Uncertain Supply Chain Management 11 (2023) 1397–1404

Contents lists available at GrowingScience

Uncertain Supply Chain Management

homepage: www.GrowingScience.com/uscm

Design and management of supply networks in retail companies: A bibliometrics review

Marco Antonio Aguilar Roman[a*], Mishel Gissley Rosas Pizarro[a] and Javier Romero Meneses[a]

[a]*Universidad Continental, Peru*

A B S T R A C T

In this presentation, a systematic review on the design and management of supply networks in retail companies was proposed. Currently, organizations seek to prioritize the management of their supply networks in a comprehensive manner to avoid uncertainty and the intricate connections between the various levels of the supply network, seeking growth in sales, ensuring adequate inventory rotation, supplier management and transportation or inventory-related expenses. In this case, the objective was to promote the concept of design and management of supply networks in retail companies. The review was carried out including the literature of 15 theses and articles in the period 2003-2023 using different reliable databases. Research shows that a good design and management of supply networks in retail companies reduces shrinkage and provides greater control of their stocks, avoiding unnecessary expenses or losses.

Article history:
Received May 7, 2023
Received in revised format July 28, 2023
Accepted August 14 2023
Available online
August 14 2023

Keywords:
Supply network design
Supply network management
Distribution chain design
Logistics network design

1. Introduction

Today, organizations are focused on managing their supply network holistically due to the various sources of uncertainty and intricate connections between the various levels of the supply network, such as the potential for lost sales due to inadequate inventory, the expiration of products, transportation costs and expenses related to inventory (Restrepo, 2013). The management of supply networks are the interconnected pathways used by companies through which goods and services move from suppliers to customers (Gutiérrez & Jaramillo, 2009). Likewise, it is interpreted as the union of the main business processes of a company from the initial suppliers to the final customer, about the delivery of products and services (Flynn et al., 2010). Thus, it has been shown that a high degree of integration between companies is an important factor that contributes to improving the performance and long-term success of the organization (Näslund & Hulthen, 2012). It is undeniable that, for an organization to achieve its objectives, it must be an open system with a structure that includes connections with other organizations. To optimize its performance, it is vital to properly coordinate business processes integrating effectively, efficiently, and cost-effectively (Aldana et al., 2019). The integration of processes in the management of supply networks is a primary factor for business development, so it is necessary to evaluate the determinants that lead companies to include this process (Aldana et al., 2019). In addition, it is considered as the method by which the operations of an organization are facilitated through the supply network (Romano, 2003). So, companies must understand their competitive environment and develop a strategy to remain competitive to succeed in a rapidly changing market. This strategy must consider the economic sector and the size of the company, as well as the need to innovate and adapt to changing market demands (Ballou, 2004). It is evident that the management of supply networks is necessary both for the demands of goods or services (Vickery et al., 2003). Therefore, efficient flows of products, services, information, and decisions must be created that offer value to the customer (Flynn et al., 2010) and improve the performance of organizations (Aryee et al., 2008). For its different interest groups (Fontrodona & Sison, 2006). Likewise, the degree of collaboration between three or more organizations with a sectoral relationship is measured by their ability to trust and work on common long-term goals. This implies exchanging information, resources, technologies and sharing risks and benefits to improve performance and obtain advantages that could not be achieved by a single organization (Borgatti & Li, 2009).

* Corresponding author
E-mail address 70105430@continental.edu.pe (M. A. Aguilar Roman)

doi: 10.5267/j.uscm.2023.8.007

This statement underscores the importance of companies improving both their external performance and their internal performance to remain competitive in the marketplace. External performance involves meeting customer needs with quality products and services at competitive prices and on time, while internal performance involves effectively managing resources such as human, financial, and technological resources (Gómez, 2015). Organizations need to improve their internal and external performance to remain competitive in the market. This includes increasing market share, building customer loyalty, reducing costs, and increasing efficiency. Doing so is essential to create a sustainable competitive advantage and long-term success (Anaya, 2015). Investing in the design and management of product supply networks can be an effective strategy for improving business performance. It can lead to cost reduction, better inventory management, greater responsiveness to market demands, improved product and service quality, and increased customer satisfaction and loyalty (Santos, 2010). Retail companies must properly manage their supply chains to meet customer demand effectively and efficiently. This requires careful inventory planning and management to ensure that enough products are available when needed, but that excess inventory is avoided to minimize costs. Proper supply chain management is essential to ensure success in the retail market (Zapata, 2014). The lack of planning and improvisation in our logistics system is a major problem. This leads companies to spend more money than necessary to manage their supply chain and can cause problems with customer service (Mora, 2016). Therefore, through a systematic review of the available literature, the aim of this study is to lay the foundation for future studies and gain a deep understanding about the design and management of supply networks in retail companies. This article is expected to lay the foundations for future studies on the subject and contribute to a better understanding of the challenges and opportunities in supply network management in delivery companies, which can be very useful for researchers, company managers and responsible for public policies in this field (Díaz, 2017).

2. Materials and method

2.1 Materials

In the process of developing a systematic review of a scientific article, it is important to have the right materials to carry out a thorough and rigorous search of the scientific literature. First, it is necessary to have access to bibliographic databases, such as Scielo, ScienceDirect, Google Scholar and Redalyc, which allow access to a wide range of scientific articles in different areas of knowledge. These databases also provide advanced search tools that allow you to filter the results by date, language, type of study, among others. In addition, it is essential to have a bibliographic reference management software, such as EndNote, Mendeley or Zotero, which allows you to organize and manage the bibliography efficiently. These programs allow bibliographic references to be imported directly from bibliographic databases and references can also be added manually. In addition, these programs also allow the automatic creation of citations and the bibliography of the article in different formatting styles, which makes the preparation of the systematic review article easier. In summary, for the preparation of a scientific systematic review article, bibliographic databases and bibliographic reference management software are needed to carry out a rigorous and organized search of the scientific literature in the corresponding field of study.

2.2 Methods

This study will carry out a systematic review of the literature, a type of descriptive research based on observation and retrospective. Your objective will be to integrate the results of a research problem in an organized and systematic way, using a step-by-step process for any investigation. Linares et al. (2018) argued that systematic reviews are comprehensive studies, which combine observational and retrospective studies to answer a specific question. This allows for a rational synthesis of the research, overcoming the limitations of narrative reviews by using rigorous standards to organize the data. In addition, Sobrido and Rumbo (2018) stated that systematic reviews focus on having a transparent and understandable process to collect and critically evaluate information that contains evidence regarding the effectiveness of a treatment. The goal is to provide a timely forecast that meets the requirements of the study. It is essential to document the stages of the investigation process. First, the aim and purpose of the investigation must be determined and the search for information started. Data needs to be carefully analyzed to ensure that it is relevant and useful. Second, the data must be selected based on certain inclusion and exclusion criteria.

2.2.1 First stage: Search for information

When looking for information on the design and management of supply networks in retail companies in Peru, it is important to consider applying a subject filter. This includes the language and time of the study, as these are key elements of the systematic review process. This should be one of the first steps in conducting the review. For the collection of the necessary information, the reliable databases of Springer, Scielo, Sciencedirect, Growing Science, Google Academio and Redalyc were considered. These databases, which are scientific journals, will be used to focus the research topic. To generate the appropriate search, it is necessary to consider the keywords, search terms, authors, and year of publication. In this way, the following keywords were used: “Design of supply networks”, “Management of supply networks”, “Design of distribution chains”, “Design of logistics network”.

Table 1
Initial search for information from databases

Databases	Initial searching	Amount
SPRINGER	Scientific journal articles	15
SCIELO	Scientific journal articles	05
SCIENCEDIRECT	Scientific journal articles	10
GROWING SCIENCIE	Scientific journal articles	04
ACADEMIC GOOGLE	Scientific journal articles	25
REDALYC	Scientific journal articles	05
TOTAL		**64**

Note: Own approach

Table 1 details the databases consulted for this study, which will provide 64 studies for the inclusion and exclusion analysis. At least 15 of these studies must be relevant to the objective of the study and must be original articles from indexed databases written in Spanish and English between the years 2003-2023 that involve the design and management of supply networks in retail companies.

2.2.2 Second stage: Inclusion and exclusion criteria

It is important to screen the information using the inclusion and exclusion criteria, since this way we can take into account the relevant aspects necessary for the study. Likewise, studies published between 2003 and 2023, written in English and Spanish, may also be included, as well as databases such as Springer, Scielo, ScienceDirect, Growing Science, Google Scholar, and Redalyc. Therefore, studies published before 2003, duplicate articles and articles not related to the subject will be excluded.

3. Results

The selected investigations were submitted to a screening process in which exclusion criteria were taken into account to determine the number of articles included in the systematic review.

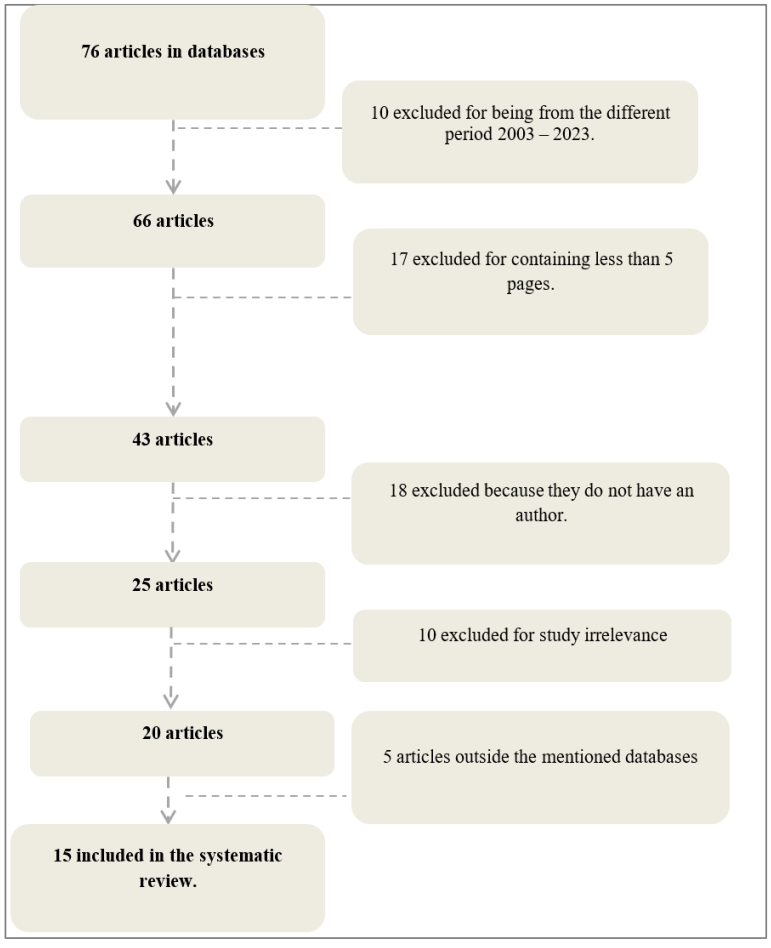

Fig. 1. The flowchart of the review

The prudent information was collected to develop the systematic review, these were gathered in a table that synthesizes the primordial characters of the investigations, which is presented below:

The studies by Mafla and Escobar (2015), Escobar et al. (2013), Ben et al. (2020), Paz et al. (2015), Buriticá et al. (2018), Escobar (2017) and Vélez et al. (2021), are focused on the redesign and optimization of a distribution network in retail companies, through the application of an SAA algorithmic strategy that consists of a structured system with respect to each sample average with the purpose of solving different stochastic problems that affect the consolidations planned by management. Likewise, these studies are oriented towards an effective mathematical model with a positive impact on the redesign of supply chains, for the best location of products in inventory and on the reduction of operating costs, with the purpose of intervening conspicuously in every decision and planned consolidation by management in a small service or production company.

On the other hand, the investigations of Gámez et al. (2017), Santana et al. (2013) and Huang et al. (2005), specify that for the design of distribution networks it is essential to implement different modeling such as network logistics, classic and explicit, respectively, which together are oriented to costs, opening and closing of different facilities as part of a strategic decision and management of out-of-stock and inventory as part of its tactics. Indeed, the models offer an optimal distribution process, generation of savings, reduction and a fixed and variable service rate in key decision making. Escobar (2012) discussed that the design of a distribution network is quite difficult, due to the uncertainty of the demand for products in different consumption scenarios depending on their service time variation.

Finally, for Peña et al. (2016), Rodríguez et al. (2022), Pérez (2018) and Ulin et al. (2020) discussed that for the design of a distribution network there are various associated aspects, such as cost analysis, inventory management, procedures, customer demand and vehicle routing, all of which are aimed at improving financial performance, reducing route times and flexibility in the supply chain. Consequently, these investigations focus on the optimal distribution capabilities of the transport of merchandise based on the type and volume of products established in a logistics and that are required more frequently by the clients of the different companies.

In accordance with the objective of the systematic review, the general objective was to analyze the evolution of studies on the design and management of supply networks in retail companies in the period 2005-2022.

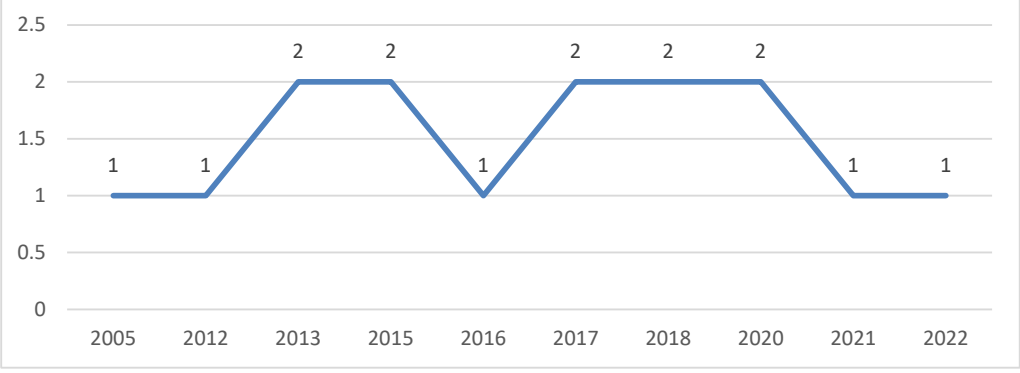

Fig. 1. Evolution of studies on the design and management of supply networks in retail companies in the period 2003-2023

According to Fig. 2, the evolution of the studies of design and management of supply networks in retail companies in the period 2005 -2022 from 2005 to 2012 maintains a line in presenting a study, from 2013-2015 it presents a peak and in 2016 it shows a decrease, after 2017 - 2020 it increased again and finally from 2021 to 2022 there was a decrease in the evolution of studies on the subject.

Table 2
Years of publication of the studies on the design and management of supply networks in retail companies in the period 2003-2023.

Year	Amount	Percentage
2005	1	7%
2012	1	7%
2013	2	13%
2015	2	13%
2016	1	7%
2017	2	13%
2018	2	13%
2020	2	13%
2021	1	7%
2022	1	7%
Total	15	100%

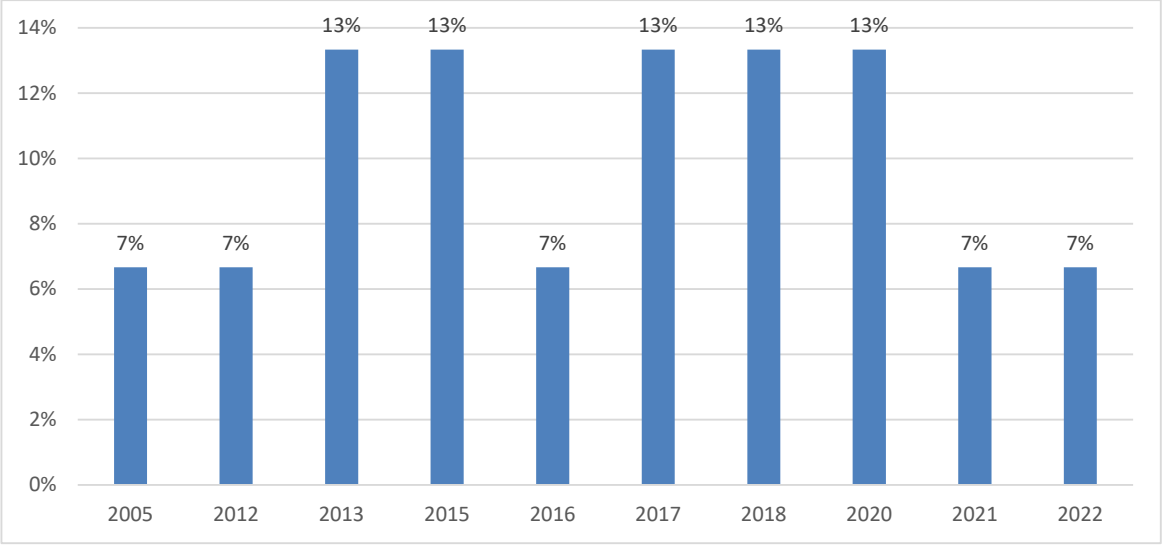

Fig. 3. Years of publication of the studies on the design and management of supply networks in retail companies in the period 2003-2023

Both in Table 2 and Fig. 3 we have found that in the highest percentage of publications referring to studies on the design and management of supply networks in retail companies in the periods 2013-2015 and 2017-2020 with 13% while the least percentage is located in the periods 2005-2012, year 2016 and 2021-2022 with a percentage of 7%.

Table 3
Publication by country of the studies on the design and management of supply networks in retail companies in the period 2003-2023.

Country	Amount	Percentage
Canada	1	7%
Chile	1	7%
Colombia	9	60%
Estado Unidos	1	7%
México	2	13%
Venezuela	1	7%
Total	15	100%

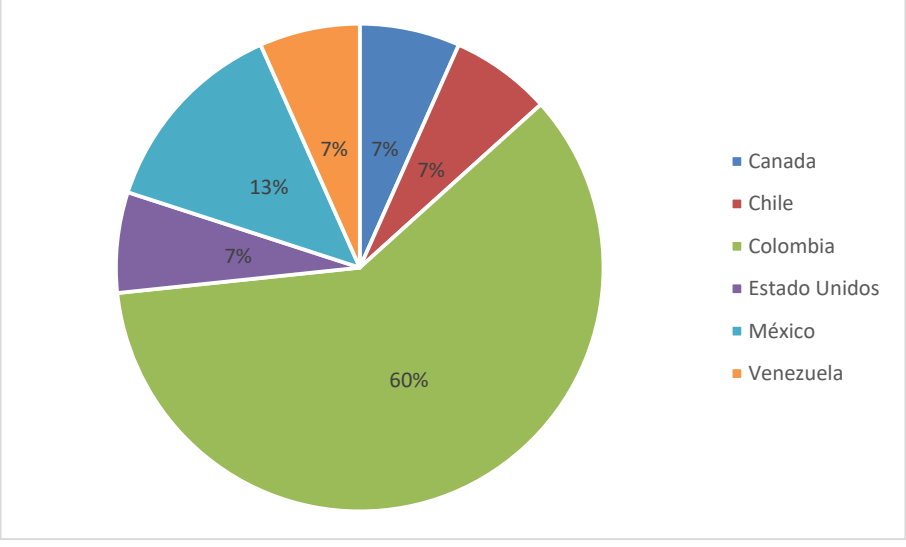

Fig. 4. Country of publication of the studies on the design and management of supply networks in retail companies in the period 2003-2023

Both in Table 3 and Fig. 4 we find that the highest percentage of the origin of the country regarding studies on the design and management of supply networks in retail companies is Colombia with a percentage of 60%, followed by Mexico with 13%. and finally with 7% are publications from Canada, Chile, the United States and Venezuela respectively.

Table 4
Database / search engine / publisher of studies on the design and management of supply networks in retail companies in the period 2003-2023

Database / search engine / publisher	Amount	Percentage
Growing Science	1	7%
INDERSCIENCE	1	7%
International Journal of Industrial Engineering and Management	1	7%
MDPI	1	7%
Redalyc	1	7%
Revista Facultad de Ingeniería UPTC	1	7%
Scielo	5	33%
ScienceDirect	2	13%
Springer	1	7%
Wiley Online Library	1	7%
Total	15	1

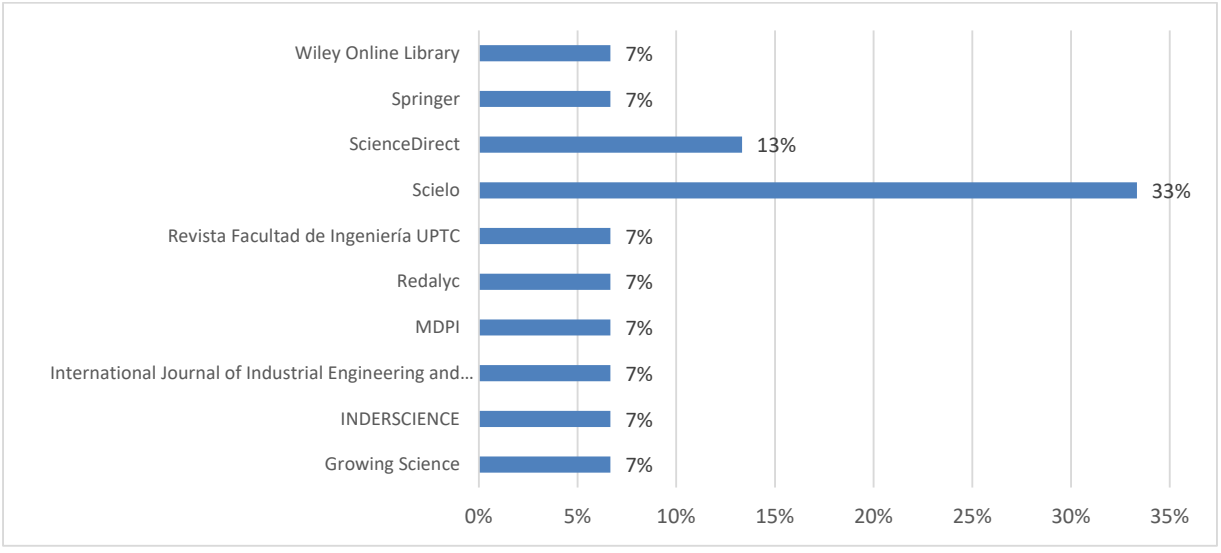

Fig. 5. Database / search engine / publisher of studies on the design and management of supply networks in retail companies in the period 2003-2023

Both in Table 4 and Fig. 5 we find that in the highest percentage of the origin of the databases/search engine/publisher of the studies on the design and management of supply networks in retail companies regarding the studies on the design and management of networks of supply in retail companies is Scielo with 33%, followed by Science Direct and finally with 7% Wiley Online Library, Springer, Facultad de Ingeniería UPTC Magazine, Redalyc, MDPI, International Journal of Industrial Engineering and Management, INDERSCIENCE and Growing Science, respectively.

4. Discussion

The collected concepts promoted learning about the design and management of supply networks in retail companies in the period 2003-2023, demonstrate its importance to effectively manage this circuit, allowing order and avoiding the incidence of unnecessary costs or expenses that are key to a retail company. The intensive search, the continuous observation and the criteria at a professional level, it is sought that the designs and management of supply networks must be implemented in all types of companies that have stocks in the same way if it focuses on a service item, recognize it for Choose the best measures for its operation and implement improvements according to the course and rhythm of the company. This is accompanied by the following statement of the subject studied, interpreting it as the union of the main business processes of a company from the initial suppliers to the final customer, about the delivery of products and services (Flynn et al., 2010).

It should also be considered that given the interdependence of distribution network design models and the repercussions that their decisions have on the supply system, the field of knowledge related to this topic is quite broad. Among the specific areas of study that can be distinguished are deterministic network design models with a single facility, deterministic network design models that consider multiple facilities, network design models that use exact methods, network design that use simulation methods, network design models that use heuristic methods, dynamic network design models and stochastic network design models (Escobar et al., 2013). It is commonly understood that strategic decisions are made for long planning horizons (years), often involving considerable investments in terms of quantity, capacity, location and function of logistics network infrastructure. Tactical decisions, for their part, consider medium-term planning (months) of operations related to manufacturing, purchasing, inventory policies, and transportation methods. Finally, the operational options are taken weekly

or daily, which allows sequencing activities, developing vehicle routes, etc. to reduce costs and delivery times (Gámez et al., 2017).

The main limitations in this research are the lack of research directly related to the subject, as a second limitation is the fact that retail companies usually have a conformation of small and medium-sized companies, they neglect the part of design and management of supply networks since who have the thought that instead of an investment it is an expense, as a third limitation there is a deficit in the execution of this topic due to ignorance in this area and lack of training in the corresponding topic, prioritizing random topics in their area, the last limitation is that very few businessmen carry out an in-depth follow-up on the subject of study, not so much due to cost issues, but rather that many find it difficult to identify the relevant bottlenecks that are highly related due to not having a design and management plan for their supply networks having a strong impact on showing problems with suppliers or in the management of their inventories, endangering precise rotation control, it will undoubtedly be reflected in your sales plan.

5. Conclusion

It has been concluded that analysis of articles based on the design and management of supply networks in retail companies are scarce because they correspond to the formation of medium or small companies that pay very little attention to their suppliers and their warehouses, causing losses either by shrinkage or expired products. It is also concluded that the design and management of supply networks in retail companies should be prioritized to optimize profits and improve each point of the companies, avoiding unnecessary expenses or costs, shortages, or malpractice to supply the goods or services. The most representative documents for the investigation of supply networks in retail companies from 2003 - 2023 were also selected and analyzed. Finally, it is concluded that the logistics network should be seen as an integrated model structured in a proposal that includes input elements associated with operating procedures, elements of the logistics system that consider the projection of demand, the application of these data within a resource planning process in terms of inventory and distribution, and finally the impact on cycle time, understood in this case as a function of the perceived level of service.

References

Aldana-Bernal, J. C., Bernal-Torres, C. A., Aldana-Bernal, J. C., & Bernal-Torres, C. A. (2019). El Capital Social y la Integración de Procesos en la Gestión de las Cadenas de Abastecimiento en el Sector Real en Colombia. *Información tecnológica*, *30*(5), 249-262. https://doi.org/10.4067/S0718-07642019000500249

Anaya, J. (2015). *Logística Integral* (Quinta). ESIC EDITORIAL. https://es.scribd.com/document/514003683/Logistica-integral-5ta-Edicion-Julio-Juan-Anaya-Tejero-www-FreeLibros-org

Aryee, G., Naim, M. M., & Lalwani, C. (2008). Supply chain integration using a maturity scale. *Journal of Manufacturing Technology Management*, *19*(5), 559-575. https://doi.org/10.1108/17410380810877258

Ballou, R. (2004). *Logística—Administración de la cadena de suministro* (Quinta). PERSON EDUCACIÓN. https://laclassedotblog.files.wordpress.com/2018/05/logistica_administracion_de_la_cadena_de_suministro_5ta_edicion_-_ronald_h-_ballou.pdf

Ben, I., Klibi, W., & Vanderbeck, F. (2020). Designing a two-echelon distribution network under demand uncertainty. *European Journal of Operational Research*, *280*(1), 102-123. https://doi.org/10.1016/j.ejor.2019.06.047

Borgatti, S. P., & Li, X. (2009). On Social Network Analysis in a Supply Chain Context*. *Journal of Supply Chain Management*, *45*(2), 5-22. https://doi.org/10.1111/j.1745-493X.2009.03166.x

Buriticá, N. C., Escobar, J. W., & Gutiérrez, R. (2018). *Supply Network Design by Using Clustering and Mixed Integer Programming*. http://ijiemjournal.uns.ac.rs/images/journal/volume9/IJIEM-1_018.pdf

Díaz, C. (2017). *Gestión de la Cadena de Abastecimiento* (Primera). https://core.ac.uk/download/pdf/326426087.pdf

Escobar. (2017). *Supply chain optimization with variable demand by considering financial criteria and scenarios*. http://www.scielo.org.co/scielo.php?script=sci_arttext&pid=S0121-11292017000100023

Escobar, J. W. (2012). Rediseño de una red de distribución con variabilidad de demanda usando la metodología de escenarios. *Revista Facultad de Ingeniería*, *21*(32), Article 32.

Escobar, J. W., Bravo, J. J., & Vidal, C. J. (2013). Optimización de una red de distribución con parámetros estocásticos usando la metodología de aproximación por promedios muestrales. *Ingeniería y Desarrollo*, *31*(1), 135-160.

Flynn, B. B., Huo, B., & Zhao, X. (2010). The impact of supply chain integration on performance: A contingency and configuration approach. *Journal of Operations Management*, *28*(1), 58-71. https://doi.org/10.1016/j.jom.2009.06.001

Fontrodona, J., & Sison, A. J. G. (2006). The Nature of the Firm, Agency Theory and Shareholder Theory: A Critique from Philosophical Anthropology. *Journal of Business Ethics*, *66*(1), 33-42. https://doi.org/10.1007/s10551-006-9052-2

Gámez, H. M., Mejía, C., León, R. A., Gámez, H. M., Mejía, C., & León, R. A. (2017). Diseño de una red de distribución a través de un modelo de optimización considerando agotados. *Ingeniare. Revista chilena de ingeniería*, *25*(4), 619-632. https://doi.org/10.4067/S0718-33052017000400619

Gómez, J. (2015). *Gestión logística y comercial*.

Gutiérrez, V., & Patricia Jaramillo, D. (2009). Reseña del Software Disponible en Colombia Para la Gestión de Inventarios en Cadenas de Abastecimiento. *Estudios Gerenciales*, *25*(110), 125-153. https://doi.org/10.1016/S0123-5923(09)70065-8

Huang, S., Batta, R., & Nagi, R. (2005). Distribution network design: Selection and sizing of congested connections. *Naval Research Logistics (NRL)*, *52*(8), 701-712. https://doi.org/10.1002/nav.20106

Linares-Espinós, E., Hernández, V., Domínguez-Escrig, J. L., Fernández-Pello, S., Hevia, V., Mayor, J., Padilla-Fernández, B., & Ribal, M. J. (2018). Methodology of a systematic review. *Actas Urológicas Españolas (English Edition)*, *42*(8), 499-506. https://doi.org/10.1016/j.acuroe.2018.07.002

Mafla, I., & Escobar, J. W. (2015). Rediseño de una red de distribución para un grupo de empresas que pertenecen a un holding multinacional considerando variabilidad en la demanda. *Revista de la Facultad de Ingeniería Universidad Central de Venezuela*, *30*(1), 37-48.

Mora, L. (2016). *GESTION LOGISTICA INTEGRAL: Las mejores practicas en la cadena de abastecimiento (2a ed.).* Ecoe Ediciones.

Näslund, D., & Hulthen, H. (2012). Supply chain management integration: A critical analysis. *Benchmarking: An International Journal*, *19*(4/5), 481-501. https://doi.org/10.1108/14635771211257963

Paz, J., Orozco, J., Salinas, J., Buriticá, N., & Escobar, J. (2015). Redesign of a supply network by considering stochastic demand. *International Journal of Industrial Engineering Computations*, *6*(4), 521-528.

Peña, D., Urueña, J., & González, L. (2016). *Diseño de una red logística para una comercializadora ferretera en el centro del Valle del Cauca*. http://www.scielo.org.co/scielo.php?script=sci_arttext&pid=S1900-38032016000100020

Pérez, G. (2018). Optimal logistics strategy to distribute medicines in clinics and hospitals. *Journal of Mathematics in Industry*, *8*(1), 2. https://doi.org/10.1186/s13362-018-0044-5

Restrepo, R. J. (2013). La logística y las soluciones en la gestión de la red de abastecimiento. *QUID: Investigación, Ciencia y Tecnología*, *21*, 53-60.

Rodríguez, J. V., Cómbita Niño, J. P., Parra Negrete, K. A., Mercado, D. C., & Fontalvo, L. A. (2022). Optimization of the distribution logistics network: A case study of the metalworking industry in Colombia. *Procedia Computer Science*, *198*, 524-529. https://doi.org/10.1016/j.procs.2021.12.280

Romano, P. (2003). Co-ordination and integration mechanisms to manage logistics processes across supply networks. *Journal of Purchasing and Supply Management*, *9*(3), 119-134. https://doi.org/10.1016/S1478-4092(03)00008-6

Santana, E. L., Giraldo, G. A. M., & Franco, C. (2013). Diseño de cadenas de distribución con demanda bajo incertidumbre: Una aproximación de programación lineal difusa. *Ingeniería*, *18*(2). https://doi.org/10.14483/udistrital.jour.reving.2013.2.a05

Santos, I. S. L. (2010). *Logística y operaciones en la empresa*.

Sobrido Prieto, M., & Rumbo-Prieto, J. M. (2018). La revisión sistemática: Pluralidad de enfoques y metodologías. *Enfermería Clínica*, *28*(6), 387-393. https://doi.org/10.1016/j.enfcli.2018.08.008

Ulin, E. J., Saucedo, J. A., & Marmolejo Saucedo, J. A. (2020). Optimization of the Distribution Network Using an Emerging Technology. *Applied Sciences*, *10*(3), Article 3. https://doi.org/10.3390/app10030857

Vélez, Y. S., Varela, H. P., Londoño, J. C., & Escobar, J. W. (2021). Redesign of supply chains for agricultural companies considering multiple scenarios by the methodology of sample average approximation. *International Journal of Business Performance and Supply Chain Modelling*, *12*(1), 44-68. https://doi.org/10.1504/IJBPSCM.2021.114748

Vickery, S. K., Jayaram, J., Droge, C., & Calantone, R. (2003). The effects of an integrative supply chain strategy on customer service and financial performance: An analysis of direct versus indirect relationships. *Journal of Operations Management*, *21*(5), 523-539. https://doi.org/10.1016/j.jom.2003.02.002

Zapata, J. (2014). *Fundamentos de la gestión de inventarios*. https://www.accioneduca.org/admin/archivos/clases/material/manejo-de-inventario_1563983589.pdf