

Accessing The Realm of Logistics, Distribution Logistics and Last Mile Delivery Within the Framework of Supply Chain Management

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Abstract

The purpose of paper to explores the evolution of logistics from its origins in the Roman Empire to modern Supply Chain Management (SCM). The objective is to examine logistics as a philosophy that transitioned from military necessities to its current role in supporting the delivery of goods from suppliers to end customers. The methods based on descriptive research approach; reviews study from a wide range of academic literature and highlighting key historical milestones in the advancement of business logistics. Meanwhile, the finding discussion shows the reveal that logistics, and its definition have evolved over time, shaped by economic and industrial demands of various eras. This research complements the Integrated Tertiary Educational Supply Chain Management (ITESCM) model, offering insights for logistics undergraduates into the discipline's progression. The conclusion in term of emphasizes the importance of developing high-caliber graduates equipped with an understanding of logistics' historical and practical dimensions, ultimately contributing to impactful research outcomes and societal well-being. Recommendations for future research are provided.

Keywords: Distribution logistics; Global logistics; Logistics; Last mile delivery; Supply chain management

Introduction

It was noticed from the various literatures viewed that all researchers failed to view logistics and supply chain management as a philosophy that was generated from the initial agrarian need to transport farm products to the market and that the concept has progressed over a period of time largely due to the changes on the specific supportive role efforts it contributed in the economic activities of the delivery of goods from the supplier to the ultimate customer. According Pathik et.al (2021), most researchers in Supply Chain Management addressed issues regarding SCM for the service industry and for improving business operations. Only his two papers relevant to the academic application of educational supply chain had been published on 2024. The development or progress of logistics as a necessity of the agrarian society during medieval times to military terminology and finally to improve the wellbeing of the society to today's technological advancements such as drone technologies and autonomous delivery vehicles.

This paper adds to the ability to access the time-based agility of logistics and to comprehend the main objectives of educational logistics management such that logistics undergraduates would have a degree of understanding of the various stages of the development and progress of logistics to what we know today as last mile delivery and smart global logistics. Besides, begins with exploring the early roles and definitions of logistics, the military application is widespread and further progressing to business logistics, distribution logistics and smart

logistics. Also, explores the influence of the internet towards the development of the concept of Supply chain management to the concept of last-mile-delivery and e-commerce associated with smart logistics. Finally, the influence of technology and Artificial Intelligence (AI) on the advancement of customer service is explored (Basu et al., 2016).

The primary focus of this research model such as: i) Provide a systematic assessment of the evolution of sustainable performance of Logistics through an integrated supply chain management with the goal of tracking the development of the knowledge base of logistics for the tertiary or educational supply chain management (Loon et al., 2018). ii) This research provides educational supply chain with appropriate information to review and appraise an overview to equip the performance of Logistics. iii) More systematic analysis about the progress of Logistics from a market delivery purpose through integrated supply chain management of developing the knowledge base of Logistics to what we know today as smart global logistics. iv) To complement the lack of literature in this aspect as pointed (Pathik et. al., 2021).

There are three objectives provided of this study. The first objective a summary of the perspectives considered within the realm of supply chain management, business logistics, distribution logistics, business logistics and finally to e-commerce and last mile deliveries, by doing an appropriate assessment these logistical terms individually. The second objective being to provide a more unified and streamlined views of logistics and supply chain management as being orthogonal to functional silos. The third objective is to narrow the confusion as to the inability of the academicians to come to a consensual definition of the various terms used in the discipline of logistics and supply chain management, which is widespread among scholars working in supply chain management (SCM).

Keywords Based on Further Research Was Done on Google Scholar

Exploring the realm of logistics

It was expected that these key words would generate similar studies relevant to this research but however it generated research topics such as autonomous logistics management, spatial politics in the digital realm, influence of logistics in the realm of public administration, establishing the realm of military strategy and logistics, significance of information and digital technology in the realm of logistics

Logistics from the 19th century to current day

Perez, R. in his article articulates well the different stages of the development of logistics from World War II to present day but falls short of the different definitions applied to the field of logistics.

Exploring the academic realm of logistics and supply chain in the past, present and future

With these key words it was expected that the search would generate articles that refer to the development from the logistics aspect. However, based on (Talib & Daud, 2011) emerged but it covered aspects of higher education of logistics in Malaysia and not as expected.

With these key works it was expected that the search would lead to the various definitions of logistics along with the changing role of logistics and supply chain. Below is the area of

research covered by some of the authors where their research title seemed to be addressed the expectations.

It is concluded that this article would bring a positive insight onto the growth of Logistics and Supply Chain Management and hence influence future development of new and up to date applicable concept for the competitive advantage of a firm and academia. This research too has opened new opportunities for future research to close the gaps discovered and to further expand this research. Figure 1: shows evolution of logistic from traditional manual to internet systematic operation.

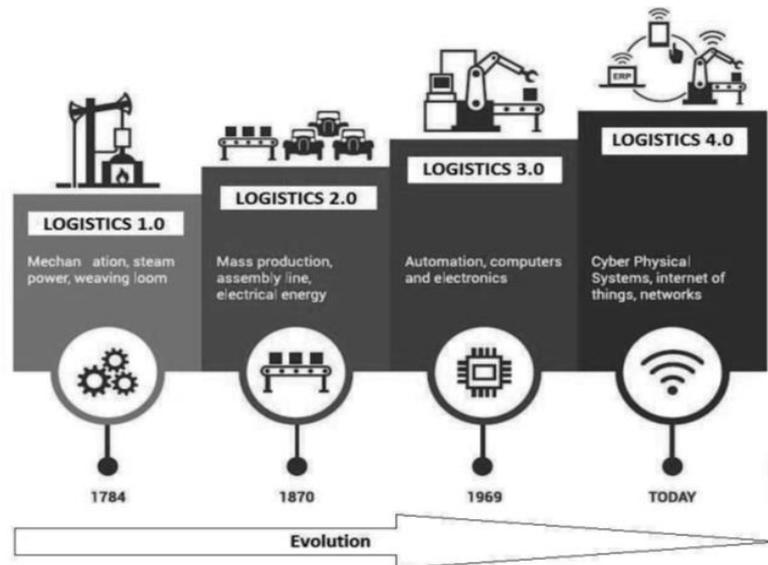


Figure 1: Diagram on the evolution of logistics by Izabela Dembinska

The methodology of this study is based on adopted the proposed review. Also, refer to descriptive research done through a vast literature review of academic research papers. It will be able to suffice the research as the literature will expose to connect between the various terms such as logistics, deliveries, supply chain, supply chain management. Key words such as Logistics, Supply Chain Management, the advance from logistics to Supply Chain and last mile delivery were some of the key words used in the search for relevant articles. Intrinsic knowledge of the author was also helpful in getting the essential knowledge, with the key words like Logistics during the era of Roman Empire, Logistics during World War 1 and II. Resourceful knowledge was attained through the articles that were searched by google engine.

Discussion on Logistics, Defining Supplying Chain, Supply Chain Management, Business Logistics, Distribution Logistics, E-Commerce, Last Mile Delivery & City Logistics and Smart Logistics

Logistics

The first of moving goods and supplier is started from the first human civilizations. The Egyptian empire (330 BCE to 332 BCE) and the Roman Empires (27 BCE to 476CE) are critical examples where the Egyptians developed transport and storage techniques to maintain a steady supply of food and basic commodities. While the Roman Empire established an extensive network of land routes known as Roman roads to facilitate the carriage of goods and

troops across its vast territory (Interlake Maculux, 2023). During Caesars campaign against the Gaul's (58-51 BC) logistical support and logistics systems were essential for the smooth running of the campaign, ensuring the soldiers and horses were fed and that the troops were armed and had the resources that were required for sieges, engineering works and open battles (Roth, 1999). Logistics has played a crucial role in the survival and expansion of civilizations such as the expansion of the Mogul empire to the steppes of Western Eurasia from 1236 to 1240. Ultimately the Moguls came to rule the cities of the Rus principalities and finally establishing what would become known as the "Golden Horde" (Wayne, 2022). Before 1950s', logistics was a term popular in military that involved sourcing, vehicle maintenance and transportation of supplies and military troops from one place to another "Supply chain logistics is a term which acts as an intermediary to coordinate the storage to the final activity of shipping of the goods and services across the supply chain. (Jenkins, 2022).

Defining Supply Chain

Table 1 shows the excerpts from Janvier-James (2022), regarding the definition of Supply chains by different researchers, it may be observed that the definitions expanded to reflect the actual and practical application of the supply chain. It can be said that the role of Supply Chain expanded over time in relation with its changing roles and objectives.

Table 1 Different definitions of Supply chain Management as researched by International Business research

1	Beamon B. (1998)	"a structured manufacturing process wherein raw materials are transformed into finished goods, then delivered to end customers"
2	Tecc.com.au (2002)	Defines Supply Chain as "a chain starting with raw materials and finishing with the sale of the finished good".
3	Bridgefield Group (2006)	Defines Supply Chain as "a connected set of resources and processes that starts with the raw materials sourcing and expands through the delivery of finished goods to the end consumer".
4	Pienaar W. (2009)	Defines Supply Chain as "a general description of the process integration involving organizations to transform raw materials into finished goods and to transport them to the end-user"
5	Little, A. (1999)	Defines a Supply Chain as "the combined and coordinated flows of goods from origin to final destination, also the information flows that are linked with it".
6	Chow, D. and Heaver, T. (1999)	Defines Supply Chain "as the group of manufacturers, suppliers, distributors, retailers and transportation, information and other logistics management service providers that are engaged in providing goods to consumers. A Supply Chain comprises both the external and internal associates for the corporate".
7	Ayers, J.B. (2001)	Defines Supply Chain as a "life cycle processes involving physical goods, information, and financial flows whose objective is to satisfy end consumer requisites with goods and services from diverse, connected suppliers"
8	Mentzer, J., Witt, W. D., Keebler, J., Min, S., Nix, N., Smith, D. & Zacharia, Z. (2001)	Defines Supply Chain as "a set of entities (reorganizations or individuals) directly involved in the supply and distribution, flows of goods, services, finances, and information from a source to a destination (customer)".

Regarding definitions 1 to 4 centralize on the core determinants of an effective Supply Chain. They connote the need for an expressed need and a destination within which goods flow and accept the approach that overall Supply Chains start with resources (raw materials), combine a few values adding activities and finish with the transfer of a finished goods to consumers. Definitions 4 onwards are more complicated as they include an extended view of a Supply Chain and integrate other subsidiary activities in the function of the Supply Chain. Investopedia a financial media with headquartered in New York City. This article titled "The Supply Chain: From Raw Materials to order fulfillment" (March, 2023) defines Supply Chain as "a network of individuals and companies who are involved in creating a product and delivering it to the consumer.

Supply Chain to Supply Chain Management

In today's competitive environment the focus is on delivering value to the customer. Concurrent to this focus to the marketplace too has evolved with customers demanding a better and more efficient service. Accompanied with globalization which led to an expansion of the market both domestically and globally with the aim to improve profitability and to remain competitive to customer demands, led firms also to improve the interconnection and interdependence in the product flow (Simatupang et al., 2022). At the end of the first decade of the 19th century and towards the beginning of the Second decade, the scientific management theories advanced by Frederick Tylor in 1911 saw the start of recognizing "Management as a scientific discipline giving rise to Supply Chain Management (Janvier-James, 2022).

The Council of Supply Chain Management Professionals CSCMP (2024) which is the leading global association for supply chain management professionals. CSCMP publishes the Journal of Business Logistics every quarterly, it was first published in 1881 and is one of three academic journals published by the Society of Biblical Literature (SBL). CSCMP defines Supply Chain Management as follows: "Supply chain management encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers, and customers."

In essence, supply chain management integrates supply and demand management within and across companies. The American Production and Inventory Control Society APICS (2024) defines supply chain management as: "The global network used to deliver products and services from raw materials to end customers through an engineered flow of information, physical distribution, and cashbacks too reiterates that Supply Chain Management is a matter of vital importance to the company the road to survival or ruin for the company. It is mandatory that it be thoroughly studied.

Meanwhile, the Global Supply Chain Forum (GSCF), a group of non-competing firms and a team of academic researchers, has been meeting regularly for the past 6 years with the objective to improve the theory and practice of SCM. The definition of SCM as developed and used by The GSCF is as follows: "Supply Chain Management is the integration of key business processes from end user through original suppliers that provides products, services, and information that adds value for customers and other stakeholders. Increasingly, the management of multiple relationships across the supply chain is being referred to as supply chain management (SCM)" (Xabier, 2020).

Business logistics

As the scope of physical distribution was expanded to include physical supply and was called business logistics (Ballou, 2007). The Council Logistics of Management (2024) a trade organization proposed the following definition: "Business logistics as the term describing the integration of two or more actors for the purpose of planning, implementing and controlling the efficient flow of raw materials, in-process inventory and finished goods from the point of origin to point of consumption. The University of Northern Texas (2024) states that these activities may include, but are not limited to customer service, demand forecasting, distribution communication, inventory control, material handling, order processing, parts and service

support, plant and warehouse site selection, procurement, packaging, return goods handling, salvage and scrap disposal, traffic and transportation and warehousing and storage.

Distribution Logistics

Distribution logistics, also known as sales logistics, deals with the planning, realization and control of the movement of goods. It is an inter-organizational logistics system, where the aim is to make the logistics channel from the supplier to the customer efficient, especially in terms of costs and performance (Logistic Dictionary, 2024). It serves as the link between production and sales of a company, distribution logistics includes all storage, handling and transport processes of goods from production to the customer. Distribution logistics deals with the processes necessary to get a company's products to the customer as quickly as possible. Therefore, distribution logistics is divided into strategic, tactical and operational tasks (Max Fredman, 2024). Distribution plans largely depend on the financial and company goals of the business. An organization may choose to sell products directly to their clients while others use third parties for distribution purposes. To be successful, your supply chain distribution should be formalized through an organized plan. Logistics describes how products get from their origin point to the location at which customers buy them. It prioritizes efficient paths from warehouses and inventories to points of sale. Supply chain distribution is logistics in practice.

E-Commerce, Last Mile Delivery & City Logistics

It is common to describe E-commerce as the buying and sale of goods and services by both businesses and consumers over the internet. Online sales and globalization lead to new trends in freight transport, and moreover, a larger quantity of goods is expected to be delivered in the next future. In a study by World Resource Institute 80% of the delivered goods end up in the city centers (University Northern Texas, 2024). In the last mile delivery, which is the last and final leg of the delivery process to its owner and thus where the goods are handed to the owner and thus ownership is transferred. The final leg of urban deliveries accounts for more than half of carriers' total delivery costs and is rife with inefficiencies (United nation, 2018).

The World Bank has predicted that the urban population is expected to double by the year 2050. In some developed countries the urban population percentage is well above 70 % and continues to rise (Ballou, 2007). The International Monetary Fund IMF reported that over the past 20 years, the growth of world trade has averaged 6 percent per year, twice as fast as world output. But trade has been an engine of growth for much longer. Trade has been the tool for economic growth. about 54% of the population live in the cities today, and about 66% is expected in 2050. E-Commerce emerged in the 1990's when the Internet was opened for commercial use and retailers started selling directly online to their consumers (International Monetary Fund, 2001).

This final stage accounts for a significant share of total supply-chain expenses, ranging from 13% to 75% of the total cost. The most widespread transport mode adopted is road. Last mile delivery is the most inefficient stage of the delivery process and accounts for 28% of the delivery cost. Last mile logistics is applicable to road transport. This Now brings us to city logistics which is the means enabling freight distribution in urban areas and the strategies that can improve its efficiency while mitigating externalities such as congestion and emissions. It involves managing the movement of urban goods and providing innovative responses to customer demands (Rodrigue & Dablanc, 2024). Many challenges which have led to increased business activities and international partners for the business expansion. This aspect now brings us to the aspect of Global logistics and Supply Chain Management where raw materials are

sourced from overseas suppliers and finished goods exported throughout the world. With the increase in international trade many companies have established overseas partners and suppliers (Bloomenthal, 2024).

Smart Logistics

The development of digitization and the Internet creates new conditions not only for the economic and social spheres but brought about the inspiration to change and develop in the business world. The concept of smart logistics began to emerge in the late 20th and early 21st centuries with advancements in technology and the increasing digitization of supply chain operations. Logistics, as a key function of a company or a supply chain, has been significantly affected by the recent technological advancements and innovation. Smart logistics operations are enabled by the increasing use of new technological solutions, Smart logistics can be traced back to the adoption of early technologies such as barcode scanning, which enabled more accurate tracking and management of inventory. Additionally, the development of transportation management systems (TMS) and warehouse management systems (WMS) in the 1980s and 1990s laid the groundwork for automated and digitized logistics processes (Dembiska, 2018).

The rise of the Internet in the 1990s facilitated greater connectivity and data exchange among supply chain partners, paving the way for more collaborative and integrated logistics networks. This era also saw the beginnings of real-time tracking and monitoring technologies, such as GPS and RFID (Radio Frequency Identification), which provided greater visibility into the movement of goods.

While smart logistics have brought about changes in the supply chain structure, the management of the logistics process for efficiency and effectiveness, better relations in the supply chain for a greater visibility in the movement of goods. However the basic condition for obtaining these effects is the ability to properly use intelligent solutions, which in turn depends on the competence of the logistics staff. In other words, it should be expected that the competences of the logistics staff will be directed to intelligent solutions to serve the development of intelligent logistics and intelligent supply chains (Dembiska, 2018).

Conclusion

Logistics is an essential component of modern business, evolving from its early militaristic role of moving goods and services to a comprehensive system encompassing procurement, storage, and distribution to end customers. This study highlights the historical development of logistics and supply chain management (SCM), emphasizing its transformation from basic transportation and storage to a dynamic, information-driven field integrating customer satisfaction and operational efficiency. The novelty of this research lies in its examination of logistics' evolving definitions and its role in shaping SCM practices, particularly in aligning academic understanding with industry needs. By offering insights into the progression of logistics, this study provides a foundation for developing high-caliber graduates equipped to address modern challenges in logistics and SCM. Future research should explore the integration of emerging technologies, such as artificial intelligence and smart logistics systems, to enhance the agility, sustainability, and efficiency of global supply chains.

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