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Strengthening the Practice Pillar of Sustainable Development: A Survey-Based Assessment of AI, Digital and Leadership Competencies among Romanian Public Servants

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Abstract

The acceleration of the digital transformation of public administration in Romania, supported by the reforms undertaken by the new European regulations on artificial intelligence, requires the strengthening of institutional capacity and the skills of civil servants in relation to the sustainable development objectives. Although the specialized literature addresses digitalization and algorithmic governance, there is a gap regarding the empirical assessment of the real skills and training needs of civil servants in the context of AI implementation and skills-based reform. The study aims to analyze the level of training and existing gaps in the field of advanced digital skills, AI literacy, cybersecurity, administrative skills and leadership skills in the Romanian public sector.

The methodology consists of an online questionnaire applied to civil servants in central and local administration, complemented by comparative analyses between executive and management functions and regression models to identify the relationship between skills, confidence in the use of AI and the perceived capacity to implement digital reforms. The results highlight significant differences between hierarchical levels, as well as gaps in strategic competencies regarding algorithmic governance and change management.

The added value lies in the empirical substantiation of the practical dimension of sustainable development, by correlating individual competencies with the institutional capacity to implement responsible digitalization. The study contributes to the literature on sustainable digital governance and provides recommendations for public policies and training programs. Limitations concern the self-reported nature of the data and the cross-sectional design of the research. Future directions include longitudinal analyses and comparative extension at the European level.

Keyword: AI, Digital and Leadership

Introduction

The acceleration of the digital transformation of public administration in Romania, supported by the reforms undertaken by the new European regulations on artificial intelligence, requires the strengthening of institutional capacity and the skills of civil servants in relation to the sustainable development objectives. Although the specialized literature addresses digitalization and algorithmic governance, there is a gap regarding the empirical assessment of the real skills and training needs of civil servants in the context of AI implementation and skills-based reform. The study aims to analyze the level of training and existing gaps in the field of advanced digital skills, AI literacy, cybersecurity, administrative skills and leadership skills in the Romanian public sector.

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Literature Review

the literature converges toward several key conclusions. First, digital transformation and AI are reshaping public administration in fundamental ways, affecting governance structures, decision-making processes, and public service delivery. Second, the successful adoption of AI depends on the development of multidimensional competencies that integrate technical, managerial, and ethical dimensions. Third, trust, governance, and institutional readiness play a critical role in mediating the relationship between technological innovation and administrative outcomes. Finally, although existing studies provide valuable conceptual frameworks and empirical insights, there remains a need for context-specific analyses that examine how different categories of competencies relate to confidence in AI use and to the perceived capacity of public institutions to implement digital reform.

Methodology

This study employs a quantitative, cross-sectional design to examine the relationships between civil servants' competencies, confidence in the use of artificial intelligence (AI), and the perceived institutional capacity to implement digital reforms. The empirical analysis is based on a primary dataset collected through an online questionnaire administered to civil servants in central and local public administration in Romania.

Results

Descriptive Statistics

The descriptive analysis indicates moderate levels of digital and AI-related competencies among respondents, with higher scores for general digital skills and lower values for AI literacy and cybersecurity awareness. Leadership and administrative competencies show greater dispersion, suggesting heterogeneous preparedness for managing digital transformation. Confidence in the use of AI is moderate, while perceived institutional capacity for digital reform reflects a balanced assessment between progress and existing constraints.

Table 1. Descriptive statistics of key variables

Variable	N*	Mean	Std. Deviation	Minimum	Maximum	Skewness	Kurtosis
Digital skills (software knowledge index)	172	2.17	0.67	1.00	4.00	0.71	0.16
AI literacy / familiarity index	131	1.66	0.74	1.00	4.42	1.62	2.09
Confidence in AI use (feasibility index)	129	2.71	1.12	1.00	5.00	0.25	-0.69
Perceived institutional capacity for digital reform	171	3.72	0.99	1.10	5.00	-0.54	-0.52
Need for AI-related training	128	3.01	1.06	1.00	5.00	-0.12	-0.50

Comparative Analysis: Executive vs. Management

Comparative analyses reveal statistically significant differences between executive and management staff. Respondents in management positions report higher levels of leadership competencies, strategic digital skills, and confidence in AI use. The largest differences are observed in competencies related to algorithmic governance and change management, indicating a structural gap between operational and strategic levels.

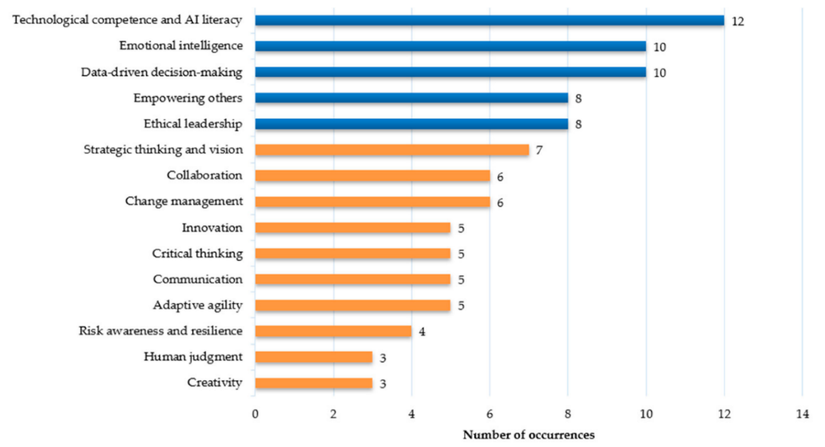

Figure 1. Distribution of key competencies for AI-enabled public administration

In contrast, transversal and adaptive competencies such as innovation, critical thinking, and communication show moderate representation (n = 5–6), while human judgment and creativity are among the least frequently mentioned (n = 3), suggesting a relative underestimation of reflective and interpretative capacities in AI-driven administrative contexts.

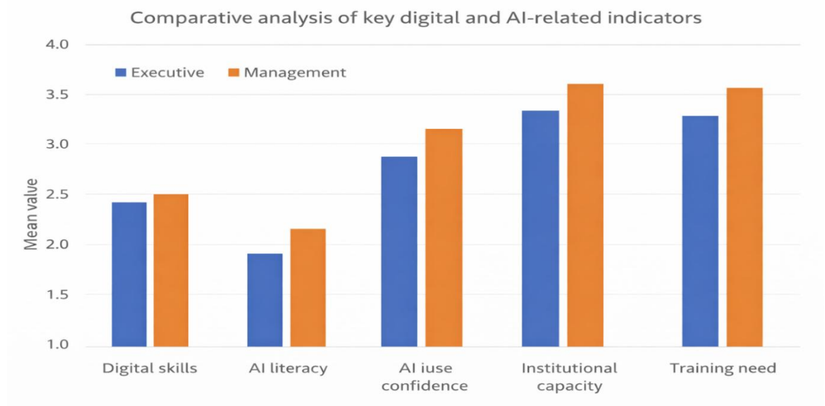

Figure 2. Comparative evolution of key digital and AI-related indicators across respondent groups

Correlation Analysis

The correlation matrix shows positive and statistically significant relationships between competencies, confidence in AI, and perceived institutional capacity. The strongest associations are identified between:

- leadership competencies and institutional capacity,
- AI literacy and confidence in AI.

These findings suggest that both technical and strategic competencies contribute to shaping perceptions of digital transformation readiness.

Variables	1	2	3	4	5
1. Digital skills	1				
2. AI literacy	0.42**	1			
3. AI use confidence	0.38**	0.56**	1		
4. Institutional capacity	0.29**	0.34**	0.47**	1	
5. Training need	-0.21*	-0.33**	-0.28**	-0.19*	1

Discussion

The findings of this study provide empirical support for the growing body of literature emphasizing that the digital transformation of public administration is not solely a technological process, but a complex socio-technical transition shaped by competencies, organizational factors, and individual perceptions. In line with previous research (Medaglia et al., 2024; Criado et al., 2025), the results confirm that competencies play a central role in enabling the adoption and effective use of artificial intelligence (AI) in the public sector.

Conclusion

This study examined the relationships between civil servants' competencies, confidence in the use of artificial intelligence (AI), and the perceived institutional capacity to implement digital reforms in Romanian public administration. The findings confirm that digital transformation is fundamentally conditioned by human capital factors, extending beyond technological infrastructure.

The results highlight three main contributions. First, they identify a hierarchical digital divide, with management-level staff demonstrating higher levels of digital and AI-related competencies than executive employees. Second, the study reveals a significant gap between general digital skills and AI-specific competencies, indicating limited preparedness for algorithmic governance. Third, and most importantly, the analysis demonstrates that confidence in AI use acts as a mediating mechanism between competencies and perceived institutional capacity, emphasizing that skills must translate into operational trust to influence organizational outcomes.

These findings have relevant policy implications. Public administrations should prioritize targeted training programs focused on AI literacy, data-driven decision-making, and change management, while also addressing disparities across hierarchical levels. At the same time, capacity-building strategies should integrate not only technical skills but also mechanisms that enhance trust and usability of AI systems.