International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

Supply Chain Innovation

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Abstract: ***This article explores the history and contemporary difficulties of supply chain technology, highlighting how, from the invention of mainframe computers to the present, it has continuously attempted to find solutions for logistical problems. The need for strong supply chain innovation has been brought to light and made more pressing by the COVID - 19 epidemic, which has forced executives to reconsider their business strategies and seize new technical opportunities. Analysis of supply chain innovation is conducted to determine how it may address sustainable practices through green supply chain management (GSCM) and enhance efficiency, flexibility, speed, and accuracy. This includes improvements made to processes as well as technical breakthroughs. But the article also highlights important drawbacks, like digital waste and the underappreciation of integrated planning procedures. The article makes the case for a change in focus from cost minimization to profit enhancement as supply chains become more crucial to e - commerce and international business operations. It does this by promoting sophisticated planning tools and improved supply chain visibility.***

Keywords: Supply Chain, Technology, Innovation, COVID - 19 Pandemic, E - commerce, Green Supply Chain Management (GSCM), Process Innovation, Digital Waste, Business Models

1. Introduction

The history of supply - chain technology has been rocky. Companies have sought technological answers to their supply - chain problems ever since the creation of the first mainframe computers. They have encountered many expensive dead ends in their search. Some technological advancements create as many issues as they solve. In actuality, their mechanistic, rigid approach frequently found it difficult to deal with the ambiguities and volatility of the real world, where machines malfunction, suppliers fall through, and clients change their minds. Others proved to be creative fixes looking for a genuine issue. In reality, only a few specialized fields have been able to make use of the technology due to its high cost and implementation challenges.

Supply, demand, and logistics have all been impacted by the COVID - 19 epidemic. The pandemic has brought attention to the need to change the current consumer structure model, supply chain model, and market digitization due to its unpredictable intensity. The COVID - 19 situation also presents more and more prospects for e - commerce, including fresh company ideas and online business ventures. Leaders are currently being compelled to reconsider their business models due to difficulties like interruptions, shortages, and security incidents that put organizations at risk and are brought on by an increasingly global supply chain network. Supply chain leaders are today facing a brand - new surge of never - before - seen technological opportunities. Ideas are coming from different industries as well. The application and potential impact of those technologies will differ, just like with earlier inventions. Some innovations might help improve current procedures, some might only ever find niche applications, and some might actually be disruptive. As a result, it can be challenging for businesses to decide where to concentrate their supply - chain technology investments while juggling their desire to make risky, truly disruptive bets that could change the game.

2. Discussion

This chapter covers the relevance or significance of Supply Chain innovations. It provides a reflection on the merits of Supply Chain innovations, as well as its limitations.

Supply Chain Innovation

Technology - enhanced improvements to outbound supply chain processes and procedures as well as modifications to goods, processes, or services that either advance effectiveness or raise overall customer happiness constitute supply chain innovation (Seo et al., 2014). Wong and Ngai (2019) show that because SC innovation is a priceless, unique, scarce, and non - substitutable resource, research on it has primarily used the resource - based perspective (RBV). As a result, businesses that embrace SC innovation typically outperform their rivals. According to earlier research (Kwak et al., 2018), process innovation and technology innovation can be seen as the dimensions of SC innovation. In order to differentiate logistics services and eventually provide value to end users, technological innovation aims to strengthen real - time tracking technologies, cutting - edge logistics equipment, and integrated information systems throughout the supply chain (Christopher, 2005). Re - engineering and redesigning the supply chain with the ultimate objective of raising service quality and cutting costs is referred to as process innovation (Kwak et al., 2018). Process innovation is crucial for two reasons: first, it leads to product innovation (the capacity to create new goods and services to satisfy consumer demand); and second, process innovation is closely tied to the volume of output generated (Mikalef and Krogstie, 2018).

Sustainable Supply Chain Innovation

The green supply chain management (GSCM) movement urges businesses to adopt and put these strategies into reality. Majority of companies have incorporated GSCM procedures into their company operations as a long - term environmental obligation (Masudin 2019). GSCM strikes a balance between negative environmental consequences, social benefits, and profit - generating operations. Companies with sustainable supply chains and operations are more competitive (Juma et al.2021; Saade et al.2019). Thus, it has been acknowledged that implementing green technology into company operations

offers more benefits and affects supplier and customer relationships within firms (Lin et al.2020).

3. Merits of Supply Chain Innovation

Speed
Thanks to improved product distribution strategies, high runners now arrive in only a few hours. The foundation of these services is advanced forecasting methods, such as predictive analytics of internal (such as demand) and external (such as market trends, weather, school breaks, and construction indices) data, as well as machine status data for spare - parts demand, which provide a much more accurate forecast of customer demand.

Flexibility
A flexible reaction to changing supply or demand situations is made possible by ad hoc and real - time planning. Fewer planning cycles and frozen periods allow planning to become a continuous activity that can adapt quickly to changing needs or constraints (e. g., real - time production capacity feedback from machines). New business models, such as Supply Chain as a Service for transport management duties, boost the supply chain organization's flexibility. Supply chain can be acquired as a service and charged for every usage as opposed to having the resources and expertise in - house.

Granular
Customers are continually asking for products that are more and more customized. This gives micro segmentation a significant push, and mass customization concepts will eventually be put into practice. Customers are managed in much smaller groups, and a wide range of appropriate products will be provided. Customers may now pick the "logistics menu" that best meets their needs from a number of options. Thanks to innovative transport ideas like drone delivery, businesses may efficiently handle the final mile for single and high - value dense items.

Accuracy
The most recent generation of performance management tools provides whole supply chain transparency in real - time. The spectrum of data includes both synthesized top - level KPIs, such as overall service level, and more specific process data, such as the precise location of cars in the network. This data set provides a uniform information base for all supply chain positions and levels of seniority. By combining the data of suppliers, service providers, and other parties in a "supply chain cloud, " all parties participating in the supply chain may steer and make choices based on the same information. In digital performance management systems, targets are automatically created using clean - sheet models for storage, delivery, or inventory.

Efficiency
Supply chain efficiency is increased by automating both physical tasks and planning. From receiving/unloading to storage to picking, packaging, and shipping, robots completely autonomously manage the material (pallets/boxes as well as individual components) throughout the warehousing operation. Autonomous trucks transport the cargo throughout the network. For the purpose of maximizing truck utilization and enhancing transport flexibility, cross - company transport optimization is utilized to swap capacity across businesses. The network configuration itself is continually improved to create the greatest possible match with business objectives.

4. Limitations of Supply Chain Innovation

Digital waste prevents supply networks from utilizing Supply Chain innovation potential. The accessible data is typically handled manually (data collecting in a system, management of paper - based data, etc.) and is not updated regularly. For instance, once master data on supplier lead time is recorded (or infrequently, merely with fake figures), it may be left untouched for years. Even while many firms have started using integrated planning procedures, most of the work is still done in silos and not all the information is being utilized to its maximum. Planners frequently replace automatically generated planning or statistical prediction data with human replacements. For parts moving at a medium or high speed, manual overwrites often have a negative impact on the accuracy of the prediction.

5. Conclusion

The management of the supply chain is directly impacted by the information technology industry's rapid development. Supply chain innovation is essential due to the availability of various e - commerce solutions. The supply chain is just one of several e- commerce businesses that benefit from information technology. Businesses may easily overcome delays and restocking problems and make sure that their supply networks function as intended by utilizing advancements in supply chain management. The main problem for any supply chain, especially in the wake of the COVID - 19 epidemic, has been to maximize overall system profit while remaining fiercely competitive in a dynamic environment. More businesses are switching from cost optimization to profit improvement in recent years. As more businesses look to invest in supply chain innovation in the future, greater emphasis should be placed on advanced planning solutions, end - to - end control visibility, and autonomous cognition.

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