject is extensive, and numerous studies highlight the benefits of using AI in the public sector. With the advancement of hardware technologies and access to large datasets, AI has the potential to improve decision-making and predictive ability, facilitate interaction between government and citizens, personalise public services, lighten administrative burdens, and ultimately elevate citizens' quality of life (Ulnicane et al., 2021; Margetts & Dorobantu, 2019; Hitz-Gamper et al., 2019; Androutsopoulou et al., 2019).

In this context, the digitalization of public services emerges as a critical component of

[1] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32024R1689

the modernisation of public administration, a process that has already been underway for years (Borgonovi, 2004).

Italy has taken significant steps towards the digitisation of its administrations, emphasising the importance of this transformation to promote economic development and national growth (Cepiku, 2018; Belisario & Cassano, 2023; Bonomi Savignon et al., 2023).

The use of AI-based control systems has been recognised as an effective means of identifying and preventing fraudulent behaviour, reducing the workload of administrative staff and increasing the accuracy and efficiency of controls.

The aim of this study is to understand the adoption of technologies in the public sector and provide information on the use of AI to modernize public administrations and optimize control processes, as well as analyze steps to improve the efficiency of public sector services through the use of AI.

The remainder of the paper is structured as follows. Section 2 provides a literature review on the nature of AI and the factors that determine its successful implementation in public organizations. Sections 3 and 4 discuss the challenges of improving reporting efficiency using AI, followed by a conclusion in Section 5.

2. LITERATURE REVIEW

Although the field of AI research in the public sector has expanded considerably recently (de Sousa et al., 2019), a dearth of empirical studies persists (Campion et al., 2022; Sun & Medaglia, 2019).

There are a number of important studies that have looked at AI from the perspective of administrative discretion and transparency (Ahonen & Erkkilä, 2020; Bovens & Zouridis, 2002; Criado et al., 2020; de Boer & Raaphorst, 2023; Peeters, 2020), organisational transformations related to the use of AI in predictive policing (Meijer et al., 2021), chief information officers (CIOs) perceptions and expectations of AI in the public sector (Criado et al., 2020), creating public value with AI (Wang et al., 2021) and the use of AI during the pandemic (Cheng et al., 2021). However, empirical studies investigating the determinants of successful AI implementation in public organizations are still limited (Campion et al., 2022; Chen et al., 2021; Schaefer et al., 2021; Sun & Medaglia, 2019). Considering the complexity of AI and its many potential areas of emerging application, regarding accountability and efficiency improvement through AI, the dearth of studies on AI adoption mechanisms is a major research gap. It is, therefore, crucial to obtain empirical evidence on the specific challenges and factors that facilitate the implementation of AI projects in public sector practice (Wirtz et al., 2021), in order to bridge the gap between theories of AI and its practical implementation.

Several initiatives have begun to integrate AI into government operations, highlighting the importance of a structured approach to effectively exploit these technologies (Bontempi, 2022). In an environment where transparent and accountable management of public resources is essential (Comite, 2012), robust and efficient control systems are essential. These systems not only monitor and regulate financial activities but also ensure that all administrative operations comply with established objectives of effectiveness and efficiency. Recent technological innovations have opened up new opportunities for fraud detection research.

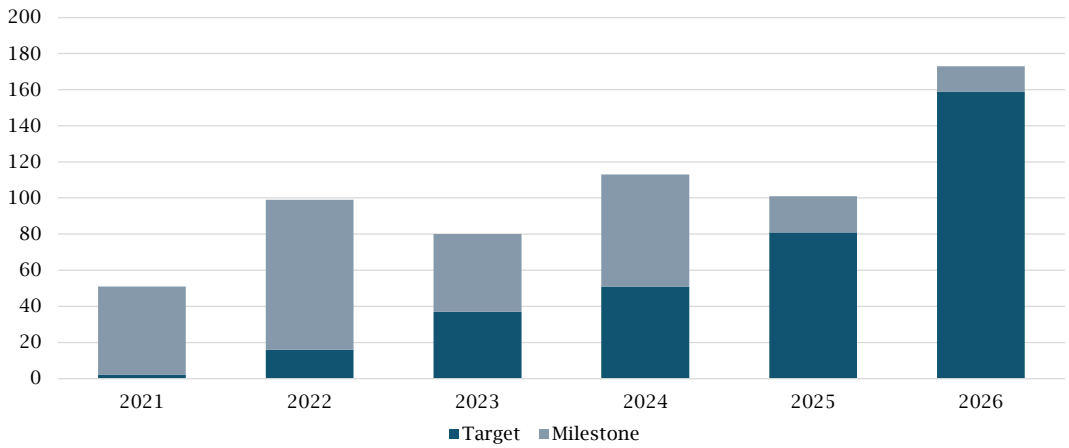
Recently, in Italy, there has been a significant increase in cases of misappropriation of public funds, making this issue particularly relevant for the administrations in charge of National Recovery and Resilience Plan (NRRP) management (Bontempi, 2022).

It is, therefore, imperative that administrations ensure appropriate and transparent use of the financial resources allocated to them, preventing fraud, conflicts of interest and illegal practices.

3. REPORTING AND IMPROVED EFFICIENCY

A key aspect of the NRRP concerns the reporting of milestones and achievements. Reporting on objectives and milestones means, in practice, communicating and documenting the achievement of specific objectives (targets) and milestones set in a programme or project. This approach is crucial in contexts such as the EU's NRRP, which differs from most other EU and national spending programmes in its emphasis on performance and results rather than spending levels.

Figure 1. European milestones and targets



Source: https://www.italiadomani.gov.it/content/sogei-ng/it/en/Interventi/milestone-e-target.html

The main difference lies in the fact that the NRRP adopts an "uncosted" funding model, i.e., a "performance-based" approach, whereby funds are disbursed based on the achievement of certain results and not in relation to expenditure incurred. This mechanism, provided for in Article 125 of the EU Financial Regulation[2], represents a significant change compared to the traditional management of structural funds, where funding is typically linked to documentation and reimbursement of costs incurred (Centurelli, 2023).

The innovativeness of this approach, however, may encounter cultural and comprehension limits both on the part of the administrations managing the funds and the citizens (Centurelli, 2022). Indeed, there is often a tendency to evaluate funding programmes based on the expenditure made rather than the results achieved, which may make it more difficult to fully appreciate the specificities and advantages of the model adopted by the NRRP. A key aspect that distinguishes the NRRP from the traditional European Structural and Investment Funds (ESIF) is the reporting mechanism. Unlike the ESIF, which is based on expenditure-related reporting, the NRRP adopts an innovative approach focused on the achievement of specific objectives defined as "milestones" and "targets" (Centurelli, 2022). This funding method, defined as "non-cost-related", thus, moves away from simple expenditure control to focus on performance, on achieving specific results within pre-established deadlines. This paradigm shift implies a significant challenge for the institutions involved: it is not enough to spend according to plan, but it is important to ensure that this spending actually leads to the achievement of the objectives set by the NRRP (Gallo, 2024). Although the focus is on results rather than spending, the importance of not neglecting the protection of the EU's financial interests is emphasised.

Member States must, therefore, take strict measures to ensure that the use of funds complies with the principles of legality, preventing and correcting possible cases of fraud, corruption, conflicts of interest and double funding. This requires the implementation of a robust internal control system and the establishment of procedures for the recovery of any incorrect amounts.

In essence, managing the NRRP requires a balance between the desire for ambitious results and the need to maintain strict financial integrity. The challenge for institutions involved in the NRRP is not only to plan and execute projects in line with European and national objectives but also to adopt a reporting approach that is flexible, results-oriented and strict in terms of compliance. This represents a significant change in the approach to European funds, which could pave the way for future European funding programmes.

Despite reporting based on milestones and targets, Member States must still take strict measures to protect the EU's financial interests. This includes implementing effective and efficient internal management and control systems, similar to those required for structural funds, to prevent fraud, corruption, conflicts of interest and double funding. States are also required to recover amounts unjustifiably paid or misused.

Article 8 of Decree-Law No. 77/2021[3] provides that each central administration responsible for the interventions of the NRRP must ensure the coordination, monitoring, reporting and control of activities related to investments and reforms under its responsibility. This implies the adoption of a management and control system that includes effective measures to prevent, identify and correct fraud, corruption, conflicts of interest and duplication of funding.

The State General Accounting Department (*Ragioneria generale dello Stato* — RGC) Circular No. 9[4] dated February 10, 2022, provided further details on how to set up the organisation and procedures and how to develop the descriptive document of the management and control system. This system, similar to that provided for the ESIF, is essential for describing the structure, functions and procedures implemented for the management and control of the NRRP. Through these procedures, the aim is to ensure coherent action and effective strategic direction, as well as working methodologies and tools to ensure efficient and effective management of NRRP interventions. The aim is also to ensure the complementarity of these interventions with other national and European funding instruments, in particular, the Next Generation EU (NGEU) priorities, the Complementary National Plan (approved by Decree-Law No. 59 of May 6, 2021) and the instruments of the Cohesion Policy legislative package 2021–2027.

The debate on control in the context of the NRRP highlights the tension between the need to ensure the proper use of funds through detailed control and the need not to stifle the implementation of interventions with excessive administrative burdens. The tendency towards extreme capillary control, which focuses not only on performance but also on procedures and expenditure, risks creating a significant impact on the time and resources dedicated to the implementation of the investments envisaged in the Plan.

Experience shows that the administrative burdens required, especially on the part of beneficiaries such as companies and municipalities, even the smallest ones, can exceed their capacity to provide a rapid and effective response, leading to delays in the implementation of interventions and possibly to the cessation of funding (Gallo, 2024).

4. REPORTING AND IMPROVED EFFICIENCY THROUGH AI: A BREAKTHROUGH CHALLENGES

To address these challenges, it is essential to move forward with a simplification of the process that includes uniform implementation rules and enhanced support and mentoring at all levels while respecting the principle of proportionality and a single audit. These principles are already provided for in the Structural Funds regulations for cohesion policies and can offer a significant reduction in the administrative burden of control activities.

It is also important to consider that the NRRP resources are not the only ones available.

[2] Regulation (EU, Euratom) 2018/1046 of the European Parliament and of the Council, 18 July 2018 (https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018R1046).

[3] https://www.gazzettaufficiale.it/eli/id/2021/05/31/21G00087/sg

[4] https://www.rgs.mef.gov.it/VERSIONE-I/circolari/2022/circolare_n_09_2022/

In the context of overall programming, additional funding from EU and national sources is expected to be significant. Unified management of these resources through single management centres that implement development policies regardless of the financial source, becomes crucial to maximise the effectiveness and sustainability of interventions.

A key element for the success of this strategy is the continuous strengthening of administrative capacity at all levels through increased staffing, improved skills, clear organisational rules and effective tools. Well-trained and competent staff are essential to implement projects and programmes correctly and on time, thus meeting the challenges associated with the turnover freeze of recent years and responding to the complex management rules that characterise the current financial environment (Gallo, 2024).

In this complex and dynamic framework, AI can make significant improvements to actuator signalling in various ways, exploiting its ability to process large volumes of data with high accuracy and speed. Below are some practical examples of how AI could be used to optimise this process:

- *Reporting automation*: AI can automate the collection, organisation and analysis of data required for reporting. Machine learning algorithms can be trained to recognise, classify and process expense items, reducing the time it takes to prepare reports and minimising human error.
- *Fraud and discrepancy detection*: Advanced AI systems can analyse spending patterns and transactions to identify anomalies, potential fraud, double funding or conflicts of interest. This type of predictive analysis helps prevent irregularities before they become problematic.
- *Compliance verification:* Through text analysis and machine learning, AI can be used to ensure that spending practices and funded projects comply with conditionalities and legislative requirements, including those specific to the NRRP. This includes compliance with environmental and social principles, such as the "do no significant harm" (DNSH) principle.
- *Improved data transparency and accessibility:* AI can help create interactive dashboards and accessible reports, facilitating the monitoring of expenditure and project progress in real-time for both managers and the public. This improves transparency and promotes greater citizen participation and trust.
- *Forecasting and planning:* Using historical data and current trends, AI can help predict future spending needs and potential areas of risk. This enables organisations to implement more effective planning, optimising resource utilization and improving overall project performance.
- *Decision support:* With the ability to analyse complex data networks, AI can provide data-driven insights and recommendations to support the strategic decisions of implementing organisations, ensuring optimal resource allocation to meet NRRP goals.
- *Training and assistance to users:* With AI-powered chatbots and virtual assistants, organisations implementing the system can provide immediate training and assistance to their employees on reporting issues, improving the accuracy and compliance of reports.

By incorporating AI into their reporting practices, implementing organisations can not only improve the efficiency and accuracy of their processes but also strengthen the prevention of irregularities and promote greater transparency and trust in the public funds management system.

The use of AI in executive agency reports, such as the NRRP, presents several challenges, ranging from data integrity to transparent decision-making. These technologies, while offering advantages in terms of efficiency and analytical capacity, raise complex issues that require careful management (Gallo, 2024).

A primary challenge concerns data quality and integrity. Reports based on AI are highly dependent on the accuracy and completeness of the input data. Inaccurate or incomplete data can lead to misleading results, negatively affecting decisions based on these analyses. Ensuring the cleanliness, reliability, and up-to-date data, therefore, becomes crucial and requires robust data collection and verification systems.

Transparency and understandability of automated decision-making processes are another major challenge. AI algorithms can function as black boxes, making it difficult to understand the logical path that led to a particular decision. This raises concerns in terms of accountability and trust, especially when decisions have a significant impact on funding or resource allocation. It, therefore, becomes crucial to make these processes more transparent and interpretable, possibly through the adoption of explainable AI (XAI) techniques.

Regulatory compliance is a further challenge. Current data privacy laws, such as the EU General Data Protection Regulation (GDPR), impose strict requirements on the handling of personal data. Implementing organisations must ensure that the use of AI in reporting complies with these regulations, protecting people's privacy and ensuring data security.

Finally, the training and skills required to effectively manage AI represent a non-negligible challenge. Implementing agencies must invest in training staff and developing specific skills to implement, manage and supervise AI systems, a task that requires significant resources and a constant commitment to technological upgrading.

The use of AI by plan implementers for reporting and in public administration for administrative control represents a significant evolution towards modernisation and efficiency in the public sector. This technological transformation offers unique opportunities to improve accuracy, speed up processes and optimise resource management. However, the integration of AI also poses complex challenges that require careful attention and management.

From an accountability perspective, AI can revolutionise the way performance organisations collect, analyse and present data, offering the opportunity to automate repetitive tasks and improve the quality of financial analysis. This could lead to greater transparency and accountability, as well as provide valuable insights that can guide better strategic decisions. The main challenge in this area concerns data quality and the need to ensure that AI systems are fed with accurate and complete information to avoid incorrect or misleading conclusions.

In terms of administrative control, AI has the potential to make inspection processes more efficient and less prone to human error, enabling real-time monitoring and the ability to detect anomalies or potential irregularities with unprecedented accuracy. Issues of transparency, algorithm functionality, and accountability of automated decisions become central, as it is essential to maintain trust in the system and ensure that decisions can be understood and challenged.

Both of these AI applications address the issue of "algorithmic legality", i.e., the need to ensure that the use of algorithms complies with the principles of legality, fairness and transparency that govern administrative actions. This implies the development of appropriate regulatory frameworks that can effectively regulate the use of AI while ensuring that technological innovation can take place in a responsible and ethical manner. The adoption of AI by implementing organisations for reporting purposes and by paying agencies for administrative control purposes is a promising avenue for efficiency and innovation. However, proactively addressing the challenges of data quality, transparency, accountability and regulation is essential to successfully tackle this transition. Only in this way will it be possible to fully exploit the benefits of AI, maintaining public trust and ensuring that decisions made remain fair, understandable and consistent with the core values of society. In the context of the NRRP's in-depth study, 2024 is a turning point when managing unprecedented resources will become a major challenge for those implementing them. The latter find themselves having to navigate in a sea of often inconsistent regulations, circulars and controls, dealing with a complexity that risks slowing down the effective implementation of projects. The simultaneous implementation of the new cohesion policy programmes for the period 2021–2027 adds further layers of complexity, heralding even more intense years than in the past (Centurelli, 2021).

Reporting, monitoring and resource management emerge as particularly treacherous terrains, where the multiplication of rules and the excessive differentiation of operational tools can generate confusion and not inconsiderable administrative burdens. In particular, the low administrative capacity of some authorities and the remoteness of technical support from the territories, especially for smaller local administrations, represent significant obstacles to the effectiveness of the NRRP.

To address these critical issues, recent literature on the topic suggests a number of measures to simplify the process, strengthen administrative capacity, and make technical support more accessible and tailored to local needs. Among these, the revision of guidelines to reduce their complexity and the promotion of a proportional control system are key measures to reduce the administrative burden and focus on the actual implementation of projects.

The idea of creating committees or task forces to coordinate and integrate technical assistance and capacity-building initiatives is particularly promising. These bodies could generate complementarities and synergies between the various resources allocated, maximizing the use of investments and targeting them to the real needs of the territory. At the same time, the definition of single standards for participation in calls for proposals and project management could significantly reduce the variability and complexity that currently burden beneficiary bodies, simplifying their path to obtaining and using funds. A change of pace is needed in the approach to managing the NRRP and development policies in general. The proposals put forward aim to simplify the entire system and make it more efficient, overcoming the bureaucratic and operational barriers that currently limit the ability of entities to transform the funds received into concrete projects with an impact on local communities.

AI is a transformative force that can address the complexity and criticality of the NRRP implementation process. Through automation and predictive analytics, AI can simplify the management of multiple guidelines and circulars, making information more accessible and understandable to end users. This not only reduces complexity for authorities but also makes it easier to navigate the rules.

AI has the potential to optimise controls, identify areas of increased risk and enable targeted activities, easing administrative burdens and preventing duplication. In this sense, it can contribute to the creation of a "single audit" environment, coordinating information between different control bodies for a more efficient and less redundant approach.

By enhancing administrative capacity, AI can customise learning and training through online platforms that provide support and content tailored to meet the specific needs of professional auditors. Virtual assistants and chatbots can offer instant advice, overcoming geographical barriers and making technical support more flexible and less dependent on physical presence.

In terms of standardization of operational tools, AI can play an important role in analysing and comparing documents to identify discrepancies and promote common, uniform standards. This automated process not only facilitates the creation of standardised formats but also reduces variability and administrative burden for the entities involved, contributing to a more coherent and integrated approach to NRRP implementation.

AI is an innovative solution to address the challenges of the NRRP, facilitating simplification, increasing efficiency and better responding to the needs of administrations and territories (Gallo, 2024).

5. CONCLUSION

The study highlighted the significant role AI can play in in improving government efficiency and transparency. By using AI for automated data processing and advanced analysis, studies in the literature have observed greater accuracy in monitoring and reporting, helping to reduce human error and potential bias. The regulatory framework provided by the AI Act ensures that these technologies are implemented while respecting individual rights and maintaining public trust.

Despite the considerable benefits of AI, its implementation in the public sector is not without challenges. These include: 1) the need to ensure data integrity, 2) protection against bias in decision-making processes, and 3) maintaining transparency

in automated operations. It is essential that public entities take proactive measures by establishing clear guidelines and implementing continuous monitoring to ensure responsible and effective use of AI tools.

Looking ahead, it is crucial that public administrations continue to explore the application of AI in various operational aspects. As technologies evolve, AI integration strategies must also adapt to meet changes in regulatory frameworks and ethical standards. Collaboration between technology experts, regulators and public stakeholders will be crucial in shaping an innovative and responsible public sector enabled by AI.

Moreover, progress in digitisation and the use of AI offers opportunities to develop more robust ethical and regulatory frameworks, integrate AI into decision-making at more complex levels, and customise public services to better meet citizen needs. These technologies can also enhance civic participation through platforms that increase government transparency.

Finally, it is recommended that public administrations engage in ongoing training and capacity building of their staff to enable them to effectively manage and use AI technologies. It is also crucial to increase public awareness of the role and implications of AI in public governance, to stimulate informed and sustainable public debate, and to promote a more responsible and transparent approach to the management of public funds and policies.

Despite its considerable benefits, the present study has some limitations that deserve attention. First, the speed of technological evolution may make some of our findings less relevant over time as new AI capabilities and applications emerge. Second, the dynamics of AI implementation may vary significantly between different administrative contexts, thus limiting the generalisability of our findings. Third, our study may not capture all the challenges and implications of AI adoption, particularly those related to rapid regulatory changes that may affect the implementation of the technologies in question. Finally, the reliance on secondary data and the interpretation of pre-existing studies may introduce a degree of interpretive bias that needs to be considered when evaluating the results.

These considerations underline the importance of continuing research in this field, with a particular focus on longitudinal studies that can trace the evolution of the impact of AI over time and across different geographies and sectors of public administration.

REFERENCES

Ahonen, P., & Erkkilä, T. (2020). Transparency in algorithmic decision making: Adeational tensions and conceptual shifts in Finland. *Information Polity, 25*(4), 419–432. https://doi.org/10.3233/IP-200259

Androutsopoulou, A., Karacapilidis, N., Loukis, E., & Charalabidis, Y. (2019). Transforming communication between citizens and government through artificial intelligence-driven chatbots. *Government Information Quarterly, 36*(2), 358–367. https://doi.org/10.1016/j.giq.2018.10.001

Belisario, E., & Cassano, G. (2023). *Intelligenza artificiale per la pubblica amministrazione* [Artificial intelligence for public administration]. Pacini Editore.

Bonomi Savignon, A., Zecchinelli, R., Costumato, L., & Scalabrini, F. (2024). Automation in public sector jobs and services: A framework to analyze public digital transformation's impact in a data-constrained environment. *Transforming Government: People, Processes and Policies, 18*(1), 49–70. https://doi.org/10.1108/TG-04-2023-0044

Bontempi, V. (2022). L'amministrazione centrale alla prova della governance per il PNRR: Attualità e prospettive [The central administration at the test of governance for the PNRR: actuality and perspectives]. *Diritto Costituzionale, 2*, 63–76. https://doi.org/10.3280/DC2022-002005

Borgonovi, E. (2004). *Ripensare le amministrazioni pubbliche. Tendenze evolutive e percorsi di approfondimento* [Rethinking public administration. Evolving trends and pathways for further study]. Egea.

Bovens, M., & Zouridis, S. (2002). From street-level to system-level bureaucracies: How information and communication technologies are transforming administrative discretion and institutional control. *Public Administration Review, 62*(2), 174–184. https://doi.org/10.1111/0033-3352.00168

Campion, A., Gasco-Hernandez, M., Jankin Mikhaylov, S., & Esteve, M. (2022). Overcoming the challenges of collaborative adoption of artificial intelligence in the public sector. *Social Science Computer Review, 40*(2), 462–477. https://doi.org/10.1177/0894439320979953

Centurelli, G. (2021). Gli strumenti europei per la ripresa e la resilienza ed il quadro finanziario pluriennale 2021–2027: Verso la "performance" attuativa ed i risultati [The European instruments for recovery and resilience and the multiannual financial framework 2021–2027: Towards implementation "performance" and results]. *Legal Journal of the Mezzogiornon, 2–3*, 651–666. https://www.rivisteweb.it/doi/10.1444/101001

Centurelli, G. (2022). *Concorso funzionario esperto in gestione e controllo dei fondi europei: Fondi strutturali e PNRR* [Competition for an expert official in the management and control of European funds: Structural Funds and NRRP]. Maggioli.

Centurelli, G. (2023). Pnrr: l'evoluzione della governance e dei sistemi di gestione e controllo e analisi comparativa con le politiche di coesione [The evolution of governance and management and control systems and comparative analysis with cohesion policies]. *Rivista Giuridica del Mezzogiorno, 3,* 753–782. https://www.rivisteweb.it/doi/10.1444/112128

Cepiku, D. (2018). *Strategia e performance nelle amministrazioni pubbliche* [Strategies and performance in public administrations]. Egea.

Chen, H., Li, L., & Chen, Y. (2021). Explore success factors that impact artificial intelligence adoption on telecom industry in China. *Journal of Management Analytics, 8*(1), 36–68. https://doi.org/10.1080/23270012.2020.1852895

Cheng, J., Luo, H., Lin, W., & Hu,G. (2021). Pros and cons of artificial intelligence — Lessons from e-government services in the COVID-19 pandemic. In *2021 2nd International Conference on Artificial Intelligence and Education (ICAIE)* (pp. 167–173). Institute of Electrical and Electronics Engineers (IEEE). https://doi.org/10.1109/ICAIE53562.2021.00042

Comite, U. (2012). The system of accountability in the Italian public administration: A managerial approach. In *Proceedings of 2012 International Conference on Public Administration (8th)* (Vol. 3, pp. 297–302). UESTC Press.

Criado, J. I., Valero, J., & Villodre, J. (2020). Algorithmic transparency and bureaucratic discretion: The case of the SALER early warning system. *Information Polity, 25*(4), 449–470. https://doi.org/10.3233/IP-200260

de Boer, N., & Raaphorst, N. (2023). Automation and discretion: Explaining the effect of automation on how street-level bureaucrats enforce. *Public Management Review, 25*(1), 42–62. https://doi.org/10.1080/14719037.2021.1937684

de Sousa, W. G., de Melo, E. R. P., Bermejo, P. H. D. S., Farias, R. A. S., & Gomes, A. O. (2019). How and where is artificial intelligence going in the public sector? A literature review and research agenda. *Government Information Quarterly, 36*(4), Article 101392. https://doi.org/10.1016/j.giq.2019.07.004

Eubanks, V. (2017). *Automating inequality: How high-tech tools profile, monitor and punish the poor* (1st ed). St. Martin's Press.

Gallo, A. M. (2024). *PNRR and artificial intelligence: Innovation in public administration control system.* Virtus Interpress. https://doi.org/10.22495/paiipacs

Hitz-Gamper, B. S., Neumann, O., & Stürmer, M. (2019). Balancing control, usability and visibility of linked open public data to create public value. *International Journal of Public, 32*(5), 451–466. https://doi.org/10.1108/IJPSM-02-2018-0062

Janssen, M., & Kuk, G. (2016). The challenges and limitations of big data algorithms in techno-cratic governance. *Government Information Quarterly, 33*(3), 371–377. https://doi.org/10.1016/j.giq.2016.08.011

Maciejewski, M. (2017). To do more, better, faster and more cheaply: Using big data in public administration. *International Review of Administrative Sciences, 83*(1, supplement), 120–135. https://doi.org/10.1177/0020852316640058

Margetts, H., & Dorobantu, C. (2019). Rethinking government with AI. *Nature, 568,* 163–165. https://doi.org/10.1038/d41586-019-01099-5

Meijer, A., Lorenz, L., & Wessels, M. (2021). Algorithmisation of bureaucratic organisations: Using a practical lens to study how context shapes predictive policing systems. *Public Administration Review, 81*(5), 837–846. https://doi.org/10.1111/puar.13391

O'Neil, C. (2016). *Weapons of math destruction: How big data increases inequality and threatens democracy* (1st ed.). Crown.

Peeters, R. (2020). The agency of algorithms: Understanding human-algorithm interaction in administrative decision-making. *Information Polity, 25*(4), 507–522. https://doi.org/10.3233/IP-200253

Schaefer, C., Lemmer, K., Kret, K. S., Ylinen, M., Mikalef, P., & Niehaves, B. (2021). Truth or dare? — How can we influence the adoption of artificial intelligence in municipalities? In *Proceedings of the 54th Hawaii International Conference on System Sciences* (pp. 2347–2356). University of Hawaii at Manoa. https://doi.org/10.24251/HICSS.2021.286

Sun, T. Q., & Medaglia, R. (2019). Mapping the challenges of artificial intelligence in the public sector: Evidence from public health. *Government Information Quarterly, 36*(2), 368–383. https://doi.org/10.1016/j.giq.2018.09.008

Ulnicane, I., Eke, D. O., Knight, W., Ogoh, G., & Stahl, B. C. (2021). Good governance as a response to discontent? Déjà Vu, or lessons for AI from other emerging technologies. *Interdisciplinary Science Reviews, 46*(1–2), 71–93. https://doi.org/10.1080/03080188.2020.1840220

Wang, C., Teo, T. S. H., & Janssen, M. (2021). Public and private value creation using artificial intelligence: An empirical study of AI voice robot users in Chinese public sector. *International Journal of Information Management, 61*, Article 102401. https://doi.org/10.1016/j.ijinfomgt.2021.102401

Wirtz, B. W., Langer, P. F., & Fenner, C. (2021). Artificial intelligence in the public sector — A research agenda. *International Journal of Public Administration, 44*(13), 1103–1128. https://doi.org/10.1080/01900692.2021.1947319