Chapter 1
Digital Transformation of Internal Control Systems: The Role of Artificial Intelligence

Marta F. Ceia
http://orcid.org/0009-0001-7916-3747
University of Aveiro, Portugal

Rui P. Marques
http://orcid.org/0000-0001-8449-0526
University of Aveiro, Portugal

Helena Inácio
http://orcid.org/0000-0003-1281-2156
University of Aveiro, Portugal

ABSTRACT

This study investigates the integration of Artificial Intelligence (AI) into Internal Control Systems (ICS). The objective is to understand the role of AI within ICS: (1) identifying AI technologies that benefit ICS, (2) determining ICS procedures that AI can assist, (3) characterizing an AI-assisted ICS, and (4) assessing the challenges in implementing AI within ICS. The results reveal that machine learning for process automation and chatbots are the most well-known and used AI functionalities. Internal Control (IC) procedures are inherently linked, so all benefit from AI implementation. With or without AI, the fundamental characteristics of an ICS remain intact. Key challenges in AI implementation include cost, the need for training, resistance to change, ethical and legal considerations, and data and model suitability. The ICS benefits from AI implementation, directly contributing to improved governance and proactive risk prevention mechanisms, as well as providing time savings.

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INTRODUCTION

In an era marked by economic globalization, accelerated technological change, the emergence of new business models, and growing regulatory complexity, organizations face an increasingly dynamic and uncertain environment. The vast amount of data produced daily, combined with the pervasive dependence on Information Technology (IT), has transformed the way entities operate, manage risks, and pursue strategic objectives. Within this context, the ICS has become a cornerstone of modern management, ensuring operational integrity, regulatory compliance, and the sustainable creation of value (PWC, 2019).

The implementation of innovative ideas and models to foster economic transformation and international competitiveness must be guided by robust and adaptive control systems (Liu, 2011). Regardless of organizational size or structure, an effective ICS serves as both a safeguard and a strategic enabler. It aligns operations with corporate objectives, protects assets, and ensures the reliability of financial and operational information (Masdi et al., 2022; Inácio, 2014). The relevance of ICS is evident across contexts, from the supervision of subsidiaries and state-owned enterprises to the prevention of fraud and enhancement of financial performance (Hu et al., 2021; Cheng, 2011; Abu Hamour et al., 2023; Donelson et al., 2017).

Parallel to this evolution, Information Technology has emerged as a catalyst for change, shaping virtually every aspect of business activity (Mandilas et al., 2022). Its integration with internal control mechanisms has driven research on tools for detecting control nonconformities (Doganata & Curbera, 2012), assessing control risks (Davis et al., 1997), and supporting internal auditing processes (Jans et al., 2011). Recent advances indicate that digital technologies not only enhance control efficiency but also enable continuous monitoring and adaptive governance structures (Fotoh & Lorentzon, 2023; Klius et al., 2020).

Among these technological innovations, AI stands out as a transformative force. AI systems are increasingly embedded in the design and execution of internal controls, offering unprecedented capabilities in automation, anomaly detection, and predictive analysis (Chen et al., 2022; Werner et al., 2021). Moreover, the integration of AI enables real-time automated data processing and enhances both internal communication and external disclosures (Zong & Guan, 2024). Studies have explored AI applications across diverse control functions – from procurement monitoring (Caruso et al., 2023) and financial reporting (Kokina & Blanchette, 2019) to auditing and continuous assurance services (Jans & Hosseinpour, 2019; Marques et al., 2015). Nonetheless, existing research remains fragmented, often limited to specific domains such as auditing or accounting, without providing a holistic understanding of AI's role within the overall architecture of internal control systems (Monteiro et al., 2023; Mehta et al., 2021).