Trends, Patterns, and Research Frontiers in Reverse Logistics Practices: A Bibliometric Analysis (2010-2022)

Noor Irdiana Ngadiman[1], Zuhra Junaida Ir Mohamad Husny Hamid[2], Nazatul Syahira Hussein[3], Nusaila Johari[4], Faradina Ahmad[5]

[1,2]Faculty of Built Environment and Urban, University Technology Malaysia

[3]Faculty Pengurusan dan Perniagaan, Universiti Teknologi Mara, Pasir Gudang, Johor.

[1,4]Department of Industrial Logistics, University Kuala Lumpur, Malaysian Institute of Industrial Technology, Malaysia

[5] Faculty Pengurusan, Universiti Teknologi Malaysia

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ABSTRACT

Reverse logistics has garnered increasing attention in recent years, driven by stringent environmental standards and the growing awareness of environmental issues. Additionally, there is a realization of the economic benefits derived from reusing products rather than discarding them. However, the adoption of reverse logistics poses significant complexities, necessitating organizations to seek external expertise and technology to bridge the knowledge gap. Consequently, this study aims to explore current trends and background information on reverse logistics practices through the application of bibliometric analysis. This research employed VOS viewer software to conduct comprehensive bibliometric analysis of reverse logistics literature from the period 2010 to 2022. A total of 3538 papers were retrieved from the Scopus database, utilizing the keyword 'reverse logistics.' The analysis of search results reveals fluctuations in the trend of reverse logistics research in previous years, but a slight increase was observed from 2021 to 2022, with document count rising from 322 to 332. This upward trend indicates a growing awareness among organizations, stakeholders, scholars, experts, and end-users regarding reverse logistics and the recognition of its potential to offer a competitive advantage.

Keywords: Reverse Logistics, Bibliometric Analysis, Sustainability, Trends

INTRODUCTION

In today's competitive business world, organizations continually seek innovative methods to improve their processes, enhance customer satisfaction, and maintain a competitive edge. In the past two decades, reverse logistics was regarded as a strategy for making these products a reality (Hasmat Wan Hasan et al., n.d., p. 2022). The implementation of reverse logistics as a strategic decision has gained significant attention amongst organizations due to its benefits to sustainable development (Banihashemi et al., 2019). Thus, recently most of the organizations have started to be concerned about sustainability due to community concerns about the environment and organization adoption of green strategies, and want the recognition of their social responsibility, which they need to respond to legislation aimed to reduce environmental impacts and economic competition.

According to Wlamyr et al., (2022), reverse logistics is one of the most prominent techniques in this context. Reverse logistics enables the reutilization and creation of new value from product waste and discarded goods. In addition, Mugoni et al., (2023) define reverse logistics as the process of moving goods or products from the consumers to the manufacturer for recapturing value or ensuring disposal in an environmentally friendly manner. Recycling, remanufacturing, reuse, refurbishment, and disposal are examples of reverse logistics processes and activities. Nonetheless, the reverse logistics activities depend on the condition of the products. The decision of reverse logistics activities was based on several factors such as the end-of-life cycle, the defect

condition, and others. The main objective of this study is to apply bibliometric analysis to explore and comprehend the current trends developments in reverse logistics activities. The selection of articles was made using a search database from the Scopus database, which was filtered using specific search criteria such as "Reverse Logistics" keywords and a 12-year window from 2010 to 2022 for filtering by year. Using bibliometric analysis, the reverse logistics keyword was chosen to determine the current trends and direction of reverse logistics research. This research is structured by a few subtopics. It begins with the introduction of research. Followed by the literature review of reverse logistics. Next, research methodology was discussed on the steps and flows of conducting bibliometric analysis. After describing the methodology, this research elaborates on the result. The final stages concluded with a conclusion and acknowledgement.

Reverse Logistics

Recently, organizations or companies have aspired to implement reverse logistics in response to stakeholders' requirements to reduce negative environmental consequences, enhance organizational sustainability performance, and ultimately gain a competitive advantage. Reverse logistics is considered a vital element of the circularity concept, a regenerative or restorative perspective of this industrial economy, and is one of the most rapidly expanding areas of supply chain management research. (U-Dominic et al., 2021). Forward logistics is a direct path from the supplier to the end users, whereas reverse logistics is the opposite path from the end users to the manufacturer or supplier. The most cited definition of reverse logistics by Rogers and Tibben-Lembke during 1999 was mentioned that reverse logistics is the process of planning, implementing, and controlling the efficient, cost-effective flow of raw materials, work in process inventory, finished goods, and related information from the point of consumption to the point of origin for the purpose of recapturing value or proper disposal (Sharma et al., 2021). In addition, The Reverse Logistics Association, according to research conducted by (Beleya et al., 2017), defines reverse logistics as all activity associated with a product or service after the point of sale, with the intent of optimizing or enhancing aftermarket activity. In the Malaysian context, reverse logistics refers to the responsible disposition of used product and packaging that is collected from consumers and/or returned to the supplier. Besides that, reverse logistics includes the traditional logistics activities of transportation and inventory management, but its focus is on returning products to customers rather than delivering them. This included the process of alternative actions in the reversed flow, such as repair, refurbishment, remanufacturing, cannibalizations, recycling, reconditioning, landfills, and others, based on the condition and circumstance of each product. Unfortunately, most reverse logistics actors in developing countries are informal businesses with low awareness of the environment and health issues. This is because they are more focused on earning profits to ensure their survival (Maheswari et al., 2020).

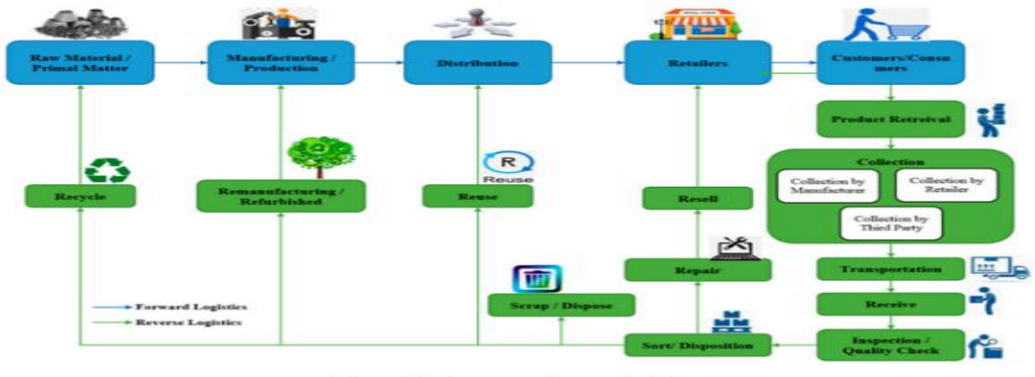

Figure 1: Forward logistics and reverse logistics

Source: (Alkahtani et al., 2021)

Figure 1 demonstrates the flow of reverse and forward logistics as mentioned by (Alkahtani et al., 2021). The forward logistics is represented by a blue line that begins with raw materials and extends through production, distribution, retailers, and customers. On the other hand, reverse logistics represent a green line. Customers return products or commodities to product retrieval, then proceed to the collection department to initiate the flow. In these stages, the returned goods can be sorted by manufacturer, retailer, or third party according to the

condition of the returned items. After the returned products were sorted, they were transported, received, or delivered to the destination. At these phases, the responsible party conducts inspections and quality checks prior to deciding on reverse logistics activities such as reselling, repairing, reusing, remanufacturing, recycling, or disposal.

METHODOLOGY

Bibliometric analysis is the quantitative study of bibliographic materials. It provides an overview of a research field that can be organized according to papers, authors, and journals (Merigó & Yang, 2017). This type of research enables researchers to analyze specific research fields by considering research articles, journals, authors, institutions, and countries, thereby providing researchers with a broad picture of the research fields (Alkahtani et al., 2021). This study aims to explore and understand the reverse logistics activities between 12 years ago and the present. The most influential research in the field of reverse logistics is presented here based on the information gathered from the Scopus database. The keyword "Reverse Logistics" was used in the topic section of the literature search. Almost 3,538 documents were retrieved from the Scopus database, as indicated by the search result analysis. Bensalem & Kin, (2019) has explained the steps and procedures to conduct bibliometric analysis. The process of bibliometric analysis starts with collecting the data needed for the study. This study uses the approach of using a set of keywords in the Scopus Database. and time frame from year 2010 until year 2022 only. Next, the data is exported into the dataset. This study chooses the dataset of Comma Separated Values (.csv).

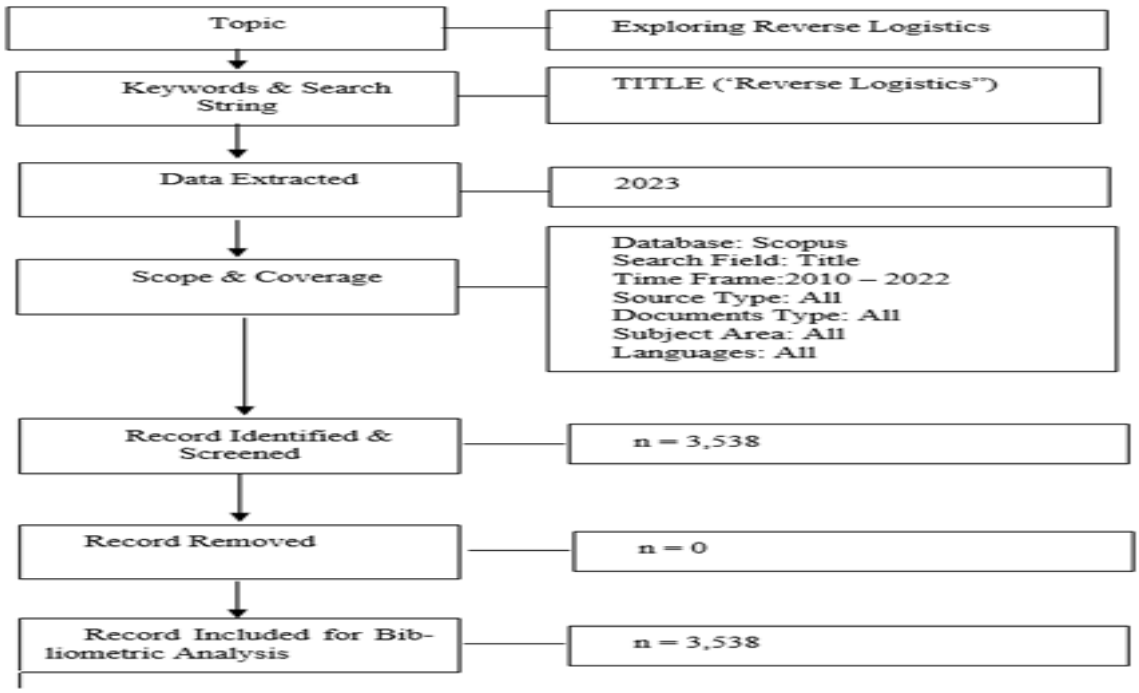

Figure 2: Research Protocol for Dataset Acquired

Source: Authors

After obtaining the dataset, the researcher employs VOSviewer for bibliometric analysis. VOSviewer is a software application for building and visualizing networks of documents, authors, organizations, and countries. After the VOSviewer is displayed on the homepage, the next step is to select a map based on bibliographic data. Then, choose the data source; for this study, the option to read data from bibliographic database files was selected. Next is file selection. At this point, it can select the previously saved scopus.csv file. After reading the Scopus file, the form of analysis conducted in VOSviewer is explained. Then, se-lect the thresholds, number of authors, verify selected authors, and continue to create the visualization. There are three types of visualizations such as network visualization, overlay visualization and density visualization. The outcome of the visualization is explained in the next section which is results and discussion.

RESULTS AND DISCUSSION

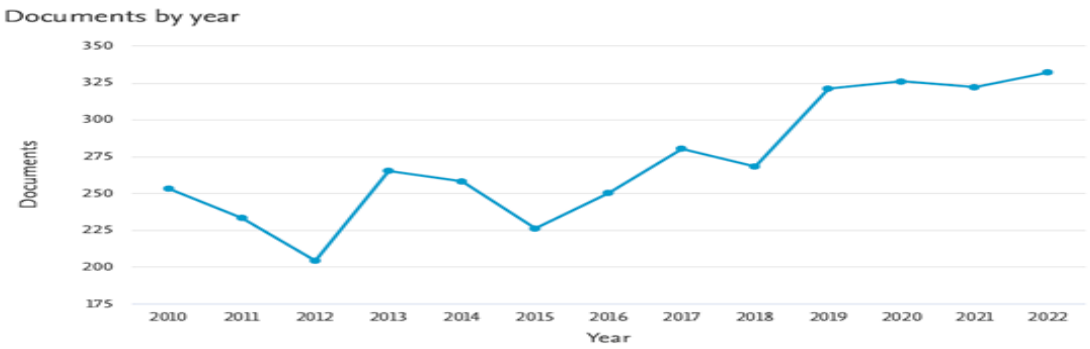

Figure 3: The Scopus database on "Reverse Logistics" trend of publication from year 2010 until 2022

Sources: Authors

Figure 3 illustrates the trend of publications on the topic of reverse logistics in the Scopus database from 2011 to 2022. In 2010, a total of 251 documents related to reverse logistics were recorded. Subsequently, the trend fluctuated over the years until 2019, displaying varying levels of publication activity. However, from the year 2020, there was a noticeable upward trend in the number of publications, reaching approximately 326 documents. This trend continued to rise in 2022, with around 332 documents recorded about reverse logistics. It shows that reverse logistic start has captured the interest and attention of many stakeholders, including academics, manufacturers, and organizations. It is strongly supported by the statement from Mallick et al., (2023) that reverse logistics is currently receiving increased attention, and Rubio et al., (2016) who state that reverse logistics has grown in strategic importance in Supply Chain Management over the past few years. Companies are motivated to implement reverse logistics by legislation, economic, social, and environmental sustainability, consumer expectations, and corporate image, among others. All these factors serve as justification for an organization to implement reverse logistics.

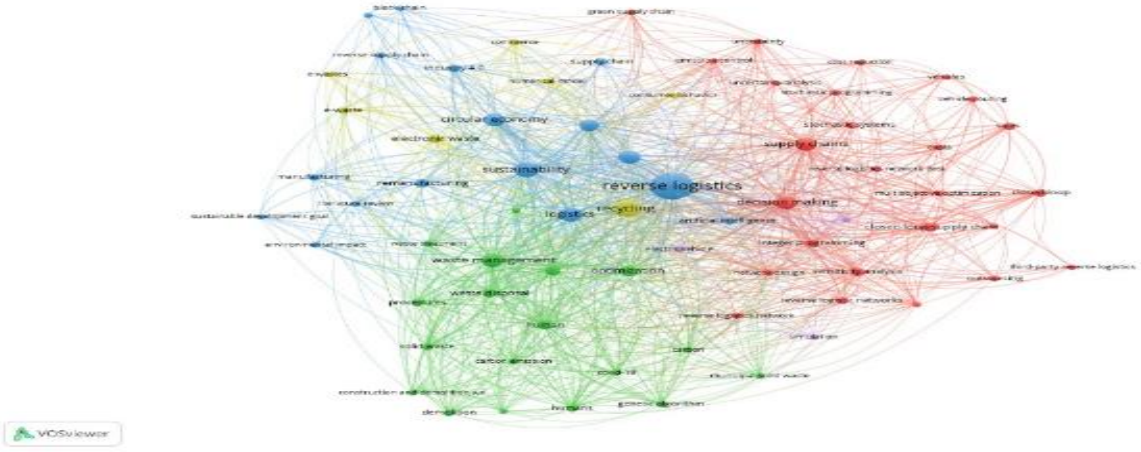

Figure 4: The author's keyword co-occurrence based on network visualization

Sources: Authors

In the keyword co-occurrence network, each node of the networks represents a keyword, and the edge between nodes was composed of keyword co-occurrence. Figure 4 shows that "reverse logistics" was the most common keyword that mentioned and cited by the authors, occurred almost 111 times followed by the keywords of recycling (42), waste management (30) and sustainability (36). Recycling, waste management and sustainability are related to each other with the reverse logistics. One of the reverse logistics activities is

recycling. Recycling is the use of materials recovered from waste or end-of-life products, regardless of whether the material is used for its original purpose (Martins et al., 2022). According to Goyal et al., (2018), recycling is translating waste into new resources. At this point, organizations can indirectly generate new and increased income. Recycle involves recovering and repurposing resource outputs to create new products to maximize economic value and minimize resource loss. In today's competitive business environment, according to Banihashemi et al., (2019), well-managed revere logistics practices can lead to sustainable development. Besides that, reverse logistics can serve as an innovative method for companies to enhance their processes, increase consumer satisfaction, and maintain a competitive advantage. supply chain management, waste management, and sustainable practices (Hasmat Wan Hasan et al., n.d.). In a nutshell, the proper and well-managed application of reverse logistics activities such as recycle, reuse, remanufacturing, or landfill disposal, along with efficient and effective operational factors such as warehousing, packaging, and transportation, and strategic factors such as customer service, overall quality, strategic costs, and legislative concern, can have a direct influence on the development and application of reverse logistics practices (Antonyová et al., 2016).

CONCLUSIONS

The bibliometric analysis of this study reveals a significant and consistent increase in reverse logistics research interest and activity from 2010 to 2022. Evidently, organizations and academics are recognizing that reverse logistics integration can provide a competitive advantage in today's dynamic business environment. The study compiled a comprehensive dataset of 3,538 Scopus documents, focusing primarily on the keyword "reverse logistics." This keyword density indicates a recent increase in interest in reverse logistics. Most organizations and stakeholders begin to consider these practices due to environmental concerns. In addition, reverse logistics can provide an economic, social, and environmental competitive advantage.

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