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MAPPING THE EVOLUTION OF ONLINE SHOPPING: A BIBLIOMETRIC ANALYSIS OF GLOBAL RESEARCH TRENDS AND THEMES (2020–2024)

MAPEANDO A EVOLUÇÃO DAS COMPRAS ONLINE: UMA ANÁLISE BIBLIOMÉTRICA DAS TENDÊNCIAS E TEMAS GLOBAIS DE PESQUISA (2020–2024)

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Abstract
This study conducts a bibliometric analysis of online shopping research from 2020 to 2024, utilizing 972 articles from the Scopus database. Key identified themes include the expansion of e-commerce platforms, the application of technologies like artificial intelligence and machine learning, and the influence of the COVID-19 pandemic on consumer behavior. Using VOSviewer software, the analysis identifies four research clusters. The red cluster focuses on technology integration, including platform optimization and AI applications. The green cluster highlights consumer psychology, emphasizing trust, satisfaction, and risk perception. The yellow cluster addresses socio-demographic factors, such as age, gender, and social media's impact on purchasing decisions. The blue cluster explores pandemic-driven changes in food shopping, delivery services, and supply chains. The study highlights the contributions of countries like China, the United States, and India, emphasizing international collaboration. Findings provide valuable insights into the field's evolution and propose directions for future research, including integrating emerging technologies like IoT and blockchain to enhance the online shopping experience.

Keyword: Online Shopping. E-commerce. Consumer Psychology. Artificial Intelligence. Bibliometric Analysis. Consumer Behavior.

Resumo
Este estudo realiza uma análise bibliométrica de pesquisas sobre compras online de 2020 a 2024, utilizando 972 artigos da base de dados Scopus. Os principais temas identificados incluem a expansão das plataformas de comércio eletrônico, a aplicação de tecnologias como inteligência artificial e aprendizado de máquina, e a influência da pandemia de COVID-19 no comportamento do consumidor. Utilizando o software VOSviewer, a análise identifica quatro grupos de pesquisa. O grupo vermelho concentra-se na integração de tecnologias, incluindo otimização de plataformas e aplicações de IA. O grupo verde destaca a psicologia do consumidor, enfatizando confiança, satisfação e percepção de risco. O grupo amarelo aborda fatores sociodemográficos, como idade, gênero e o impacto das mídias sociais nas decisões de compra. O grupo azul explora as mudanças impulsionadas pela pandemia nas compras de alimentos, serviços de entrega e cadeias de suprimentos. O estudo destaca as contribuições de países como China, Estados Unidos e Índia, enfatizando a colaboração internacional. Os resultados fornecem informações valiosas sobre a evolução da área e propõem direções para pesquisas futuras, incluindo a integração de tecnologias emergentes como IoT e blockchain para aprimorar a experiência de compras online.

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Palavras-chave: *Compras Online. Comércio Eletrônico. Psicologia do Consumidor. Inteligência Artificial. Análise Bibliométrica. Comportamento do Consumidor.*

1 INTRODUCTION

Over the past decade, e-commerce has emerged as a transformative force in the global economy, reshaping how consumers access and engage with goods and services (Singhal & Tanwar, 2024; Roszko-Wójtowicz et al., 2024). Online shopping, in particular, has seen significant uptake due to its convenience, accessibility, and ability to offer global product variety. Its popularity spans sectors such as fashion (Fung, 2021), electronics (Dayal, 2020), and food retail (Thompson et al., 2022), where it has disrupted traditional consumption models and enabled new forms of customer interaction.

The outbreak of the COVID-19 pandemic intensified this shift, pushing consumers and businesses to rapidly adapt to digital platforms amid widespread lockdowns (Khrouf & Maghraoui, 2023; Ismajli et al., 2022). Online shopping has became not only a convenient alternative but a necessary channel for everyday consumption (Andruetto et al., 2023; Kakar & Kakar, 2020). Post-pandemic behavior has shown that many of these habits persisted, resulting in long-term changes in purchasing patterns, such as the widespread adoption of contactless payment, personalized digital experiences, and rapid expansion of grocery delivery services (Ellison et al., 2022; Galich & Kehrt, 2024; Kashyap & Kumar, 2024).

As online shopping evolves through digital transformation, scholarly interest has expanded across multiple disciplines, including consumer psychology, information systems, marketing, logistics, and AI applications. This surge in publications creates a need for systematic synthesis. Bibliometric analysis, a widely accepted method for mapping scientific knowledge (Morris & Van der Veer Martens, 2008), provides powerful tools to visualize intellectual structures, detect emerging trends, and identify influential contributors within a field (Lawani, 1981).

Numerous bibliometric studies have examined various aspects of online shopping. For example, Gou et al. (2020) explored foreign consumers' online purchase intentions, Zu et al. (2020) analyzed Chinese readiness for digital commerce, and Jaiswal et al. (2024) investigated the use of behavioral models such as TAM and TPB in online

shopping. Other studies have targeted emerging subfields like AI-enhanced customer service, AR shopping interfaces, or logistics service quality (Purnomo et al., 2020). While these works provide important contributions to specific topics, most adopt narrow theoretical or conceptual lenses and do not attempt to capture the macroscopic evolution of the field.

In particular, few studies have employed the core term "online shopping" as the primary lens to trace how the field has developed globally – thematically, geographically, and collaboratively – especially in the wake of the COVID-19 pandemic. Among 18 relevant bibliometric reviews surveyed, none have holistically mapped the intellectual structure of online shopping research in the post-pandemic era using this keyword-centered approach. This lack of integration limits our understanding of how different research strands connect, which regions are leading or lagging, and how pandemic-related disruptions have redefined scholarly focus.

To address this gap, the present study conducts a comprehensive bibliometric analysis of 972 Scopus-indexed journal articles published between 2020 and 2024. Using tools such as VOSviewer and Excel, the study identifies major research clusters, international co-authorship networks, and thematic evolutions. By doing so, it offers an integrative overview of the global research landscape on online shopping and proposes future research directions that are timely, interdisciplinary, and policy-relevant.

2 LITERATURE REVIEW

In recent years, the transformation of consumer behavior within digital ecosystems has emerged as a central focus of scholarly inquiry. As online shopping increasingly shapes global retail dynamics, bibliometric analysis has become a valuable tool for understanding the intellectual evolution of this domain. Drawing from a curated set of 19 peer-reviewed articles indexed in Scopus, the existing literature can be synthesized into three core thematic clusters: (1) Technology Integration in Online Retail, (2) Trends in Consumer Experience and Channel Choice, and (3) Theoretical Perspectives on Online Commerce.

Under the Technology Integration theme, researchers have examined the role of cutting-edge technologies such as artificial intelligence (AI), chatbots, augmented reality (AR), and gamification in shaping the online shopping experience. AI is seen as a tool for

enhancing personalization and building trust (Sharma & Tandon, 2024), while chatbots are increasingly being adopted across Asian markets (Sharma et al., 2024). AR, on the other hand, has evolved into a multi-functional tool enabling immersive shopping, and gamification is gaining attention for its ability to boost brand loyalty and consumer engagement (Yadav & Saini, 2025). The COVID-19 pandemic has also accelerated trends like multichannel shopping and social commerce (Halibas et al., 2023).

The second theme focuses on how consumers make choices across shopping channels and how various factors shape their experience. Research has identified several key drivers of behavior, including trust, perceived usefulness, risk, and social influence (Biswas et al., 2024; Manjeet, 2024). Logistics and delivery performance also play a vital role in online shopping satisfaction, as seen in studies on online grocery services (Monoarfa et al., 2024) and service quality in e-tailing logistics (Dhaigude & Mohan, 2023). Other studies explore how environmental concerns impact online shopping, especially in terms of willingness to pay for sustainable products (Shafi et al., 2024). Recent literature also shows rising interest in topics like mobile commerce, digital personalization, and consumer segmentation (Azzahra et al., 2024; Jaiswal et al., 2023).

The third theme, Theoretical Perspectives on Online Commerce, provides a conceptual lens on topics such as social shopping (Barbosa Branca & Santos, 2023), e-commerce marketing strategies (Rosário Albérico & Raimundo, 2021), and optimization frameworks like the Internet Shopping Optimization Problem (Chaerani Diah & Rusyaman, 2022). Notably, Leong et al. (2024) introduce a novel Social Commerce framework incorporating technological, social, and behavioral dimensions. In a broader context, Agung Purnomo et al. (2020) offers a macro-level bibliometric mapping of global digital market research over four decades, classifying the field into the MEDDD framework—Management Information Systems, E-commerce, Digital Printing, Data, and Digitalization.

Taken together, these studies illustrate a vibrant, multidisciplinary field shaped by ongoing digital transformation and shifting consumer expectations. Yet, despite the breadth of existing work, there remains a lack of consolidated bibliometric studies focused specifically on the term "shopping online”. Addressing this gap would help clarify the structural development of the field and offer a foundation for future research into online consumer behavior within digitally driven economies.

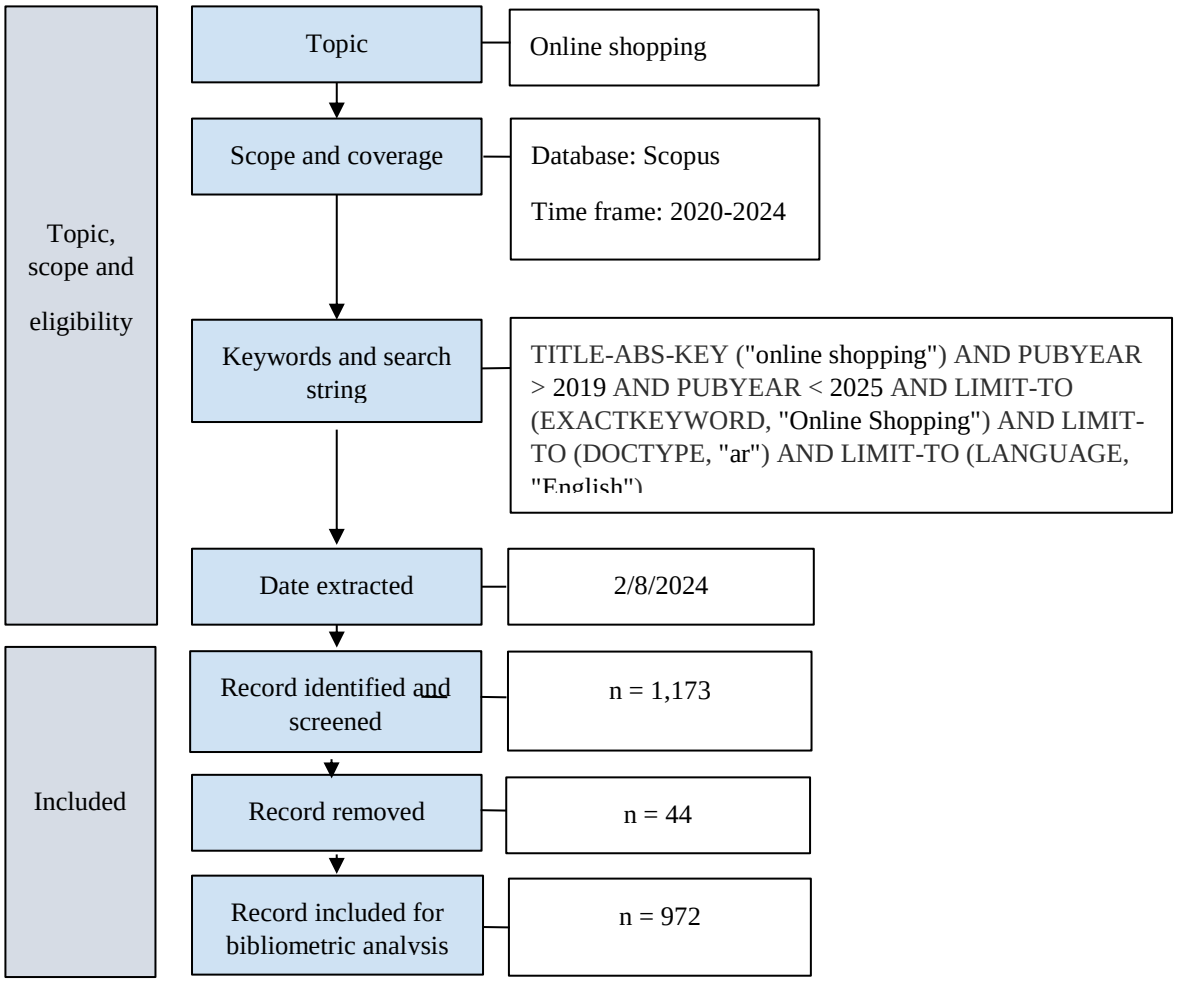
3 METHOD

The data for this study was retrieved from Scopus, one of the world's most reputable scientific databases, accessible at https://www.scopus.com. Scopus was selected over other databases, such as Web of Science, due to its broader coverage of interdisciplinary fields and inclusion of a larger number of journals, particularly in areas relevant to online shopping and consumer behavior (Mongeon & Paul-Hus, 2016). Additionally, Scopus ensures data reliability through rigorous quality checks and evaluations (Gašparac, 2006). The data collection took place on August 2, 2024, covering the period from January 1, 2020, to August 2, 2024. This timeframe was selected because online shopping saw significant growth beginning in 2020, driven by the COVID-19 pandemic, which reshaped consumer behavior and accelerated e-commerce development.

The data collection process involved two phases: (i) Topic, scope & eligibility, and (ii) Inclusion, as outlined in Figure 1. To align with the research objectives, "online shopping" was used as the primary keyword. The search strategy focused on scientific articles published within the specified date range and limited to English-language documents. The search results were exported in CSV format. Initially, 1,173 documents were retrieved from Scopus. After filtering for relevance to the research topic, 972 documents were retained for analysis.

Figure 1

Search Strategy Flow Diagram



The initial search strategy retrieved 1,173 articles covering various subcategories of online shopping. To ensure transparency and minimize selection bias, a systematic inclusion and exclusion process was applied. Articles were included if they explicitly discussed online shopping behaviors, trends, or impacts between 2020 and 2024, focused on e-commerce platforms, consumer decision-making, digital retail environments, or technological influences (e.g., AI, machine learning, blockchain), and were peer-reviewed journal articles written in English to ensure reliability.

Conversely, articles were excluded if they: (1) addressed non-consumer-related digital activities (e.g., general social media use unrelated to shopping); (2) focused primarily on technical aspects of IT infrastructure, logistics, or supply chain management without engaging consumer behavior; (3) were duplicates; or (4) consisted of non-peer-reviewed sources such as conference proceedings or editorials. A manual screening of

titles and abstracts was conducted to apply these criteria consistently. The screening process was performed independently by the lead author and verified by a second reviewer to enhance reliability. After filtering, 972 articles were selected for bibliometric analysis. This rigorous and transparent filtering process provides a reliable foundation for mapping research trends in online shopping.

The final dataset of 972 articles was extracted from Scopus in CSV Excel format. It contained detailed information such as publication counts, authors, institutions, journals, countries, titles, keywords, years, and citation counts. The data were imported into VOSviewer 1.6.19 for analysis, allowing for the generation of network, overlay, and density visualizations. These visualizations enabled a multi-faceted analysis of the dataset, including keyword analysis and the creation of publication volume maps, keyword network visualizations, and keyword timeline maps. Additionally, statistical charts were generated using Excel to further explore and present the data.

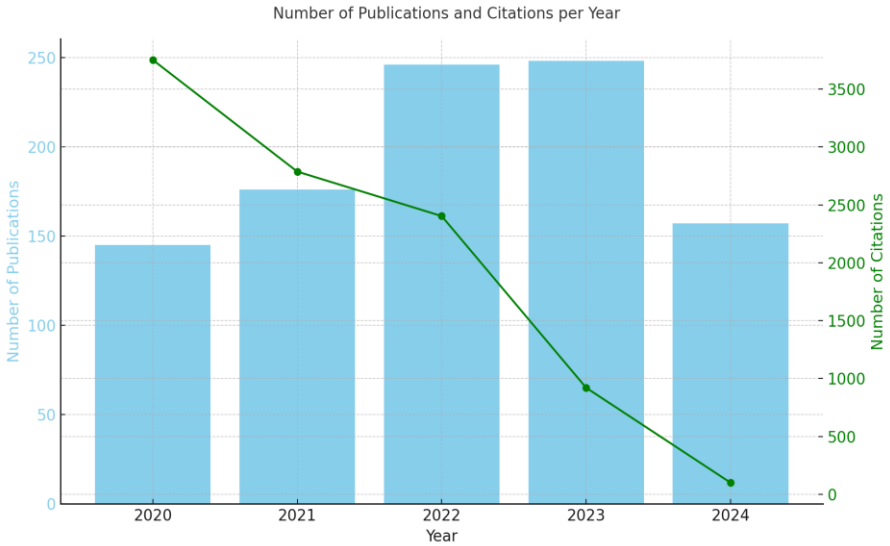
4 RESULTS

4.1 Trends of publications and citations

This study analyzes the distribution of research on online shopping from 2020 to 2024 using data from the Scopus database, as illustrated in Figure 2.

Figure 2

Distribution of Publications and Citations by Years



The chart shows a slight upward trend in the number of publications related to online shopping from 2020 to 2023, reflecting increased interest in this area as technology and e-commerce continue to advance. The number of publications rose from 145 articles in 2020 to 174 articles in 2023, with a peak of 3715 citations in 2020. In 2024, 157 articles were recorded with 101 citations; however, this data only includes information up to August 2024, so it may not fully capture the year's totals.

The number of citations has gradually decreased over the years, with 2,787 citations in 2021 and 2,403 citations in 2023. This trend suggests that while new research is being published, its impact may take time to be fully recognized. New studies often need time to gain widespread attention and influence, similar to earlier research. Additionally, the increase in the number of publications could result in citation dispersion, where individual articles receive fewer citations on average. Another potential explanation for the decline could be a shift in research focus within the field or a possible saturation of key topics, leading to reduced emphasis on previously popular studies. These factors collectively contribute to the observed trend.

4.2 Country co-authorship analysis

The article assesses the geographical distribution of research on online shopping, as depicted in Figures 3 and 4. Figure 3 displays a global map illustrating the number of publications from various countries, while Figure 4 visualizes the co-occurrence of countries in scientific publications.

Figure 3

Global Map of Documents Published in Different Countries

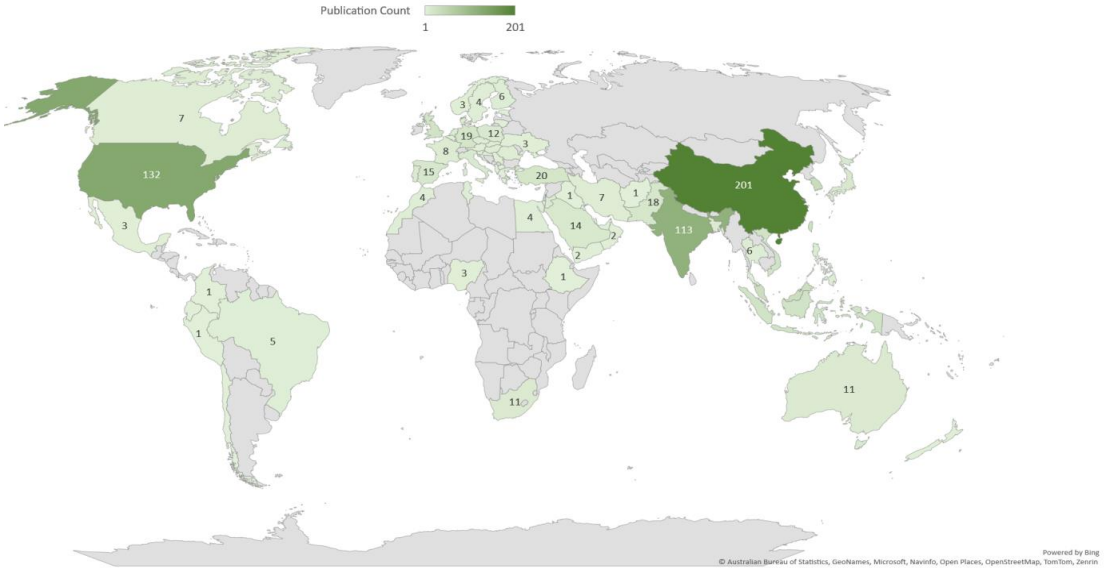
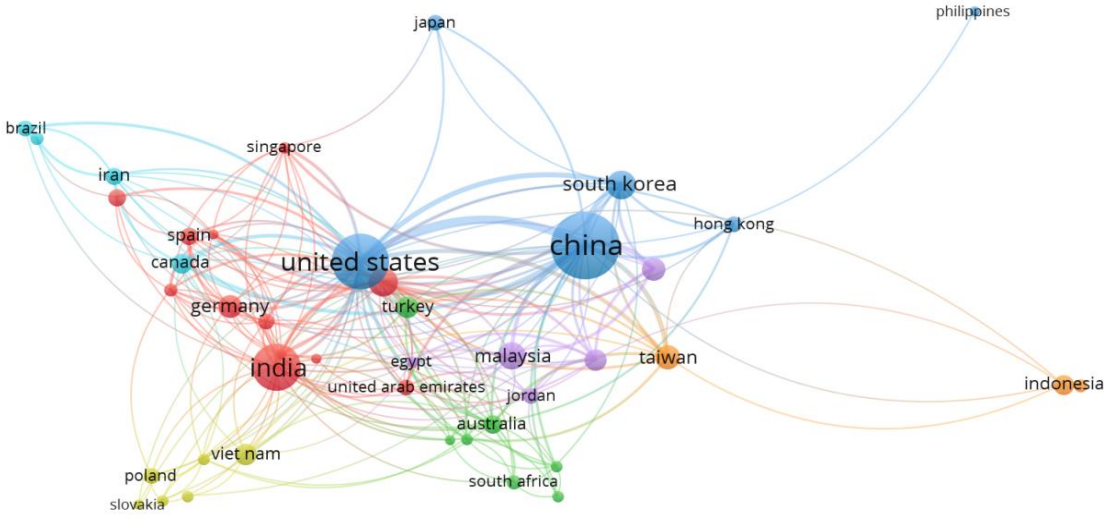


Figure 4

Network of Collaboration among Countries



The co-authorship analysis by country, derived from VOSviewer visualizations and publication data, reveals a globally uneven distribution of online shopping research. The field is predominantly concentrated in Asia, North America, and Europe, with China (201 articles), the United States (132), and India (113) emerging as the top contributors. These countries benefit from strong research infrastructures, significant funding, and a

strategic focus on digital commerce, which foster both domestic output and international collaboration.

The co-authorship links—particularly between China and the United States—indicate frequent and intensive collaborations, driven by shared technological and market interests. The United States, collaborating with 23 countries, demonstrates a broader international reach compared to China (18 countries), reflecting differing geopolitical strategies and openness in academic networks.

In Europe, research is well-distributed across major economies such as Germany (20 articles), the United Kingdom (19), and France (15), reflecting balanced regional engagement. In contrast, emerging economies, despite growing publication outputs, often exhibit limited international collaboration and fragmented research clusters. This fragmentation can hinder knowledge diffusion and the integration of local insights into the global discourse. For instance, countries in Africa and parts of Latin America contribute minimally and are loosely connected, which may be due to structural challenges such as limited research funding, linguistic barriers, or digital infrastructure deficits.

Strengthening South-South collaboration and fostering inclusion in global networks could help bridge these gaps and enhance the visibility and impact of research from emerging regions.

Table 1

The Most Cited Authors in the Field of Online Shopping

Author	Country	Institution	Citations
Shamshiripour A.	United States	University of Illinois at Chicago	390
Kim R.Y.	United States	Montclair State University	265
Grashuis J.	United States	University of Missouri	264
Qalati S.A.	Pakistan	Jiangsu University	153
Smink A.R.	Netherlands	University of Amsterdam	143
Wagner G.	Germany	University of Siegen	127
Jaller M.	United States	University of California	126
Erjavec J.	Slovenia	University of Ljubljana	123
Rtayli N.	Morocco	Ibn Tofail University	112
Moon J.	South Korea	Korea University	99

The most cited document in the dataset is "*How is COVID-19 reshaping activity-travel behavior? Evidence from a comprehensive survey in Chicago*" (n = 390) by Shamshiripour A. and colleagues. The second most cited work, authored by Kim R.Y., has 265 citations, while Grashuis J. ranks third with 264 citations. Notably, all three of

these highly cited authors are based in the United States, one of the leading countries in terms of publications on online shopping. This underscores the significant influence and pivotal role the United States plays in shaping research within this field.

4.3 Most active and cited journals

The number of published articles and citations are key indicators commonly used to evaluate a journal's importance and impact within a specific research field. Journals with high publication and citation counts play a crucial role in advancing their respective areas of study (Aksnes et al., 2019). In the context of online shopping behavior research from 2020 to 2024, the leading journals, as shown in Table 2, not only published a significant number of articles but also had substantial influence through high citation counts, highlighting their impact within this field.

Table 2

The Most Cited Journals in Online Shopping

Name of journal	Number of documents	Percentage	Citations	Citations per paper
Sustainability	31	3.18	707	22.80
Journal of Retailing and Consumer Services	12	1.23	609	50.75
Transportation Research Interdisciplinary Perspectives	2	0.20	390	195
International Journal of Environmental Research and Public Health	21	2.16	363	17.28
Journal of Business Research	5	0.51	354	70.8
Cogent Business and Management	10	1.02	343	34.3
IEEE Engineering Management Review	1	0.10	265	265
Information Technology and People	8	0.82	174	21.75
Frontiers in Psychology	8	0.82	156	19.5
Electronic Commerce Research and Applications	15	1.54	147	9.8

The top three journals with the highest overall citation counts are *Sustainability* (Switzerland) (n = 707), *Journal of Retailing and Consumer Services* (n = 609), and *Transportation Research Interdisciplinary Perspectives* (n = 390). Meanwhile, the journals with the highest number of citations per paper are *IEEE Engineering Management Review* (n = 265), *Transportation Research Interdisciplinary Perspectives* (n = 195), and *Journal of Business Research* (n = 70.8). These figures demonstrate not

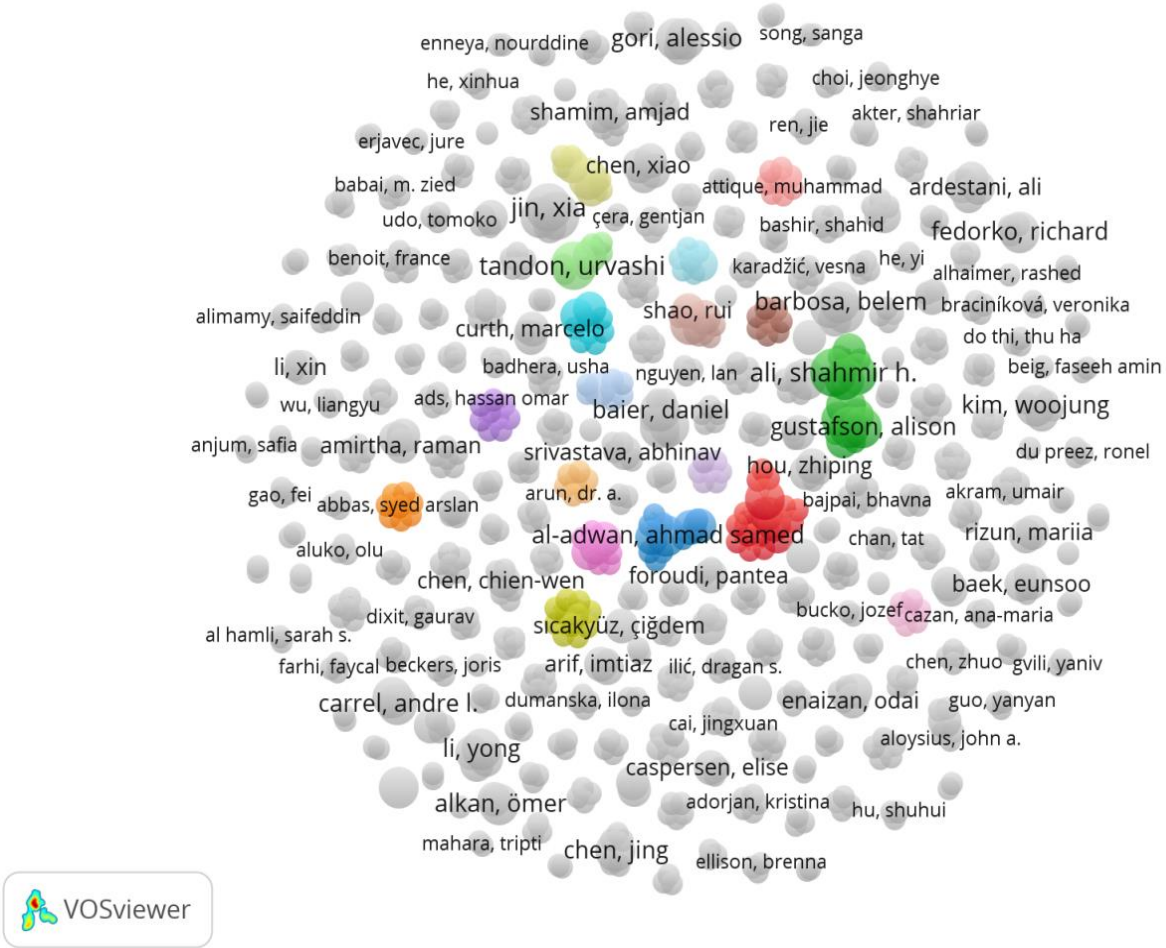
only the volume of research published but also the relative influence of each article within these journals.

4.4 Co-authorship analysis

Figure 5 illustrates the co-authorship network in online shopping research publications from 2020 to August 2024, with different colors representing various author clusters. These clusters indicate research groups or key collaborators in scientific studies. Using a minimum threshold of at least one document per author and at least ten citations (Hausken, 2016), 935 authors out of a total of 3,168 meet this criterion.

Figure 5

Network of Collaboration among Authors



Authors tend to collaborate in small groups of 2-5 members or larger groups exceeding five members. Larger clusters, such as the green and red clusters, represent extensive collaborative networks with many closely connected authors, indicating a high level of cooperation and a focus on popular research topics. Conversely, smaller clusters and individual authors focus on independent research, showing the dispersion of studies across various areas.

The significant number of connections between authors, with many studies conducted as co-authored works, highlights the high level of collaboration in this field. This also underscores the complexity and interdisciplinary nature of consumer behavior research, which often requires integrating knowledge and skills from diverse researchers.

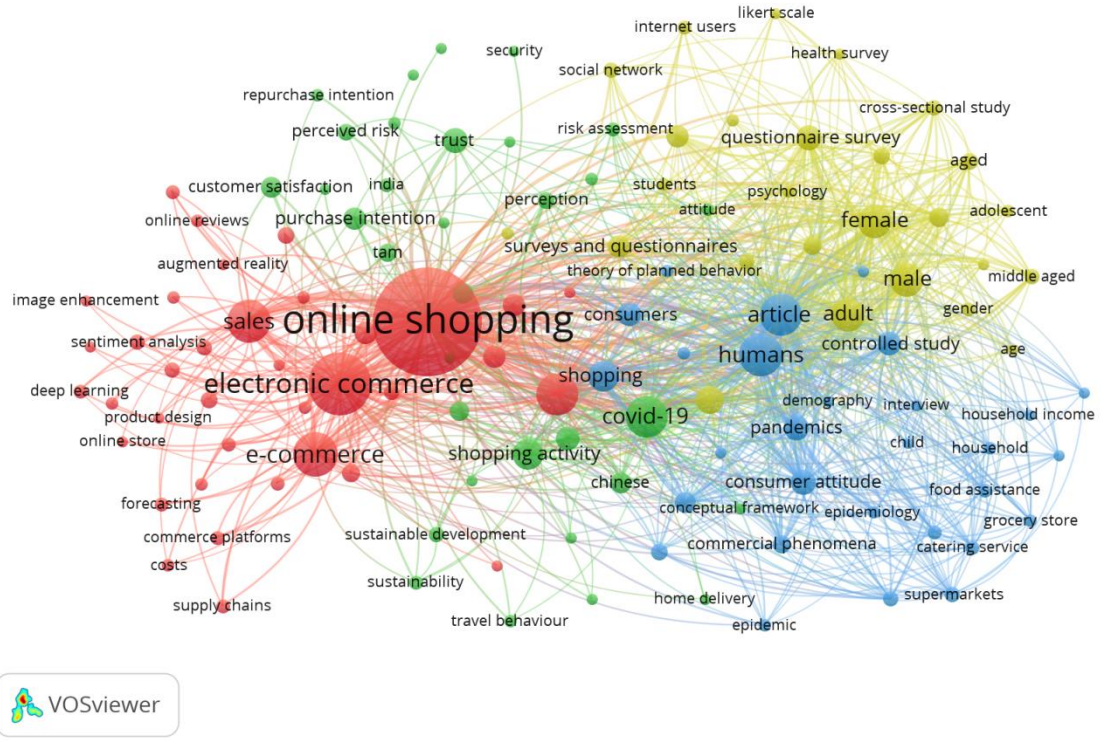
4.5 Keyword co-occurrence analysis

The keyword map, generated using VOSviewer, visually represents the research topics related to online consumer behavior by analyzing keywords. A minimum threshold of 10 keyword occurrences was set, resulting in four main research clusters, each represented by distinct colors: red, green, blue, and yellow. Keywords with higher frequencies are highlighted as hotspots in the current research field, indicated by larger circle sizes.

Keyword co-occurrence visualizations reflect shifts in research priorities by identifying frequently studied topics and their interconnections. Emerging themes can be observed through the formation of new clusters or the prominence of certain keywords, indicating growing interest in specific areas of study. This provides valuable insights into the evolving focus of the research field.

Figure 6

Keyword co-occurrence network (threshold ≥ 10). Four thematic clusters show core research areas; circle size reflects frequency.



Red cluster: This cluster focuses on various aspects of e-commerce and online shopping, including the development and management of online shopping platforms (Şimşek & Güvendiren, 2023) aimed at optimizing sales processes and operational costs (Yang et al., 2022; Namburu et al., 2022). This group also explores the application of advanced technologies such as artificial intelligence (Chakraborty et al., 2024) and machine learning to analyze customer data and enhance the online shopping experience. However, these advancements also pose significant security risks (Moon et al., 2021; Calahorra-Candao & Martín-de Hoyos, 2024). Additionally, it covers customer perceptions, feedback (Wen et al., 2024), and factors influencing purchase intentions (Horr et al., 2023).

Green cluster: This cluster centers on online consumer behavior from psychological and social perspectives, including trust (Chetioui et al., 2021), customer satisfaction (Tzeng et al., 2021; Khongorzul et al., 2022), and perceived risk (Alrawad et

al., 2023). Structural equation modeling (SEM) is a prominent research method used to analyze relationships in this area.

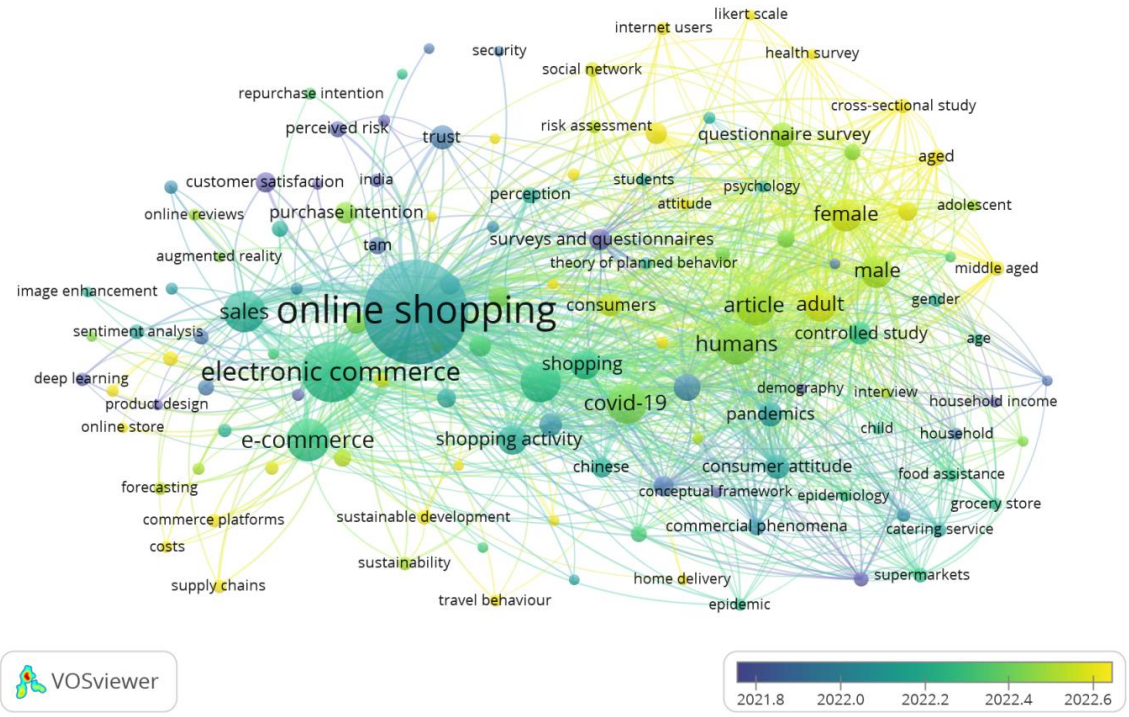
Yellow cluster: This cluster provides a socio-demographic perspective, focusing on different target groups (Varghese & Nandini, 2020; Rummo et al., 2022) and the impact of technology on consumer behavior (Kumar et al., 2023). It employs quantitative methods to study differences across age groups (Rummo et al., 2022) and gender (Adekoya & Laksitamas, 2024), aiming to understand shopping motivations. Social media (Nasidi et al., 2022) and social networks (Misra et al., 2023) are also analyzed for their influence on purchasing decisions.

The yellow cluster provides a socio-demographic perspective, focusing on different target groups (Varghese & Nandini, 2020; Rummo et al., 2022) and the impact of technology on consumer behavior (Kumar et al., 2023). Research in this cluster extensively employs quantitative methods to collect and analyze data on the differences in consumer behavior across age groups (Rummo et al., 2022) and gender (Adekoya & Laksitamas, 2024) to better understand shopping motivations. Additionally, it examines how social media platforms (Nasidi et al., 2022) and social networks (Misra et al., 2023) influence consumer purchasing decisions and interactions.

Blue cluster: This cluster primarily explores pandemic-driven shifts in food shopping behavior and associated services, assessing how demographic groups adapted to changes in food supply (Ellison et al., 2022; Chang et al., 2023), dining services (Thompson et al., 2022), and home delivery practices (Galich & Kehrt, 2024). It frequently employs randomized controlled trials (Marty et al., 2020; Coffino et al., 2020) and leverages the Theory of Planned Behavior (Wu & Song, 2021; Kashyap & Kumar, 2024). However, alongside immediate COVID-19 impacts, emerging themes such as sustainability in delivery and resilience in food supply chains suggest a broader evolution in online consumer behavior beyond pandemic influences.

Figure 7

Keyword overlay visualization. Displays average keyword publication years; brighter colors reflect newer research topics and evolving trends.



The keyword co-occurrence – overlay visualization illustrates the evolution of research on online consumer behavior over time. Early studies (2020) focused on foundational topics like online shopping (Zu et al., 2020; Dayal, 2020), electronic commerce, and shopping behavior (Varghese & Nandini, 2020), highlighting an interest in understanding how consumers interact with digital platforms. In 2021-2022, there was a shift towards technology-driven research, with an increase in keywords related to artificial intelligence (Muslikhin et al., 2022), machine learning (Namburu et al., 2022), and sentiment analysis (Gao & Li, 2022). This reflects the growing application of advanced technologies to optimize user experiences and improve e-commerce operations.

The COVID-19 pandemic further influenced the research focus, introducing keywords such as home delivery (Galich & Kehrt, 2024) and supply chains (Jalil et al., 2024), which highlight the shift in consumer habits and challenges faced during the crisis. This marks a significant shift in research, emphasizing the need for both academic and industry adaptation to evolving consumer behaviors amid the pandemic.

Together, these emerging terms indicate a broad reorientation of research priorities—from general consumer behavior to interdisciplinary themes at the intersection of technology, ethics, and post-pandemic adaptation. This evolution reflects how academic inquiry is responding dynamically to societal and technological shifts.

5 DISCUSSION

The co-authorship analysis reveals significant disparities in the global distribution of online shopping research. China, the United States, and India stand out as major research hubs, producing the highest number of publications and demonstrating strong collaborative networks. However, this activity is concentrated in developed regions, leaving many parts of the world, such as Africa and South America, underrepresented. This uneven distribution highlights a critical need for more inclusive research initiatives to diversify perspectives and enrich the understanding of online shopping behaviors across different cultural and economic contexts.

China, while leading in publication volume, shows limited international collaboration compared to the United States. This inward-focused strategy aligns with its emphasis on domestic innovation and market growth (Tsui, 2004). In contrast, the United States leverages international partnerships to expand the reach and impact of its research. These contrasting approaches underscore how national priorities and global positioning influence research strategies. Bridging these gaps requires fostering collaborations in underrepresented regions through targeted initiatives such as regional funding programs, knowledge-sharing platforms, and partnerships with established research hubs in Europe, Asia, and North America. Additionally, promoting open-access publishing and projects addressing region-specific challenges can help build capacity and integrate diverse perspectives into the global research network.

The keyword co-occurrence analysis provides critical insights into the evolving intellectual structure of online consumer behavior research. Among the four identified clusters, the red cluster stands out as a convergence point for interdisciplinary inquiry, bridging technology, management, and consumer psychology. The frequent appearance of keywords such as artificial intelligence, machine learning, customer feedback, and purchase intention reflects an intensifying research focus on data-driven personalization and automation in online retail contexts. This shift aligns with industry demands for

efficiency and predictive insights, yet simultaneously introduces pressing concerns surrounding data privacy, algorithmic transparency, and digital security – issues increasingly visible through the emergence of security and risk as co-occurring terms.

This evolution from traditional consumer behavior theories to technologically mediated experiences signals a broader paradigm shift: online shopping is no longer solely a matter of convenience or price sensitivity, but a complex interaction between personalized systems, ethical considerations, and trust mechanisms. Notably, while the technological frontier expands, research has also deepened along psychological (green cluster) and socio-demographic (yellow cluster) lines, emphasizing factors such as perceived risk, trust, age, and gender. These factors are often studied through sophisticated analytical techniques such as structural equation modeling (SEM), indicating a maturation in methodological rigor across disciplines.

The blue cluster, with its focus on food-related consumer behavior during COVID-19, offers a timely snapshot of how external shocks reshape digital consumption patterns. The incorporation of randomized controlled trials (RCTs) and behavioral models such as the Theory of Planned Behavior (TPB) points to a growing interest in evidence-based policy and consumer resilience under crisis conditions.

Looking ahead, future research should further explore the integration of emerging technologies – such as blockchain for secure transactions, explainable AI for transparency, and green logistics for sustainability – within the online shopping ecosystem. In particular, the rise of sentiment analysis and big data suggests promising avenues for studying real-time emotional engagement and predictive behavior modeling. Second, future research should explore theoretical integration by combining traditional behavioral theories with technology adoption frameworks, thus providing comprehensive explanatory power in digital consumption contexts. Additionally, there is a need to investigate digital inclusion and algorithmic equity, ensuring that the benefits of intelligent commerce systems are accessible and ethical across diverse consumer segments.

Our analysis identifies COVID-19 as a critical juncture accelerating the shift toward online shopping; yet, sustained technological innovations—particularly advancements in AI, machine learning, blockchain, and IoT—also independently shape consumer behavior beyond pandemic-specific influences. Results further highlight enduring themes, including delivery sustainability and supply chain resilience, suggesting

that COVID-19 functions primarily as a catalyst rather than an exclusive driver of change. Therefore, future research should adopt longitudinal approaches and develop integrated theoretical frameworks capable of distinguishing between temporary disruptions and continuous innovation-driven transformations, effectively capturing both immediate and long-term dynamics.

Taken together, the current trajectory reflects a fundamental reorientation of scholarly priorities: from studying general digital consumption to tackling complex, cross-cutting challenges at the nexus of technology, ethics, behavior, and global disruption. This multidimensional expansion underscores the critical role of interdisciplinary collaboration in shaping the future of online shopping research.

6 CONCLUSION

This study delivers a comprehensive bibliometric mapping of global scholarly output on online shopping from 2020 to 2024, analyzing 972 Scopus-indexed journal articles. Four principal thematic clusters emerged: (1) a technology-driven red cluster highlighting the accelerating integration of artificial intelligence and machine learning for data-driven personalization; (2) a green cluster emphasizing psychological constructs such as trust and perceived risk; (3) a yellow cluster focused on socio-demographic determinants of purchase behavior; and (4) a blue cluster examining pandemic-induced shifts in consumer habits and their implications for supply chain resilience and service delivery. Together, these clusters illustrate the field's evolution from foundational consumer behavior research toward interdisciplinary, technology-mediated investigations that respond dynamically to external shocks like COVID-19.

Despite robust growth in publications—led by China, the United States, and India—the global research landscape remains uneven. Collaboration networks reveal significant underrepresentation of Africa, Latin America, and other emerging regions. To promote inclusive and impactful scholarship, we recommend four policy strategies: (1) establish targeted cross-border research initiatives and funding mechanisms that facilitate partnerships between established and emerging research institutions; (2) prioritize interdisciplinary projects that integrate technological innovation, behavioral science, and sustainability frameworks to capture the complexity of modern online commerce; (3) support multilingual and open-access publishing models to reduce linguistic and

economic barriers, thereby broadening participation; and (4) invest in ethical and sustainable e-commerce infrastructures—such as green logistics solutions, blockchain-enabled transparency, and explainable AI systems—to strengthen consumer trust and marketplace resilience.

These recommendations offer actionable guidance for policymakers seeking to craft equitable digital strategies and for academic institutions aiming to align research agendas with emergent trends. By fostering diverse collaborations and emphasizing ethical, sustainable innovations, stakeholders can accelerate the development of a more equitable, resilient, and innovative online shopping ecosystem worldwide.

Nevertheless, this study is subject to several limitations, notably its exclusive reliance on the Scopus database, which may inadvertently exclude relevant scholarly contributions indexed in other academic databases. Additionally, restricting the analysis to English-language publications could introduce potential bias by neglecting significant research produced in other languages, especially substantial scholarly work published in Chinese. Furthermore, while the selected timeframe (2020–2024) effectively captures post-pandemic dynamics, it constrains the ability to offer longitudinal insights into earlier trajectories of online shopping research. Future research should therefore adopt extended longitudinal designs, triangulate multiple bibliographic databases (e.g., Web of Science, Google Scholar), and incorporate multilingual datasets to achieve a more comprehensive and nuanced understanding of the evolving intellectual landscape of online shopping.

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Authors' Contribution

Both authors contributed equally to the development of this article.

Data availability

All datasets relevant to this study's findings are fully available within the article.

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