Chapter 4
Artificial Intelligence in the Industrial Sector: Legal Implications Beyond the Code

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ABSTRACT

Artificial intelligence is reshaping industrial operations—from automation to predictive logistics—raising complex legal challenges beyond algorithmic design. This chapter explores legal liability, data governance, contractual uncertainty, and compliance with frameworks like the EU AI Act. It also addresses AI's intersection with blockchain and the effects on employees' digital rights. Using a comparative lens, it examines divergences between legal systems and the drive toward regulatory coherence. Ethical concerns such as transparency, fairness, and human oversight are also discussed. The chapter offers a forward-looking legal perspective aligned with industrial transformation and fundamental rights protection.

INTRODUCTION

In recent decades, artificial intelligence technologies have left research laboratories and have been discreetly but decisively integrated into industrial processes. From automated production lines to predictive systems that anticipate failures, AI is redefining not only operational efficiency but also the relationships between people, machines, and decision-making (Acemoglu & Restrepo, 2020). Beyond techno-

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logical innovation, these advance raises profound questions about accountability, transparency, control, and rights (Bryson & Winfield, 2017).

The industrial sector, known for its technological pragmatism and agile pace of implementation, faces a paradox: while AI optimizes costs and accelerates processes, the legal framework often lags behind the real complexity of interactions between algorithms, employees, and infrastructures (Ebers et al., 2021). The lack of clarity on the legal limits of automated decisions, how data is managed, or liability in case of damage creates an uncertain terrain, where traditional regulation is struggling to find its footing (Wachter et al., 2017).

In Europe, the proposed Regulation on Artificial Intelligence outlines an ambitious legislative effort to introduce classification criteria, safety requirements, and control mechanisms for systems considered to be high-risk—a category in which many industrial applications fall (European Commission, 2021). However, this regulatory framework is developing in a fragmented international landscape, where legal regimes vary significantly and cross-border cooperation is often hampered by divergent interests (OECD, 2023).

In addition to the technical and legal dimensions, industrial AI also brings with it transformations in the field of digital rights: employee monitoring and automated decisions related to performance, but also the continuous collection of data from workspaces, become realities that affect human dignity, personal autonomy, and the limits of privacy (Zuboff, 2019). Thus, the law can no longer treat AI as a simple tool but as an actor capable of influencing social structures and economic balances (Yeung, 2018). In this chapter, the analysis will focus on the multiple legal dimensions generated by the implementation of AI in industry—from issues related to liability and smart contracts to the implications for individual freedoms and compliance standards. The goal is not only to describe a reality in full swing but to outline a direction in which the law can evolve in dialogue with technology without abdicating the values that underpin the democratic order (Calo, 2015).

2. ARTIFICIAL INTELLIGENCE IN THE INDUSTRIAL SECTOR: EMERGING APPLICATIONS AND LEGAL FRICTIONS

Artificial intelligence is no longer an abstract promise or a technology reserved for advanced research laboratories. In the industrial space, AI has become an integral part of decision-making, quality control, logistics, and even strategic planning. Unlike other fields, such as finance or medicine, where AI interacts directly with individuals in strictly regulated contexts, in industry it often acts "in the background," in invisible layers of the digital infrastructure, producing significant effects without necessarily being visible on the surface (Hildebrandt, 2016). It is precisely this

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