Chapter 11
Understanding Supply Chain and Quality 4.0 Intersection:
A Literature Review Perspective

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ABSTRACT

This review summarises the research conducted towards practical application of Quality 4.0 in the supply chains by defining theoretical framework and models aimed at bridging the gap between Industry 4.0 technologies and already known quality management practises. The research comprehensively analyses the existing state of the art with regard to Quality 4.0 integration. Based on the previous studies review the Findings shows that adoption of quality 4.0 faces several challenges in supply chain context, the interaction between quality 4.0 and supply chain determined by organisational readiness, workforce competencies and leadership commitment become critical enablers while technological complexity and limited resource allocations provided hindrances to successful implementation.. The review calls for

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rigorous empirical validation and development of cross-sectoral frameworks which will help to develop intelligent and adaptive quality management systems in digitally transformed supply chains.

1. BACKGROUND INFORMATION

Traditional supply chain quality management often suffers from information asymmetry, data silos, and lack of real-time visibility, leading to increased costs and reduced agility. The adoption of Industry 4.0, technology offers a unique opportunity to overcome these challenges by enabling end-to-end transparency and predictive capabilities (Sarangi, 2024). For instance, in sectors such as healthcare, the implementation of digital quality systems is crucial for ensuring the integrity of complex supply networks and improving the overall performance (Nguyen et al. 2023).

The intersection of Supply Chain and Quality 4.0 represents a pathway for the use of disruptive technologies, such as AI, the Internet of Things, and analytics, to upgrade the efficiency of supply chains, enhance product quality, and enable real-time decision-making (McKinsey, 2022; Bui et al., 2022). This particularly ignites or eases sustainability practices, especially within the application of circular economies, through an alignment of the quality management system with advanced technological infrastructure in issues such as decreased waste and optimized resource usage (Hoang et al., 2023).

Quality 4.0 combines all relevant digital technologies, methods, and processes with the quality management system (QMS). The management system function supports this by providing a cross-disciplinary approach for managing digital quality management processes that enable digital business management processes to work well. A QMS integrates all corporate and quality-related processes. This is an important approach that enables companies in all industries to improve product quality and production efficiency, minimize risks, provide individualized products to meet customer requirements, comply with relevant laws, and enter the international market (Rosenstand & Baiyere, 2019). This approach provides new possibilities for the evaluation of innovative products and business models enabled by digital trends such as the Industrial Internet of Things (IIoT), Industry 4.0, cyber-physical systems (CPS), and smart manufacturing (Ammar et al., 2021; Fonseca et al., 2021; Sader et al., 2022).

Supply chain quality management is vital for creating value for customers, encouraging loyalty, and flourishing. Regardless, the impediments in integrating various processes and overlooking the total quality management principles behind developing such an SCQM are challenges for most organizations (Robinson et al., 2005). In the digital era, supply chain stakeholders employ a platform's analytical