Chapter 7
Opportunities and Challenges in Leveraging AI for Sustainable Supply Chain Management

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ABSTRACT

Modern societies rely heavily on efficient supply chains to deliver products and services. Currently, supply chain management (SCM) faces multiple challenges such as external disruptions, modern technology integration, cost pressures, and sustainability demands. Supply chain management is improved by AI, but integrating it is challenging. Data complexity, quality issues, and the need for skilled personnel and a strong technological infrastructure are all issues that organizations must deal with. AI technology requires careful planning and resource allocation to change SCM operations. Artificial Intelligence (AI), a significant development from the digital and industrial revolutions, holds tremendous potential to address these challenges.

1. INTRODUCTION

The area of artificial intelligence (AI) has advanced significantly during the last few decades. AI is evolving from a theoretical academic field to a useful component of corporate operations. Applications of AI are starting to appear in a growing range of industries, such as supply chain management, healthcare,

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transportation, and consumer interactions. This naturally begs the question: How can AI help these fields, tasks, and industries? The purpose of this study is to investigate how artificial intelligence (AI) might help supply chain management by looking at the applications that have already been used in businesses and seeing potential future developments.

These days, new technologies like artificial intelligence (AI) are revolutionizing the lives of people, governments, and businesses. By 2030, AI is expected to boost local economies' GDP by 26%, or +15.7 trillion USD, according to renowned consulting firm PwC (PricewaterhouseCoopers, 2021). While artificial intelligence (AI) presents numerous opportunities to address pressing global issues like food security and climate change, it also carries significant dangers and hazards that need to be carefully considered.

Supply chains (SC) have a direct impact on citizens' well-being and are crucial to overall economic progress. AI can assist supply chain management (SCM), which is now struggling with its complexity. AI can improve transportation, automate manufacturing, logistics, and warehousing processes, drastically cut down on errors, offer precise forecasting and extensive analytics, improve product quality, and much more. Adopting AI in SCM has enormous potential to boost output, profitability, and success in general. For future implementation to be successful, it is crucial to increase knowledge and comprehension of AI.Numerous experts and companies interested in effective AI deployments will find value in the answers to these questions.

Supply chain management (SCM) makes sure that businesses and consumers trade commodities, which promotes economic progress. Product development, marketing, operations, distribution, finance, and customer service are just a few of the organizational domains that are impacted by the supply chain. There are several aspects of SCM that require the use of tools and systems to improve productivity, streamline processes, and increase accuracy. For businesses to manage supply chains effectively, information systems are essential for scheduling, resource acquisition, supplier management, and data analysis.

The COVID-19 epidemic, the conflict between Russia and Ukraine, energy crises, shifting consumer behavior, heightened competitiveness, the growing need for sustainable practices, and the emergence of circular economy requirements are just a few of the upheavals that supply chain management (SCM) is currently facing. Supply chain experts find it very challenging to keep a steady, uninterrupted flow of goods and services while staying cost-effective because of these variables.

Professionals who depend on conventional technologies can find it difficult to keep up with the quick developments. Although there are significant risks and uncertainties that need to be carefully considered, the integration of artificial intelligence (AI) offers a viable answer.

In order to obtain important insights into how AI might assist in resolving current issues, this chapter will examine the field of AI applications in SCM. The study will investigate how artificial intelligence might improve customer satisfaction, resilience, efficiency, and service levels. .

The chapter provides a thorough theoretical framework for the research, covering three main topics: supply chain management (SCM), artificial intelligence (AI), and the use of AI in SCM. To guarantee depth and relevance, the literature chosen for review underwent a thorough analysis and critical assessment. This chapter successfully integrates AI with SCM methods by organizing itself to meet the research objectives. All things considered, the theoretical framework developed in this chapter provides a strong basis for the chapter and a thorough comprehension of the main ideas covered.