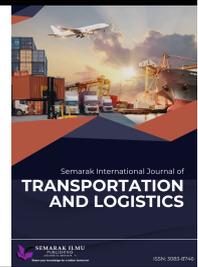




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Trends and Research Landscape of Logistics 4.0 Capabilities in Malaysia: A Bibliometric Analysis

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ABSTRACT

Businesses can now reap the benefits of technology of the increasing use of the Internet in Malaysia. Logistics 4.0 capabilities are very important for businesses that tend to expand their business into an online platform and using technologic. Therefore, this study considered the variables of capabilities of technological, organizational, and environmental in determining Logistics 4.0 capabilities. Numerous academics are interested in this field because of the possibilities of Logistics 4.0. This study report may provide readers with additional information on the topic. The study includes a comprehensive examination of 853 publications collected between 1988 and 2025. This essay will focus on the findings of significant writers, publications, nations/regions, and fields of study. This article also attempted to discover many themes that evolved and evolved during the active years through the use of co-citation and co-occurrence networks. Because of the growing number of research articles and the widespread adoption of Logistics 4.0 in many countries, bibliometric analysis must be used to provide a comprehensive set of data that can help researchers find the most relevant work to date. This can be achieved by utilizing the VOS Viewer and Biblioshiny tools to explore different facets of the Logistics 4.0 research topic and discover potential future study directions.

1. Introduction

The crucial factors that influence logistics 4.0 capabilities in firm performance delivery among Malaysia manufacturing. Businesses can now reap the benefits of technology of the increasing use of the Internet in Malaysia. Logistics 4.0 capabilities are very important for businesses that tend to expand their business into an online platform and using technologic. In advance, once the businesses identify logistics 4.0 capabilities, they can utilize and optimize business features to make an improvement in online platform performance. Where digitization is an important tool of running the firm operation to optimize the performance. The firm is involved in using technology for their

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operations while working together with human and logistics. However, we must know the challenges of imputing the smart technology into operations as Logistics 4.0. For example, embedding big data, internet of things, RFID, skill of workers, skill of workers and commitment from top management. The relevant title is the title because businesses can now reap the benefits of technology from the increasing use of the Internet in Malaysia. Logistics 4.0 capabilities are very important for businesses that tend to expand their business into an online platform and using technologic. In advance, once the businesses identify logistics 4.0 capabilities, they can utilize and optimize business features to make an improvement in online platform performance. In advance, once the businesses identify logistics 4.0 capabilities, they can utilize and optimize business features to make an improvement in online platform performance. Hence, this study is going to focus on investigating the factors that influence logistics capabilities in firm performance. The companies need to fit with the current digitization world. Where digitization is an important tool of running the firm operation to optimize the performance. The firm is involved in using technology for their operations while working together with human and logistics. However, we must know the challenges of imputing the smart technology into operations as Logistics 4.0. For example, embedding big data, internet of things, RFID, skill of workers, skill of workers and commitment from top management.

Technological capabilities are needed in logistics to optimize the firm operation performance. In this dynamic business world, firms are facing various sustainability-related challenges in global logistics operations and emerging digital technologies can provide solutions to such problems. For example, logistics 4.0 involves system-based planning and control of the physical movement of goods and its associated information flow from the source to the final destination. Organization capabilities are needed in logistics to optimize the firm operation performance. The digitalization strategy can reduce the impact to the economy and society in Malaysia because of having technology to employ fit with industrial 4.0 to not stop the production. The skill is important for the production department to create quality products. For example, the skill of multitasking is needed to motoring and complete the task on time. Thus, the employees are able to work tighter with the technology on doing, they work and unlock the new skills. For example, the employees are able to unlock the skill of using mobile tracking during scanning the goods using smart devices. Hence, having the employees with high skill that can work together with smart technology can increase the quality of products and activities. Where the employees are able to provide a better quality of work because their skills are working with technology to complete the task of work. For example, using the skill of multitasking can enable the employees to do the work faster by using smart devices such as smart shelves that will update the SKUs of goods on the shelf in a software system and this will enable the employees to replace the stock of goods on time. Hence the lack of employees because of covid 19 can work from home to handle the software works. The firm needed to take care of our world to have a good environment. Firm policies are needed to reduce global warming and provide a better environment to the people and living things. Hence, the firm policies need to integrate with the environment to have eco-friendly products such as electric cars and trains. With the current situation the use of digital and online as more because make life easy, which "was also undertaken by Winkelhaus *et al.*, [23]", smart logistics or Logistics 4.0 has evolved around 2011 with the aim of meeting the changing customer requirements and providing sustainable logistics solutions. Logistics 4.0 uses front end and base technologies and provides logistics solutions to customers by meeting their demands without increase in costs. Therefore, comprehensive bibliometric mappings of Logistics 4.0, consolidating scattered literature into a structured overview and establishing a foundation for future research in the digital transformation of logistics.

Dynamic capabilities theory by Teece shows that technical, organizational, and environmental capabilities positively impact logistics 4.0 capabilities, which "was also undertaken by Teece, [21]".

As "also undertaken by earlier studies Bag *et al.*, [3]", examined how Logistics 4.0 capabilities affect business results and how they vary by technical, organizational, and environmental aspects. That study sampled 230 operations-related upper-level managers. That study found that logistics 4.0 improves corporate productivity. Technology and the environment affect Logistics 4.0 more than organizations. However, dynamic capacities theory may be utilized to predict and shape opportunities and threats, grab chances, and preserve competitiveness by increasing, integrating, safeguarding, and reconfiguring the firm's physical and intangible assets, which "was also undertaken by Teece, [21]". Logistics operations are appropriate for dynamic management theories like the dynamic capabilities' theory due to their dynamic environment, which "was also undertaken by Beske, [6]". Define logistics capabilities as, which "was also undertaken by Clifford Defee *et al.*, [7]", (1) integrating firm performance-related activities and procedures. (2) Logistics sub functions like logistics information system characteristics. (3) Capabilities that support corporate goals. As "also undertaken by Bag *et al.*, [3]", suggests that concentrating on logistics jobs might help a firm develop. These jobs indicate organizational knowledge, giving the corporation a competitive advantage. As "also undertaken by Teece, [21]", dynamic capabilities theory will be used to study logistical capabilities' impact on firm performance. Provide input for firms to provide the crucial factors that influence logistics 4.0 capabilities in firm performance delivery among Malaysia manufacturing. businesses can now reap the benefits of technology of the increasing use of the Internet in Malaysia. Logistics 4.0 capabilities are very important for businesses that tend to expand their business into an online platform and using technologic. In advance, once the businesses identify logistics 4.0 capabilities, they can utilize and optimize business features to make an improvement in online platform performance.

The logistics 4.0 capabilities have been affected by technological capabilities, organizational capabilities and environmental capabilities. Where the fourth industrial revolution, or industry 4.0, is a relatively new phenomenon in today's economy, which "was also undertaken by Slusarczyk, [20]", and its offshoot, Logistics 4.0, is a relatively new term, which "was also undertaken by Barreto *et al.*, [5]", that opens up a plethora of possibilities for enhancement across the supply chain network, especially in the logistics sphere. Thus, this is important because logistics 4.0 capabilities, which strengthen a company's ability to implement smart technological applications in the logistics sector, are an example of a higher-order dynamic capability that is influenced by the development of lower order dynamic capabilities like those pertaining to technology, organization, and the environment. If built appropriately, Logistics 4.0 might boost company performance in a number of ways, including by improving supply chain agility, flexibility, and responsiveness, which "was also undertaken by Winkelhaus *et al.*, [23]". Therefore, Logistics 4.0 is a useful asset that offers competence development to remove uncertainty in logistics decision making. Logistics 4.0 allows businesses like Amazon, XPO logistics, and DB Schenker to use AI and robots into their supply chain management and other logistics processes, which "was also undertaken by Bag *et al.*, [3]".

Besides that, the technological capabilities factor has been affecting logistics 4.0 capabilities. Where technological readiness, which "was also undertaken by Richey *et al.*, [17]", is a crucial characteristic that aids a company in incorporating new technology. As a result, a company's competitive advantage might be affected by its technical preparedness. When a country has a high level of technical preparedness, it attracts manufacturers that utilize technology as a tool for efficiency, allowing them to be both adaptable and competent, which "was also undertaken by Richey *et al.*, [17]". The logistics and warehousing sector are characterized by intricate business procedures calling for creative approaches, which "was also undertaken by Bag *et al.*, [3]". In addition, it has been discovered that a company's competitive advantage may be maintained via the development of technology skills such as the generation, management, and use of information, which "was also

undertaken by Eisenhardt *et al.*, [9]". Through the use of the crucial information gleaned from big data, technological capabilities promote transparency. Thus, this important industry 4.0 encompasses not a single technology, but rather a set of technologies that, when used together, may unleash their full potential, which "was also undertaken by earlier studies [13,18]", therefore it's important to keep that in mind when businesses begin to implement the latest innovations in this field. Industry 4.0 innovations have major effects on procedures that may result in refreshed goods and services because of the widespread use of a wide variety of new technology, which "was also undertaken by Engelbertink *et al.*, [10]".

More than that, the organizational capabilities factor has affected logistics 4.0 capabilities. Where human resource capability, management ability, and digital transaction capability are three types of organization capabilities. Worker and vendor/customer IT abilities, as well as general business acumen, make up a company's human resource capability. Some examples of management abilities relate to the way in which IT projects are overseen and how much input the business has in technological matters. The extent to which a transaction is conducted digitally is considered part of the digital sphere, which "was also undertaken by Aral *et al.*, [1]". Thus, this importance for logistics is at the center of every supply chain system, since it has been recognized as a fundamental function of SCM, which "was also undertaken by Papadopoulos *et al.*, [15]". As "also undertaken by Shibin *et al.*, [19]", Logistics as a part of the supply chain, now entails functioning in intricate webs of organizations that rely on one another. In order to manage this level of complexity, it is crucial to have access to the intelligent solutions provided by information technology, particularly via cutting-edge Industry 4.0 technologies, which "was also undertaken by Von *et al.*, [12]".

Not only that, the environmental capabilities factor has affected logistics 4.0 capabilities. Having environmental skills allows you to manage environmental dynamics while meeting regulatory standards and sustainability goals set by your customers. The capacity to fulfill consumer expectations, efficiently manage market changes, and achieve the company's environmental objectives all fall under the umbrella of "environmental capabilities", which "was also undertaken by Bag *et al.*, [3]". Improvements in the natural world and smart system breakthroughs in production are direct results of Industry 4.0. Thus, this is important for sustainable living and renewable power. Concerning the former, which "was also undertaken by Banyai, [4]", employed a black hole optimization-based heuristic model to assess the energy efficiency of last-mile logistics, a topic at the intersection of energy efficiency and environmental challenges in logistics. The researcher used a scenario analysis method to assess how different options might impact energy use. Concerning the latter idea, which "was also undertaken by Rakyta *et al.*, [16]". took a preventative tack, doing research on impending adjustments and the transition towards smart maintenance and smart logistics in light of the increased complexity of these processes with the advent of Industry 4.0. Still, their studies mostly continued to be discussions of current developments. As "also undertaken by Zhong *et al.*, [24]", included a smart logistics concept among various illustrative scenarios in a manufacturing firm, where logistics processes are described using IoT gadgets such as using RFID tags.

Theory that supports the relationship of technological capabilities, organizational capabilities, and environmental capabilities has a positive and significant effect on the logistics 4.0 capabilities is dynamic capabilities theory, which "was also undertaken by Teece, [21]". As "also undertaken by earlier studies Bag *et al.*, [3]", with the purpose of studying the impact of Logistics 4.0 capabilities on business outcomes and how they vary by technological, organizational, and environmental factors. The sample that was involved in that research was 230 upper-level management personnel involved in the operations process. The finding of that research is that the capabilities of logistics 4.0 have a noticeable impact on the efficiency of businesses. When it comes to Logistics 4.0, the influence of

technology and the environment is greater than that of organizations. On the other hand, the concept of this dynamic capability's theory, which "was also undertaken by Teece, [21]", is a may be used firstly to foresee and shape opportunities and threats, secondly to seize opportunities, thirdly to maintain competitiveness by enhancing, integrating, protecting, and fourthly, if needed, reconfiguring the firm's physical and intangible assets. The dynamic nature of the surroundings in which logistics operations take place makes it an ideal setting in which to use dynamic management theories like the dynamic capabilities' theory, which "was also undertaken by Beske,[6]". As "also undertaken by Clifford Defee *et al.*, [7], logistics capabilities may be broken down into (One) a major capacity that entails integration of activities and processes that are related to company performance. (Two) The sub-functions that make up logistics, such as the features of a logistics information system. (Three) Capabilities that are directly related to the company's objectives. As "also undertaken by earlier studies Bag *et al.*, [3]", a company may improve its logistics skills by focusing on the types of tasks that fall within the logistics domain. These tasks provide the company an edge in the market since they demonstrate superior organizational expertise. Hence, these dynamic capabilities theory, which "was also undertaken by Teece, [21]", will apply in this research to investigate factors that influence logistics capabilities in firm performance.

Findings on the relationship between technological capabilities and logistics 4.0 capabilities. Technological capabilities have a positive and significant effect on the logistics 4.0 capabilities. As "also undertaken by earlier studies Bag *et al.*, [3]", with the purpose of studying the impact of Logistics 4.0 capabilities on business outcomes and how they vary by technological, organizational, and environmental factors. The sample that was involved in that research was 230 upper-level management personnel involved in the operations process. The finding of that research is that the capabilities of logistics 4.0 have a noticeable impact on the efficiency of businesses. When it comes to Logistics 4.0, the influence of technology and the environment is greater than that of organizations. Besides that, findings on the relationship between technological capabilities and logistics 4.0 capabilities. Technological capabilities have a positive and significant effect on the logistics 4.0 capabilities. As "also undertaken by earlier studies Kucukaltan *et al.*, [12]", with the purpose of study to take a multi-pronged look at the logistics forecasts of Industry 4.0 and how they could affect LSPs. The sample that was involved in that research was 190 expertise of logistics experts. The finding of that research assists logistics experts in making informed judgments and bolstering their competitive Industry 4.0 activities via serving as a reference.

Findings on the relationship between organizational capabilities and logistics 4.0 capabilities. Organizational capabilities have a positive and significant effect on the logistics 4.0 capabilities. As "also undertaken by earlier studies Bag *et al.*, [3]", with the purpose of studying the impact of Logistics 4.0 capabilities on business outcomes and how they vary by technological, organizational, and environmental factors. The sample that was involved in that research was 230 upper-level management personnel involved in the operations process. The finding of that research is that the capabilities of logistics 4.0 have a noticeable impact on the efficiency of businesses. When it comes to Logistics 4.0, the influence of technology and the environment is greater than that of organizations. Besides that, Findings on the relationship between organizational capabilities and logistics 4.0 capabilities. Organizational capabilities have a positive and significant effect on the logistics 4.0 capabilities. As "also undertaken by earlier studies Kucukaltan *et al.*, [12]", with the purpose of study to take a multi-pronged look at the logistics forecasts of Industry 4.0 and how they could affect LSPs. The sample that was involved in that research was 190 expertise of logistics experts. The finding of that research assists logistics experts in making informed judgments and bolstering their competitive Industry 4.0 activities via serving as a reference. More than that, findings on the relationship between organizational capabilities and logistics 4.0 capabilities. Organizational

capabilities have a positive and significant effect on the logistics 4.0 capabilities. As "also undertaken by earlier studies Dennehy *et al.*, [8]", with the purpose of studying the relationship between collective mindfulness and big data analytics for the purpose of building more resilient supply systems for humanitarian aid. The sample that was involved in that research was 50 workers in the field of humanitarian relief. The finding of that research proves that big data analytics aren't the only tool for building reliable supply chains for humanitarian aid organizations.

Findings on the relationship between environmental capabilities and logistics 4.0 capabilities. Environmental capabilities have a positive and significant effect on the logistics 4.0 capabilities. As "also undertaken by earlier studies Bag *et al.*, [3]", with the purpose of studying the impact of Logistics 4.0 capabilities on business outcomes and how they vary by technological, organizational, and environmental factors. The sample that was involved in that research was 230 upper-level management personnel involved in the operations process. The finding of that research is that the capabilities of logistics 4.0 have a noticeable impact on the efficiency of businesses. When it comes to Logistics 4.0, the influence of technology and the environment is greater than that of organizations.

Despite the recent surge in interest in Logistics 4.0, the present body of research is still fragmented and has a narrow focus. The majority of research focuses on bibliometric metrics like publication patterns, co-citations, and keyword analysis, but it ignores the more profound qualitative facets of the organizational, technological, and environmental components of Logistics 4.0 capabilities in Malaysian manufacturing. Furthermore, there has not been enough discussion of the impact of new technologies like digital and smart logistics. Many research continues to focus on the past while ignoring consequences for academic advancement in the future. These discrepancies highlight the necessity for a more comprehensive and proactive investigation of logistics 4.0 in connection to logistics 4.0 performance. Objective of this paper is to conduct a bibliometric analysis of the literature on Logistics 4.0 in order to provide readers with a comprehensive understanding of the field. The study specifically focuses on mapping the field's intellectual structure that publication patterns, and thematic evolution. By utilizing data from the Scopus database, the research aims to uncover various patterns related to Logistics 4.0, including its connection to Malaysian logistics, COVID-19, and digital logistics. Crucially, the analysis confirms the field's growing importance that has seen a notable and quickening trend in research activity, peaking in recent years. By systematically compiling and mapping previous research, the study seeks to enhance scholarly discourse, reveal the conceptual framework of the research field, and offer actionable recommendations to practitioners and policymakers for utilizing Logistics 4.0 as a scalable and sustainable approach to improve outcomes in a digital society. This study makes several important contributions to both academia and practice. First, it provides one of the earliest and most comprehensive bibliometric mappings of Logistics 4.0 research in Malaysia, consolidating scattered and fragmented studies into a structured overview. By analyzing 853 publications from the Scopus database, the study identifies key authors, influential journals, dominant countries, and thematic evolutions, thereby offering a clear picture of how research in this field has developed over time. Second, the study contributes theoretically by applying Dynamic Capabilities Theory to explain how technological, organizational, and environmental capabilities collectively influence Logistics 4.0 performance in the Malaysian manufacturing context. Third, it provides practical insights for businesses and policymakers on how to strengthen Malaysia logistics ecosystem by leveraging digital technologies and sustainability practices. Finally, this study serves as a reference framework for future researchers, helping them identify gaps, emerging themes, and potential directions for advancing knowledge in digital logistics and Industry 4.0 transformation in Malaysia and beyond.

Overall, the research bridges the gap between academic inquiry and practical application, positioning Malaysia as a growing hub for Logistics 4.0 innovation and scholarly development. The endeavor will use bibliometric analysis to address a number of topics. Search academic databases and research repositories to determine the total number of publications on the topic of Logistics 4.0. Analyze the publication trend over time, breaking down the number of research papers published year on year. Identify and list the names of influential academic journals that frequently publish papers on Logistics 4.0. Find reports or analyses on the geographical distribution of Logistics 4.0 research to determine which countries are the most prolific in publishing on this topic. Identify the most relevant and most influential authors in the field of Logistics 4.0, based on their publication volume and citation count. Find the titles of highly cited research papers, differentiating between papers with high global citation counts and those with high local citation counts. This study focuses on Malaysia because the country is undergoing a significant digital transformation aligned with the Fourth Industrial Revolution (Industry 4.0), which has made the logistics sector a key driver of economic growth and competitiveness. Malaysia rapid expansion of e-commerce, manufacturing, and international trade has intensified the need for efficient, technology-driven logistics systems commonly referred to as Logistics 4.0. Despite the global interest in Logistics 4.0, research specific to Malaysia remains fragmented and underdeveloped, particularly concerning how technological, organizational, and environmental capabilities influence logistics performance. By examining Malaysia research output through bibliometric analysis, this study aims to map the evolution, structure, and emerging themes of Logistics 4.0 literature within the Malaysian context.

The focus on Malaysia is also justified by its policy initiatives such as the National Policy on Industry 4.0 (Industry4WRD) which promote digital integration in logistics and manufacturing. Therefore, the study not only fills a scholarly gap by consolidating dispersed knowledge but also provides insights relevant to policymakers, academics, and practitioners striving to strengthen Malaysia logistics ecosystem and enhance its readiness for the digital economy. Find the title of the research paper that has been cited or referred to the maximum number of times. Analyze existing literature reviews and meta-analyses to determine the current and evolving thematic structure of Logistics 4.0 research. This study used bibliometric analysis of the Scopus database to describe the patterns of publications on Logistics 4.0 in order to support the earlier findings. This study looked at a range of publications in terms of accessibility, language, topic matter, and source title in addition to the most often cited works, publishing patterns, and authors' keywords. The rest of the paper will be organized in the following steps. The methodology for bibliometric analysis will be presented in part (2) and result in part (4) and followed by results and conclusion in parts (4) and respectively.

2. Methodology

The bibliometric toolbox will be used to do the bibliometric analysis. The primary technique and the enrichment technique are the two methods included in the toolbox. Performance analysis (A) and science mapping (B) are the two key components of the approach. Although the primary approaches may be used for a wide range of investigations, this research study will concentrate on a few of them. Two pieces of software, R and VOSViewer, helped with the bibliometric. A quantitative study of a vast collection of data is called bibliometric analysis, and the results are presented as themes, networks, research elements, and descriptive analysis. The evolution and thematic organization of a certain field may be studied with the use of this bibliometric analysis, which "was also undertaken by *Badenes-Rocha et al.*, [2]". Additionally, this study is free of subjective prejudice. This paper's analysis of the bibliographic data "was also undertaken by *Nasir et al.*, [14]." Science mapping and performance analysis were used to derive the trends and research direction. A

technique for analyzing the contributions of research participants, including authors, counties, publishers, publications, and institutions in the subject region, is performance analysis. The purpose of science mapping is to create connections among the components of research. As "also undertaken by earlier studies [2,14]," combining scientific mapping and enrichment approaches gives us the conceptual framework of a study area and the fundamental topics of the issue, establishing a connection between different research parts.

2.1 Bibliometric Database Search

A bibliometric analysis database is gathered from the Scopus database. The Scopus database, which "was also undertaken by Jakhar *et al.*, [11]," is regarded as the most scientific and methodical database for bibliometric analysis. Scopus has been recognized as the best database for bibliometric analysis in addition to the aforementioned claim, which "was also done prior research [2,14,25]". Therefore, it can be claimed that Scopus is the most extensive database that includes a wide range of information on articles and that papers must meet strict criteria in order to be included in this database.

Several keywords are recognized for the optimal search, including "Logistics 4.0 in Malaysia", "Logistics 4.0", and "Asia". The optimal keyword was "Logistics 4.0 in Malaysia". This article will analyze Logistics 4.0. A search was performed on the Scopus database using the phrase " Logistics 4.0 in Malaysia," resulting in the retrieval of 853 papers.

2.2 Filtration

Only English-language publications were chosen using the first filter to understand information of the journals. The selected papers were then those that were printed in journals. There were 853 final articles chosen for analysis. Since further filtration may lower the number of articles and may affect the bibliometric analysis, no sorting criteria other than these two were used. The total number of articles obtained from the Scopus database with the optimized search term "Logistics 4.0 in Malaysia" is 853 publications. Following a filter for English-language publications published in journals, this number served as the final collection of papers for the study. A thorough analysis of 853 papers gathered between 1988 and 2025 is part of the project.

2.3 Analytical Process and Tools

A bibliometric toolkit consisting of two primary methodologies Science Mapping and Performance Analysis was employed in the study's analytical procedure. R and VOSViewer were used to do the full bibliometric analysis, to a quantitative examination of a large dataset. Quantifying the contributions of research participants, such as authors, nations, and publications, was the main goal of performance analysis. This involved rating the most relevant and prominent writers, finding the most promising journals using Bradford's rule, and identifying the leading nations based on the number of documents and total citations. To create links between the many components of the research, Science Mapping was employed. This included co-citation analysis, which reveals the conceptual framework and groups related works into thematic clusters, co-occurrence analysis, also known as co-word analysis, which uses author keywords to create themes or groups based on words that frequently appear together, and citation analysis to measures the impact of a publication both locally and globally. Additionally, the co-occurrence analysis was expanded to create a more comprehensive thematic analysis and monitor thematic evolution over time.

3. Results

3.1 Total Publication and Number of Active Years of Publication

One performance analysis approach is the total publication. The overall number of publications on the study topic is taken into account. The 853 gathered findings from the articles released each year are included in the yearly scientific production. The papers were arranged in groups based on the year they were published in the journals. It is possible to conclude from Figure (1) that Logistics 4.0 in Malaysia research is growing annually. There was just one publication in 1988; nevertheless, by 2012, there were 26 publications overall, and in 2023 and 2024, there were 80 and 79, respectively. 69 papers are counted until August 2025. The phrase "active years of publishing" refers to the number of years that research has been done in the field to examine the phenomena. Groundbreaking research is still being conducted, and the active year began in 1988. Given the pattern shown in Figures (1) and (2), there are still comparatively fewer studies conducted annually; as a result, there is need for further study on this subject.

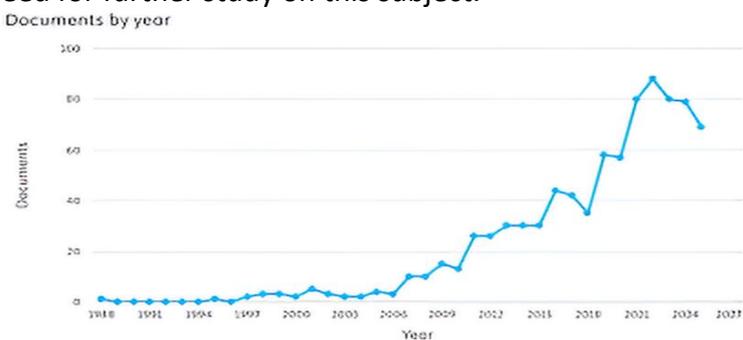


Fig. 1. Shows year-to-year publications from 1988 to 2025

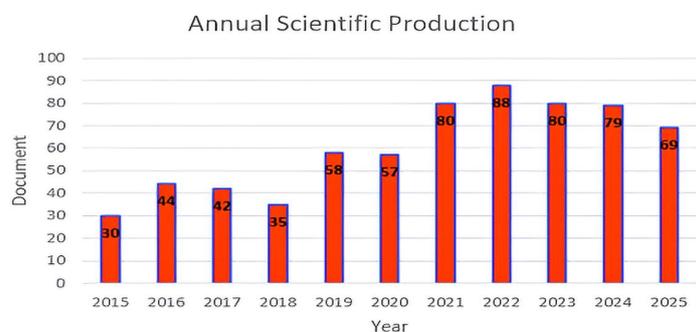


Fig. 2. Shows year-to-year publications from 2015 to 2025

3.2 Most Promising Journals

The journals that publish the most articles on a certain subject are considered promising. R software was used to identify promising journals based on Bradford's law. Table (1), which lists the top 10 promising journals in the subject of Logistics 4.0 in Malaysia, shows the most promising journals. With a total of 43 articles in the topic of Logistics 4.0 in Malaysia, the Medical Journal of Malaysia has an advantage over other journals. With a total of 39 articles in the field of Logistics 4.0 in Malaysia, the journal Plos One has an advantage over other journals. With a total of 32 publications in the subject of Logistics 4.0 in Malaysia, the International Journal of Environmental Research and Public Health have an advantage over other journals. Other journals have advantages over other journals that shows in in Table (1). Bradford's law was chosen for examination in publications that

showed promise. A graph displaying the source name and the quantity of papers published by a journal achieved the result. This can be seen in Table (1), the graph was later shaped into a table. By identifying the most pertinent journals that are leading the way in publishing content about Logistics 4.0 in Malaysia, Bradford's law analysis will help researchers swiftly find and choose a few journals that will support their study of Logistics 4.0 in Malaysia and future research. A journal's potential to impact future scholars in a certain topic increase with the number of papers it publishes in that field.

Table 1

The name of the journal along with the number of a paper published

No.	Name of journals	No. of published
1.	Medical Journal of Malaysia	43
2.	Plos One	39
3.	International Journal of Environmental Research and Public Health	32
4.	Bmc Public Health	31
5.	Malaysian Journal of Medicine and Health Sciences	27
6.	Singapore Medical Journal	19
7.	Malaysian Journal of Medical Sciences	18
8.	Asian Pacific Journal of Cancer Prevention	15
9.	Malaysian Family Physician	15
10.	Malaysian Journal of Public Health Medicine	13

3.3 Dominant Countries

In the field of research, the nations with the highest number of published papers and citations are regarded as dominating nations. The database is examined using R software for the analytical task. The results are interpreted using the scientific production and citations of the countries in order to identify the leading nations in the field of Logistics 4.0 in Malaysia. Both the quantity of papers and the number of citations is used to determine which nations are dominant. The top ten nations are chosen to be examined from both angles. Finding the top nation by looking at figures (2) and (3) shows that, while Hong Kong has the greatest average article citations (3.59), the Malaysia leads all other nations in terms of documents (803) that leads all other nations in terms of documents when including only the study of local Malaysia and published by Malaysia. With just 15 papers, China ranks second in terms of average document citations, which is a surprise element. Even though these nations had more published documents, United States lagged behind several others in terms of citations, including United Kingdom, Thailand, Indonesia, and others. Australia is in a similar situation. Compared to its Hong Kong equivalent, this country earned more citations with less papers. Information from figures (3) and (4) was transformed into a tabular format in Table (2) to facilitate the interpretation of the analysis. Thus, it can be said that Hong Kong and United States are at the forefront of Logistics 4.0 in Malaysia research. In terms of average article citations, Hong Kong, China, India, and United Kingdom are notable nations.

Country Scientific Production



Fig. 3. A world map depicting the number of documents published by each country

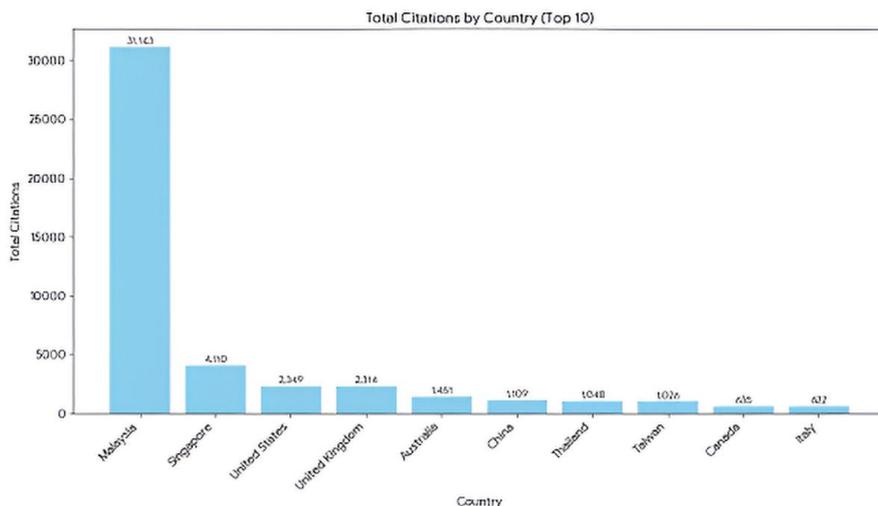


Fig. 4. The number of citations received by each country’s documents

Table 2

The countries' names, the number of documents published and the number of citations received

Rank	Country	Document	Rank	Country	Average Article Citations
1	Malaysia	803	1	Hong Kong	3.59
2	United States	53	2	China	3.34
3	United Kingdom	46	3	India	2.99
4	Australia	43	4	United Kingdom	2.83
5	Singapore	41	5	Thailand	2.74
6	Thailand	20	6	Singapore	2.54
7	Indonesia	17	7	Australia	2.28
8	China	15	8	United States	2.27
9	Hong Kong	15	9	Indonesia	1.76
10	India	13	10	Malaysia	1.72

3.4 Most Relevant Authors

The quantity of papers each author publishes determines which writers are the most pertinent. R software therefore calculated it by counting the number of Logistics 4.0 in Malaysia related publications they had written. According to the data, an author's significance increases with the number of papers they have written. The ten most pertinent writers are displayed in Figure (5). It is evident that Boo have 21 papers, Ahmad has 15 papers, Kamaruilzaman have 14 papers. The top ten writers cited can help readers understand their work and what more needs to be done.

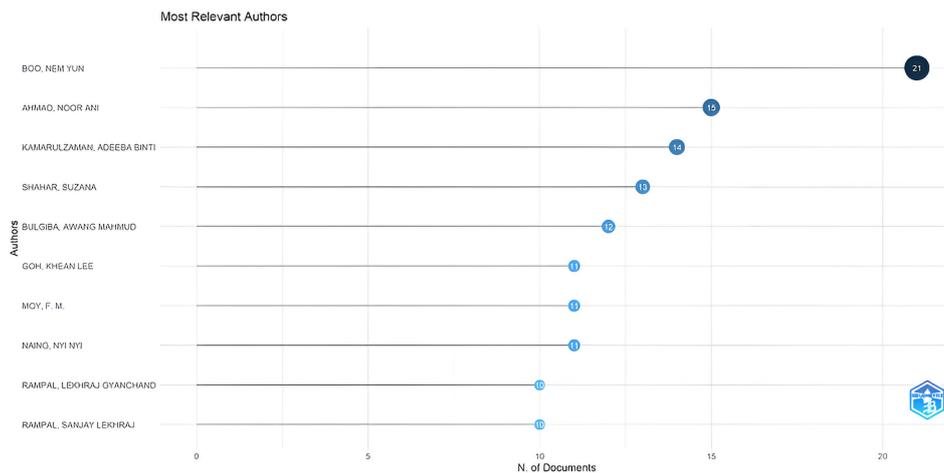


Fig. 5. Shows the authors’ names and the number of papers published by them

3.5 Influential Authors

The most influential authors are the ones who have received the highest number of documents in their field. It is solely based on the citations. Therefore, influential authors were determined by the total document count an author receives. Authors with the highest total document in their account will be the most influential, and authors with fewer citations will be less influential. Authors such as Goh Khean Lee with 553 documents, and Bulgiba Awang Mahmud with 396 total documents are clearly leading the chart. But authors such as Rampal Sanjay Lekhraj and Boo Nem Yun are in 3rd and 4th position respectively. The rest of the authors are shown in figure (6).

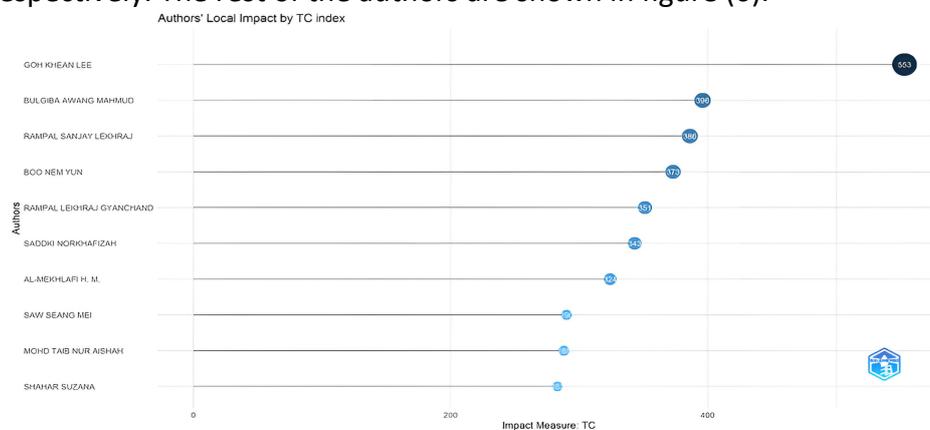


Fig. 6. Shows authors’ names and numbers of total document

3.6 Citation Analysis

Citation analysis is a scientific mapping approach. When a publication is referenced by another publication, it links the publication. This “was also done by Krishnamoorthi *et al.*, [25]”. Two criteria are used for citation analysis: (1) global citation and (2) local citation. The quantity of citations an article obtains from readers may be used to gauge its impact in citation analysis.

3.6.1 Most global cited documents

The publications with the most citations without any filtering, such as topic domain, are referred to as the most internationally cited texts. This research “was also done by Jakhar *et al.*, [11]”. To put

it another way, global citations are those that a publication receives regardless of whether it has been cited inside or outside of its topic domain. The ten most frequently cited papers worldwide might also be seen as having a significant impact on other writers' decision to include citations in their works. Both articles that discuss Logistics 4.0 in Malaysia and those that do not discuss it make reference to these materials. Figure (7) displays the ten most influential papers, and table (3) analyses them. The top ten most internationally cited publications that were examined from Figure (7) are included in Table (3) along with their article names, authors, and citation counts.

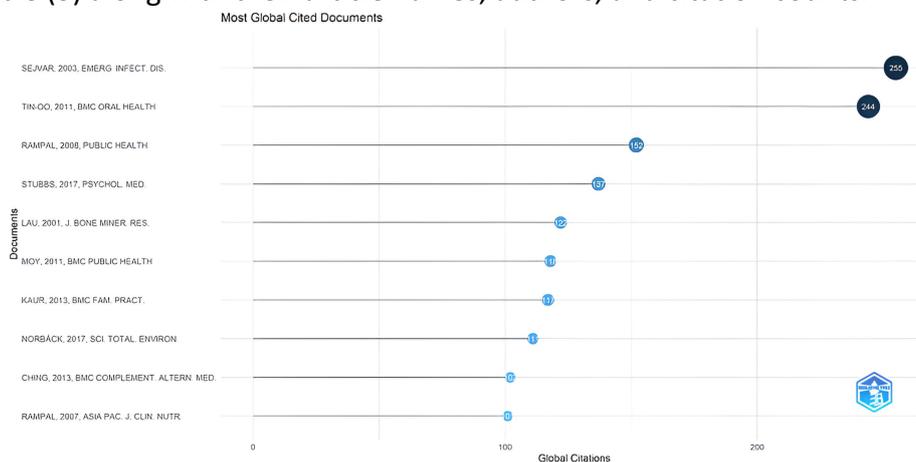


Fig. 7. The most influential papers in terms of global citation

Table 3

The article name, authors' name, and citations of the top 10 globally cited documents

No.	Article Title	Authors	Global citation
1.	Leptospirosis in “eco-challenge” athletes, Malaysian Borneo, 2000	Sejvar, 2003, Emerg. Infect. Dis.	255
2.	Factors influencing patient satisfaction with dental appearance and treatments they desire to improve aesthetics	Tin-Oo, 2011, BMC Oral Health	244
3.	Prevalence, awareness, treatment and control of hypertension in Malaysia: a national study of 16,440 subjects	Rampal, 2008, Public Health	152
4.	Depression and physical health multimorbidity: primary data and country-wide meta-analysis of population data from 190 593 people across 43 low- and middle-income countries	Stubbs, 2017, Psychol. Med.	137
5.	Risk factors for hip fracture in Asian men and women: the Asian osteoporosis study	Lau, 2001, J. Bone Miner. Res.	122
6.	High prevalence of vitamin D insufficiency and its association with obesity and metabolic syndrome among Malay adults in Kuala Lumpur, Malaysia	Moy, 2011, BMC Public Health	118
7.	Depression, anxiety and stress symptoms among diabetics in Malaysia: a cross sectional study in an urban primary care setting	Kaur, 2013, BMC Fam. Pract.	117
8.	Volatile organic compounds (VOC), formaldehyde and nitrogen dioxide (NO ₂) in schools in Johor Bahru, Malaysia: Associations with rhinitis, ocular, throat and dermal symptoms, headache and fatigue	Norbáck, 2017, Sci. Total. Environ.	111
9.	Complementary alternative medicine use among patients with type 2 diabetes mellitus in the primary care setting: a cross-sectional study in Malaysia	Ching, 2013, BMC Complement. Altern. Med.	102
10.	A national study on the prevalence of obesity among 16,127 Malaysians.	Rampal, 2007, Asia Pac. J. Clin. Nutr.	101

3.6.2 Most local cited documents

Publications that are mentioned inside the topic domain are known as local cited documents; for example, an article that "was also undertaken by Jakhar *et al.*, [11]" obtains citations from another article in the same subject area. To put it another way, local citations are those that are specific to the field in which the materials are found. As an illustration, a paper about Logistics 4.0 in Malaysia is referenced in another work about Logistics 4.0 in Malaysia. As a result, the majority of locally cited papers examine works that are often referenced or mentioned in the field. One can rely on the papers displayed in figure (8) to gain understanding about the topic matter. These materials are particularly pertinent to the subject of Logistics 4.0 in Malaysia and can be considered trustworthy sources for obtaining first papers. It should be highlighted that, for the clear reasons stated in their definition, local citations are always lower than global citations. The analysis of Figure (8) is completed in Table (4).

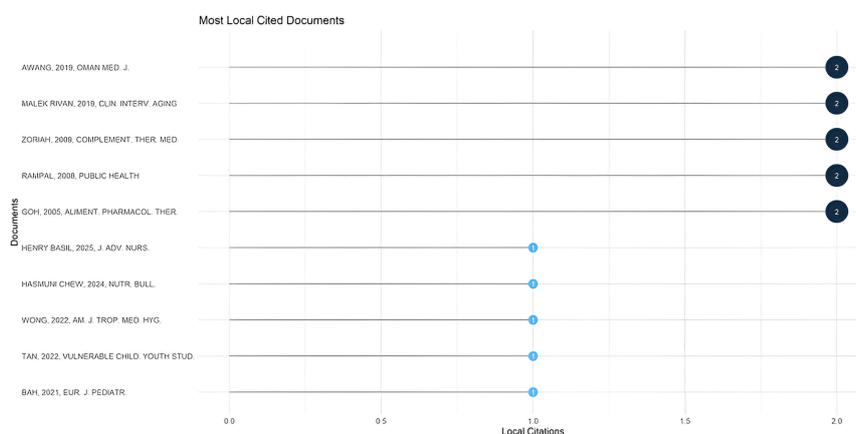


Fig. 8. Documents receiving a total number of local citations

Table 4

The article name, authors' name, and citations of the top 10 locally cited documents

No.	Article Title	Authors	Local Citations
1.	Pediatric tuberculosis in a Northeast state of Peninsular Malaysia: Diagnostic classifications and determinants	Awang, 2019, Oman Med. J.	2
2.	Cognitive frailty among Malaysian older adults: baseline findings from the LRGS TUA cohort study	Malek Rivan, 2019, Clin. Interv. Aging	2
3.	Herbal medicines: prevalence and predictors of use among Malaysian adults	Zoriah, 2009, Complement. Ther. Med.	2
4.	Prevalence, awareness, treatment and control of hypertension in Malaysia: a national study of 16,440 subjects	Rampal, 2008, Public Health	2
5.	Colorectal cancer in Asians: a demographic and anatomic survey in Malaysian patients undergoing colonoscopy	Goh, 2005, Aliment. Pharmacol. Ther.	2
6.	Prevalence and factors associated with medication administration errors in the neonatal intensive care unit: a multicentre, nationwide direct observational study	Henry Basil, 2025, J. Adv. Nurs.	1
7.	A cross-sectional study on the dietary patterns of multiethnic Malaysian preschoolers and their sociodemographic determinants	Hasmuni Chew, 2024, Nutr. Bull.	1
8.	Pediatric COVID-19 risk factors in Southeast Asia-Singapore and Malaysia: a test-negative case-control study	Wong, 2022, Am. J. Trop. Med. Hyg.	1
9.	Poor self-regulation in eating behaviour during the COVID-19 lockdown contributes to weight gain among young adults in Malaysia	Tan, 2022, Vulnerable Child. Youth Stud.	1
10.	Epidemiology, clinical characteristics, and immediate outcome of Kawasaki disease: a population-based study from a tropical country	Bah, 2021, Eur. J. Pediatr.	1

3.7 Co-citation Analysis

One method of scientific mapping is co-citation analysis. When two references are mentioned together in a third work, it is assumed that they are related in some way or share a similar content structure. Co-citation analysis, which "was also undertaken by Jakhar *et al.*, [11]," is used to expose the conceptual framework of a particular field of research. Based on the clusters created, this approach also assists us in identifying the most important publications. Each cluster has a theme and is based on a certain foundation. After grouping the documents into clusters, the co-citation analysis identifies the publications that are most related to each subject. Researchers can learn more about the article based on their interests thanks to this analysis. Additionally, future scholars might gather literature on a specific topic by consulting the related publications. The VOSViewer program employs a co-citation approach for the analysis. Only publications that have at least five citations in published articles are chosen. Just 60 out of 4462 reach the citation limit. Figure (9) was examined by assigning weight to the links.

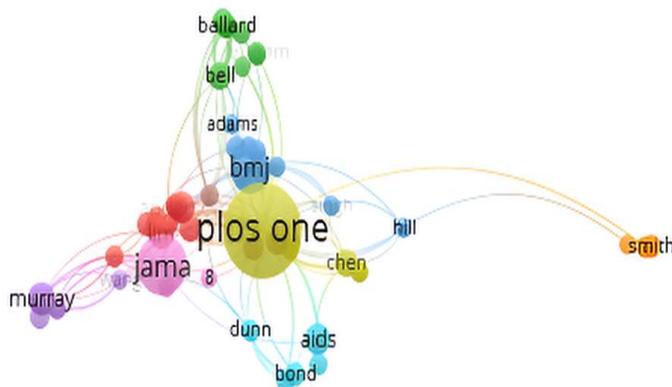


Fig. 9. Shows a map of co-citation analysis based on the authors' name

Nine clusters are created in total. By giving the connections more weight, you may show how many additional papers are related to the papers in the reference list. A paper is better suitable for study if it has a greater number of connections.

Table 5
 The interpretation of the co-citation map

Colour of cluster	Author name	Citation
Red	Anderson	11
Green	Ballard	7
Bule	Adams	5
Gold	Abdullah	5
Purple	Aram V.	6
Sky bule	Aids	11
Orange	G.	6
Yellow	Al-Mekhlafi	8
Pink	Allison	5

This bar chart, titled "Document by author," in Figure (10) illustrates the number of documents published by a selection of authors. The y-axis represents the number of documents, while the x-axis lists the authors. The two authors with the highest rankings, "Shahar, Suzana and Singh," and "Mohd

Taib, Nur Aishah and" both received 6.0. "Ahmad, Noor Ani and", "Hashim, Jamal Hisham and...", and "Peltzer, Karl K. and" are among the eight authors who come after them. They all have a lesser but equal score of 5.0. "Kee, Chee Cheong and Lim," "Lim, Kuang Hock and Teh," "Ramanon, Siti Zubaidah" and "Hashim" are the remaining authors on the list. The top two performers and the next cluster of writers with the same scores are prominently displayed in the graphic, which successfully illustrates how this measure is distributed across the listed authors.

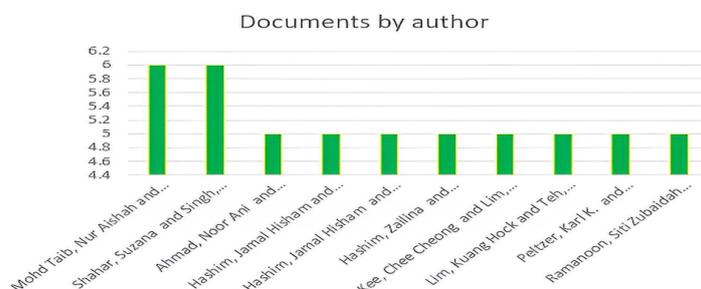


Fig. 10. Highest document from authors' name

This Table 6. shows the author pair of the collaborations," lists the top 10 author pairs based on the number of collaborations they've had. The table has three columns: No. (ranking), Author Pair, and Collaborations (the number of joint publications). "Shahar, Suzana and Singh, Devinder K.A." and "Mohd Taib, Nur Aishah and Yip, Chenghar Har," the top two author couples, each have six collaborations. Each of the eight author pairings that survive, ranging in ranking from 3 to 10, has five collaborations. "Hashim, Jamal Hisham and Norbäck, Dan," "Ramanon, Siti Zubaidah and Sadiq, Mohammed B.," "Peltzer, Karl K. and Pengpid, Supa," "Kee, Chee Cheong and Lim, Kuang Hock," "Lim, Kuang Hock and Teh, Chien Huey," "Hashim, Zailina and Norbäck, Dan," and "Hashim, Jamal Hisham and Hashim, Zailina" are a few of these. The most common collaborative partnerships in the dataset are prominently displayed in the table 6.

Table 6

The author pair of the collaborations

No.	Author Pair	Collaborations
1.	Shahar, Suzana and Singh, Devinder K.A.	6
2.	Mohd Taib, Nur Aishah and Yip, Chenghar Har	6
3.	Hashim, Jamal Hisham and Norbäck, Dan	5
4.	Ramanoon, Siti Zubaidah and Sadiq, Mohammed B.	5
5.	Peltzer, Karl K.and Pengpid, Supa	5
6.	Ahmad, Noor Ani and Chan, Yingying	5
7.	Kee, Chee Cheong and Lim, Kuang Hock	5
8.	Lim, Kuang Hock and Teh, Chien Huey	5
9.	Hashim, Zailina and Norbäck, Dan	5
10.	Hashim, Jamal Hisham and Hashim, Zailina	5

3.8 Co-occurrence Analysis

A further science mapping method that uses "author keywords" is co-occurrence analysis. Considering the study aims to concentrate on the author's preferred method of conducting research, it contains terms that the author has utilized as keywords. Co-word analysis, which "was also undertaken by Jakhar *et al.*, [11]," creates themes or groups based on words that occur together.

	Attitude	9	34	15
	Practice	10	31	13
Yellow	Elderly	22	32	13
	Aging	9	12	6
	Cognitive impairment	7	9	5
Pink	Breast cancer	4	7	9

3.8.1 Thematic analysis

The co-occurrence analysis was used to create thematic clusters, as seen in Figure (12). This "was also studied by Jakhar *et al.*, [11]" Co-occurrence analysis is a science mapping approach concentrating around terms to develop clusters of different themes by categorizing keywords that fact that come together regularly. Every term was chosen in order to recognize the various themes that emerged. The reason is due to the simple reason that all keywords provide a more accurate image for theme creation, which considers the words used in the abstract, title, or keywords. Because the coverage of all keywords is greater than that of the author's keyword, phrases that featured in publications at least ten times were chosen for thematic analysis. Phrases that appeared in documents more frequently were also considered. Although a keyword develops of greater significance in a specific area if it appears a minimum of 10 times in various papers, we need to assign it a weight of at least ten times before it appears in papers. Second, a hit-and-trial approach was used with varying weights; findings were easy to understand when the weight was ten times. A total of 374 words satisfied the minimum requirement, which assigned weight to keyword occurrences. Six clusters in all were created. Theme 1 talks about the red cluster, dominated by the term "human," reflects studies emphasizing human-centered aspects such as health, epidemiology, and demographic analyses. Theme 2 aims to green cluster centers on themes like "questionnaire," "knowledge," "pandemic," and "COVID-19," highlighting research involving behavioral studies, survey-based methods, and the societal impacts of the pandemic. Theme 3 is all about the blue cluster focuses on chronic diseases and risk factors, including keywords such as hypertension, obesity, and smoking, showing links to lifestyle and medical studies. Theme 4 is all the yellow cluster relates to logistic models, cohort analysis, and statistical methods, representing analytical and data-driven approaches in research. Theme 5 is all the purple cluster includes child, infant, and prematurity, emphasizing pediatric and early development topics. Theme 6 is all the sky blue cluster explores ethnic groups and genetic predispositions, pointing toward genetic and population-based health research. The same idea applies to analysis here as it does to cooccurrence; that is, a word is given more weight the larger the circle, which is visible.

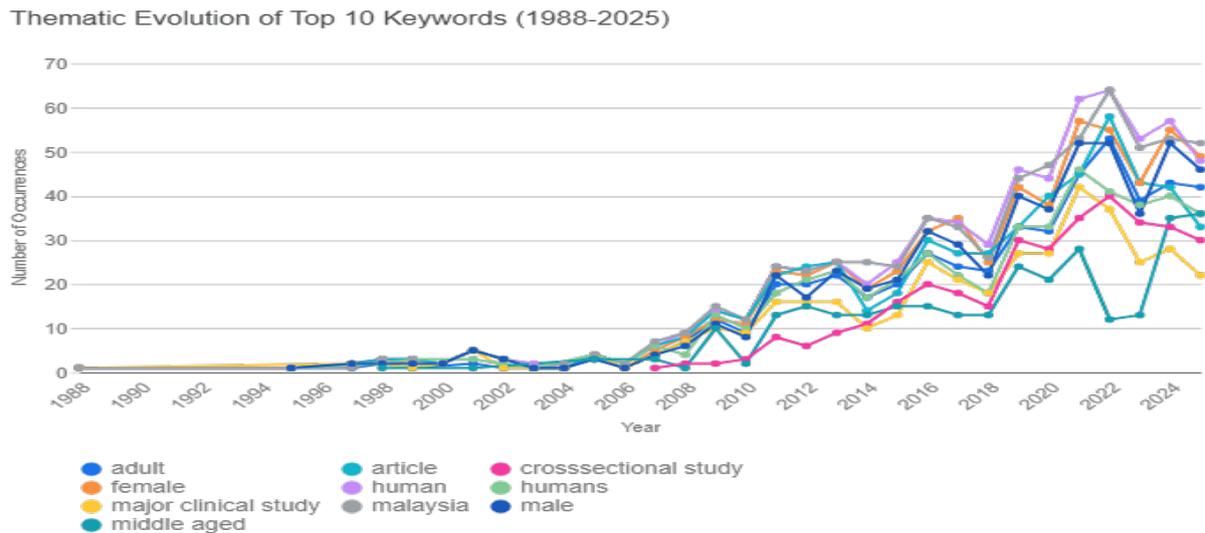


Fig. 13. Showcases thematic evolution

3.10 Discussion

This numerous bibliometric analyses of Logistics 4.0 in Malaysia adds to both academic discussion and real-world implementation. Scholarly knowledge of the topic is greatly improved by the study's compilation and mapping of earlier studies. Importantly, the results offer a well-organized roadmap for further study. For example, Bradford's law analysis can be used to quickly find and choose the best journals to support academics' work on Logistics 4.0 in Malaysia. The conceptual framework of the research field is also revealed by the co-citation and local citation studies, which enable researchers to pinpoint the most significant, reliable, and locally cited works in order to develop a thorough grasp of the subject. As a useful tool for practitioners, institutions, and policymakers alike, the study provides actionable suggestions for applying Logistics 4.0 for Malaysia as a scalable and sustainable strategy to improve academic and professional outcomes in a digital society. Lastly, despite yearly growth, the examination of publication trends shows that there are still relatively fewer studies, pointing to a strong need and direction for additional research on the topic.

According to the study's findings, research on Logistics 4.0 in Malaysia has grown dramatically between 1988 and 2025. Publications have also increased sharply after 2010, suggesting that both academia and industry are becoming increasingly interested in digital logistics transformation. Based on an analysis of 853 documents, Malaysia was the top contributor in terms of publication volume, while China and Hong Kong had higher citation averages, indicating a greater influence on worldwide research. According to the data, the most common journals publishing research on Logistics 4.0 are the Medical Journal of Malaysia, PLOS One, and the International Journal of Environmental Research and Public Health. Research themes have shifted from conventional logistics and operational management to more complex subjects like Industry 4.0 technologies, sustainability, and smart logistics systems, according to co-citation and co-occurrence analysis. The study also demonstrated that, in line with the ideas of dynamic capabilities theory, technological, organizational, and environmental capabilities have a major impact on the growth and effectiveness of logistics 4.0 in Malaysian manufacturing. Overall, the results demonstrate Malaysia's increasing research output, but they also suggest that in order to improve global competitiveness in the Logistics 4.0 space, more attention needs to be paid to quality, teamwork, and the integration of interdisciplinary viewpoints.

4. Conclusions

To enable readers to better comprehend the field of Logistics 4.0, the paper's main objective was to perform a bibliometric study of the data gathered. The study's path, theme development and evolution, network analysis, and Logistics 4.0 patterns were the main topics of the current study. Relevant data was gathered with the use of the bibliometric analysis about the logistics 4.0 and to uncover the topic's various Logistics Malaysia, Covid - 19, digital logistics and more. The field's increasing significance was confirmed by the bibliometric analysis of Logistics 4.0 in Malaysia, which showed a notable and quickening trend in research activity. In particular, the overall number of publications has been rising consistently, but between 2010 and 2015 there was a noticeable spike, reaching a peak of 80 documents in 2023 and 79 in 2024. This increasing tendency suggests that Malaysian research on Logistics 4.0 is expanding yearly. But even with this increase, the analysis indicates that the number of studies undertaken each year is still very small, underscoring the ongoing need for more research on the subject. Malaysia has the most published papers (803), more than any other country, but Hong Kong has the most average article citations (3.59), followed by China (3.34), and India (2.99), indicating their substantial intellectual influence on the topic. According to Bradford's rule, the *International Journal of Environmental Research and Public Health* (32 articles), *Plos One* (39 articles), and the *Medical Journal of Malaysia* (43 articles) are the most prolific journals. Last but not least, the thematic evolution analysis indicates that the research focus has changed over time, moving from early theoretical and foundational exploration in the late 1990s and early 2000s to practical application and implementation between 2008 and 2012. At this point, the analysis of Logistics 4.0's results and efficacy has taken centre stage, securing its position as a common form of developmental support.

The bibliometric analysis reveals that research on Logistics 4.0 in Malaysia has grown steadily over the past three decades, reflecting the country increasing commitment to digital transformation and Industry 4.0 adoption. The findings indicate that most studies emphasize the technological dimension such as the use of big data, IoT, RFID, and smart systems while organizational and environmental capabilities have received comparatively less attention. This suggests that Malaysian logistics research is still evolving from a technology-centric to a more integrated systems perspective. The study also shows that Malaysia dominates publication output in the field, though citation impact remains moderate, highlighting opportunities for deeper theoretical and international collaboration. Thematic evolution maps demonstrate a transition from early descriptive and conceptual works toward more applied and data-driven studies that examine logistics efficiency, sustainability, and digital resilience. Through the lens of Dynamic Capabilities Theory, the analysis confirms that technological, organizational, and environmental capabilities collectively enhance Logistics 4.0 performance and competitiveness. Overall, the synthesis underscores the need for Malaysian researchers and industries to balance technological innovation with human skill development, policy alignment, and sustainable practices to fully realize the potential of Logistics 4.0.

The present investigation has limitations. primarily because this study only examined publications in the Scopus database, its conclusions weren't applicable to various other contexts. Prospective investigations may thus gain intriguing insights by using more extensive datasets, such Web of Science or Google Scholar. This limitation narrows the scope of insights and may overlook influential contributions in the Logistics 4.0 in Malaysia of domain published outside Scopus. Therefore, future research can expand the bibliometric mapping by incorporating multiple databases, which would allow for more holistic coverage, stronger cross-validation of findings, and broader generalizability across disciplines.

This study primarily concentrated on quantitative bibliometric indicators such as publication trends, co-occurrence, co-citation, and thematic evolution. While these methods provide valuable insights into structural patterns, they do not capture deeper qualitative aspects of consumer experiences and managerial practices. Future research can adopt a mixed-method approach, using more language combining bibliometric mapping with content analysis or systematic literature reviews to offer richer theoretical and practical insights. The study also has limitations in terms of temporal and thematic scope. Although it identifies evolving themes and trends from 2021 to 2025, the analysis remains largely retrospective and does not account for smart supply chain changes that may redefine the logistics 4.0 landscape in the near future. For example, innovations such as AI personalization, virtual logistics, digital tools, and the logistics management systems could significantly reshape digital logistics performance. Thus, future research should extend the bibliometric horizon by incorporating foresight analysis, trend forecasting, and scenario planning to anticipate emerging research avenues and practical challenges in the logistics 4.0 in Malaysia ecosystem.

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References

- [1] Aral, Sinan, and Peter Weill. "IT assets, organizational capabilities, and firm performance: How resource allocations and organizational differences explain performance variation." *Organization science* 18, no. 5 (2007): 763-780. <https://doi.org/10.1287/orsc.1070.0306>
- [2] Badenes-Rocha, Alberto, Enrique Bigné, and Carla Ruiz. "Online food delivery: An overview and bibliometric analysis." *Hosted By The School of Hospitality and Tourism* (2022). <https://doi.org/10.34190/ictr.15.1.123>
- [3] Bag, Surajit, Shivam Gupta, and Zongwei Luo. "Examining the role of logistics 4.0 enabled dynamic capabilities on firm performance." *The international journal of logistics management* 31, no. 3 (2020): 607-628. <https://doi.org/10.1108/IJLM-11-2019-0311>
- [4] Bányai, Tamás. "Real-time decision making in first mile and last mile logistics: How smart scheduling affects energy efficiency of hyperconnected supply chain solutions." *Energies* 11, no. 7 (2018): 1833. <https://doi.org/10.3390/en11071833>
- [5] Barreto, Luis, Antonio Amaral, and Teresa Pereira. "Industry 4.0 implications in logistics: an overview." *Procedia manufacturing* 13 (2017): 1245-1252. <https://doi.org/10.1016/j.promfg.2017.09.045>
- [6] Beske, Philip. "Dynamic capabilities and sustainable supply chain management." *International journal of physical distribution & logistics management* 42, no. 4 (2012): 372-387. <https://doi.org/10.1108/09600031211231344>
- [7] Clifford Defee, C., and Brian S. Fugate. "Changing perspective of capabilities in the dynamic supply chain era." *The international journal of logistics management* 21, no. 2 (2010): 180-206. <https://doi.org/10.1108/09574091011071915>
- [8] Dennehy, Denis, John Oredo, Konstantina Spanaki, Stella Despoudi, and Mike Fitzgibbon. "Supply chain resilience in mindful humanitarian aid organizations: the role of big data analytics." *International Journal of Operations & Production Management* 41, no. 9 (2021): 1417-1441. <https://doi.org/10.1108/IJOPM-12-2020-0871>
- [9] Eisenhardt, Kathleen M., and Jeffrey A. Martin. "Dynamic capabilities: what are they?." *The SMS Blackwell handbook of organizational capabilities* (2017): 341-363. <https://doi.org/10.1002/9781405164054.ch21>
- [10] Engelbertink, D. G. L., and Stijn Woudstra. "Managing the influences and risks of Industry 4.0." Bachelor's thesis, University of Twente, 2017.
- [11] JAKHAR, RIYA. "BIBLIOMETRIC ANALYSIS OF FRONT-OF-PACK-LABELLING ATTRIBUTES.". <https://doi.org/10.58419/gbs.v9i2.922309>
- [12] Kucukaltan, Berk, Omur Y. Saatcioglu, Zahir Irani, and Okan Tuna. "Gaining strategic insights into Logistics 4.0: expectations and impacts." *Production Planning & Control* 33, no. 2-3 (2022): 211-227. <https://doi.org/10.1080/09537287.2020.1810760>
- [13] Lasi, Heiner, Peter Fettke, Hans-Georg Kemper, Thomas Feld, and Michael Hoffmann. "Industry 4.0." *Business & information systems engineering* 6, no. 4 (2014): 239-242. <https://doi.org/10.1007/s12599-014-0334-4>

- [14] Nasir, Nur Syakinah Abdul, Nurul Labanihuda Abdull Rahman, Hasyeilla Abd Mutalib, and Rabeatul Husna Abdull Rahman. "A Review and Bibliometric Analysis of Online Food Delivery by Using Scopus Database." *Journal of Management & Marketing Review (JMMR)* 7, no. 3 (2022). [https://doi.org/10.35609/jmmr.2022.7.3\(8\)](https://doi.org/10.35609/jmmr.2022.7.3(8))
- [15] Papadopoulos, Thanos, Angappa Gunasekaran, Rameshwar Dubey, and Samuel Fosso Wamba. "Big data and analytics in operations and supply chain management: managerial aspects and practical challenges." *Production Planning & Control* 28, no. 11-12 (2017): 873-876. <https://doi.org/10.1080/09537287.2017.1336795>
- [16] Rakyta, Miroslav, Miroslav Fusko, Jozef Herčko, Ľudmila Závodská, and Nenad Zrnić. "Proactive approach to smart maintenance and logistics as a auxiliary and service processes in a company." *Journal of applied engineering science* 14, no. 4 (2016): 433-442. <https://doi.org/10.5937/jaes14-11664>
- [17] Richey, R. Glenn, Patricia J. Daugherty, and Anthony S. Roath. "Firm technological readiness and complementarity: capabilities impacting logistics service competency and performance." *Journal of Business Logistics* 28, no. 1 (2007): 195-228. <https://doi.org/10.1002/j.2158-1592.2007.tb00237.x>
- [18] Schröder, Christian. "The challenges of industry 4.0 for small and medium-sized enterprises." *Friedrich-Ebert-Stiftung: Bonn, Germany* 7 (2016): 1-28.
- [19] Shibin, K. T., Rameshwar Dubey, Angappa Gunasekaran, Zongwei Luo, Thanos Papadopoulos, and David Roubaud. "Frugal innovation for supply chain sustainability in SMEs: multi-method research design." *Production Planning & Control* 29, no. 11 (2018): 908-927. <https://doi.org/10.1080/09537287.2018.1493139>
- [20] Ślusarczyk, Beata. "Industry 4.0: Are we ready?." *Polish Journal of Management Studies* 17 (2018). <https://doi.org/10.17512/pjms.2018.17.1.19>
- [21] Teece, David J. "Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance." *Strategic management journal* 28, no. 13 (2007): 1319-1350. <https://doi.org/10.1002/smj.640>
- [22] Von der Gracht, Heiko A., and Inga-Lena Darkow. "Scenarios for the logistics services industry: A Delphi-based analysis for 2025." *International journal of production economics* 127, no. 1 (2010): 46-59. <https://doi.org/10.1016/j.ijpe.2010.04.013>
- [23] Winkelhaus, Sven, and Eric H. Grosse. "Logistics 4.0: a systematic review towards a new logistics system." *International journal of production research* 58, no. 1 (2020): 18-43. <https://doi.org/10.1080/00207543.2019.1612964>
- [24] Zhong, Ray Y., Xun Xu, and Lihui Wang. "IoT-enabled smart factory visibility and traceability using laser-scanners." *Procedia Manufacturing* 10 (2017): 1-14. <https://doi.org/10.1016/j.promfg.2017.07.103>
- [25] Krishnamoorthi, T., Azman, N., & Fakir, F. Z. (2025). Contributions of Factors that Influence Consumer Purchase Intention in Online Food Delivery Apps: Bibliometric Study. *Open Journal of Social Sciences*, 13(11), 208–237. <https://doi.org/10.4236/jss.2025.1311013>