

A 35-Year Bibliometric Study on Online Shopping Trends and Developments Around the COVID-19 Pandemic

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DOI : <https://dx.doi.org/10.47772/IJRISS.2024.8120020>

Received: 23 November 2024; Accepted: 28 November 2024; Published: 28 December 2024

ABSTRACT

The rise of online shopping has significantly altered consumer behaviour and the retail landscape. With the increasing integration of digital platforms into retail, understanding the evolving dynamics of online shopping has become significantly more important. The COVID-19 pandemic has accelerated the shift in consumer habits, underscoring the need to analyse how online shopping trends and research have evolved over different time periods. This study aims to provide an insight into the field of online shopping studies in the periods before, during, and after the COVID-19 pandemic. Through a comprehensive bibliometric analysis of 2,260 sources worldwide, it aims to map the development of online shopping literature, identify important articles, and examine critical areas of research in these different time periods. With an emphasis on the pandemic context, this study uses Bibliophagy, a tool developed from the Bibliometric package in R, to visualise and comprehend data from the Scopus database from 1987 to 2022. The study recognises certain changes in the consumers' behaviour and research activities during the pandemic and provides several landmark publications and main streams of research. This overview provides a broad perspective on the topic, discusses various aspects, and identifies current and future trends in online shopping research. Furthermore, the study presents the application of its findings for policy makers and business practitioners pertaining to trust building, strategy optimization and management of sustainable growth of e-commerce. When making these changes, the study also enhance the clarity regarding the importance of the study and its contributions to the field.

Keywords: Bibliometric Analysis; Bibliophagy, Online Shopping; e-Commerce; COVID-19 Pandemic

INTRODUCTION

Today, internet shopping is very popular because it is much easier to buy products without having to go out and get them from shopping centres (Vasudevan & Arogyaswami, 2021). When customers choose to buy online, the entire browsing experience is streamlined. Online shoppers can swiftly investigate by browsing a website and selecting a product without having to go to a physical location to hunt for and buy anything. Furthermore, online buying is more convenient for clients because they may shop 24 hours a day, whereas traditional shopping is limited to specific hours. The act of purchasing goods and services using the Internet is known as online purchasing (Javadi et al., 2012; Qureshi et al., 2014; Tariq et al., 2016). The desire of consumers to buy online has emerged as one of the key motivators for them to do so (Jiang et al., 2013). This situation has arisen because of technological advancement and complexity, as well as the modernisation tendency. The COVID-19 outbreak, on the other hand, has increased the acceptance of e-commerce worldwide. The pandemic hastened the transition to a more digital world and changed people's online purchasing behaviours, both of which are probably going to have long-term impacts (United Nations, 2020). A Rakuten Insight survey found that 34% of participants said the epidemic caused them to spend more money online (Statista, 2020a).

PROBLEM STATEMENT

Following previous online purchasing studies, previous researchers described online shopping in various ways using various managerial ideas. Previous internet buying studies have focused on issues and causes, relief actions, stakeholder management, and a variety of other topics. While there is much research that explains internet buying, less focus given on the COVID-19 outbreak. As a result, studying and analysing the online shopping research trend before, during, and after the COVID-19 outbreak will help lay a better basis for future online shopping studies. Even though a large body of studies on the COVID-19 outbreak, fewer studies give detailed evaluations of difficulties raised in online shopping, particularly during natural catastrophes when people are concerned about their health.

Following a review of the sources, there is a notable lack of online shopping research that emphasises a review of the COVID-19 outbreak online shopping-linked. As a result of this gap, this research's primary goal is to analyse online shopping studies during the COVID-19 outbreak. The bibliometric analysis of online shopping conducted for this research focuses on the before, during, and after COVID-19 outbreak phases. Bibliometric analysis, according to Wahyuni et al. (2019) and Feng et al. (2017), is a productive way to map out and analyze specific locations in-depth, providing visual analysis and creating a cluster of exploration from earlier studies.

In comparison to traditional trend analysis, it is limited to the list and basic analysis based on variable lists and theories. By using bibliometric analysis, a researcher can create a cluster area of interest in the discipline by performing network analysis on keywords and titles. In actuality, the researcher was able to completely characterize the authors, sources, and citations of the previous paper by using network analysis and scientific mapping. The purpose of this study is to address the following research questions:

RQ1: What are the current publications and trends in online shopping literature?

RQ2: What are the most cited documents in online shopping research?

RQ3: Who are the most productive contributors to online shopping literature regarding authors, countries, institutions and source titles?

RQ4: What are the important keywords in online shopping before and after the era COVID-19 outbreak?

RQ5: What are the current states of knowledge structure regarding co-citations, collaboration, and co-occurrence networks in online shopping research?

RQ6: What are the themes in online shopping before and after the COVID-19 outbreak?

The paper is set up as follows. The development of online shopping literature will be discussed in the next part, which will be followed by a review of online shopping studies conducted before, during, and after the COVID-19 epidemic. The bibliometric approach utilised in this investigation is then described in this publication utilising Bibliophagy. This section contains some references and a flow diagram for performing bibliometric analysis. Following the discussion of the specific analysis to address the aforementioned research topics, the discussion turned to the contribution, limitations, and suggestions for further research.

LITERATURE REVIEW

Information and Communication Technology (ICT) has developed so much that people can perform such as shopping from the comfort of their homes (Enam, Azad, & Afrin, 2024). In due course, e-business has been investigated through some places, mostly social networks and online sales delineated by websites (Sun et al, 2016). Some products have experienced a decline in year-on-year terms and this list includes clothing, footwear & accessories; magazines & books; office equipment; furniture but also motor vehicle products. The transactions of such products need to be fulfilled through both physical and online stores, but during the pandemic physical stores were shut off (Lu, Wu, Peng & Lu, 2020). There are certain types of products where demand has increased more, for example car accessories or household goods to the point that since the early days of COVID-19 pandemic on the Internet people have been buying more hygiene but also home articles. Finally, it has generated changes in the way people behave or expect certain things to be (the expectations of

the customers) due to its influence on many characteristics of our society and they have also changed a lot which produced economic changes at the same time during COVID-19 pandemic and for some companies these months were an opportunity as well (Wang & Wang, 2020). With the onset of COVID-19 and the fear among people of going to stores, turning to home delivery services became a regular habit which would require more than what the existing delivery companies could provide. Digitization and Internet access have led to a significant increase in online shopping, year by year, and in 2019, online retail worldwide exceeded \$ 3.5 trillion, so that people who purchased goods and services from the virtual environment reached 1.92 billion (Statista, 2020b).

The global spread of COVID-19 has had enormous consequences for public health, society, and the economy. The COVID-19 pandemic has caused individuals to stay at home and shop online (Nistor, 2021). At the same time, the novel coronavirus had a significant impact on all aspects of people's life. People's shift to online retailers reflected the desire for security and the ability to use the digitizing services provided by websites, online stores, social networks, and others. People have turned to the virtual environment while most countries have resorted to quarantine, closing schools and shops, cancelling events, and suspending air travel. However, it was able to boost the dynamism of e-commerce between companies, consumers, and countries while also expanding the consumer base by audience niche. If young people were the ones who chose online commerce before to the pandemic, the elderly have now joined, resulting in the creation of a digital society based on information and purchasing power (Nistor, 2021).

Thus, the way people carry out their activities has changed, and companies have focused on developing the technological process to survive in the market and for precise cost efficiency. E-commerce was a good opportunity for most companies, allowing a range of products and services and not least, prompt delivery (Shahzad et al., 2020). This demonstrates that e-commerce has much greater control over the markets, and companies have joined the new business development opportunities. Each country has its own culture and civilization, through which the set of values, principles, customs, beliefs, and traditions is formed Society and the individual generally form consumer preferences, so that the main values of a particular society determine, as a rule, what the public buys, the types of products consumed and purchased, through sets of values and the principle transmitted (Jaakkola & Alexander, 2014).

As highlighted in the surfaced perspectives, there has occurred a significant increase in the number of research papers produced in every year over the past ten years (Mahendra & Yoshiki, 2015). Research of papers published during the period 2000-2003 seems to have had a very significant impact when the number of citations is considered. This is in part because of the expansion of internet companies during the earliest years of this century and while most basic theories of e-business and e-commerce were being formulated. On the other hand, it can be contended that the articles designed between 2000 and 2003 were of longer span hence having more cites resulting to a higher effect. Out of the nine authors, Izak Benbasat claimed the top authorship in terms of output and sustenance. The period from 2000 to 2014 saw the publication of the research's ten papers but at different intervals spanning seven years. But it is Gefen et al. (2003) who authored an article on this subject that amassed 995 quotes turning out to be more than any such other study. The growth of e-commerce has ushered increased efforts and more influential publications toward the direction of a study by Mahendra and Yoshiki (2015). But it should be mentioned that the so-called e-commerce panacea has not been widely applied to the topic area. This means that Online Shopping or e-commerce research publications are not a standalone subject area, and many such dissertations are published in several periodicals, sometimes associated with Technology, Marketing, Operations, or Management due to the content and motives of writers. In any case, Journal of Business Research, Marketing Science, Information & Management and Psychology & Marketing occupy the top positions in all evaluation criteria - rate of productivity, sustainability and the scope of influence of this area.

METHODOLOGY

Any study that is done must have its methodology explained in detail. The use of bibliometric analysis in literature reviews is common because it gives the researcher a deeper understanding of the subject by providing a scientific mapping of the relevant publication database. Performing bibliometric review analysis enables the

researcher to better grasp the body of knowledge on the topic, according to Transfield et al. (2003). This is also in line with Denney and Tewksbury’s (2013) evaluation of the literature utilising bibliometric analysis and specialised online databases like Scopus or the Web of Science (WoS) database, which results in the acquisition of a sizable pool of publications and pertinent articles. Scopus also enables flexible searching across numerous bibliographic fields (Hassan & Ahmi, 2022).

Defining Keywords

It is important to choose the appropriate keywords when doing the bibliometric investigation. To achieve the study aims, the researcher employed the following query terms: online shopping, online purchase and online purchasing using the following query: TITLE (online shopping* AND (online purchase* OR “online purchasing”)).

Search Strategy

The online Scopus database is used in this study to gather a collection of articles published on online shopping. The Scopus online database was chosen for this study because of its standing as the leading citation and abstract database in the fields of technology, social science, business, and management, including supply chain and logistics (Fahimnia et al., 2015). Well-known and prestigious academic publishers like Emerald, Elsevier, Springer, Inder science, and Taylor & Francis Group are responsible for all peer-reviewed articles that are published in this Scopus online database. Chicksand et al. (2012) and Norris and Oppenheim (2007) suggested that the Scopus database is an excellent resource for peer-reviewed articles in social sciences and logistics and supply chains. Figure 1 details the steps and search strategy used to conduct the bibliometric analysis for this study.

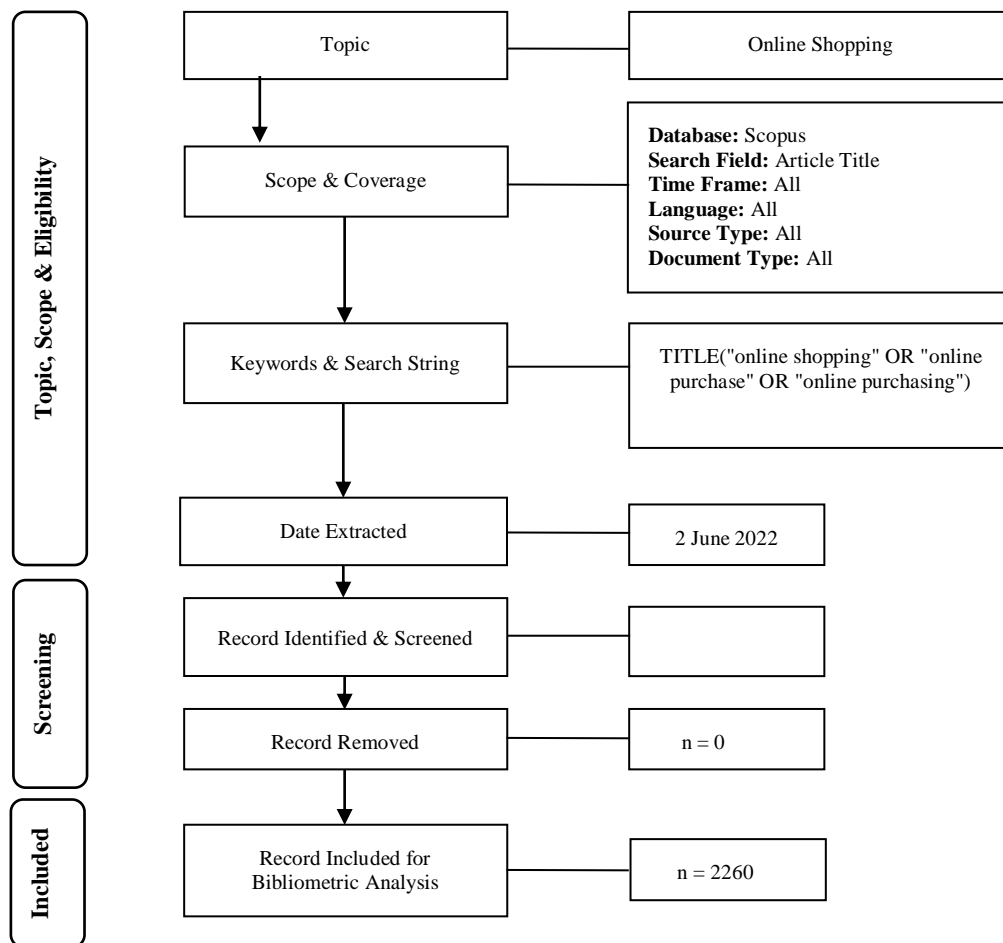


Figure 1: Flow Diagram of the Search Strategy

Source: Zakaria et al. (2021); Kushairi & Ahmi (2021)

In Figure 1, there is the stepwise procedure for data selection pertaining to online shopping literature including the records from the Scopus Database up to the date of 2nd June 2021. The search began with an attempt to pinpoint the raised topics to articles contained in titles of articles, to include all documents, languages, source and the document type. Regarding phrases, 2,260 records were located and processed including no deletions of records, this meant that all 2,260 were subjected to bibliometric analysis. Bibliophagy presents itself as an all-encompassing method of research which views the range of the primary spendings in the described studies as ranging from 1987 to 2022.

Tool and Data Analysis

The study employed Bibliophagy, a shiny app for the Bibliometrics R package, to conduct the bibliometric analysis to meet the research objective and respond to the research questions presented in this study. Aria and Cuccurullo (2017) developed this software, primarily concentrating on science mapping analysis. The phases and analyses carried out for this investigation are displayed in Figure 2. The research questions (RQs) listed in the beginning chapter of this paper are the primary focus of the two types of studies, which are network analysis and descriptive analysis.

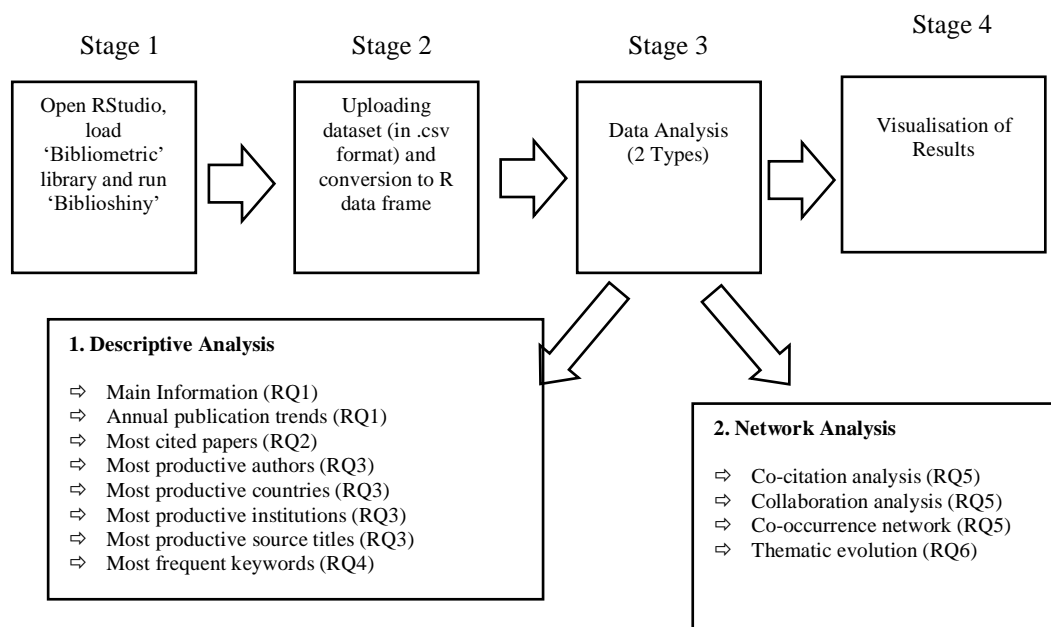


Figure 2: Detailed Steps for Bibliometric Analysis using Bibliophagy

Source: The authors (guided by Rahman et al., 2022)

ANALYSIS AND RESULTS

Descriptive Analysis

This section examines the online purchasing research profile, covering the sources of publishing from 1987 to 2022. This covers all information about the current condition of publications, research trends, highly cited papers, prolific authors, countries and institutions, publication sources, and author keywords.

Main Information

The first publication about online shopping appeared in the Scopus database in 1987. The number of publications is increasing rapidly at a pace of 22.33% per year. Table 1 shows data on all articles published in online commerce from 1987 to 2022, including average years since publication, average citation per document, average citation per year, document categories, document contents, author details, and author collaboration.

Table 1: Main Information Regarding Selected Articles

Description	Results
MAIN INFORMATION ABOUT DATA	
Timespan	1987:2022
Sources (Journals, Books, etc.)	1038
Documents	2260
Average years from publication	6.31
Average citations per document	19.71
Average citations per year per doc	2.051
References	81800

DOCUMENT TYPES	
Article	1410
Conference Paper	695
Book Chapter	82
Review	40
Retracted	7
Editorial	6
Erratum	6
Note	5
Short Survey	3
Article In Press	2
Data Paper	2
Book	1
Letter	1

DOCUMENT CONTENTS	
Keywords Plus (ID)	5230
Author's Keywords (DE)	4089

AUTHORS	
Authors	4778
Author Appearances	6346
Authors of single-authored documents	281
Authors of multi-authored documents	4497
AUTHORS COLLABORATION	

Single-authored documents	318
Documents per Author	0.473
Authors per Document	2.11
Co-Authors per Documents	2.81
Collaboration Index	318

Annual Publication Trends

Annual publication trends from 1987 to 2022, including total publication, total citation, citation per document, and citation per year, are displayed in Table 2 and Figure 3, respectively. Given the data acquired from this bibliometric research, the maximum total publication in the field of online shopping occurs in 2021, with a total of 270 articles. This could be linked to the global pandemic caused by the COVID-19 outbreak. As the pandemic continues to spread, these changes may cause a rising in research in COVID-19 online shopping fields and bring about a higher rate of research collaboration.

Table 2: Annual Publications Trends

Year	TP	TC	C/D	C/Y	Citable Years
1987	1	1	1.00	0.03	35
1988	0	-	-	-	0
1989	0	-	-	-	0
1990	0	-	-	-	0
1991	0	-	-	-	0
1992	0	-	-	-	0
1993	0	-	-	-	0
1994	0	-	-	-	0
1995	0	-	-	-	0
1996	0	-	-	-	0
1997	0	-	-	-	0
1998	0	-	-	-	0
1999	2	84	42.00	1.83	23
2000	12	1,538	128.17	5.83	22
2001	12	914	76.17	3.63	21
2002	13	1,172	90.15	4.51	20
2003	17	6,179	363.47	19.13	19

2004	11	611	55.55	3.09	18
2005	26	1,967	75.65	4.45	17
2006	41	3,291	80.27	5.02	16
2007	33	1,442	43.70	2.91	15
2008	38	1,309	34.45	2.46	14
2009	84	2,434	28.98	2.23	13
2010	98	2,544	25.96	2.16	12
2011	108	3,085	28.56	2.60	11
2012	78	1,992	25.54	2.55	10
2013	110	1,778	16.16	1.80	9
2014	111	2,756	24.83	3.10	8
2015	113	1,734	15.35	2.19	7
2016	137	2,643	19.29	3.22	6
2017	167	1,864	11.16	2.23	5
2018	193	2,128	11.03	2.76	4
2019	239	1,387	5.80	1.93	3
2020	220	1,180	5.36	2.68	2
2021	270	464	1.72	1.72	1
2022	126	51	0.40		0
Total	2260	44,548	19.71	-	-

Note: TP=Total publications; TC=Total citations; C/D=Citation per documents; C/Y=Citations per year.

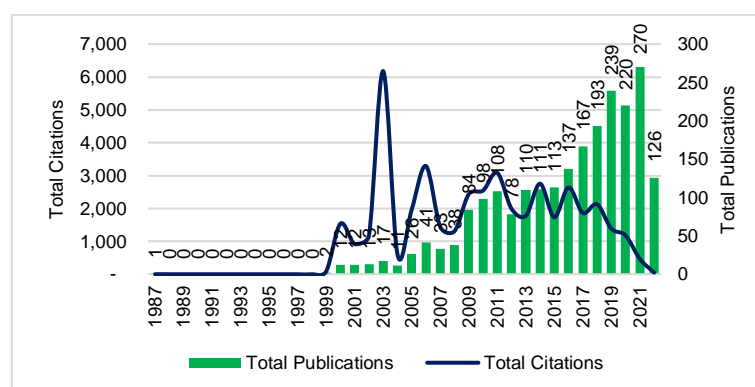


Figure 3: Growth and Publications Impact Per Year

Most Cited Papers

Table 3 shows the most cited papers both globally and locally. The article's popularity is indicated by its top citation paper (Guo et al., 2021). Global citations often show the frequency of annual citations when data is downloaded. The most cited article by Gefen et al. (2003), with 4446 citations, discusses the Technology Acceptance Model (TAM) and trust as an integrated model in online shopping. The second most cited article by Häubl and Trifts (2000), with 998 citations, highlights the issue of consumer decision-making in online shopping environments. The third most cited article by Miyazaki and Fernandez (2001), with 729 citations, discusses consumer perceptions of privacy and security risks for online shopping.

Table 3: Top 20 Most Cited Documents

No.	Author(s)	Title	TC	C/Y
1	Gefen et al. (2003)	Trust and TAM in online shopping: An integrated model	4446	234
2	Häubl & Trifts (2000)	Consumer decision making in online shopping environments: The effects of interactive decision aids	998	45.36
3	Miyazaki & Fernandez (2001)	Consumer perceptions of privacy and security risks for online shopping	729	34.71
4	Heijden et al. (2003)	Understanding online purchase intentions: Contributions from technology and trust perspectives	698	36.74
5	Lee & Lin (2005)	Customer perceptions of e-service quality in online shopping	653	38.41
6	Yoon (2002)	The antecedents and consequences of trust in online-purchase decisions	618	30.9
7	Schlosser et al. (2006)	Converting web site visitors into buyers: How web site investment increases consumer trusting beliefs and online purchase intentions	561	35.06
8	Hausman & Siekpe (2009)	The effect of web interface features on consumer online purchase intentions	545	41.92
9	Overby & Lee (2006)	The effects of utilitarian and hedonic online shopping value on consumer preference and intentions	525	32.81
10	Bauer et al. (2006)	eTransQual: A transaction process-based approach for capturing service quality in online shopping	520	32.5
11	Hassanein & Head (2007)	Manipulating perceived social presence through the web interface and its impact on attitude towards online shopping	493	32.87
12	Park & Kim (2003)	Identifying key factors affecting consumer purchase behavior in an online shopping context	486	25.58
13	Forsythe et al. (2006)	Development of a scale to measure the perceived benefits and risks of online shopping	453	28.31
14	Limayem et al. (2000)	What makes consumers buy from Internet? A longitudinal study of online shopping	431	19.59

No.	Author(s)	Title	TC	C/Y
15	Chang et al. (2005)	Literature derived reference models for the adoption of online shopping	341	20.06
16	Grabner-Kraeuter (2002) [24]	The role of consumers trust in online-shopping	333	16.65
17	San Martín & Herrero (2012)	Influence of the user’s psychological factors on the online purchase intention in rural tourism: Integrating innovativeness to the UTAUT framework	327	32.7
18	Escobar-Rodríguez, & Carvajal-Trujillo (2014)	Online purchasing tickets for low-cost carriers: An application of the unified theory of acceptance and use of technology (UTAUT) model	293	36.63
19	Amblee & Bui (2011)	Harnessing the influence of social proof in online shopping: The effect of electronic word of mouth on sales of digital microproducts	287	26.09
20	Chiu et al. (2009)	Determinants of customer re-purchase intention in online shopping	285	21.92

Note: TC=Total citations; C/Y=Citations per year.

Most Productive Author

Table 4 shows the top ten productive authors with their total publication numbers, the number of cited papers, total citation, h index and their publication year start. As shown in Table 4, Tandon Urvashi appeared as a leading author in online shopping, with a total production number of articles is 10. This is followed by Benbasat, Kiran and Wu with nine articles each.

Table 4: Most Productive Authors with a Minimum of 6 Publications

Author’s Name	Affiliation	Country	TP	NCP	TC	h	g	m	PYS
Tandon, Urvashi	Chitkara University	India	10	8	172	7	8	1	2016
Benbasat, Izak	UBC Sauder School of Business	Canada	9	9	220	6	9	0.353	2006
Kiran, Ravi	Thapar Institute of Engineering & Technology	India	9	8	166	7	8	1	2016
Wu, Wann Yih	Nanhua University Taiwan	Taiwan	9	7	238	6	7	0.353	2006
Forsythe, Sandra Monk	Auburn University	United States	8	8	878	8	8	0.471	2006
Zakuan,	University Technology	Malaysia	7	7	65	4	7	0.4	2013

Author's Name	Affiliation	Country	TP	NCP	TC	h	g	m	PYS
Norhayati M.	Malaysia								
Cheung, Christy M.K.	Hong Kong Baptist University	Hong Kong	6	5	260	5	5	0.357	2009
Frank, Lauri Dieter	University of Jyväskylä	Finland	6	5	6	1	1	0.25	2019
Khare, Arpita	GL Bajaj Institute of Management and Research	India	6	7	194	7	7	0.538	2010
Kukar-Kinney, Monika	University of Richmond	United States	6	2	320	2	2	0.154	2010
Patro, Chandra Sekhar	Gayatri Vidya Parishad College of Engineering	India	6	5	31	3	5	0.429	2016

Note: TP=Total publications; NCP=Number of cited papers; TC=Total citations; h=h-index; g=g-index; m=m-index; PYS=Publication year start

Most Productive Countries

Table 5 shows the 42 productive countries with at least ten published articles. The top ten countries publishing more research articles on online shopping are China, the United States, India, Taiwan, Malaysia, South Korea, the United Kingdom, Indonesia, Canada, and Japan. Nikkei (2020) highlights China's current position due to its significant expenditure on R&D and the rising number of researchers. When adjusted for buying power, the nation spent around \$554 billion on gross domestic R&D in 2018, an increase of 10% over the previous year. In addition, China's university spending has increased noticeably, increasing 10.2 times between 2000 and 2018, compared to only 1.8 times in the United States. Additionally, in terms of researchers, China had more than 2.1 million in 2019, up 13% from the previous year, and the country's pool of top academics is still expanding (BI Weizi, 2021). BI Weizi (2021) added the massive increase in China's proportion of scientific articles and citations worldwide is the result of the country's investment in scientific resources, combined with other stimulus programmes by the public and private sectors.

Table 5: Top Countries that Published Ten or More Documents

No.	Country	Total Publications	Percentage (%)
1	China	525	23.23
2	United States	341	15.09
3	India	296	13.10
4	Taiwan	150	6.64
5	Malaysia	147	6.50
6	South Korea	99	4.38
7	United Kingdom	94	4.16
8	Indonesia	91	4.03

No.	Country	Total Publications	Percentage (%)
9	Canada	53	2.35
10	Japan	48	2.12
11	Germany	45	1.99
12	Hong Kong	45	1.99
13	Spain	44	1.95
14	Australia	41	1.81
15	Pakistan	39	1.73
16	Viet Nam	39	1.73
17	Iran	33	1.46
18	Singapore	32	1.42
19	Turkey	31	1.37
20	France	27	1.19
21	Jordan	26	1.15
22	Portugal	25	1.11
23	Saudi Arabia	22	0.97
24	United Arab Emirates	21	0.93
25	Brazil	19	0.84
26	South Africa	18	0.80
27	Czech Republic	17	0.75
28	Finland	16	0.71
29	Netherlands	16	0.71
30	Thailand	16	0.71
31	Italy	15	0.66
32	Norway	15	0.66
33	New Zealand	14	0.62
34	Nigeria	14	0.62
35	Poland	14	0.62
36	Sweden	13	0.58
37	Switzerland	13	0.58
38	Greece	12	0.53
39	Austria	11	0.49
40	Mexico	11	0.49
41	Romania	11	0.49
42	Oman	10	0.44

Most Productive Institutions

Similarly, Bibliophagy is used to identify the most productive university. Table 6 lists the most productive affiliations or institutions, together with the number of publications they have published. The table includes the top ten affiliations for ease of reference. The table shows that Bina Nusantara University is the most productive university for addressing and publishing online shopping issues, with a total of 26 articles.

Table 6: Top Institutions that Published Ten or More Documents

No.	Institution	Total Publications	Percentage (%)
1	Bina Nusantara University	26	1.15
2	City University of Hong Kong	20	0.88
3	National University of Singapore	17	0.75
4	Tsinghua University	17	0.75
5	Amity University	16	0.71
6	University Utara Malaysia	15	0.66
7	Zhejiang University	15	0.66
8	Beijing University of Posts and Telecommunications	15	0.66
9	University Putra Malaysia	15	0.66
10	Ministry of Education China	14	0.62
11	University Technology MARA	14	0.62
12	National Cheng Kung University	14	0.62
13	University Technology Malaysia	14	0.62
14	Shenzhen University	13	0.58
15	The University of British Columbia	13	0.58
16	Xi'an Jiaotong University	13	0.58
17	Tongji University	13	0.58
18	Sungkyunkwan University	12	0.53
19	Sichuan University	12	0.53
20	Xiamen University	12	0.53
21	University of North Texas	12	0.53
22	Donghua University	11	0.49
23	Seoul National University	11	0.49
24	Harbin Institute of Technology	11	0.49
25	Brunel University London	11	0.49
26	University Sains Malaysia	10	0.44
27	Thapar Institute of Engineering & Technology	10	0.44
28	Auburn University	10	0.44
29	Hong Kong Baptist University	10	0.44
30	Virginia Polytechnic Institute and State University	10	0.44

31	Wuhan University	10	0.44
32	Nanjing University	10	0.44

Table7: Most Productive Source Titles

Source Title	TP	TC	NCP	h	g	m	PYS
Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)	44	122	30	4	9	0.25	2007
ACM International Conference Proceeding Series	35	24	15	3	3	0.25	2011
Journal of Retailing and Consumer Services	33	1647	30	18	30	1.13	2007
Developments in Marketing Science: Proceedings of the Academy of Marketing Science	26	20	9	3	3	0.38	2015
Journal of Internet Commerce	26	629	22	13	22	0.65	2003
Sustainability (Switzerland)	21	389	19	11	19	1.57	2016
Internet Research	20	1258	19	15	19	0.83	2005
Journal of Business Research	19	3097	18	16	18	0.89	2005
Advances in Intelligent Systems and Computing	18	11	6	2	2	0.25	2015
International Journal of Electronic Marketing and Retailing	17	71	14	5	7	0.29	2006
International Journal of Recent Technology and Engineering	17	18	10	2	3	0.50	2019
Computers in Human Behavior	16	1631	16	13	16	0.87	2008
Behaviour and Information Technology	15	653	13	10	13	0.48	2002
International Journal of Retail and Distribution Management	15	1494	13	12	13	0.67	2005
Proceedings of the Annual Hawaii International Conference on System Sciences	15	88	14	5	9	0.28	2005

Several journals published the 337 articles. Based on the retrieved data, the source-wise publishing analysis is completed and shown in Table 7. The top 10 journals are displayed with at least five papers released to make things easier to understand. With a total of 44 articles, Table 7 shows that the Lecture Notes in Computer Science has the most publications. The ACM International Conference Proceeding Series (35 articles) and the Journal of Retailing and Consumer Services (33 articles) follow afterwards. The productivity of the journals over the years are shown detail in Table 7.

Note: TP=Total publications; TC=Total citations; NCP=Number of cited papers; h=h-index; g=g-index; m=m-index; PYS=Publication year start

Most Frequent Keywords

A similar analysis for the most frequent analysis is conducted for this bibliometric study in online shopping. Table 8 shows the top 25 author’s keywords and indexed keywords.

Table 8: Top 25 Keywords

Author's Keywords	Occurrences	Indexed Keywords	Occurrences
online shopping	729	e-commerce	1001
e-commerce	373	online shopping	650
purchase intention	208	sales	410
consumer behaviour	164	website	185
trust	150	internet	182
perceived risk	120	consumer behaviour	123
consumer satisfaction	93	purchase	120
technology acceptance model	85	surveys	118
online purchase	66	customer satisfaction	115
internet	57	decision making	97
purchase behaviour	50	online systems	93
shopping behaviour	49	purchase intention	88
consumers	42	behavioural research	87
attitude	41	information systems	78
e-wom	41	social networking (online)	77
satisfaction	40	commerce	71
internet shopping	39	shopping activity	71
security	37	marketing	65
India	34	human	63
e-tailing	30	online purchase	58
service quality	30	trust	56
shopping	30	article	53
re-purchase intention	29	perceived risk	51
covid-19	28	quality of service	47
website quality	28	regression analysis	45

Figure 4a and Figure 4b illustrate the word cloud of the keywords before and after the COVID-19 pandemic. E-commerce, purchase intention, consumer behaviour, perceived risk, trust, technology acceptance model, customer satisfaction, internet shopping, online purchase, Internet, satisfaction, purchase behaviour, consumer

attitude, security and service quality are among the top words found in this analysis before the pandemic outbreak COVID-19 on the online shopping study.



Figure 4a: Word Cloud of The Author’s Keywords (Before COVID-19)

While the word cloud of the indexed keywords that appeared in the field of online shopping after the pandemic COVID-19 outbreak are purchase intention, e-commerce, consumer behaviour, trust, covid-19, perceived risk, online purchase, shopping behaviour, technology acceptance model, e-worm, social media and consumer satisfaction.



Figure 4b: Word Cloud of the Author’s Keywords (After COVID-19)

Network Analysis

Network analysis is one of the most well-liked bibliometric analysis tools. Pajek, VOS viewer, Gephi, and HistCite are among the most popular tools for undertaking network exploration, according to Mishra et al. (2017). Bibliophagy has recently been acknowledged as the newest network analysis tool. The discussion of co-citation, collaboration, co-occurrence, and thematic analysis in online purchasing is covered in the next section.

Co-Citation Analysis

The term “citation analysis” refers to counting the frequency of citations in a given work. Garfield (1972) emphasised that a publication’s overall citation count is important in that field of study. On the other hand, co-citation analysis reveals connections between cited and referenced works. When two documents are both cited in a third document, this is known as co-citation (Aria & Cuccurullo, 2017). According to Small (1973), co-citation analysis is the study of the connections between authors, journals, titles, and keywords to determine how they are related to one another. The co-citation network by papers in the literature on online shopping is shown in Figure 5. It has been observed that clusters of study start to form when numerous writers co-cite the same pairs of papers. There are some common topics among the co-cited works in these clusters. Co-citation analysis, when used in conjunction with single-link clustering and multidimensional scaling methods, may map the structure of specialised study fields and science. Based on Figure 5, three main clusters indicate the papers co-cited by other papers within the dataset. A node that shares the same colour tends to have some common themes. This network maps the structure of common references made by the authors in this online shopping research. This co-citation network in this discipline is formed by the significant publications indicated in Table 3.

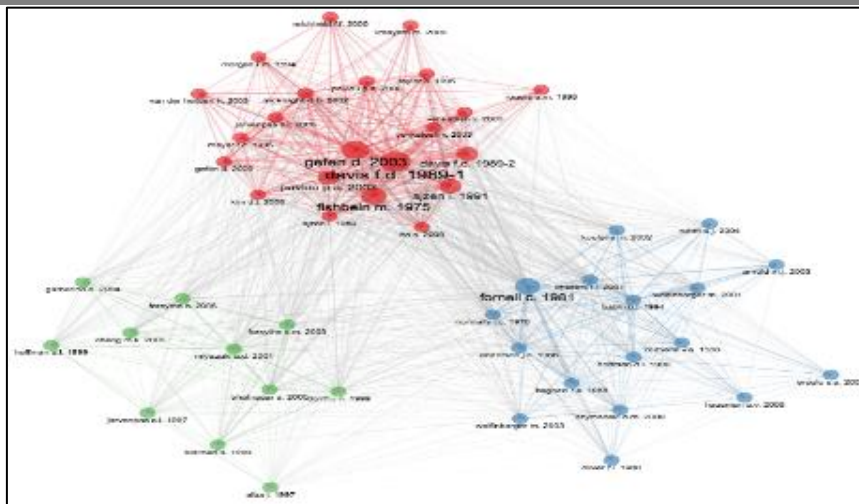


Figure 5: Co-Citation Network by Documents

Collaboration Analysis

Based on the data, collaboration analysis was performed to produce bibliographic networks that showed collaborative ties between authors, affiliations, and countries. Figure 6 illustrates an assessment of key collaboration between countries on online shopping research. As shown in Figure 6, it is noticeable that the collaboration is being developed by China scholars, followed by the United States (USA) and the United Kingdom country. These three leading countries have strong partnerships with others and with other countries such as Korea, Hong Kong, Singapore, Canada, New Zealand, Pakistan, Turkey and Belgium.

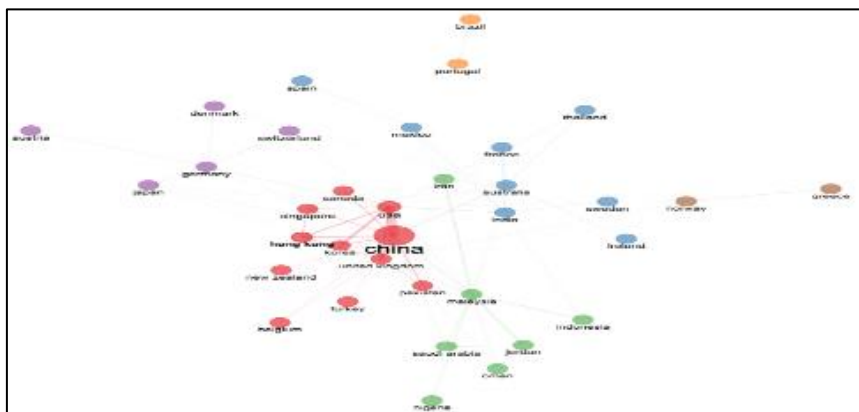


Figure 6: Countries Collaboration Network

Co-Occurrence Network

A co-occurrence, known as a semantic network, is the frequency with which identical keywords appear across numerous documents. Keywords that are similar and related to the same issue but not identical may be co-occurring. Figure 7 depicts the author's keyword co-occurrence network. The figure indicates that the thicker the line, the more significant the association between the keywords. Keywords without connecting lines indicate that no association has been formed. The higher the number of co-occurrences, the closer the phrases appear to the centre of the network. Authors' usage of terms indicates how closely related they are to one another, which leads to stronger and closer links. A keyword was used more frequently if its bubble was larger. Four thematic groups have been found based on this investigation. A unique colour is used to identify each cluster. According to the result, the following themes have been identified:

1. e-commerce (red bubbles)
2. Consumer Behaviour (blue bubbles)

3. Service/Product Quality (green bubbles)
4. Online Security and Privacy (purple bubbles)



Figure 7: Author's Keyword Co-Occurrence Network

Thematic Evolution

The theme evolution based on the author's keyword before and after the COVID-19 study related to online shopping is depicted in Figure 8. This analysis gives the reader information about a single subject or theme - online shopping. From Figure 8, for example, we can see how the themes related to online shopping have evolved before COVID-19 (i.e., for the period from 1987 to 2019) and after COVID-19 (from 2020 until early 2022). We can see how the six themes that existed before having become seven themes in the current period. While Figure 9 and Figure 10 show the thematic map before and after the COVID-19 pandemic specifically.

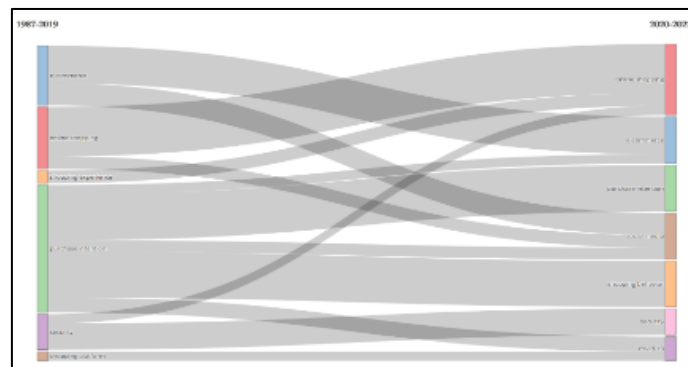


Figure 8: Thematic Evolution (Based on the Author's Keywords) Before and After COVID-19

As illustrated in Figure 9a, the upper-left quadrant shows the niche themes. They have well-developed internal ties but unimportant external ties and so are of only marginal importance to the field. The niche themes in this quadrant are security, shopping experience, and shopping platform. Finally, the lower-right quadrant shows the themes that are basic and transversal. Three themes appear in this quadrant: e-commerce, online shopping, and purchase intention. This theme relates general topics transversal to the different research areas of the field. This map (Figure 9) illustrates the positions of the themes before the COVID-19 pandemic.



Figure 9a: Thematic Map (Before COVID-19)

On the other hand, Figure 9b illustrates the positions of the themes associated with online shopping during the COVID-19 outbreak. We can see that the COVID theme is located between basic and emerging themes. Also, we can see the security theme appeared in the emerging or declining themes, low carbon and shopping behaviour in the niche themes. Lastly, social media has also become the new theme that is the motor theme in this field.

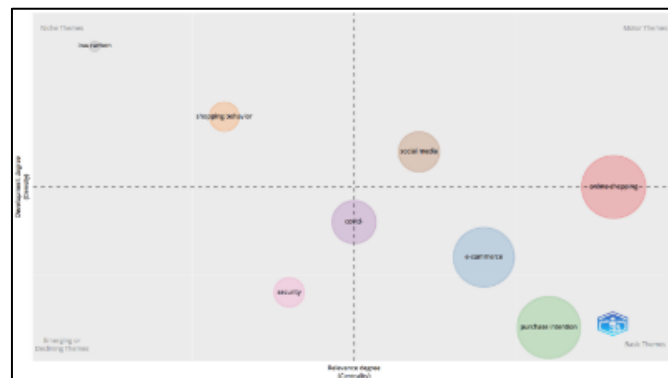


Figure 9b: Thematic Map (After COVID-19)

DISCUSSION

Due to the recent increase in interest in the online shopping study, this bibliometric analysis of the online shopping study concentrating on before, during, and after the COVID-19 outbreak reveals the significant number of publications in the field, which has led to an increase in requests for future research in the field of online shopping. Over the past three decades, the major contribution made by prior researchers has been addressed. Although previous studies and related keywords were analysed to demonstrate the increasing significance of the online shopping study, it has been determined from the COVID-19 outbreak perspective that future researchers could be more critical of the issue at hand, particularly in terms of related research clusters that are appropriate to address to fill the significant current gap. Respective researchers should explore understanding online shopping activity from several stakeholder viewpoints.

The study's lack of policy viewpoints develops concerns about online shopping during the pandemic. The role of the government and the country's policy in managing online shopping in a specific country must also be thoroughly investigated. For instance, it is necessary and intriguing to investigate how a country's national policy on pandemic management and supply control should be managed. While most of the previous research has focused on bibliometric analysis regarding the issue of investigation and cost management (Behl & Dutta, 2019; Ramos et al., 2020); assessment tool (Banomyong et al., 2019), this study presents a novel analysis of the previous research that was centred on COVID-19 outbreak online shopping.

The research under consideration stresses the diverse progression in online shopping activities before, during, and after the COVID 19 pandemic periods which is viewed as a range that brought about significant transition in the world. The emphasis on these temporal transitions fills an important void in most of the literature available, providing fresh perspectives on how ideas, technologies, and even government policies responded over time. The results show that, preferences such as "security" and "trust" became more dominant during and after the pandemic due to growing consumer concern about privacy and reliability. The emergence of "social media" as a central theme points out its increasing role in shaping purchase behaviours and facilitating customers' participation. In addition, the analysis of the international collaborative patterns showed that the countries with developed. digital space and effective e-commerce policies e.g. China or the United States, had a championing position in the research and innovation activities. Addressing these insights fosters the understanding of businesses and policy makers on how they can build on instilling trust in consumers, improve their digital approaches and manage growth in e-commerce in the post COVID 19 years. Furthermore, the researchers present the application of their findings for policy makers and business practitioners pertaining to trust building, strategy optimization and management of sustainable growth of e-commerce. When making

these changes, the authors also enhance the clarity regarding the importance of the study and its contributions to the field.

CONCLUSION

This research makes use of bibliometric and R software analysis to systematically and scientifically address the question of internet shopping's consumption trajectories in the pre COVID-19, during the COVID-19 and post COVID-19 eras. It carefully considers the aspects such as publication dates, publication types, publication sources and content of the documents. Moreover, the analysis brings attention to crucial aspects of the data such as yearly growth in number of publications, prolific authors and a list of their top ten most productive countries and institutions, the most cited publications and periodic changes in these indicators before and after the pandemic. The analysis of other advanced techniques such as co-citation and collaboration network analyses, thematic evolution and mapping, also put more light into the online shopping research scope and insights. This study is one of the first of its kinds, as a bibliometric study about the rise of online-shopping during the COVID-19 pandemic it builds up theoretical knowledge by rendering necessary future research. It extends understanding of the complexity of online shopping and how it is being altered further by the pandemic. The knowledge created from the analysis adds value to ensuring that academics, practitioners, and policymakers understand the sector's future, and this can assist in the formulation of policies. However, the research is sound, but doesn't sidestep weaknesses, such as focus on some specific keywords and the limit of Scopus coverage database, which might narrow down the coverage of the literature. It is recommended that other databases and reviewing methods be employed by other researchers so that the narrowness of the scopes is avoided. Going forth, it is very relevant to study future technological innovations that will further ease online shopping during challenges such as the pandemics. In line with Chen et al 2019, it is also suggested that further studies in the online shopping field focus on disruption strategies, operational resilience and catastrophe avoidance. A combination of experimental, qualitative and quantitative approaches could provide a better understanding of how to manage and develop the digital commerce value chain.

As part of the research, the study sought to determine notable developments, significant works, and changing themes in online shopping behaviour before, during, and after the COVID-19 pandemic. Such events have evolved norms around security and trust as well as rapid technology integration of social media that has been witnessed during the COVID pandemic period. These findings highlight the importance of understanding the patterns in e-commerce for policy and strategy formulation aimed at achieving sustainable development in the ever-mapping world. This study presents a comprehensive bibliometric analysis and strengthens the absent of specific/several aspects in the literature and proves the association of the pandemic with consumer behavior changes and formation of research perspectives. Its findings are of great importance for scholars, business representatives and policy makers, who must face ongoing changes on e-commerce markets and strategize their actions for the upcoming issues.

REFERENCES

1. Amblee, N., & Bui, T. (2011). Harnessing the influence of social proof in online shopping: The effect of electronic word of mouth on sales of digital microproducts. *International Journal of Electronic Commerce*, 16(2), 91–114.
2. Aria, M., & Cuccurullo, C. (2017). Bibliometric: An R-tool for comprehensive science mapping analysis. *Journal of Informetrics*, 11(4), 959–975.
3. Banomyong, R., Julagasigorn, P., Varadejsatitwong, P., & Piboonrunroj, P. (2019). The online shopping assessment tool (HumSCAT). *Journal of Humanitarian Logistics and Supply Chain Management*, 9(2), 221–249.
4. Bauer, H. H., Falk, T., & Hammerschmidt, M. (2006). e-TransQual: A transaction process-based approach for capturing service quality in online shopping. *Journal of Business Research*, 59(7), 866–875.
5. Behl, A., & Dutta, P. (2019). Online shopping management: A thematic literature review and future directions of research. *Annals of Operations Research*, 283(1–2), 1001–1044.

6. BI Weizi (2021). China: The world's no.1 producer of most cited research papers. *Science and Technology Daily*. Retrieved from
7. Blanco, E. E., & Goentzel, J. (2006). Online shopping: A review. *POMS: MIT Center for Transportation and Logistics*.
8. Chang, M. K., Cheung, W., & Lai, V. S. (2005). Literature derived reference models for the adoption of online shopping. *Information & Management*, 42(4), 543–559.
9. Chen, H. Y., Das, A., & Ivanov, D. (2019). Building resilience and managing post-disruption supply chain recovery: Lessons from the information and communication technology industry. *International Journal of Information Management*, 49, 330-342.
10. Chicksand, D., Watson, G., Walker, H., Radnor, Z., & Johnston, R. (2012). Theoretical perspectives in purchasing and supply chain management: An analysis of the literature. *Supply Chain Management: An International Journal*, 17(4), 454–472.
11. Chiu, C. M., Chang, C. C., Cheng, H. L., & Fang, Y. H. (2009). Determinants of customer re-purchase intention in online shopping. *Online Information Review*, 33(4), 761–784.
12. Denney, A. S., & Tewksbury, R. (2013). How to write a literature review. *Journal of Criminal Justice Education*, 24, 218–234.
13. Enam, A., Azad, I. I., & Afrin, S. (2024). Exploring online shopping behaviour in Dhaka, Bangladesh. *Transportation Research Interdisciplinary Perspectives*, 25, 101081.
14. Escobar-Rodríguez, T., & Carvajal-Trujillo, E. (2014). Online purchasing tickets for low-cost carriers: An application of the unified theory of acceptance and use of technology (UTAUT) model. *Tourism Management*, 43, 70–88.
15. Fahimnia, B., Tang, C. S., Davarzani, H., & Sarkis, J. (2015). Quantitative models for managing supply chain risks: A review. *European Journal of Operational Research*, 247(1), 1–15.
16. Feng, Y., Zhu, Q., & Lai, K.-H. (2017). Corporate social responsibility for supply chain management: A literature review and bibliometric analysis. *Journal of Cleaner Production*, 158, 296–307.
17. Forsythe, S., Liu, C., Shannon, D., & Gardner, L. C. (2006). Development of a scale to measure the perceived benefits and risks of online shopping. *Journal of Interactive Marketing*, 20(2), 55–75.
18. Garfield, E. (1972). Citation analysis as a tool in journal evaluation: Journals can be ranked by frequency and impact of citations for science policy studies. *Science*, 178(4060), 471–479.
19. Gefen, D., Karahanna, E., & Straub, D. W. (2003). Trust and TAM in online shopping: An integrated model. *MIS Quarterly*, 51–90.
20. Grabner-Kraeuter, S. (2002). The role of consumers' trust in online-shopping. *Journal of Business Ethics*, 39(1), 43–50.
21. Guo, Y.-M., Huang, Z.-L., Guo, J., Guo, X.-R., Li, H., Liu, M.-Y., Ezzeddine, S. & Nkeli, M. J. (2021). A bibliometric analysis and visualisation of blockchain. *Future Generation Computer Systems*, 116, 316–332.
22. Hassan, S., & Ahmi, A. (2022) Mapping the state of the art of scientific production on requirements engineering research: a bibliometric analysis. *International Journal of Information Technologies and Systems Approach*, 15(1), 1–23.
23. Hassanein, K., & Head, M. (2007). Manipulating perceived social presence through the web interface and its impact on attitude towards online shopping. *International Journal of Human-Computer Studies*, 65(8), 689–708.
24. Haubl, G., & Trifts, V. (2000). Consumer decision making in online shopping environments: The effects of interactive decision aids. *Marketing Science*, 19(1), 4–21.
25. Hausman, A. V., & Siekpe, J. S. (2009). The effect of web interface features on consumer online purchase intentions. *Journal of Business Research*, 62(1), 5–13.
26. Jaakkola, E., & Alexander, M. (2014). The role of customer engagement behaviour in value co-creation: A service system perspective. *Journal of Service Research*, 17(3), 247–261.
27. Javadi, M. H. M., Dolatabadi, H. R., Nourbakhsh, M., Pour Saeedi, A., & Asadollahi, A. R. (2012). An analysis of factors affecting on online shopping behaviour of consumers. *International Journal of Marketing Studies*, 4(5), 81–98.
28. Jiang, L., Yang, Z., & Jun, M. (2013). Measuring consumer perceptions of online shopping convenience. *Journal of Service Management*, 24(2), 191–214.

29. Kushairi, N., Ahmi, A. (2021) Flipped classroom in the second decade of the Millenia: A bibliometrics analysis with Lotka's law. *Education and Information Technologies*, 26(4), 4401–4431.
30. Lee, G. G., & Lin, H. F. (2005). Customer perceptions of e-service quality in online shopping. *International Journal of Retail & Distribution Management*, 33(2), 161-176.
31. Limaye, M., Khalifa, M., & Frini, A. (2000). What makes consumers buy from Internet? A longitudinal study of online shopping. *IEEE Transactions on Systems, Man, and Cybernetics-Part A: Systems and Humans*, 30(4), 421–432.
32. Lu, Y., Wu, J., Peng, J., & Lu, L. (2020). The perceived impact of the Covid-19 epidemic: evidence from a sample of 4807 SMEs in Sichuan Province, China. *Environmental Hazards*, 19(4), 323–340.
33. Mahendra, S., & Yoshiki, M. (2015). A bibliometric analysis on online shopping. *International Journal of e-Education, e-Business, e-Management and e-Learning*, 5(2), 55.
34. Mishra, D., Gunasekaran, A., Papadopoulos, T., & Hazen, B. (2017). Green supply chain performance measures: A review and bibliometric analysis. *Sustainable Production and Consumption*, 10, 85–99.
35. Miyazaki, A. D., & Fernandez, A. (2001). Consumer perceptions of privacy and security risks for online shopping. *Journal of Consumer affairs*, 35(1), 27–44.
36. Nikkei (2020). China passes US as world's top researcher, showing its R&D might rise fuelled by heavy spending and growing number of researchers. Retrieved China-passes-US-as-world-s-top-researcher-showing-its-R-D-might
37. Nistor, A. (2021). The Influence of the COVID-19 Pandemic on E-Commerce. Trends and Challenges before and after COVID-19. *Revista Economical*, 73(3), 151–161.
38. Norris, M., & Oppenheim, C. (2007). Comparing alternatives to the Web of Science for coverage of the social sciences' literature. *Journal of Informetrics*, 1(2), 161–169.
39. Overby, J. W., & Lee, E. J. (2006). The effects of utilitarian and hedonic online shopping value on consumer preference and intentions. *Journal of Business Research*, 59(10-11), 1160–1166.
40. Park, C. H., & Kim, Y. G. (2003). Identifying key factors affecting consumer purchase behavior in an online shopping context. *International Journal of Retail & Distribution Management*.
41. Qureshi, H.A., Fatima, R., & Sarwar, A. (2014). Barriers to adoption of online shopping in Pakistan. *Science International*, 26(3), 1277–1282.
42. Rahman, N. A. A., Ahmi, A., Jraisat, L., & Upadhyay, A. (2022). Examining the trend of humanitarian supply chain studies: Pre, during and post COVID-19 pandemic. *Journal of Humanitarian Logistics and Supply Chain Management*, (ahead-of-print).
43. Ramos, E., Dien, S., Gonzales, A., Chavez, M., & Hazen, B. (2020). Supply chain cost research: a bibliometric mapping perspective. *Benchmarking An International Journal*, 28(3), 1083–1100.
44. San Martín, H., & Herrero, Á. (2012). Influence of the user's psychological factors on the online purchase intention in rural tourism: Integrating innovativeness to the UTAUT framework. *Tourism Management*, 33(2), 341–350.
45. Schlosser, A. E., White, T. B., & Lloyd, S. M. (2006). Converting web site visitors into buyers: how web site investment increases consumer trusting beliefs and online purchase intentions. *Journal of Marketing*, 70(2), 133–148.
46. Shahzad, A., Hassan, R., Abdullah, N. I., Hussain, A., & Fareed, M. (2020). COVID-19 impact on e-commerce usage: Empirical evidence from Malaysian healthcare industry. *Humanities & Social Sciences Reviews*, 8(3), 599–609.
47. Small, H. (1973). Co-citation in the scientific literature: A new measure of the relationship between two documents. *Journal of the American Society for Information Science*. American Society for Information Science, 24(4), 265–269.
48. Statista (2020a). Frequency of online purchases during COVID-19 pandemic Malaysia 2020. Retrieved from
49. Statista (2020b). E-commerce worldwide. Retrieved from shopping
50. Sun, Y., Wei, K. K., Fan, C., Lu, Y., & Gupta, S. (2016). Does social climate matter? On friendship groups in social commerce. *Electronic Commerce Research and Applications*, 18, 37–47.
51. Tariq, A., Bashir, B., Shad, M. A., Main, A. Z., & Dar, M. A. (2016). Factors affecting online shopping behavior of consumers in Pakistan. *Journal of Marketing and Consumer Research*, 19, 95–100.

52. Transfield, D., Denyer, D., & Smart, P. (2003). Towards a methodology for developing evidence-informed management knowledge by means of systematic review. *British Journal of Management*, 14(3), 207–222.
53. United Nations (2020). Pandemic has forever changed online shopping; UN-backed survey reveals. Retrieved from
54. Van der Heijden, H., Verhagen, T., & Creemers, M. (2003). Understanding online purchase intentions: contributions from technology and trust perspectives. *European Journal of Information Systems*, 12(1), 41–48.
55. Vasudevan, P., & Arokiasamy, L. (2021). Online shopping among young generation in Malaysia. *Electronic Journal of Business and Management*, 6(1), 31–38.
56. Wahyuni, H., Vanany, I., & Ciptomulyono, U. (2019). Food safety and halal food in the supply chain: Review and bibliometric analysis. *Journal of Industrial Engineering and Management*, 12(2), 373–391.
57. Wang, J., & Wang, Z. (2020). Strengths, weaknesses, opportunities and threats (SWOT) analysis of China's prevention and control strategy for the COVID-19 epidemic. *International Journal of Environmental Research and Public Health*, 17(7), 2235.
58. Yoon, S. J. (2002). The antecedents and consequences of trust in online-purchase decisions. *Journal of Interactive Marketing*, 16(2), 47–63.
59. Zakaria, R., Ahmi, A., Ahmad, A. H., & Othman, Z. (2021) Worldwide melatonin research: A Bibliometric analysis of the published literature between 2015 and 2019. *Chronobiology International*, 38(1), 27–37.