


An Integrative Theoretical Framework for Responsible Artificial Intelligence

Ahmad Haidar, Université Paris-Saclay, Univ Evry, IMT-BS, LITEM, Evry-Courcouronnes, France & Institut Mines-Télécom Business School, 9 rue Charles Fourier, Evry, France*

 <https://orcid.org/0000-0001-8045-1546>

ABSTRACT

The rapid integration of Artificial Intelligence (AI) into various sectors has yielded significant benefits, such as enhanced business efficiency and customer satisfaction, while posing challenges, including privacy concerns, algorithmic bias, and threats to autonomy. In response to these multifaceted issues, this study proposes a novel integrative theoretical framework for Responsible AI (RAI), which addresses four key dimensions: technical, sustainable development, responsible innovation management, and legislation. The responsible innovation management and the legal dimensions form the foundational layers of the framework. The first embeds elements like anticipation and reflexivity into corporate culture, and the latter examines AI-specific laws from the European Union and the United States, providing a comparative perspective on legal frameworks governing AI. The study's findings may be helpful for businesses seeking to responsibly integrate AI, developers who focus on creating responsibly compliant AI, and policymakers looking to foster awareness and develop guidelines for RAI.

KEYWORDS

AI for Sustainability, AI Governance, Digital Strategy, Digital Transformation, Integrative Framework, IT Governance, Responsible AI, Responsible Innovation Management

INTRODUCTION

The International Data Corporation forecasts that global spending on Artificial Intelligence (AI), encompassing software, hardware, and services, will reach \$154 billion in 2023, a 26.9% increase from 2022, and is expected to exceed \$300 billion in 2026 with a compound annual growth rate of 27.0% from 2022 to 2026 (IDC, 2023). One classical definition for AI comes from Kaplan and Haenlein (2019) as “a system’s ability to interpret external data correctly, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation” (p. 15). The European Commission defined AI as any software that analyzes and interprets data to simulate human intelligence, including identifying patterns, making predictions, or generating creative content (EC, 2023).

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*Corresponding Author

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The pervasive influence of AI is revolutionizing traditional business models and operational strategies. Mkrttchian & Voronin (2021) illustrate this in the tourism industry, where technologies like blockchain and digital twin avatars are reshaping operations. Similarly, Zhang (2023) explore the digital transformation in sports tourism in Hainan Province, demonstrating how digitalization, through the “Daubechies wavelet transform and Roughness Analysis Techniques (DRAT) model” (p. 7), deconstructs and redefines the industry with innovative technologies and new consumer-business collaboration models. This paradigm shift, as noted by Iansiti and Lakhani (2020) and Tarafdar et al. (2019), is fundamentally altering how companies operate and compete, extending beyond the realms of technology to redefine entire business ecosystems.

However, alongside these advancements, businesses face significant moral responsibilities due to potential risks such as discrimination and lack of transparency in data usage (Munoko et al., 2020). As organizations increasingly embed AI into their core operations, the evolution of traditional information technology (IT) governance becomes crucial. From a professional standpoint, effective IT governance is a pivotal mechanism that leverages information and processes to amplify profits and future benefits (Khther & Othman, 2013). De Haes & Van Grembergen (2009) emphasized the critical role of IT in maintaining business sustainability, and Wu et al. (2015) highlighted that strategic alignment serves as a crucial mediator in enhancing business operational efficiency. Thus, integrating a responsible AI (RAI) framework into an organization’s IT strategy, which ensures that AI’s deployment aligns with business objectives, regulatory requirements, and ethical considerations, is essential. RAI, as defined by De Laat (2021), means that AI should be “fair and non-biased, transparent and explainable, secure and safe, privacy-proof, accountable, and to the benefit of mankind” and revolves around governance, mechanisms, and participation (Dignum, 2019, pp. 102–104).

From a theoretical perspective, despite some studies addressing AI’s integration into managerial procedures (Ransbotham et al., 2017), there is a lack of frameworks encompassing all dimensions relevant to responsible AI integration. Kearns and Sabherwal (2006) emphasize that implementing a practical IT governance framework can yield significant business value, suggesting the potential benefits of a well-structured AI governance approach. However, companies may fail to extract value from digital transformation due to the disconnection between strategy formulation and implementation. This study aims to bridge this gap by developing a comprehensive framework for integrating AI into businesses responsibly. Two primary research inquiries guide this study by employing a comprehensive review of existing AI principles and practices: What are all the dimensions essential for integrating AI into businesses in a responsible manner, and can an integrative framework be developed that unifies these dimensions to facilitate the effective adoption of AI systems?

The remainder of this article is structured as follows: The Literature Review section explores the existing literature on RAI, highlighting the growing need for comprehensive frameworks and discussing the limitations of previous approaches. In the subsequent section, the proposed integrative framework, a multidimensional approach to RAI, is presented. Following this, the Discussion section delves into the implications of the framework, drawing connections with current practices and theoretical perspectives. Finally, the Conclusion synthesizes the findings and suggests directions for future research.

LITERATURE REVIEW

The Need for AI Governance Within the Company

The adoption of AI is driven by exponential data growth, algorithmic advancements, cloud technologies, smart network evolution, cyber insecurity, and costly development errors, necessitating robust governance to ensure responsible AI deployment (Papagiannidis et al., 2023). Schneider (2022) highlights four main challenges in AI governance: the complex and opaque nature of AI outputs, unpredictable results that may evade control, data-driven biases in AI decisions, and rapid technological

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