Analysis of retail sector research evolution and trends during COVID-19

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ABSTRACT

The purpose of this study is to analysis the evolution of the retail sector during the COVID-19 period and to identify future research issues. Scopus databases were searched for articles published in English between 2020 and 2022 to discover current trends and concerns in the retail industry. A total of 1071 empirical and nonempirical studies were compiled as a result of the evaluation process. During the study period, the number of articles published in scientific journals increased exponentially, indicating that the research topic is still in the developmental phase. It also highlights the most important research trends, allowing numerous new research lines to be proposed via visual mapping of Thematic Maps. This study makes an important contribution to the field of the retail sector, providing a comprehensive overview of the field's evolution and current status, as well as a comprehensive, synthesized, and organized summary of the various perspectives, definitions, and trends in the field.

1. Introduction

Societies and economies should take note of the COVID-19 virus as a warning, since both were caught off guard and now face serious consequences (Lopes and Reis, 2021; Chopra et al., 2022; Srour et al., 2022; Narayan et al., 2022; Alowibdi et al., 2021). Globally, the current pandemic has had severe health, social, political, and economic consequences. To survive in this new reality, countries will need to implement new measures, policies, and habits (Hall et al., 2021; Bouncken et al., 2022; Lee and Suh, 2022). As a result of increased food demand and the resulting strain on the supply chain, the retail sector has been forced to focus more on employee safety and health, improve hygiene in physical spaces, and better manage its workforce to ensure the well-being of the civilian population (Trapp et al., 2022; Rasmusen et al., 2022; Vassiliades et al., 2022). In light of the fact that pandemics are likely to persist, this study aims is to determine the effects of the COVID-19 pandemic on the retail sector. It is also meant to serve as a pre-planning guide so that the industry can respond permanently to these scenarios and avert service closures. In this research, our main aim is to find the answer to the following questions:

RQ1 What are the recent research themes, topics, and keywords related to the retail sector.

RQ2 : Which countries are working to develop new theories and techniques for the retail sector.

RQ3 : Who are the key researchers in the creation of novel approaches to the retail sector?

The rest of the paper is organized as follows: Section 2 documents the recent literature surveys. Section 3 explains the methodology; Section 4 analyzes the results. Section 5 presents the theoretical implications, and the conclusion is presented in Section 6.

2. Literature review

This subsection discusses details about the latest survey conducted in the retail sector. Taking into account the proliferation of COVID-19 and the likely repercussions of its propagation, the authors in the review article (Artemyeva et al., 2022) examine the process of e-commerce.

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The author examines international online trade during COVID-19 (Kofi Mensah and Simon Mwakapesa, 2021). In another review, the author says that the primary criterion for speeding up the performance of supply chains is "Collaboration Efficiency". In addition, "Order Fulfillment" and "Digital RSCs" are the most suitable resilient business methods to reduce long-term consequences (Sharma et al., 2021).

The banking industry has long been seen as a leader in the use of new information and communication technologies in business operations. In this context, the authors of the paper (Saprikis et al., 2022) try to answer the question "Why do people use mobile banking applications?" via an empirical investigation. For this study, the researchers looked at two groups of people: those who use m-banking applications, and those who don't, and discover whether there are any differences or similarities in the variables that influence their decision to use or not use this sort of service.

According to our knowledge, none of the current evaluations have covered the retail sector under COVID-19 to its fullest extent. It is thus necessary for researchers to undertake a bibliometric analysis to evaluate the field's state, identify the primary academic agents who are continually growing in this area, determine the important issues from present research as well as define future challenges for this field of study.

2.1. Latest business models for the retail sector

Recently many researchers proposed something different to improve the retail sector from the impact of COVID-19 (Yu et al., 2020; Tarhini et al., 2022; Tan et al., 2021; Chopra et al., 2022) using different techniques such as blockchain Martínez et al. (2022), Stergiou et al. (2021), Deveci et al. (2022) and machine learning (Lv et al., 2022; Gaurav et al., 2022). Some of the novel modes are as follows: The authors (Vizuete-Luciano et al., 2022) propose a decision assistance system for grocery shop operators in Barcelona based on the Forgotten Effects Theory of the City's 701 establishments. There are indirect impacts that can be determined by conducting an experiment like this one. Varied districts have different approaches to evaluating the study's variables, as seen by these findings.

In recent years, there has been a surge in the use of the Omnichannel business model in recent years. In this investigation (Piskunova, 2022) author analyze the omnichannel operations of merchants to propose a short-term omnichannel business strategy under the pressure of this economic crisis. Research shows that the COVID-19 situation has pushed the omnichannel retail paradigm forward. The researchers have outlined numerous step-by-step metrics in their study of the implementation process of the omnichannel strategy (Mouawad et al., 2021; Saab et al., 2021). The study includes retailers' thoughts on new ways of doing business, which proposes how the concept of omnichannel development may be influenced by external influences, as well as offering opportunities for additional research in the development of the concept of omnichannel. This study provides a step-by-step strategy to implement an omnichannel business model for retail company managers.

Using FAHP and WASPAS methodologies, this research proposes a fuzzy MCDM-based solution to the problem (Kao et al., 2022). We want to design a tool that may help a decision maker in a garment sector dealing with fuzzy environments choose a good supplier. In this case study, the suggested MCDM model is put into practice to illustrate its usefulness and viability. Due to the help of the model in achieving its desired results, an ideal garment industry supplier was found.

Cognitive similarity is a notion that the authors propose as the basis for the product recommendation system (Krishnan and Nair, 2022). Collaborative filtering serves as the foundation for this hybrid recommendation approach. To ensure that the new approach is better than the old, it is compared to both the old and the new. In an additional study of research, the authors use a novel lifecycle data science approach. With the use of user behavior analytics and an RFM analysis technique, the suggested model predicts product sales and makes product suggestions to consumers (Zhao and Keikhosrokiani, 2022). The suggested recommendation model gives excellent suggestions and sales combinations to increase sales and market response. New clients may also receive product recommendations from it. This study provide a highly practical and valuable case study of a company through a change in business model and provides guidance to others in a similar scenario.

Based on the constantly developing concept of "curbside pickup", Ponis et al. Ponis et al. (2022) proposes a solution that is further strengthened using a Wi-Fi system and Augmented Reality. Retailers will be equipped with an easy-to-implement solution and will use one that will help them overcome the problems posed by COVID-19, a pandemic that has ravaged much of the world.

In another study, the authors address the issue of determining low-cost delivery routes in metropolitan regions for online purchases (Cerrone et al., 2021; Al Sobbahi and Tekli, 2022). The proposed system places the realistic 3D model and provides a virtual test experience using marker-based and marker-less methodologies (Chavan et al., 2021). Despite the difficulties posed by COVID-19, companies will benefit from using this technology (Koweyes et al., 2021; Yang et al., 2022). Therefore, people will be able to keep their own space while yet interacting with one another via Augmented Reality (AR). The authors also proposed a similar concept in the proposed approach using cloud computing (Van Ngoc and Xuan Canh, 2021).

2.2. Behavior analysis in retail sector

Many scholars employed state-of-the-art methodologies to examine consumer behavior with the aim of enhancing the retail industry. Several contemporary and inventive methods are currently available (Paiva et al., 2022; Mourad et al., 2020; Haldma et al., 2021). Retailers may consider COVID-19 as an opportunity to build bike lanes and other forms of active transportation infrastructure to counteract the fact that fewer people are using public transit out of fear of infection.

The urban landscapes in London, Manchester, Newcastle and Liverpool are examined in this research article (Cavada, 2022). This study uses case studies to investigate the effects of geographical isolation due to COVID-19. Some of the limitations of the metropolitan area, changes in sharing behavior, and gamification potential may be seen using this study's data. The expected results will provide evidence-based scenarios for gamification systems.

3. Research methodology

A detailed literature study was conducted to determine the effect of COVID-19 on the retail sector. The PRISMA review method (Page et al., 2021) was used to guide the review process. The following are the steps used in writing this paper: Selection of the database, modification of research criteria, coding of recovered material and evaluation of the information. Because the Web-of-Science database contains fewer indexed journals than Scopus (Mongeon and Paul-Hus, 2014), this study uses the Scopus database as a sample to limit the chance of missing important articles throughout the search process.

3.1. Eligibility criteria

This research examined the evolution and trends in the retail industry during the COVID-19 pandemic. Publications published between 2019 and 2022 in English were included in the map to show the current state of research around the world.

3.2. Restrictions

Few papers were disqualified because they were irrelevant to the study's fundamental objectives. For example, we restrict ourselves to researching articles written in English.

3.3. Data source

Using the Scopus bibliographic database, the data was gathered in December 2022. The following two keywords were included in the search strategy to answer the research question.

- Retail
- COVID-19

3.4. Search query selection

In order to get the information from Scopus database, we used the following query at different screening levels:

- **Stage 1**: included only papers written in English

    "(TITLE-ABS-KEY(retail) AND TITLE-ABS-KEY("COVID-19")) AND (LIMIT-TO (LANGUAGE,"English"))"

- **Stage 2** : Include only "Articles" and "conference papers",

    (TITLE-ABS-KEY (retail) AND TITLE-ABS-KEY ("COVID-19")) AND (LIMIT-TO (LANGUAGE, "English")) AND (LIMIT-TO (DOCTYPE, "cp") OR LIMIT-TO (DOCTYPE, "ar"))

3.5. Tools used

R language was used to analyze the data. Science mapping research can be carried out using R language, which is based on the (Cobo et al., 2011) science mapping analytic technique that allows longitudinal investigations. Another benefit of using this method is that it helps researchers discover connections and interactions between previously studied topics and new areas of study.

4. Results and discussion

Studies of an area's bibliography may provide light on how the topic has developed and point to potential directions for future study. It provides a bird's eye perspective of several facets of an area. This section is separated into two sub-sections for the sake of a more thorough study. An overview of scientific output over time is provided, as well as a breakdown by topic area and publication venue of the most widely cited publications, institutes, and authors. Furthermore, we examine the content findings to identify the most important trends in the growth of the retail sector.

The impact of COVID-19 on the retail industry is a significant field of study, as shown by Fig. 1. The details of our database are represented in Fig. 2. As represented in Fig. 2, our dataset includes 1071 articles. Furthermore, more than 3735 unique authors published papers during this time; therefore, we can say that the impact of COVID-19 on the retail sector is an interesting topic because many authors were working on it.

In addition to the number of papers and authors, citations are also a good criteria for representing the productivity and importance of the topic. Since, this indicates that the research area is still fresh, and there is a scope of research in this area.

4.1. Analysis of source distribution

In this subsection, we give an analysis of the publication sources. To represent the productivity and impact of sources, we use the number of citations, the number of documents published, the h index, the g index and the m index as comparative variables. Therefore, the top 10 productive sources are represented in Table 1. From Table 1 it is clear that the most productive source is *JOURNAL OF RETAILING AND CONSUMER SERVICES* with the highest number of citations. Other more popular and quantity-based journals are as follows: *CANADIAN JOURNAL OF AGRICULTURAL ECONOMICS, INTERNATI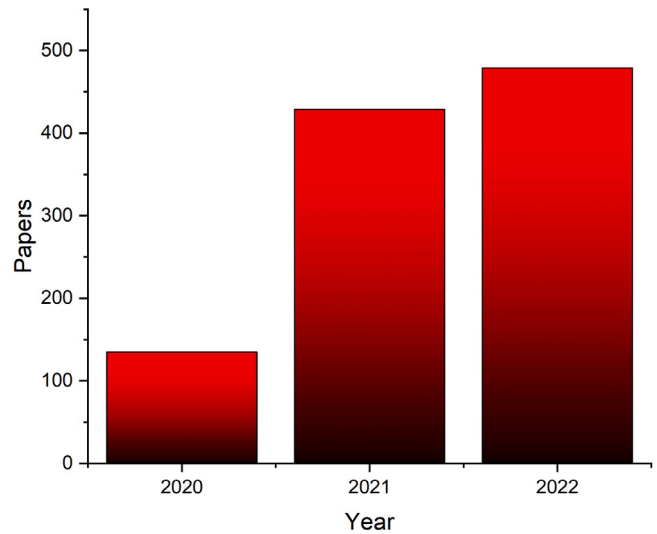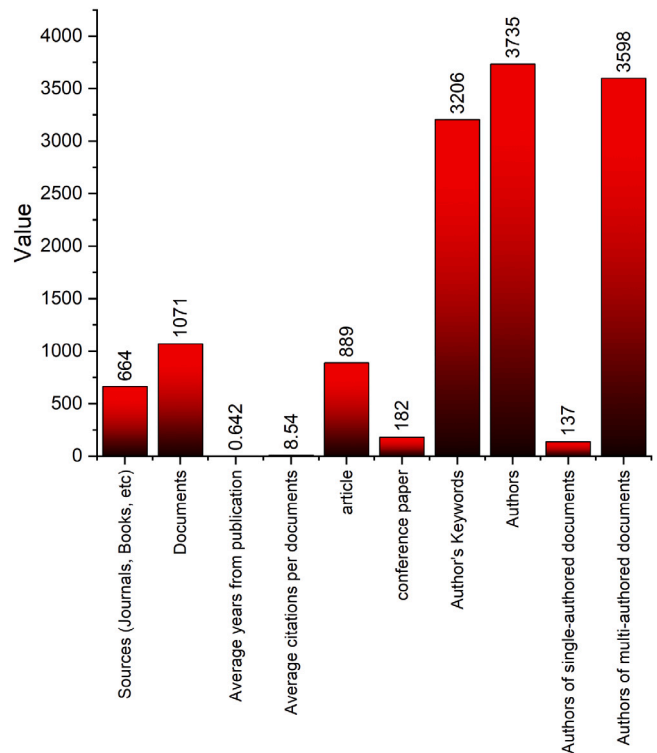ONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH, JOURNAL OF BUSINESS RESEARCH, TIJDSCHRIFT VOOR ECONOMISCHE EN SOCIALE GEOGRAFIE, SUSTAINABILITY (SWITZERLAND), TRANSPORTATION RESEARCH INTERDISCIPLINARY PERSPECTIVES, PLOS ONE, SAFETY SCIENCE, JOURNAL OF SERVICE MANAGEMENT, JAMA NETWORK OPEN, and JOURNAL OF PUBLIC ECONOMICS.*

Other than quality and quantity, the topic of interest is also a good criterion for the identification of the importance of a source. Fig. 3 represents this criterion using Sankey diagrams (Riehmann et al., 2005). Visualizing the movement of energy or materials in networks and processes has historically been done with the use of Sankey diagrams. They depict quantitative information about flows, their interactions, and their transformations. Each node in a Sankey diagram is connected

Fig. 1. Variation of Number of Papers.

Fig. 2. Overview of Dataset.

Table 1
Local source impact details.

Source	H index	G index	M index	Total Citation	Total Publication
JOURNAL OF RETAILING AND CONSUMER SERVICES	9	21	3	693	21
CANADIAN JOURNAL OF AGRICULTURAL ECONOMICS	8	10	2.67	643	10
INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH	7	17	2.3	301	21
JOURNAL OF BUSINESS RESEARCH	3	3	1	271	3
TIJDSCHRIFT VOOR ECONOMISCHE EN SOCIALE GEOGRAFIE	4	5	1.33	258	5
SUSTAINABILITY (SWITZERLAND)	8	14	2.67	245	27
TRANSPORTATION RESEARCH INTERDISCIPLINARY PERSPECTIVES	4	4	1.33	235	4
PLOS ONE	4	6	1.33	229	6
SAFETY SCIENCE	2	2	0.67	166	2
JOURNAL OF SERVICE MANAGEMENT	1	1	0.5	154	1
JAMA NETWORK OPEN	5	8	1.67	146	8
JOURNAL OF PUBLIC ECONOMICS	1	1	0.33	135	1
IEEE ENGINEERING MANAGEMENT REVIEW	2	2	0.67	122	2
FRONTIERS IN PSYCHOLOGY	4	6	1.33	117	6
RESEARCH IN SOCIAL AND ADMINISTRATIVE PHARMACY	1	1	0.5	108	1
SERVICE INDUSTRIES JOURNAL	2	2	0.67	106	2
INTERNATIONAL JOURNAL OF RETAIL AND DISTRIBUTION MANAGEMENT	3	9	1.5	98	9
SOCIAL SCIENCE AND MEDICINE	3	3	1	97	3
JOURNAL OF RETAILING	2	2	1	90	2
AMERICAN JOURNAL OF AGRICULTURAL ECONOMICS	2	2	1	88	2

to other nodes through a weighted network, and each weighted node's incoming weight is equal to its outgoing weights. The first, second map third row in Fig. 3 represents countries, keywords, and source, respectively. Therefore, this Sankey diagram representation can easily represent the core topics in which the respective source is publishing papers. From Fig. 3, it is clear that sustainability is one of the most versatile journals because it covers a variety of topics. Fig. 4 represents the number of publications with respect to the source. Hence, it is clear from Fig. 4 that most of the articles related to the retail sectors are published in the *MPDI* journal followed by the LNCS springer.

4.2. Analysis of authors and country distribution

In this subsection, we give statistical details about the authors who are actively working to study the impact of COVID-19 on the retail sector. There are many ways through which we can find the most productive authors in the respective field. One method is the classification of authors by the number of citations. The Fig. 5 represents the statics of the author. In Fig. 5(a) the authors are represented through the frequency of article factorization, and in Fig. 5(b) the authors most cited are represented. Therefore, from Figs. 5(a) and 5(b) it is clear that *WANG J, KUMAR A,* and *LI Y,* are the authors who actively work in the field of analyzing the effect of COVID-19 on the retail sector.

Apart from the number of citations, frequency and reverence are also the variables via which the most renowned authors in a particular subject may be determined. This analysis is presented in Figs. 5(c) and 5(d). Fig. 5(c) indicates a positive correlation between the progression of time and the level of interest in the respective research area. In 2020, only nine researchers were working in the field, but in 2021, more than 15 researchers started their research to analysis the effect of COVID-19 on the retail sector. This also shows that this research topic is still developing and there is a scope of research in this domain. Finally,

Fig. 5(d) represents the working area of the authors, and this figure is constructed on the principles of Sankey diagrams. From Fig. 5(d) provides evidence that a majority of the authors have conducted research on various factors influencing the performance of the retail industry amidst the COVID-19 pandemic.

The distribution of researchers by nations is also a significant and beneficial component. This metric indicates the effectiveness of a country's researchers. Fig. 6 represents the distribution of countries according to the total number of publications in the paper and the corresponding authors. From Fig. 6(a) the top countries according to the paper publication frequency the countries with the most published articles are:

- USA (913)
- CHINA (297)
- INDIA (279)
- UK (270)
- CANADA (171)
- INDONESIA (113)
- MALAYSIA (111)
- ITALY (102)

Therefore, from Fig. 6(a), we can say that USA researchers have been actively working in the field of the development of concepts for the retail sector for the past two years. The next important factor is the collaboration among the authors from different countries, which represents the productivity of a country. Fig. 6(b) represents the distribution of the corresponding authors and the nature of the paper (ie, single author (SCP) or multiauthor (MCP) paper).
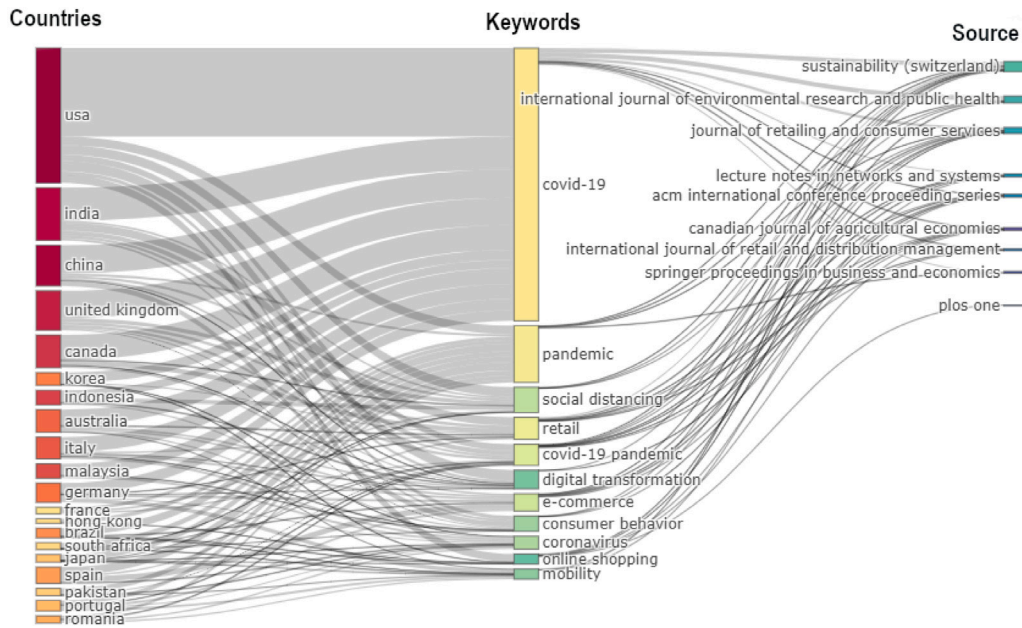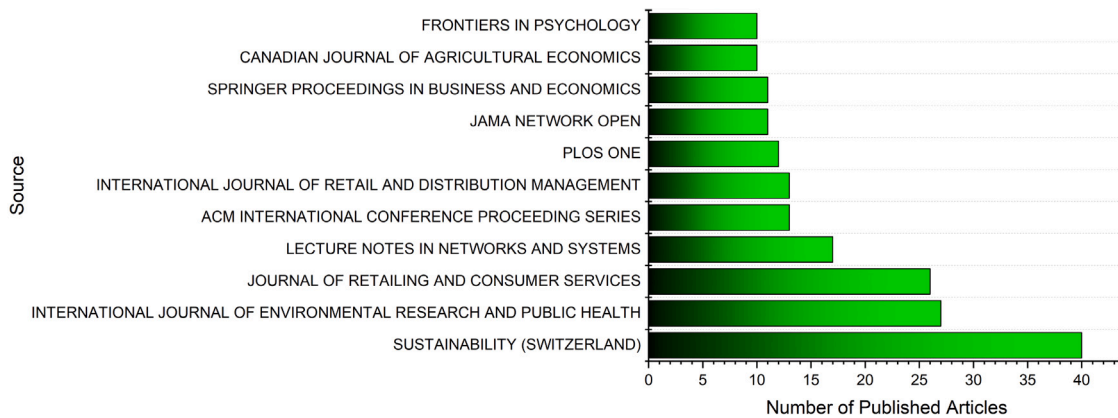
Fig. 3. Source and Keyword Plot.

Fig. 4. Source variation according to total publication.

4.3. Analysis of document distribution

In this subsection, we give details about the scientific distribution of the research papers. In the Scopus database, there are 1071 articles related to our study. However, not all the published papers are important and provide valuable information about the subject area. Therefore, to obtain the information of the article, we find highly cited articles related to the development of the retail sector during COVID-19 times. The details of this type of paper are presented in Table 2. In Table 2 the papers are arranged according to total citations, average citations, and normalized citations.

4.4. Analysis of trending research topics

We analyze the current research directions and trends in this subsection. First of all, we examine the distribution of the keywords of the paper. Keywords are a representation of the paper's principal subject matter. Fig. 7(a) represents the frequency of keywords in our research database; In this figure, the frequency of the keyword dictates its size. According to the analysis, the most frequent keywords with occurrence frequency are

- COVID-19 (389)

- human (213)
- pandemic (191)
- humans (182)
- united states (126)
- pandemics (110)
- sales (110)
- retailing (76)
- epidemic (63)
- electronic commerce (59)
- workplace (58)
- commerce (51)
- public health (50)

These trending keywords give us an idea of the directions in which scholars are doing research. Therefore, we can say that '*sales, retails stores*' is the most common topic in the paper, and most researchers are doing research in this direction. *IoT, sustainable development, AI, deep learning* are some of the fields that are developing. This will help future researchers to find the direction of their research.

The next important technique for finding the trending topic is to group similar keywords using clustering and collaboration. Keyword collaboration is a technique for analyzing the relationship between different keywords. Fig. 7(b) represents the result of the clustering

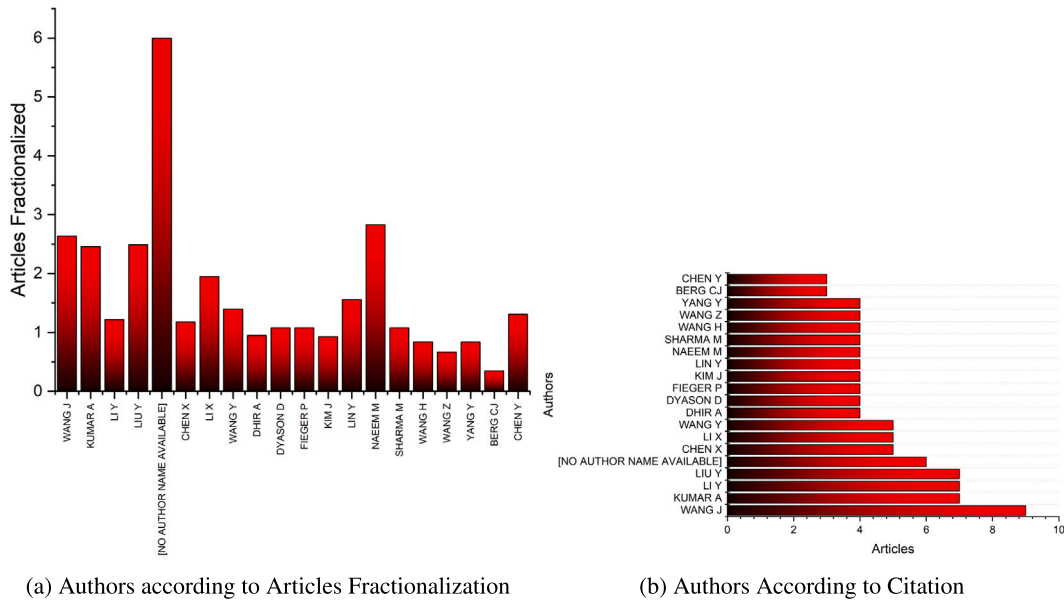(a) Authors according to Articles Fractionalization

(b) Authors According to Citation

(c) Authors work over the years

(d) Authors According working fields

Fig. 5. Authors Stastics.

(a) Paper distribution according to Countries
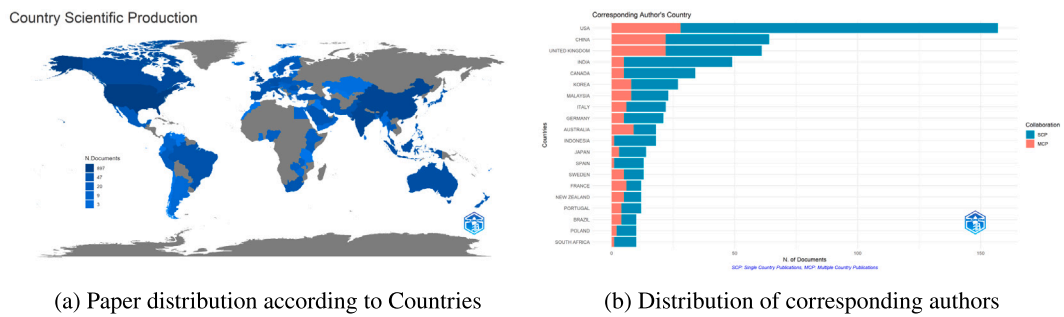
(b) Distribution of corresponding authors

Fig. 6. Countries' Scientific Production.

and collaboration among different keywords. Keyword collaboration is an important technique through which the relationship between different keywords can be analyzed. According to Fig. 7(b) there are four different clusters that contain the keywords:

- Cluster 1: This cluster belongs to sales terms. These terms are: *sales*, *commerce*, *decision making*, and *forecasting*.
- Cluster 2: This cluster belongs to the development in the retail sector. Important keywords in this cluster are: *AI*, *COVID-19*, *retail stores*, *deep learning*, *IoT*, *pandemic*, *supply chains*, *viruses*, and *sustainable development*.
- Cluster 3: This cluster represents the e-commerce industry. Important terms in this cluster are: *e-commerce* and *COVID-19 pandemic*

- Cluster 4: This cluster represents the service sector terms. The important terms of this cluster are: *service industry*, *consumer behavior*, and *digital transformation*.

4.4.1. Thematic map of keywords

We used Co-word analyze to build the thematic diagrams for the keywords. Thematic map helps the user analyze the behavior of different topics in the research field (Muñoz-Leiva et al., 2012). There are two parameters through which thematic maps are built (Callon et al., 1991):

- Centrality: This metric measures the degree of interconnectivity of a network. A concept's centrality may be gauged by looking

Table 2
Highly cited papers.

Paper	DOI	Total Citations	TC per Year	Normalized TC
Laato et al. (2020)	10.1016/j.jretconser.2020.102224	309	103	9.3239
Pantano et al. (2021)	10.1016/j.jbusres.2020.05.036	261	87	7.8755
Haischer et al. (2020)	10.1371/journal.pone.0240785	208	69.333	6.2763
Richards and Rickard (2020)	10.1111/cjag.12231	156	52	4.7072
Hall et al. (2021)	10.1108/JOSM-05-2020-0151	154	77	17.5521
Huynh (2020)	10.1016/j.ssci.2020.104872	154	51.333	4.6468
Gray (2020)	10.1111/cjag.12235	142	47.333	4.2848
Forsythe et al. (2020)	10.1016/j.jpubeco.2020.104238	135	45	4.0735
Dannenberg et al. (2020)	10.1111/tesg.12453	118	39.333	3.5606
Loske (2020)	10.1016/j.trip.2020.100165	115	38.333	3.47
Cranfield (2020)	10.1111/cjag.12246	110	36.667	3.3192
Kretchy et al. (2021)	10.1016/j.sapharm.2020.04.007	108	54	12.3092
Talwar et al. (2021)	10.1016/j.jretconser.2020.102341	95	47.5	10.8276
Li et al. (2020)	10.1111/tesg.12420	84	28	2.5346
Mahajan et al. (2021)	10.1111/ajae.12158	84	42	9.5739
Katrakazas et al. (2020)	10.1016/j.trip.2020.100186	79	26.333	2.3838
Goddard (2020)	10.1111/cjag.12243	77	25.667	2.3234
Abouk and Heydari (2021)	10.1177/0033354920976575	77	38.5	8.776
Mirza et al. (2020)	10.1016/j.qref.2020.09.002	77	25.667	2.3234
Siriwardhana et al. (2020)	10.1109/EMR.2020.3017451	76	25.333	2.2932

at how closely it is linked to other ideas. This number may be interpreted as an indicator of the relevance of a particular topic in the growth of the overall area of study under consideration. It is given by the following equations:

$$Centrality(c) = 10 \sum e_{hk} \tag{1}$$

$$CentralityRank = \frac{r_i^c}{N} \tag{2}$$

where, k a keyword belonging to the theme and h a keyword belonging to other themes. r is the r_i^c is the place of theme i in the theme cluster, and N is the total themes,

- Density: It determines the inherent strength of the network. Density enables you to determine the degree to which all of the keywords in your subject are connected to one another. This variable may be used to track the theme's progression. It is calculated by the following equations:

$$Density(D) = 100 \frac{\sum e_{ij}}{w} \tag{3}$$

$$DensityRank = \frac{r_i^D}{N} \tag{4}$$

i and j denote the keyword of the theme, while w denotes the total number of keywords of the theme. r is the r_i^c is the place of the theme i in the theme group, and N is the total theme(see Fig. 7). The thematic diagram is created with the help of density rank and the centrality rank, as represented in Fig. 7(c), Fig. 7(d), and Fig. 7(e). The thematic diagram is divided into four quadrants:

- Motor Themes: In the thematic plot, these themes can be found in the upper right quadrant. All topics that are well established and vital to the organization of a study area are included in this quadrant.
- Niche Themes: These themes are located in the thematic plot's upper-left quadrant. All of these subjects have established internal connections but have insignificant outward connections and hence are of only minor relevance to the area.
- Emerging Themes: The lower left quadrant of the diagram shows these themes. The themes of this quadrant have low density and low centrality, and they mostly reflect new or fading concepts.
- Basic Themes: The lower right quadrant of the diagram shows these themes. Each and every one of the potential study topics that has been raised but has not yet been explored. As a result, this section focuses on universal and cross-cutting topics.

We break the time period into two subperiods to better understand the current trends and the progress of the study field. The details of the themes for each period are as follows:

- First Period: In this period, there are three motor themes, two basic themes, and one emerging theme. The size of each circle depends on the citation values. From Fig. 7(d), it is clear that in this period, *sales* is the main topic of research or in the development phase. Also, 'service industry' and 'IoT' are well-developed fields. Therefore, we can say that in the first phase, researchers are trying to develop new concepts to improve sales in the retail sector using the concepts of IoT and other smart devices.
- Second Period: In this period, there are four basic themes, one motor theme, and two peripheral themes. It is represented by Fig. 7(e). 'Sales', 'e-commerce', 'behavioral analysis', and 'sustainable development' are the basic themes. 'COVID-19' and 'retail' are the motor themes with high centrality and density. Therefore, from the analysis of Fig. 7(e), we can say that researchers are developing new concepts in the field of *sales*, *e-commerce*, *sustainable development* and *behavioral analysis* in the COVID-19 scenario for the retail sector.
- Combine Analysis: Fig. 7(c) represents the general development of the research terms for the respective theme. There are three motor themes, three basic themes, and one niche theme. As can be seen in Fig. 7(c), academics are using principles from artificial intelligence, deep learning, forecasting, the Internet of Things (IoT), and sustainable development to the study of e-Commerce, consumer behavior, the supply chain, and social networking.

In addition to the thematic map of keywords, research trends can also be analyzed by evaluating different keywords; Fig. 7(f) represents the keyword evaluation during the research period. The following facts can be determined from the evaluation of the keywords:

- Researchers are using deep learning methods to address issues in the retail industry.
- All of the anomaly-based approaches that were previously used to detect virus activity are now being used to analyze customer behavior.
- Smart device ideas such as IoT are used in the e-commerce, retail, and sales sectors.
- The retail business places a premium on the creation of ideas to increase sales.

5. Theoretical and practical implications

This section describes the observations made during the analysis. This paper's primary objective is to document the research development in the retail sector due to COVID-19. Additionally, this research seeks to discover the most recent trends in the retail sector. We examine
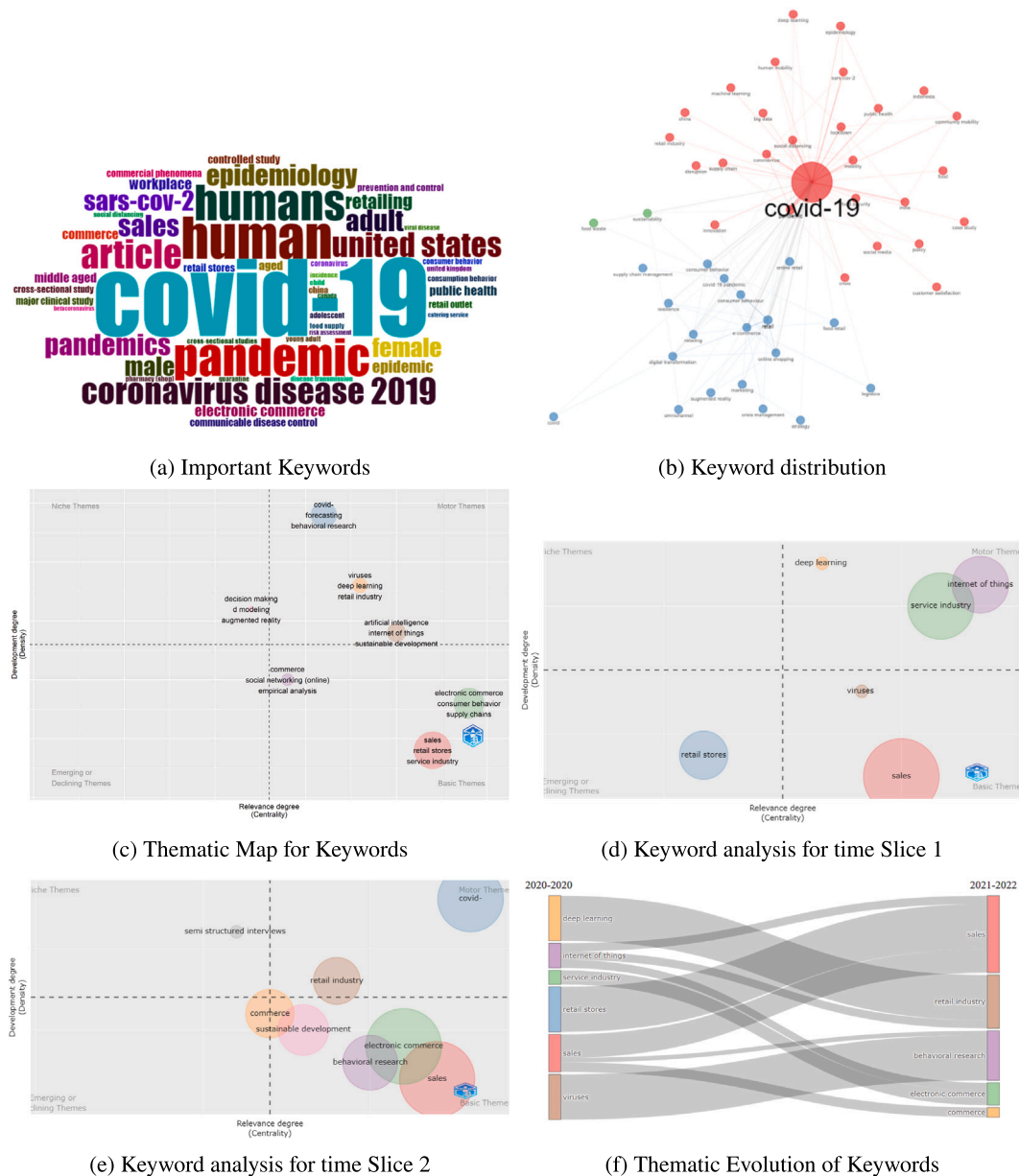
(a) Important Keywords

(b) Keyword distribution

(c) Thematic Map for Keywords

(d) Keyword analysis for time Slice 1

(e) Keyword analysis for time Slice 2

(f) Thematic Evolution of Keywords

Fig. 7. Trending Research Topic Identification.

the work of experts from across the globe to assess the most recent research subjects and trends. From our research, we get the following observations:

- The papers suggest that the pandemic has had a significant impact on online retail sales. Hwang et al. (2020) found that omnichannel retailers experienced an increase in online sales due to the closure of physical stores and the acquisition of new customers. Fihartini et al. (2021) found that consumers' perceived health risk and positive perceptions of online retail ethics influenced their online shopping behavior during the pandemic. Dannenberg et al. (2020) found that the pandemic led to a general upswing in grocery trade, with disproportionately high growth in online grocery trade. Sayyida et al. (2021) found that webrooming and pure online shopping were the dominant shopping trends during the pandemic, with retail sales in physical stores exceeding 70% of total retail sales and retail e-commerce sales being less than 30% of total retail sales. Overall, the papers suggest that the pandemic has accelerated the shift towards online retail sales, but physical stores still play a significant role in retail sales.

- The papers suggest that the pandemic has had a significant impact on retail employment. Kramer and Kramer (2020) discusses how the pandemic may change perceptions of the value and status of different occupations, resulting in changes in occupational supply and demand. Mack et al. (2021) found that workers in the transportation sector, which includes retail workers, were more likely to be unemployed due to the pandemic than workers in non-transportation industries. Izguttiyeva et al. (2021) notes that the pandemic has led to an increasing number of employers' requirements for soft skills, which may affect the demand for retail workers. del Rio-Chanona et al. (2020) predicts that the pandemic will threaten a significant portion of the US economy's GDP and jobs, with sectors such as entertainment, restaurants, and tourism facing large supply and demand shocks, which may affect retail employment.

- The papers suggest that the pandemic has had a significant impact on the retail industry, with some sectors being affected more than others. Nanda et al. (2021) argues that the pandemic has accelerated the shift towards e-commerce and digitalization, which

has led to changes in consumer behavior and the retail land-scape. Lashgari and Shahab (2022) notes that the pandemic has intensified changes in customer preferences and the role of city centers, leading to more retailers adopting multichannel retailing and repositioning strategies. Sayyida et al. (2021) found that during the pandemic, consumers tended to use online channels to reduce face-to-face contact with marketers or other consumers, but physical stores still accounted for over 70% of total retail sales. Yang 2020 suggests that the pandemic has brought both challenges and opportunities to the retail industry. Overall, the papers suggest that the pandemic has accelerated changes in the retail industry, with e-commerce and digitalization becoming increasingly important, while physical stores are still relevant but may need to adapt to new consumer behaviors.

- Based on the examination of scholarly articles, it can be posited that the global pandemic has exerted a substantial influence on consumer conduct. The study conducted by the authors (Cox et al., 2020) revealed that households belonging to various income brackets reduced their expenditures during the initial months of the pandemic. However, it was observed that low-income households exhibited a more rapid recovery in their spending patterns. There were also large increases in liquid asset balances for households throughout the income distribution, with lower-income households contributing disproportionately to the aggregate increase in balances. Hesham et al. (2021) found that the pandemic increased the intention to buy among consumers of healthy foods, with women being more anxious about the pandemic than men and taking more precautions to avoid contamination. Finally, Baker et al. (2020) found that household consumption responded to the pandemic by radically altering typical spending across a number of major categories, with spending decreasing in the latter part of March except for food delivery and grocery spending.

- It is also found that the pandemic has affected different demographics of consumers differently. Lee and Worthy (2021) found that age and race were related to changes in wellness-related behavior and lifestyle choices, with older respondents experiencing less change than younger respondents, and Whites and Asians reporting less change than Blacks or Hispanics. Crosta et al. (2021) found that changes in spending levels were associated with changes in consumer behavior, with necessities being predicted by anxiety and COVID-related fear, and non-necessities being predicted by depression. Bareja-Wawryszuk et al. (2022) found that there were clear differences in the nature of changes in consumer behavior between respondents from Turkey and Poland, with the purchasing habits of respondents in Turkey changing to a greater extent. Argyropoulou et al. (2023) found that the pandemic has impacted various aspects of consumer behavior in Greece, with online shopping and social media usage increasing during this period.

- The papers suggest that the COVID-19 pandemic has had a significant impact on online shopping behavior. Alaimo et al. (2020) found that people who were already familiar with online grocery shopping and had a higher education level were more satisfied with the experience during the pandemic. Ecola et al. (2020) found that more Americans are shopping online and spending more money on online purchases, while those who lost employment during the pandemic spent less. Moon et al. (2021) analyzed the characteristics of consumers who used offline shopping channels during the pandemic and found that many aspects of daily life, including shopping, are now conducted online. Pollák and Konečný (2021) used Facebook data to analyze e-consumer behavior during the pandemic and found that the pandemic has caused changes in consumer behavior that are suitable for further research. Overall, the papers suggest that the pandemic has accelerated the shift towards online shopping and that this trend is likely to continue even after the pandemic ends.

- According to the papers, the COVID-19 pandemic has exerted a substantial influence on the retail labor force. The research conducted by Khaled et al. (2020) revealed that the well-being of employees is positively associated with the performance of retailers. On the other hand, Alflayyeh et al. (2020) observed a significant surge in e-retailing during the pandemic, which has resulted in a change in customer preferences and purchasing patterns. Naseri et al. (2021) highlighted that the pandemic has caused a decrease in demand and business volume for the retail industry, leading to downsizing and a need for new approaches to shopping. Sayyida et al. (2021) found that consumers have shifted towards webrooming and pure online shopping during the pandemic, leading to changes in retail marketing strategies. Overall, the papers suggest that the pandemic has caused significant changes in the retail industry, with a shift towards online shopping and a need for retailers to prioritize employee well-being and adapt to new approaches to shopping.

6. Conclusion

Due to the COVID-19 pandemic, retail was in the midst of unprecedented change, largely driven by the effects of technology on customer behavior and retail processes. In this context, this paper aimed to analyze the change and development in the research field related to the retail sector. We statically compared and analyze different Scopus index papers. With the increase in the publication from 2020 to 2022 it is evident that many researchers are working to develop new technologies and theories to counter COVID-19 effects on the retail sector. The interest in retail is also visible in the contributions made by nations and institutions (the United States, China and India) of diverse origin. Additionally, the number of articles and citations has grown exponentially in the last two years, leading us to believe that retail research is a growing trend. Future research can include data from databases other than Scopus.

CRediT authorship contribution statement

Brij B. Gupta: Conceptualization, Formal analysis, writing, Supervision. **Akshat Gaurav:** Conceptualization, Formal analysis, Writing. **Prabin Kumar Panigrahi:** Conceptualization, writing, Supervision.

Data availability

Data will be made available on request.

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