Vol. 2, No. 1, April 2023, pp. 33-43
p-ISSN: 2963-8577
e-ISSN: 2964-3511
DOI: 10.57102/jescee.v2i1.50

JESCEE
Journal of Emerging Supply Chain, Clean Energy, and Process Engineering

REVERSE LOGISTICS IN THE FAST-MOVING CONSUMER GOODS INDUSTRY: A BIBLIOMETRIC ANALYSIS

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Abstract
The city's growing population is causing an increase in traffic demand for supply, mobility, and reverse logistics areas. These are the challenges that participants in the logistics sector are facing, together with rising commodity demand for fundamental requirements. As a result, many scientists are driven to design logistics solutions to mitigate the impact of a growing population, which increases demand for logistics and supply chains, which also has an influence on the community's environment. However, thorough literature survey studies targeted at finding potential treatments for the management of supply chain disorders using bibliometric, network, and theme analyses are still few and limited. According to the findings of the investigation, the primary supply chain themes are provider logistics and reverse logistics. This research has various implications for reverse logistics in the FMCG industry. According to the research, suppliers must understand that implementing environmental activities with their clients may improve their ability to compete in the market, and the "last mile" of distribution may thus be completed by electric cars because the distances are so short that they do not present any difficulties or require elaborate human planning. Therefore, we find that employing logistics providers to manage the FMCG industry or looking at the strategies of logistics providers for renewable energy might be an intriguing future study area.

Keywords:
Bibliometric; environmental; fast-moving consumer goods; logistics providers; reverse logistics

Article History:
Received: February 14th, 2023
Revised: March 8th, 2023
Accepted: April 27th, 2023
Published: April 30th, 2023

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1. Introduction

Currently, metropolitan regions house 55% of the world's population, and by 2050, this figure is expected to rise to 68% [1]; as more people live in cities, their population density increases. One-third of urban traffic is thought to be driven by commercial interests [4]. Furthermore, an increase in population will raise traffic demand in city centers for supply, mobility, and reverse logistics. As a result of the world's continually rising population and their consumption of commodities for basic needs, such as fast-moving consumer items, distribution planning research faces new challenges [1]. Fast-moving consumer goods (FMCG) sales outlets have been growing quickly in recent years because of the continual growth of FMCG sales, the integration of FMCG sales channels, and the acceleration of innovation [5]. The FMCG industry is known for being one of the most unpredictable and difficult to thrive in owing to fierce rivalry, the adoption of new rules, and the rapid improvement of technology, which causes buyers to not readily forgive any tiny flaws or issues with goods.

Because of a low unit volume of FMCG distribution, these commodities are frequently produced in batches [2]. The creation of optimal distribution strategies for batch items across many sites is necessary to satisfy the demands for a high consumption rate. Additionally, the amount of greenhouse gases (GHG) released into the atmosphere is increased by the expansion in road traffic and the usage of road freight transport. All facets of an organization's logistics must be green because it is one of the top market concerns today [6]. Therefore, it is essential to decouple an increase in transport-related emissions from an expansion in the supply of commodities, mobility, and reverse logistics. Many businesses measure their carbon footprint to assess their global

environmental effect. The GHG emissions for which an organization, a product, an event, or a person is directly or indirectly responsible are referred to as their "carbon footprint." [3]. Carbon dioxide is the most common greenhouse gas produced by human activity, and it is mostly produced when fossil fuels are utilized for transportation, heating, and electricity generation [7].

Over the last two decades, the environmental implications of logistics have received significant economic awareness, particularly in Europe and Asia [8]. Green logistics is concerned with environmental logistics and supply chain management challenges. Hazardous material transportation and disposal are regularly monitored and restricted. Packaging and its materials, and associated objects used in the activities of manufacturing, storing, or transporting a product are increasingly being removed and neglected by organizations. If not addressed properly, these concerns burden forward and reverse logistics activities by possibly raising prices and having a negative impact on customer service.

World well-known logistics services providers like DHL, UPS, and FedEx tested the best way to integrate electric cars into their distribution networks to be ready for any future law changes and limitations while still trying to meet consumer expectations [9]. However, there are not many examples of electric cars being used for commercial transport and delivery, and more real-world trials and experiments will help us better understand the conditions and options for using electric vehicles for deliveries in cities [1]. By analyzing findings from industrial pilot projects, this research aims to contribute to the debate about whether switching to electric vehicles for urban deliveries for the emerging market, even in part, will help to meet urban transportation needs while also helping to reduce emissions from commercial transportation in cities. To this end, this research aims to address the following research questions:

RQ1. Which environmental measures are most prevalent in the FMCG sector?

RQ2. In what situations should logistics suppliers switch to electric vehicles?

Therefore, this study is the first to conduct a bibliometric and network analysis to identify the primary literature topics with a focus on reverse logistics in the FMCG business and logistics provider change. The remainder of this work is structured as follows: Section 2 describes how we conduct the literature search, choose the relevant studies, evaluate the research streams, and gather the data. Section 3 then undertakes bibliometric, citation, and network studies to efficiently meet the study objectives. Section 4 addresses the primary research streams and methods derived from the analysis. Section 5 presents the important results and future research needs based on the revealed findings.

2. Research Methodology

A. Main Research Steps

In management science, there is no formal study approach to conducting a comprehensive literature review. We incorporate and refine the methodology used in previous research that managed a comprehensive literature review on logistics and SCM. This is based on various steps we took in putting together this document, including the following: 1. Topic identification, 2. Literature search, 3. Bibliometric analysis, 4. Citation analysis, as presented in Fig. 1. In the first step, we brainstormed to decide the themes to be mentioned in the paper. The mutually agreed-upon topics are then used as keywords in our search for relevant journals. The following stage will be to undertake a bibliometric analysis to identify publications by year, nation, institution, and journal, with the goal of presenting the data required for the discussion in this work.

B. Topic Identification

The fast-moving consumer goods (FMCG) sector makes a substantial contribution to a country's GDP growth. Since a result, the relevance of reverse logistics (RL) has grown, since the FMCG sector cannot escape RL. As a result, it is critical for the industry to execute RL strategies that can lead to firm competitiveness [18]. Some reverse logistics practices that need to be applied to FMCG company management are strategies for recycling, reuse, re-production, re-packaging, recall and waste disposal. Companies in the FMCG supply chain must also be able to embrace recycling as an investment in order to increase performance and move towards sustainable growth [22]. This sector will attain several aims and improve business competitiveness by

p-ISSN: 2963-8577
e-ISSN: 2964-3511

implementing RL methods. The primary goal of this study was to explore RL techniques and their impact on company competitiveness [18].

C. Literature Search

Throughout the literature search “logistics provider”, “reverse logistics” and “FMCG” are used as the main keywords. We conducted a literature search using the National Library of Indonesia e-resources platform is used in this literature search. National Library of Indonesia e-resources is a platform provided by the National Library of Indonesia that includes many platforms for searching journals, articles, and e-books. Some platforms included in National Library e-resources include science direct, EBSCO Host, Wiley online library, and many more local and international search platforms (some shown in Fig. 2). The first search yields 1,138 results by entering ("Third-Party Logistics" OR "System Suppliers" OR "Transport*") AND ("Green Transportation" OR "Renewable Energy Logistics" OR "Reverse Logistics") AND ("FMCG"). After that, we removed non-journal and non-English texts, resulting in 101 journals. Furthermore, the publishing year of the 2013-2021 journal is limited to 78 journals. The final stage is to gather and analyze these journals by reading the scope, titles, and abstracts to compile 15 journals relevant to the themes we will cover. All the papers selected as being most related to the survey's subject were then utilized to conduct bibliometric, citation, and network analysis.

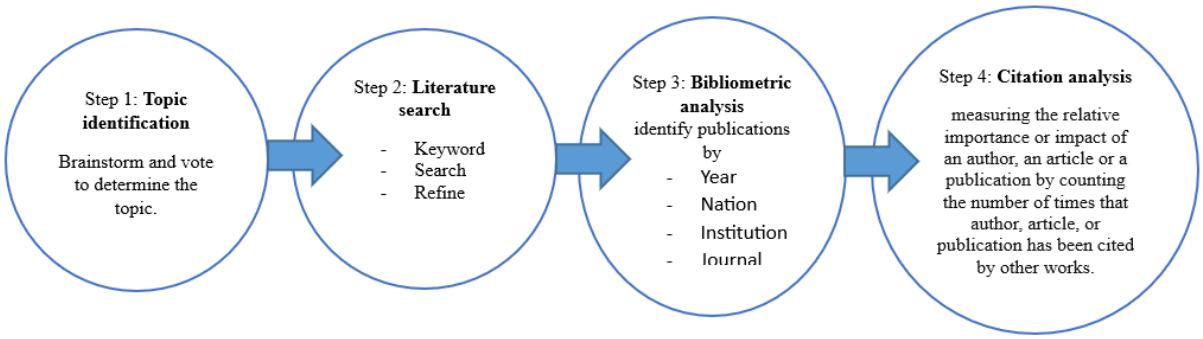

Figure 1. Research method

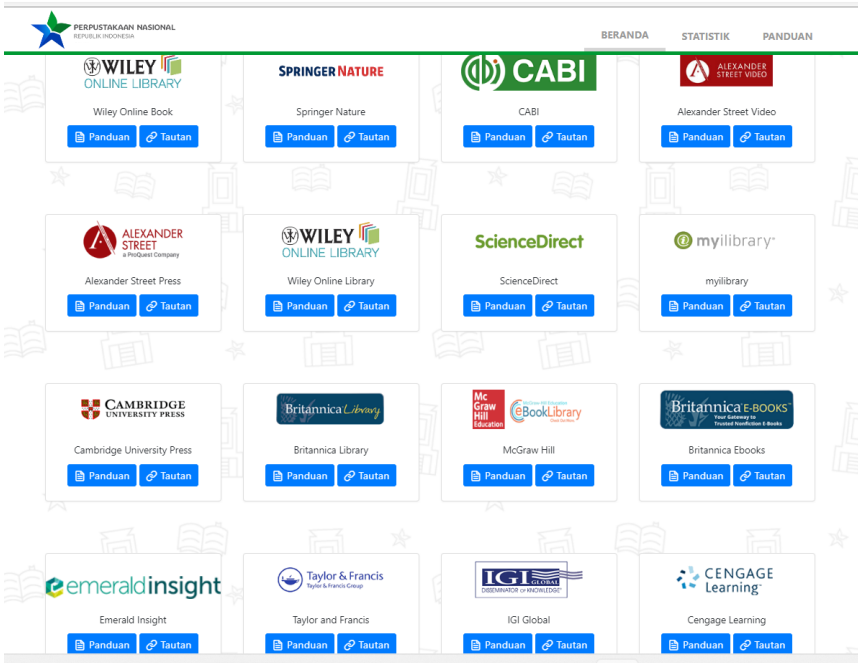

Figure 2. E- resources national library of Indonesia

3. Bibliometric Analysis

A. Publication by Years

Table 1 shows the distribution of 15 journal articles during 2016–2022. During that time, there has been no constant growth. But every year, there is at least one journal article. The most journal articles found were in 2018, 2019, and 2021, with a total of 3 journal articles. Following that, two journals will be published in 2016 and 2022. This unstable distribution shows that this research field is rarely published and that there are many gaps that need to be filled regarding the logistics of providers in FMCG. It is hoped that this trend will continue and that more articles will be published in the future.

Table 1. Years of publication

Years	No. of Article
2016	2
2017	1
2018	3
2019	3
2020	1
2021	3
2022	2

B. Publication by Countries

Table 2 shows the distribution of the number of publications of journal articles by country. We aim to identify countries that have contributed to this area of research. In the article analysis, the first author's country is considered the article's country of origin. The 15 articles we collected are spread across 11 countries. As can be seen, the highest number of publications came from South Africa with 3 articles or 20% of the total number of articles used, then followed by Germany and Serbia with 2 articles each and 8 other countries with only 1 article respectively. Trends show that research related to FMCG is not only about developed countries but also developing countries like South Africa.

Table 2. Publication by countries

Countries	No. of Publication
South Africa	3
Germany	2
Serbia	2
Belgium	1
China	1
Hongkong	1
India	1
United Kingdom	1
Malaysia	1
Slovenia	1
Sweden	1

C. Distribution of Authors in Institution

Table 3 shows the number of authors by the institution. We aim to identify institutions where authors contribute to this research field. The 15 articles we found were written by 48 people spread across 27 institutions. With an average of each journal article written by more than 3 people. These 27 institutions consist of 24 universities and 3 private organizations. One of the 48 people is affiliated with universities and research institutions. The results of the analysis show that the University of Pretoria, South Africa, is the institution with the most authors (6 articles). Followed by the University of Belgrade, based in Serbia, and the University of Antwerp, based in Belgium, with 5 authors each. The large number of authors based in South Africa shows that

there is a research trend related to FMCG in that country, where research usually focuses more on developed countries.

Table 3. Publication by institution

Institution	No. of Author
University of Pretoria	6
University of Belgrade	5
University of Antwerp	5
Loughborough University London	2
Cranfield University	2
Institute of Transport Research Rutherford	2
Universiti Sains Malaysia	2
University of Bremen	2
Beijing Technology and Business University	2
Nelson Mandela University	2
Jönköping University	2
Hang Seng Management College	2
University of Defense in Belgrade	1
University of Kragujevac	1
Calcutta Business School	1
University of Maribor	1
Polytechnic University of Cartagen	1
Universiti Putra Malaysia	1
Taylor's University	1
Delhi Technological University	1
Management Development Institute, India	1
Malmö University	1
Hanken School of Economics	1
The Hong Kong Polytechnic University	1
Hellmann Worldwide Logistics Road & Rail GmbH & Co	1
Zaragoza Logistics Center	1
Beijing Food Safety Research Base	1

D. Distribution of Authors in Institution

The collected articles were published in 12 different journal outlets. Table 4 shows 20% or 3 articles published in a well-known journal, i.e. the Journal of Transport and Supply Chain Management. Furthermore, there are two articles published in the Transport journal. Various articles from different journals show that a multidisciplinary approach is needed to analyze problems and solutions related to this research field.

Table 4. Distribution of journals

Journal Name	No. of Article
Journal of Transport and Supply Chain Management	3
Transport	2
Advance in Production Engineering & Management	1
Facta Universitatis, Series: Mechanical Engineering	1
Futures	1
Journal of Shipping and Trade	1
Jurnal Pengurusan	1
Logistics	1

Logistics Research	1
Management of Environmental Quality: An International Journal	1
Research in Transportation Economics	1
Transportation Research Part D	1

E. Keywords

One of the aspects that are examined with bibliometrics is the keywords that are expected to describe the overall content of a document. We use keyword analysis to identify related FMCGs. We use VosViewer software and choose co-occurrence analysis, which can analyze the most popular or frequently used keywords from articles collected about 3rd party logistics (3PL) on FMCG. We use co-occurrence authors with 72 keyword search results. Then we exclude the searched keywords, namely FMCG, reverse logistics, 3PL, and transport. We also remove word combinations that have similar meanings to keywords, such as "fast-moving consumer goods" and “third-party logistics”. Fig. 3 shows the top keyword that is dominant which is logistics service providers then comes the service quality index.

Figure 3. Keywords network

4. Citation and Network Analysis

As part of this study, a literature review was conducted to address the research questions of transport developers with reverse logistics in FMCG (i.e., identify the most influential articles on supply chain, main topics, streams of research, and their contributions; identify the most promising and usable strategies effectively to address concerns about transport developers with backward logistics on FMCG), as shown in Fig. 4. Many studies have employed literary analysis extensively since it is acknowledged as a well-developed tool for comprehensive literature planning. This type of study may be performed not only for one year but also for up to ten years. However, as previously noted, the chronology of publication should be addressed when doing a literature analysis because it may induce biases. In this study, we look at the recent trend from the last seven years. We also employ bibliographical analysis to compensate for the limits of the literature research and get additional insights.

5. Main Research Terms Analysis

This section addresses the main research streams found during the literature analysis and explores how the evaluated publications handle “Reverse Logistics”, “Transports”, and “FMCG”, which details are in the following Table 5.

Table 5. Main research terms analysis

Article	Citation	Methodology	Research Theme
Ksenija Kuzimina, Sharon Prendeville,Dale Walker, Fiona Charnley [10]	58	Quality	FMCG
Dragan pamucar, Malisa Zizovic, Sanjib	52	Quality	Transportation

Biswas, Darko Bozanic [1]			and Logistics (TPL)
Verena Ch Ehrler, Dustin Schoder, Saskia Seidel [11]	37	Quality	Transportation
Eugene YC Wong, Allen H Tai, Emma Zhou [12]	31	Quality	Transportation
Anchal Gupta, Rajesh Kumar Singh [13]	27	Quality	Sustainable Service Quality
Katrien De Langhe, Hilde Meersaman, Christa Sys, Eddy Van de Voorde & Thierry Vanelslander [14]	20	Quality	Transportation
Nandie Coetzee, Wilna L Bean [15]	13	Various methods, theories and best practices were researched to aid in the development of the green business profitability framework	Green Logistics
KM Kumar, AA Rahman, K Jayaraman, Suzuri Abdul Rahim [16]	9	Quality	Transportation
Nagham M El-Berishy, Bernd Scholz-Reiter [3]	8	Quality	Green Logistics
Arno Meyer, Wesley Niemann, Pierre-Roux van Pletzen, Danie smit [17]	7	Quality	FMCG
Andrej Lisec, Slobodan Antic, Francisco CB, Vaska Pejic [2]	6	Simulation	Reverse Logistics
MSM Makaleng, P Hove-Sibanda [18]	2	Quality	Reverse Logistics and FMCG
Milos Milenkovic, N Knezevic, S Val, D Lutovac, N Bojovic [19]	1	Quality	Transportation
L Wang, XY Chen, H Zhang [20]	1	Quality	FMCG
Benedikte Borgstrom, Susanne Hertz, Leif-Magnus Jensen, Elvira Ruiz Kaneberg [21]	1	Quality	TPL

Increasing carbon emissions due to the increased use of transportation is attracting a lot of attention from academics, practitioners, and policy-makers who want to improve logistics and supply chains to make them more environmentally friendly. Transportation is regarded as an important component of logistics and associated supply chains [3, 11, 12, 14, 16, 19]. More scholars are focusing on supply chain transportation than ever before. The most referenced article by K. Kuzmina [10] strives to enhance green logistics transport performance in FMCG. The primary research themes concerning transportation are illustrated in the following Fig. 5.

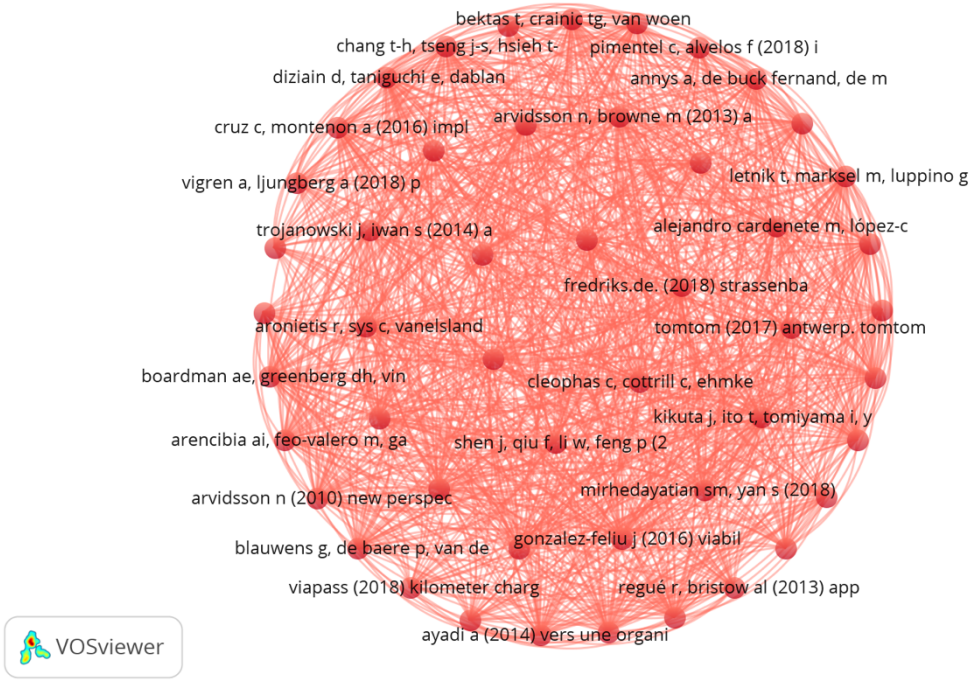

Figure 4. Network of the highly co-cited articles

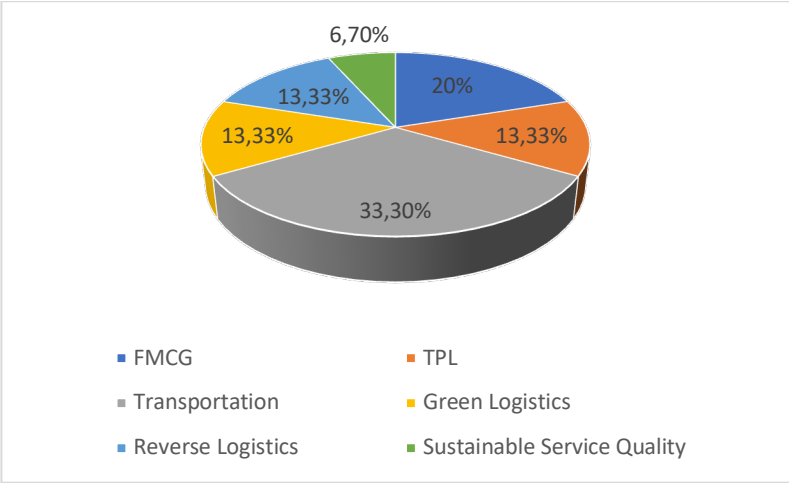

Figure 5. Research streams

6. Conclusion

This study has several implications for reverse logistics in the FMCG sector. First, the literature research revealed that while adopting environmental efforts, the buyer-supplier relationship becomes important. Environmental activities are often incorporated into buyer organizations' supplier selection criteria. The study backs up existing literature from the FMCG business. The findings revealed the effects of environmental activities on buyer-supplier relationships, including competitiveness, cost saving, and improved product quality. The current study's findings corroborate the implications found in a previous investigation by Meyer, Niemann, Van Pletzen, and Smit (2019:1-10). Secondly, the "last mile" of distribution might therefore be completed by electric cars because the distances are so low that they don't present any difficulties or call for elaborate human planning. The movable, highly adaptable micro-hub could be placed wherever necessary. Based on the lessons learned from the field tests of electric trucks presently being conducted in traditional distribution systems, it is predicted that the logistics service provider might already benefit financially from the use of electric distribution vehicles in conjunction with a micro hub. Once the project is operational, this will need to be done thoroughly. It

was discovered during the performed literature review that certain of the highlighted features within the gathered studies were explored less than the others and might be further examined in future studies, which is relevant to the demands for future studies. For instance, logistic service providers were identified as a cluster but were given less attention in the most-cited papers. Therefore, employing logistics providers to manage the FMCG industry or looking at the strategies of logistics providers for renewable energy might be an intriguing future study area.

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Yelita Anggiane Iskandar completed her bachelor's degree in Industrial Engineering from the Universitas Indonesia in 2007 with a concentration in system modeling. In 2013, she obtained a master's degree from the Institut Teknologi Sepuluh Nopember (ITS) in Surabaya, East Java, Indonesia in the field of logistics and supply chain management, with cum laude predicate. Currently pursuing doctoral education in Industrial Engineering, especially in the area of scheduling at Pusan National University, South Korea; while also actively working as a lecturer at the Department of Logistics Engineering at Universitas Pertamina. Previously, he worked at PT Freeport Indonesia in Tembagapura, Papua in the Maintenance Department; and at PT Fonterra Brands Indonesia in Jakarta, handling product import and supply planning.

Adji Candra Kurniawan is a lecturer in the Department of Logistics Engineering at Pertamina University since 2020. He completed his bachelor's degree in Industrial Engineering from Brawijaya University in 2016. Then, completed his master's degree in Industrial Engineering with a concentration in Logistics and Supply Chain Management at Sepuluh Nopember Institute of Technology (ITS) Surabaya in 2019. His interest in logistics and supply chain was continued by taking two logistics and supply chain certifications (Supply Chain Analyst (CSCA) and Professional in Logistics Management (CPLM)) from The International Supply Chain Education Alliance (ISCEA) Indonesia in 2019 and 2021. His current research interests are supply chain optimization and simulation and the analysis and prediction of consumer behavior in the supply chain business.