

Chapter 2

Artificial Intelligence

in Finance:

Navigating Opportunities

and Risks

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ABSTRACT

This chapter provides a comprehensive overview of the opportunities and risks associated with the integration of artificial intelligence (AI) in the domains of banking, investments, and microfinance. Through a detailed analysis of various data sets, case studies, and industry reports, the research highlights the significant impact of AI on enhancing customer satisfaction, improving investment portfolio performance, and promoting financial inclusion for underserved communities. The findings underscore the transformative potential of AI in driving operational efficiency, mitigating risks, and fostering innovation within the financial sector. However, the discussions also underscore the challenges related to data security, ethical implications, regulatory compliance, and workforce transitions that accompany AI integration. The abstract emphasizes the importance of implementing robust governance frameworks, ethical guidelines, and continuous skill development initiatives to ensure responsible AI deployment and sustainable growth in the financial industry.

INTRODUCTION

AI has gained immense popularity in the business world, particularly within the finance sector. It is positioned as a catalyst for economic expansion, aiming to enhance efficiency and productivity (Allioui & Mourdi, 2023; Moky, 2018).

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However, recent challenges such as growing inequalities, educational disparities, demographic shifts, mounting debts (Gordon, 2018), and environmental pressures (Daly and Farley, 2011) have led to a potential growth plateau. The financial sector, often described as a VUCA world (Millar et al., 2018) characterized by volatility, uncertainty, complexity, and ambiguity, is undergoing a transformation fueled by a combination of technological advancements, including AI. This shift has compelled financial players to adopt more open and collaborative strategies.

The concept of AI, as defined by Boden (2018), revolves around the endeavor to replicate human cognitive abilities in computer systems. Its origins trace back to the mid-20th century, with references to the three laws of Robotics, the Imitation Game, and Digital Computers (Taylor et al., 2020). Notably, the invention of the analog computer by the American Navy in 1938 and Konrad Zuse's digital computer in 1939 marked significant milestones in the history of AI (Swedin & Ferro, 2022; Bibel, 2014). The term “Artificial Intelligence” was first formally used in the title of the 1956 workshop, “Dartmouth Summer Research Project on Artificial Intelligence (DSRPAI),” organized by Marvin Minsky and John McCarthy at Dartmouth College (Haenlein and Kaplan, 2019).

Subsequently, commercial products emerged under the categories of decision support systems, executive information systems, and expert systems (Paiva et al., 2022). These early systems operated on rule-based mechanisms, storing both knowledge and problem-solving procedures as rules, typically expressed through if-then-else statements. The primary purpose was to transfer expertise to facilitate problem-solving (Das, 2013). The public's awareness of the technology heightened in 1997 following IBM's Deep Blue chess program triumph over chess grandmaster Garry Kasparov. While AI, machine learning, and deep learning are occasionally utilized interchangeably, they possess distinct meanings. Figure 1 illustrates the connection between these terms (Li et al., 2022).

The earliest form of AI, known as rules-based systems, operates on fixed knowledge and lacks the ability to learn and adapt over time (Fügener et al., 2022). In recent times, the progress in fields like machine learning, neural networks, and data mining, driven by advancements in storage technology, has largely replaced rules-based AI in intricate applications that involve an overwhelming number of rules, unless there is insufficient data for machine learning (Dogan & Birant, 2021; Tricentis, 2019). Yet, even a limited dataset, properly modeled with predictive analytics, can yield considerable forecast accuracy without the need for rule- or machine-learning-based AI (Herrmann, 2019). Nonetheless, to leverage the vast datasets available today, investors are increasingly drawn towards the utilization of Machine Learning for informed decision-making.

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