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Building the Educational Foundation for Sustainable Digital Governance: A Survey of AI and Public Administration Competencies among Romanian Students

Sorin BURLACU
The Faculty of Administration and Public Management, Bucharest University of Economic Studies, Romania
sburlacu@amp.ase.ro

Carmen Valentina RĂDULESCU
The Faculty of Agrifood and Environmental Economic, Bucharest University of Economic Studies, Romania
carmen-valentina.radulescu@eam.ase.ro

Ioan I. GÂF-DEAC
INCE C. Kiritescu / Romanian Academy, Bucharest, Romania
gafdeac@ince.ro

Ion PÂRGARU
Valahia University of Târgoviște, Romania,
pargaruion@yahoo.com

Abstract
The accelerated digital transformation of public administration and the emergence of regulations on artificial intelligence require the redefinition of the skills needed by future civil servants in relation to the demands of sustainable digital governance. Although literature analyzes institutional digitalization and administrative capacity, there is a gap regarding the systematic assessment of students' preparation for the integration of AI, data-driven skills and the ethical dimension in the context of sustainable development. The study aims to assess the perceived level of preparation and skills gaps among students in the field of Public Administration and Environmental Economics in Romania, with a focus on advanced digital skills, AI literacy, administrative skills and transversal skills.
The methodology consists of an online questionnaire applied to students from bachelor's and master's degree programs analyzed through descriptive statistics, comparative tests between groups and regression models to identify the relationships between skills, institutional trust and the intention to use AI in the public sector. Preliminary results indicate significant differences between study levels and highlight gaps in applied AI skills and algorithmic governance.
The added value lies in integrating the educational dimension into the debate on sustainable digital governance, contributing to the substantiation of curricular reform and the alignment of administrative education with the European sustainable development agenda. Limitations concern the transversal nature of the research and the use of self-assessment of skills. Future directions include international comparative extension and the integration of mixed methods for in-depth validation.
Keyword: survey, AI, public administration, competencies

1.Introduction

The ongoing digital transformation of public administration, accelerated by the integration of artificial intelligence (AI) technologies, is reshaping governance models, administrative processes, and the competencies required of future civil servants. In the European context, recent regulatory frameworks—such as the AI Act and the Digital Decade agenda—emphasize not only technological adoption but also the development of human capital capable of ensuring ethical, transparent, and sustainable digital governance. Consequently, public administration is increasingly transitioning from a bureaucratic paradigm to a data-driven and algorithmically supported system, where decision-making processes rely on advanced digital infrastructures and AI-based tools.

2. Literature Review

The accelerated integration of artificial intelligence (AI) into public administration has generated a substantial body of research examining its implications for governance, institutional capacity, and public value creation. Rather than representing a purely technological shift, AI adoption reflects a broader transformation of administrative systems, in which digital infrastructures, organizational arrangements, and human competencies co-evolve. Systematic reviews emphasize that AI deployment in the public sector is associated with both opportunities—such as increased efficiency, predictive capacity, and data-driven decision-making—and risks related to transparency, accountability, and legitimacy (Zuiderwijk et al., 2021; Madan & Ashok, 2023). Within this evolving landscape, public administrations are required to reconcile innovation imperatives with bureaucratic stability, regulatory constraints, and societal expectations, which positions human capital as a critical determinant of successful digital transformation.

3. Research Methodology

The research adopts a quantitative, cross-sectional design aimed at examining the relationships between competencies, institutional trust, and the intention to use artificial intelligence (AI) in the public sector. This approach is appropriate for analyzing perceptions, self-assessed competencies, and behavioral intentions among students preparing for careers in public administration and related fields.

Data as collected through an online questionnaire administered to students enrolled in bachelor's and master's degree programs. The target population consists of individuals with academic exposure to public administration, economics, or related disciplines, representing a relevant proxy for future public sector employees. The sampling strategy is non-probabilistic and based on voluntary participation, which is common in higher education research but requires cautious interpretation regarding external validity.

4. Results

The results of the empirical analysis provide insights into students' preparedness for AI-enabled public administration and the relationships between competencies, institutional trust, and intention to use artificial intelligence in the public sector.

The descriptive analysis indicates that respondents report relatively high levels of general digital skills, reflecting widespread familiarity with digital technologies in higher education. However, the level of AI literacy appears more heterogeneous, suggesting that exposure to digital tools does not necessarily translate into a deeper understanding of AI systems and their implications. Administrative competencies are generally perceived as adequate, while transversal skills—such as critical thinking and adaptability—are consistently evaluated as important for future professional activity. Institutional trust shows moderate levels, indicating a combination of openness toward technological innovation and concerns related to the capacity of public institutions to manage AI responsibly.

5. Discussion

The findings of this study contribute to the growing body of literature on artificial intelligence in public administration by providing empirical evidence on how future public sector professionals perceive and integrate AI-related competencies. The results confirm that AI readiness is a multidimensional construct shaped by the interaction between digital skills, AI literacy, administrative competencies, transversal skills, and institutional trust.

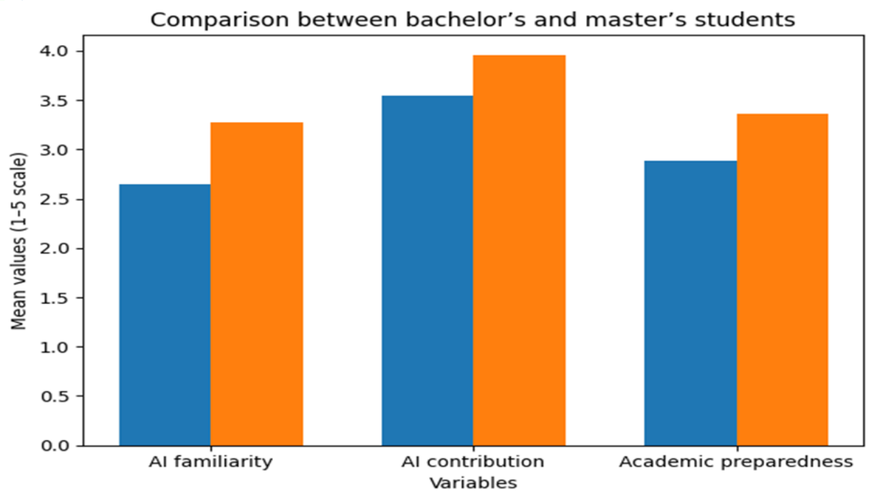
6. Conclusions

This study examined the factors that shape students' readiness to engage with artificial intelligence in the public sector, focusing on the interplay between digital skills, AI literacy, administrative competencies, transversal skills, and institutional trust. The findings confirm that intention to use AI is not determined by a single dimension, but by a combination of interrelated competencies and perceptions that reflect the complexity of AI-enabled governance.

A key conclusion is the central role of AI literacy as the most influential predictor of intention to use AI. This highlights the importance of moving beyond general digital skills toward a deeper understanding of AI systems, including their functioning, limitations, and ethical implications. While digital skills provide a necessary foundation, they are insufficient on their own to ensure effective and responsible adoption of AI in public administration.

Table 1. Descriptive statistics of the main survey variables

Variable	N	Mean	Std. Deviation	Minimum	Maximum
AI familiarity	112	2.91	1.13	1	5
AI contribution to decision-making	112	3.72	0.79	2	5
Algorithmic transparency	112	3.51	0.98	1	5
Service efficiency	112	3.88	0.97	2	5
Social/contextual risk	112	3.79	1.05	1	5
Academic preparedness	112	3.10	0.84	1	4



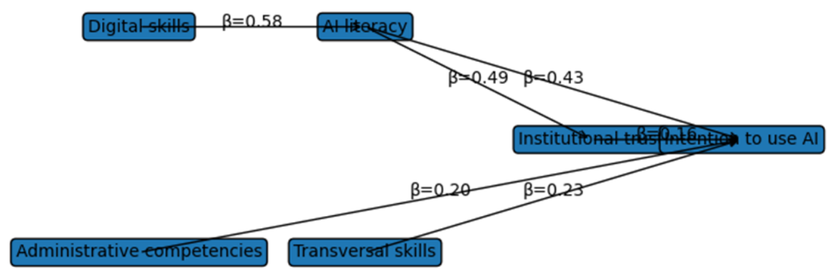


Figure 2. Conceptual model with validated relationships between competencies, institutional trust, and intention to use artificial intelligence in the public sector.

Table 2. Differences between bachelor's and master's students (independent samples t-test)

Variable	Bachelor (Mean)	Master (Mean)	t-value	df	p-value
AI familiarity	2.65	3.28	-3.12	110	0.002
AI contribution to decision-making	3.55	3.96	-2.45	110	0.016
Academic preparedness	2.88	3.36	-2.98	110	0.004

Table 3. Correlation matrix

Variable	1	2	3	4	5	6
1. Digital skills	1					
2. AI literacy	0.58**	1				
3. Administrative competencies	0.42**	0.55**	1			
4. Transversal skills	0.47**	0.52**	0.60**	1		
5. Institutional trust	0.36**	0.49**	0.41**	0.38**	1	
6. Intention to use AI	0.51**	0.67**	0.53**	0.56**	0.45**	1

Table 4. Regression analysis results for intention to use AI

Predictor	B	SE	Beta	t	p
(Constant)	0.84	0.42	—	2.00	0.048
Digital skills	0.18	0.07	0.19	2.57	0.012
AI literacy	0.41	0.08	0.43	5.12	0.000
Administrative competencies	0.21	0.09	0.20	2.33	0.022
Transversal skills	0.24	0.08	0.23	2.94	0.004
Institutional trust	0.17	0.07	0.16	2.29	0.024