SUSTAINABLE INNOVATIONS AND SOLUTIONS IN BUSINESS LOGISTICS

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Summary

Logistics businesses are developing day by day. However, those organisations have been facing many challenges to implement many advanced technologies in logistics. This article examines the innovation and solution of business logistics by discussing the various advanced technologies that can be implemented in logistics, sustainability of these technologies, challenges, and solutions for the innovation in logistics business. Innovative practices such as automation, predictive analytics, Internet of Things, block-chain technology, and last mile delivery innovations have been discussed in this article. The article points out, high cost of the technologies, lack of adapting capacity of employees and manageable issues are the main challenges of applying innovative technologies in logistics. By researching many scientific articles, this article highlighted the solutions of these challenges as continuous evaluation of these technologies, collaboration with employees and stakeholders, proper investment, training of employees and proper communication. There are many companies applying the newest technologies in logistics. Albeit there are many organisations who are still facing many challenges. This paper narrates everything about the innovation and solution of business logistics.

Keywords: innovation, supply chain, logistics, management technologies

Introduction

There have been four industrial revolutions, each characterised by inventions, modifications, new production techniques, and impacts on all other sectors, that have shaped modern industry for many centuries. The technological, social, demographic, and commercial factors evolved in tandem with the industrial revolutions, which caused the progression of logistics from traditional logistics to contemporary logistics (Radivojević and Milosavljević, 2019). Albeit, the logistics need sustainability in innovation. An organisation's capacity for innovation is seen as crucial to both its survival and competitiveness. For industrial firms, product system improvements, and more particularly, changes in the manufacturing processes that produce these goods are essential.

In any organisation, several distinct innovation process components might be mentioned. The function of logistics services has lately experienced a substantial alteration in response to the demands of globalisation and the dynamics of increasing markets. Businesses may discover that as logistics complexity increases, their competitors are also providing cutting-edge supply-chain management services that are both competitive and ecologically friendly. Innovation in logistics refers to the application of innovative products, methods, services, and ideas to enhance logistics operations (Scott, 2009).

The global economy, social structure, and environmental sustainability all depend on the logistics sector. It is linked to topics like globalisation, employment, economic growth, international security, pollution, and greenhouse gas emissions.

Research aim: to examine the innovative solutions in business logistics, along with how these improvements can be turned into a sustainability of innovation.

The following **objectives** have been set to achieve the aim:
1. To identify the innovative solutions for business logistics.
2. To explain the sustainability of innovations in logistics.
3. To find out the challenges to applying innovations in logistics
4. To suggest possible solutions for the improvement of the logistic business.

Research object and methods

The object of the research: innovations and solutions in logistics.

By evaluating the relevant scientific literature and foreign studies, the research analyses the innovations and solutions in logistics. ResearchGate and Google Scholar searches for papers and publications were used to find the data. Online there are a ton of research regarding the research findings. The methodology utilised in this study was applying literature analysis and synthesis techniques to available materials to acquire qualitative data while conceptually addressing the research goal.

Results and discussion

Innovative solutions for business logistics

Using new technology, procedures, and tactics, business logistics innovation aims to increase the effectiveness, dependability, and speed of the flow of resources and commodities both inside and between organisations. The quality of

service is becoming more significant in an e-commerce context and frequently encourages attention to performances and pushes for innovation (Amling and Daugherty, 2020). Therefore, to sustain the logistics business, the organisation should implement advanced technologies in every part of the logistics. It is the only way to improve the quality of logistics service. Besides, these innovations and solutions in business logistics are essential for both organisations and consumers.

Automation in production and distribution has evolved from the execution of programmed tasks to a level, in which software agents and robots act autonomously using artificial intelligence (AI)-based algorithms, in response to growing customer demands such as cost-effectiveness, sustainability, speed, and tailored problem solutions (LeCun et al. 2015; Kong et al. 2016). These are implemented in the logistics and the implementation of many more innovations and solutions is critical for increasing the customer service of the logistics. Innovations in business logistics can improve customer service, increase efficiency, and reduce the overall costs of business (Tavasszy, 2020).

A few innovative solutions for business logistics are mentioned below:

Automation: to handle operations like sorting, packaging, and shipping, automated systems and robots can be used, which can decrease human error and boost productivity. Through automatic systems, the logistics business will function nonstop for 24 hours at a time, increasing throughput and minimising lead times; they can also do repeated activities with a high degree of accuracy, reducing errors and enhancing the quality of logistics; businesses can save money by using automated systems to help cut down on waste and labour costs; moreover, automated systems can also assist in lowering the risk of accidents and injuries related to human labour (Tsolakis, 2022). The researchers also found that real-time tracking of inventory movement and levels via automated technologies enables companies to reduce stockouts and optimise their stock levels and order processing can be done more quickly and accurately by automated methods, which enhances client satisfaction. Besides, these are simple to scale up or down to meet changing demand, enabling firms to respond swiftly to shifting market circumstances (Pandian, 2019).

Predictive analytics: Businesses can adapt rapidly to changes in demand and cut down on waste by using data analytics to forecast demand, optimise inventory levels, and enhance supply chain management. Predictive analytics can assist companies in predicting customer demand for their goods or services, allowing them to optimise inventory levels, decrease stockouts, and improve supply chain efficiency, it can also analyse real-time traffic and weather data to help businesses plan delivery routes, minimising travel time and fuel consumption. Moreover, condition-based maintenance, quality assurance, and risk management in the logistics industry would also benefit (Sodero et al., 2019). Logistic businesses may provide more individualised and timely service by using predictive analytics to help them anticipate the wants and requirements of their customers (Uvet, 2020).

Internet of Things (IoT) : By utilising IoT devices like sensors and RFID tags, organisations can streamline their supply chains and boost customer service by having real-time insight over inventory levels, location, and condition of items (Ding et al., 2021). IoT devices can track inventory levels and movement in real time, enabling businesses to optimise their inventory levels and decrease stockouts. They can also provide early warning of potential issues and enable businesses to schedule maintenance proactively, reducing downtime and improving efficiency (Jiang, et al., 2022)

Blockchain technology: By offering a tamper-proof record of all transactions and product movements, the usage of blockchain technology can improve supply chain management's transparency and security (Perboli et al., 2018). By automating the exchange of data and documents amongst supply chain participants, blockchain technology can decrease the need for manual procedures and paperwork while increasing productivity (Sadouskaya, 2017).

Last-mile delivery innovation: The development of new delivery models, including delivery robots, autonomous vehicles, and drones, can increase the efficiency and speed of last-mile delivery, particularly in metropolitan areas (Gevaers et al., 2011). The faster delivery helps in customer satisfaction and all over the business development.

Sustainability of innovations in logistics

Logistics can be considered sustainable when it is able to meet the needs of the present without compromising the ability of future generations to meet their own needs. Innovation is a crucial strategy for promoting sustainability (Schaltegger and Wagner, 2011). Innovation and solutions in business logistics are essential for the development of logistics organisations. Apart from applying these technologies, it is important to do the activities that help to sustain these developments within the organisation for a very long duration. That is, the sustainability of these innovations and the benefits should last. Then only organisations can multiply the benefits they are getting from applying advanced technologies in logistics. The traditional logistics industry has been associated with significant environmental and social impacts, including air pollution, greenhouse gas emissions, and human rights abuses. As a result, there is a growing need for sustainable innovation in logistics to address these challenges. One way to put sustainable innovation into practise is by using technology to optimise logistics operations (Sharma et al., 2020). For example, companies can use data analytics to optimise delivery routes, reducing the distance travelled and minimising fuel consumption and emissions. In addition, using GPS tracking systems can help to reduce the time spent idling and waiting for loading and unloading, reducing air pollution, and increasing efficiency.

To ensure that sustainable innovation in logistics lasts, the companies can follow continuous evaluation. Instead of being thought of as a one-time fix, sustainable innovation should be seen as an on-going process of progress as businesses should routinely evaluate their logistics processes to find opportunities for implementing sustainable innovation (Neutzling et al., 2018). Also, they should assess the results of their sustainable innovation activities and make any necessary improvements. Collaboration between many stakeholders, including suppliers, clients, and logistical partners, is necessary for sustainable innovation. Businesses should discover possibilities for sustainable innovation and implement them together with their stakeholders (Dey et al., 2011). Besides, A significant initial investment in new

technology, equipment, or procedures is frequently necessary for sustainable innovation in logistics. To secure the sustainability of their logistics operations, businesses should be prepared to make these investments and commit the necessary resources (Piecyk and Björklund, 2015). It is frequently necessary to make an initial investment in new technology, infrastructure, or procedures for sustainable innovation in logistics. To guarantee the sustainability of their logistics operations, businesses need to be prepared to dedicate these expenditures and resources (Kayikci, 2018). Apart from these, the training and education of the employees and the proper communication also help in maintaining the advanced technologies in the logistic businesses.

Challenges of applying the innovative solution in logistics

Innovation and solutions in business logistics help the organisation to enlarge its market and maximise its product. Albeit, the logistics organisation faces several challenges to switch to the advanced technology offered by these innovations. The logistics organisations have been facing many challenges in finance, in regulation, in market, and in other areas (fig 1). It may be necessary to make a significant initial investment in new technology, infrastructure, or procedures to implement sustainable improvements in logistics. For some firms, especially smaller ones, this can be a considerable financial strain (Winkelhaus and Grosse, 2020). It might be difficult to deploy sustainable logistics improvements without extensive planning and cooperation. For businesses with little funding or experience in sustainable logistics, this may be difficult, in addition, staff members may oppose change and be hesitant to adopt new sustainable practices. If the new practices call for alterations to current routines or procedures, this might be very difficult (Sharma et al., 2020).

It can be difficult for businesses operating in several countries to understand the regulatory environment and maintain compliance because regulations on sustainable logistics might differ by area. Implementing sustainable logistics solutions in complicated supply chains with numerous partners and stakeholders may be difficult. This may call for cooperation and coordination amongst several parties, which may be challenging to accomplish (Savelsbergh and Van Woensel, 2016). Embracing new technology may be difficult as well, especially if doing so necessitates making considerable adjustments to current procedures and systems. For businesses with few resources or technological know-how, this can be a substantial hurdle.

Finance

Fig 1: Challenges of applying the innovative solution in logistics

Solutions for the improvement of logistic business

Day by day, logistics organisations are improving and they have been facing many challenges. The logistics industry is constantly evolving and companies are always looking for new and innovative ways to improve their operations and gain a competitive advantage. However, implementing new technologies can be challenging and requires careful planning and execution to overcome the challenges that may arise. It is necessary to suggest possible solutions for improving the logistics business. The researchers already proved that many organisations are facing the problem of expense while applying advanced technologies in the logistics business. In addition to lowering costs and raising customer satisfaction, collaboration and partnerships with suppliers, customers, and logistics partners may assist in increasing the efficacy and efficiency of logistics operations (Ranieri, 2018).

One of the biggest issues that logistics firms confront is the high cost of integrating new technology. New technologies such as automation systems, robotics, and IoT devices can require significant investment in hardware, software, and training. To overcome this challenge, logistics organisations can adopt a phased approach to implementation, starting with pilot projects to evaluate the feasibility and effectiveness of new technologies before committing to full-scale implementation (Savelsbergh and Van Woensel, 2016). In order to cut costs while guaranteeing proper implementation, they can also think about outsourcing some aspects of the implementation procedure to specialised technology providers. The complexity of integrating new technologies with their current systems and processes presents another difficulty for logistics organisations. This can be especially challenging if the new technology requires significant changes to the organization's workflow or if it is not compatible with existing systems. To overcome this challenge, logistics organisations can invest in interoperability frameworks and standards that promote compatibility between different systems and technologies (Winkelhaus and Grosse, 2020). They can also work with technology providers to develop customised solutions that are tailored to their specific needs and workflows.

In addition, implementing sustainable practices may save costs, increase efficiency, and improve the company's reputation among stakeholders. These methods include using renewable energy, cutting emissions, and optimising transportation routes. Companies may uncover inefficiencies and opportunities for development by analysing data on logistics operations, which enables them to make data-driven choices that enhance overall business performance.

Conclusions

1. To bring out the research aim, the innovation and the solution of business logistics have been discussed in the article. The article analysed a few innovations in logistics such as i) automation, ii) predictive analytics, iii) Internet of Things, iv) Block-chain technology, and v) Last mile delivery innovation.

2. The writings also discover how a logistics business can sustain these innovations in their organisation by following the practices including i) continuous evaluation, ii) collaboration, iii) proper investment, iv) training of employees, and v) valid communication.

3. The aim of this paper was carried out by finding both challenges and solutions for applying innovative technologies in the logistics business. The article has used scientific literature to identify these challenges and solutions. The paper explains the main challenges such as investment problems, different regulation in countries, limited adoption by consumers, and resistance to change.

4. The paper suggest possible solutions as trying logistics partnership, using phased approach in implementing the advanced technologies, outsourcing some aspects of the implementation procedure to specialised technology providers, and invest in interoperability frameworks.

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