Bibliometric Mapping of Consumer Behavior Studies in the Digital Era

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Article Info	ABSTRACT
	This study does a bibliometric analysis of consumer behavior research in the digital age to elucidate its intellectual framework, thematic focal points, and patterns of global collaboration. The analysis employs data sourced from prominent bibliographic databases, utilizing performance metrics, co-authorship and co-citation networks, as well as keyword co-occurrence mapping through VOSviewer and the Bibliometric R package. The findings indicate that "consumer behavior" constitutes the central focus of the discipline, encircled by significant themes including social media, digital platforms, artificial intelligence, big data, purchase intention, and data privacy. Maps of countries and affiliations underscore the crucial roles of India, China, the United States, Indonesia, and Malaysia in generating research output, as well as robust regional and worldwide collaborative networks. The study provides practical assistance for managers, politicians, and academic institutions, while also making a theoretical contribution by defining digital consumer behavior as an interdisciplinary field that encompasses marketing, information systems, data science, and social psychology. Recognized are the constraints pertaining to database coverage, language selection, and keyword reliance, along with recommendations for future study on developing technologies and consumer welfare.

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1. INTRODUCTION

The advent of the digital age has r adically transformed consumer behavior, incorporating technology into daily decision-making processes in unprecedented manners. Digital platforms, mobile technology, social media, and artificial intelligence have trans formed customer interactions with brands, information acquisition, alternative assessment, and purchasing behaviors [1]. Traditional consumer behavior models, for merly focused on psychological and socio-cultural factors, now converge with algorithmic curation, digital communities, and online identity formation [2]. As digital ecosystems proliferate, academics are increasingly investigating phenomena such as user-generated content, electronic word-of-mouth, omnichannel dynamics, influencer marketing, privacy issues, and digital trust. These changes highlight the necessity for revised theoretical and empirical frameworks in consumer behavior research within the digital era.

The digital shift has also catalyzed methodological innovation. In addition to

conventional surveys and tests, researchers now utilize big data analytics, social network analysis, clickstream analysis, and machine learning to examine digital consumer behavior [3]. These methodologies yield detailed insights into online activities but have also led to the fragmentation of knowledge across other fields, including marketing, information systems, behavioral economics, and communication studies [4]. The interdisciplinary character of digital consumer behavior research enhances the discipline while complicating the synthesis of conceptual boundaries, theoretical advancements, and methodological approaches.

Furthermore, worldwide trends such the expansion of platform ecosystems, the integration of finance, and the rapid digitalization prompted by COVID-19 have intensified scholarly interest in digital consumption. Modern consumers increasingly depend on tailored algorithms, digital payments, subscription services, and virtual communities that influence preference development and loyalty [5]. Researchers have emphasized psychological and contextual factors influencing digital behavior, including perceived danger, digital literacy, trust in automation, and worries over data protection [6]. As a result, digital consumer behavior has become crucial not just to marketing strategy but also to regulation about digital governance and consumer protection.

The field of consumer behavior research is currently marked by swift publishing expansion, thematic variety, and the use of new technology. This evolving context prompts critical inquiries about the progression of the study domain, the contributors to its advancement, and the conceptual frameworks that delineate its path. Bibliometric methods—such as co-citation, co-authorship, keyword co-occurrence, and citation analysis—offer systematic tools for analyzing these trends [7]. Bibliometric mapping allows academics to visually examine the intellectual framework of a discipline and comprehend the dynamics of

idea dissemination, convergence, or divergence across time.

Although there is a growing body of review research on consumer behavior in digital environments, numerous existing works concentrate on certain sub-topics, such online trust, social commerce, or mobile marketing [8], [9]. Although beneficial, these specialized assessments do not provide a comprehensive knowledge of the evolution of the overall research landscape, the existing intellectual gaps, or the strategic positioning of future research. A thorough bibliometric analysis is necessary to integrate the diverse contributions and uncover the underlying theme framework of consumer behavior research in the digital age.

Despite the substantial growth in research on consumer behavior in the digital age, its intellectual framework remains disjointed across several disciplines, subject domains, and methodological approaches. Researchers lack a cohesive and data-informed summary of the evolution of digital consumer behavior research, the interconnections among themes, the principal contributors, and the existing conceptual or methodological deficiencies. In the absence of rigorous bibliometric mapping, academics, industry practitioners, and policymakers struggle to discern research trends, intellectual clusters, rising themes, or underexplored areas. This fragmentation underscores the necessity for a thorough bibliometric analysis to elucidate the structure and development of the discipline.

This study seeks to do an extensive bibliometric analysis of consumer behavior research in the digital age utilizing data from esteemed academic sources. The objectives are to: (1) analyze publication trends, citation patterns, and productivity trajectories; (2) identify prominent authors, journals, institutions, and countries; (3) map intellectual connections via co-authorship, co-citation, and keyword co-occurrence networks; (4) delineate major thematic clusters influencing the evolution of digital consumer behavior research; and (5) suggest future research directions based on conceptual gaps and emerging opportunities identified through

bibliometric analysis. The paper systematically elucidates the intellectual framework supporting consumer behavior research in the digital age.

2. METHOD

This study employs a bibliometric research design to thoroughly examine the intellectual framework, thematic progression, and knowledge network of consumer behavior research in the digital age. Bibliometric analysis is extensively employed to measure scientific productivity, analyze citation trends, and illustrate conceptual connections within a study field [7]. This study adheres to established principles by employing a thorough, transparent, and replicable methodology that includes data retrieval, data cleaning, and analytical methods. The Scopus database, noted for its comprehensive coverage, citation indexing, and multidisciplinary significance, was chosen as the principal data source owing to its dependability in bibliometric research [10]. The search query was developed utilizing keywords pertinent to consumer behavior, the digital era, digital technology, online consumption, and digital marketing, applied to titles, abstracts, and author keywords for thorough coverage.

The data retrieval technique entailed restricting articles to the years 2000–2024, corresponding to the era when digital technology greatly impacted consumer behavior research. Only peer-reviewed jour nal articles, conference papers, book chapters, and reviews published in English were included to ensure academic rigor and comparability. Thereafter, duplicate entries, inadequate metadata, and extraneous documents were eliminated via manual review and automatic filtering. The final dataset was produced in CSV and RIS formats, encompassing bibliographic features including authors, titles, abstracts, keywords, affiliations, and citation counts This organized dataset provided the basis for performance evaluation, citation analysis, and scientific mapping.

Science mapping and visualization were performed utilizing VOSviewer and the Bibliometrix R package, two premier methods for network-based bibliometric research. VOSviewer was utilized to create co-authorship networks, co-citation networks, and keyword co-occurrence maps, facilitating the discovery of prominent writers, intellectual foundations, and theme clusters [11]. Simultaneously, Bibliometrix included descriptive data, trends in annual scientific output, citation metrics, and an analysis of topic evolution [12]. Collectively, these instruments provided a thorough analytical framework, integrating quantitative performance measurements with qualitative analysis of conceptual connections. This multi-method bibliometric approach guarantees methodological rigor and offers a comprehensive insight into consumer behavior research in the digital age.

3. RESULT AND DISCUSSIONS
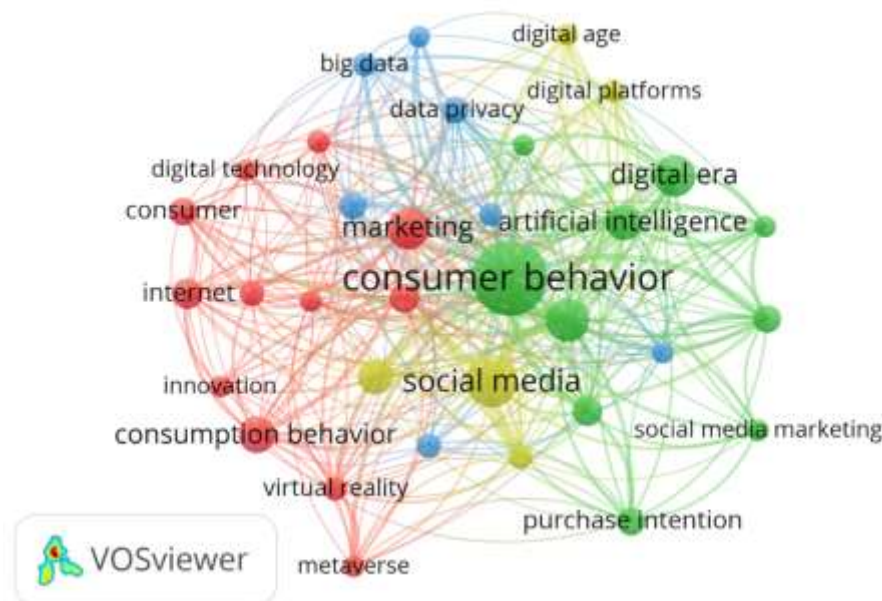
3.1 *Network Visualization*

Figure 1. Network Visualization
Source: Data Analysis Result, 2025

The VOSviewer keyword network identifies "consumer behavior" as the principal central node, signifying its essential relevance in the research domain. The substantial node size and intricate connections indicate that it functions as the conceptual nucleus connecting several subdomains. Terms such as marketing, social media, artificial intelligence, and digital era suggest that modern consumer behavior research is fundamentally rooted in digital ecosystems and increasingly shaped by technology advancements. The aggregation of these terms around the core node illustrates that digital transformation is inextricably linked to the examination of consumer decision-making, preference development, and responses to stimuli in digital contexts.

A prominent cluster, denoted in green, illustrates the robust interplay of social media, artificial intelligence, purchase intention, and digital platforms. This indicates a developing study area centered on algorithmic impact, recommendation systems, influencer interaction, and social commerce dynamics. The strong connection between social media marketing and purchase intention indicates that researchers are increasingly investigating how digital content, interaction behaviors, and platform-specific characteristics directly influence customer choices. The connection with artificial intelligence highlights the field's trajectory towards comprehending automated personalization, predictive analytics, and AI-enhanced customer experiences.

The red cluster seems to signify fundamental technological facilitators of digital consumer research, including the internet, digital technology, innovation, virtual reality, and the metaverse. This group signifies that researchers are investigating how immersive technology and digital infrastructures transform consuming environments. The emergence of virtual reality and the metaverse indicates an increasing fascination with experiential digital environments and its effects on consumer identity, presence, and interaction behaviors. These topics indicate a shift towards the examination of hybrid

physical-digital consuming experiences and the behavioral consequences of extended reality (XR) technologies.

The blue cluster, characterized by big data and data privacy, illustrates the methodological and ethical aspects of digital consumer behavior research. The association of these concepts with marketing and social media indicates that data-driven marketing methods prompt inquiries regarding customer autonomy, trust, and privacy. Researchers in this domain examine how companies gather, analyze, and utilize extensive consumer data to tailor experiences, while addressing transparency and ethical issues. This cluster indicates that matters related to digital governance, monitoring, and consent are becoming increasingly pertinent to comprehending contemporary consumer behavior.

The smaller yellow nodes, comprising digital age, digital platforms, and social media, serve as connectors that link technological, behavioral, and social elements. These terms illustrate how consumer behavior research synthesizes several viewpoints to elucidate changes at the convergence of technology adoption, cultural transitions, and market evolution. The overall distribution of clusters illustrates a multifaceted study domain marked by swift evolution, interdisciplinary connections, and converging themes related to digital transformation, data-driven personalization, immersive technologies, and ethical considerations. The network visualization offers a detailed overview of the structure of digital consumer behavior research, highlighting the concentration of knowledge clusters and the impact of technology improvements on the field's intellectual limits.
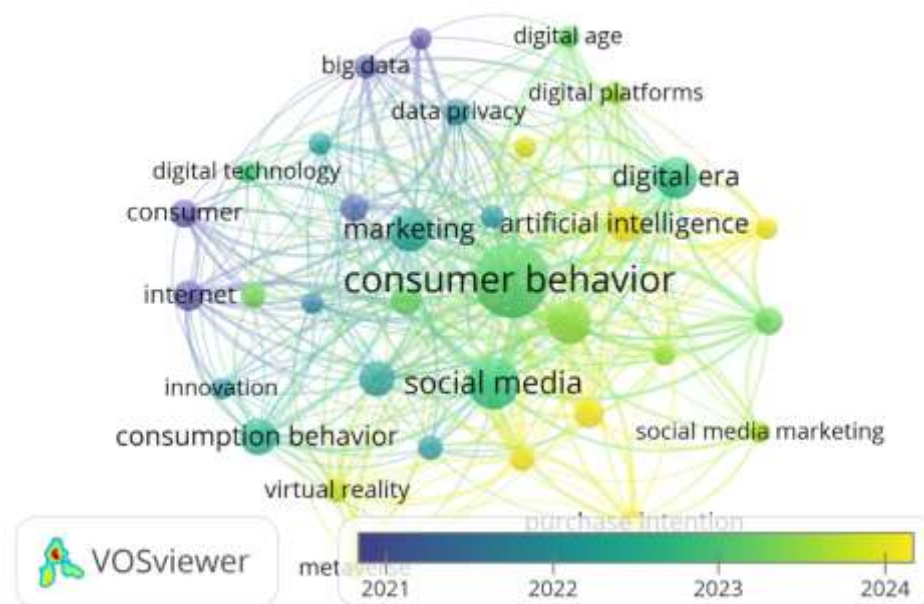
3.2 Overlay Visualization

Figure 2. Overlay Visualization
Source: Data Analysis Result, 2025

The overlay visualization illustrates the evolution of consumer behavior research in the digital age from 2021 to 2024. The keywords displayed in blue to teal—such as big data, internet, data privacy, and digital technology—indicate prior research focal points from 2021 to 2022. These subjects represent fundamental technological infrastructures and initial digital transformation issues. In this phase, researchers focused on comprehending the impact of data-driven decision-making, online connectivity, and digital ecosystems on consumer behavior. The prominence of data privacy in deeper

hues signifies that trust, security, and personal data management were initial yet crucial research themes.

As the hues transition to green, symbolizing the years 2022–2023, focus shifts to subjects including consumer behavior, social media, marketing, and consumption patterns. This signifies that throughout this intermediate phase, research evolved from technology-focused investigations to behavior-oriented analyses. Researchers are increasingly examining how digital interactions, social media involvement, and online community dynamics influence consumer reactions, preferences, and purchasing pathways. The pronounced green hue of social media and consumer behavior indicates that these emerged as prevailing themes where technological influences were incorporated into psychological and sociocultural contexts.

In the latest period, highlighted by yellow keywords, the domain has transitioned towards nascent digital innovations and sophisticated technologies. Terminology such as artificial intelligence, purchase intention, metaverse, virtual reality, and digital platforms signifies increasing interest from 2023 to 2024. These trends indicate an increasing academic focus on immersive environments, algorithmic content dissemination, AI-facilitated personalization, and predictive analytics in influencing consumer choices. The depiction of the metaverse and virtual reality in vivid yellow indicates the swift rise of experiential consumption as a prominent subject. Similarly, the prominent yellow luminescence surrounding artificial intelligence underscores its role as a modern catalyst for consumer insights and marketing strategy. The visualization illustrates a distinct temporal progression: from basic digital infrastructure (2021), to changes in behavior and social media (2022–2023), culminating in sophisticated, AI-driven, immersive consumption research (2023–2024).

3.3 Citation Analysis

To comprehend the intellectual underpinnings and evolving trajectories of consumer behavior research in the digital age, it is crucial to pinpoint the most impactful and frequently referenced publications that define the conceptual framework. Well-cited publications act as reference points that direct theoretical advancement and illuminate changes in customer expectations, digital service strategies, technical acceptance, and behavioral reactions to new digital contexts. The subsequent table encapsulates the most frequently cited references pertaining to digital consumer behavior, service innovation, machine learning in marketing, intelligent technologies, experiential marketing, and behavioral adaptations during the COVID-19 pandemic. Collectively, these studies illustrate how technical progress, socio-economic upheavals, and shifting consumer perceptions have collaboratively influenced modern consumer behavior research.

Table 1. Top Cited Research

Citations	Authors and year	Title
286	[13]	"Untact": a new customer service strategy in the digital age
270	[14]	Three eras of survey research
257	[15]	The next 20 years: How customer and workforce attitudes will evolve
183	[16]	Online shopping adoption during COVID-19 and social isolation: Extending the UTAUT model with herd behavior
182	[17]	Research framework, strategies, and applications of intelligent agent technologies (IATs) in marketing
158	[18]	Data, measurement, and causal inferences in machine learning: opportunities and challenges for marketing

Citations	Authors and year	Title
103	[19]	Do consumers want mobile commerce? A closer look at M-shopping and technology adoption in Malaysia
101	[20]	Experiential marketing: Consumer behavior, customer experience and the 7Es
91	[21]	Impact of the COVID-19 pandemic on the environment and socioeconomic viability: a sustainable production chain alternative
90	[22]	A chaotic colour image encryption scheme combining Walsh–Hadamard transform and Arnold–Tent maps

Source: Scopus, 2025

The table underscores the extensive range and variety of research influencing consumer behavior in the digital age. [13]) highlight the emergence of contactless service strategies ("untact"), illustrating the transformation of service interactions and customer anticipations through digital interfaces. [14], [15] offer foundational insights that present historical and generational viewpoints, illustrating how technological advancement and changing views influence enduring behavioral patterns. Recent studies, such those by [16], [21], illustrate the significant influence of COVID-19 on the adoption of online shopping, social isolation, and sustainable consumption behaviors. Technological improvements are pivotal: [17], [18] examine intelligent agents and machine learning as instruments for forecasting and shaping customer behavior. Simultaneously, studies conducted by [19], [20] enhance comprehension of mobile commerce and experiential marketing. These references together demonstrate that digital consumer behavior is influenced by a complex interaction of technology advancements, global disruptions, changing expectations, and enhanced analytical capabilities.

3.4 Density Visualization

Figure 3. Density Visualization
Source: Data Analysis Result, 2025

The density map distinctly illustrates "consumer behavior" as the most extensively examined and conceptually pivotal issue in the field, indicated by the bright yellow area at the center of the picture. Keywords like marketing, social media, and artificial intelligence are found in regions of

moderate density (green), indicating their significant although somewhat subordinate presence in the literature. This grouping reveals a substantial numb er of research examining the impact of digital technologies—such as AI-driven personalization, platform-based interactions, and algorithmic content delivery—on consumer attitudes and decision-making processes. The adjacent teal regions denote established but less densely filled themes, like big data, digital technology, data privacy, and the digital age, indicating foundational yet broader contextual queries that underpin the advancement of digital consumer behavior research.

Keywords such as virtual reality, metaverse, and purchase intention are located in lower-density areas (blue–green) near the perimeter, signifying that these subjects are emergent or specialized rather than mainstream. Their existence on the map, however, affirms that immersive technologies, experiential consumerism, and intention-driven models are gaining prominence as key subfields. Terms such as innovation, internet, and consumption behavior provide transitional concepts that connect old consumer theories with contemporary digital frameworks. The density visualization indicates that, although consumer behavior in digital contexts is the primary focus of research, the subject is broadening to encompass technology-driven, immersive, and behavioral-intention themes that signify the forthcoming boundaries of academic inquiry.
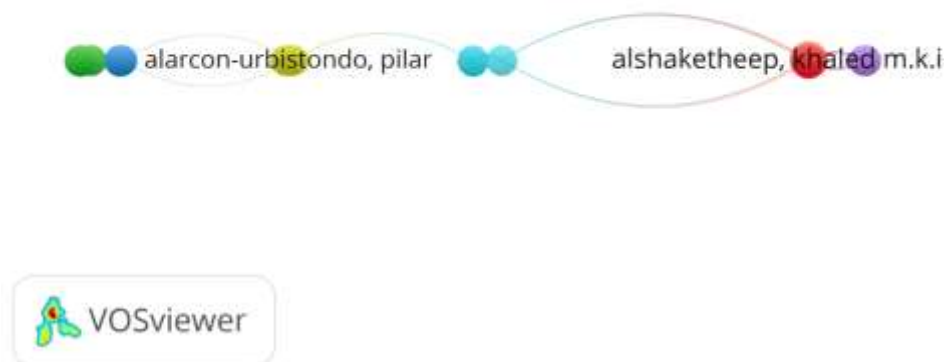
3.5 Co-Authorship Network

Figure 4. Author Visualization
Source: Data Analysis Result, 2025

The author co-authorship visualization reveals a diminutive and weakly interconnected cooperation network, suggesting that research in this domain of consumer behavior in the digital age is not mostly governed by huge, centralized author collectives. Rather, it signifies solitary or dyadic collaborations among a limited number of scholars. The connection between Alarcón-Urbistondo, Pilar and Alshaketheep, Khaled M.K.I.—linked via an intermediary pair of authors— indicates sporadic cross-institutional collaboration rather than consistent or extensive cooperative tendencies. The comparatively slender lines and ample spacing in the network signify a low fre quency of co-authorship, suggesting that these researchers may publish indepen

dently or collaborate with other partners on distinct projects. The image indicates a disjointed collaboration framework, underscoring prospects for future researchers to enhance interdisciplinary and cross-national alliances to advance the intellectual growth of digital consumer behavior research.
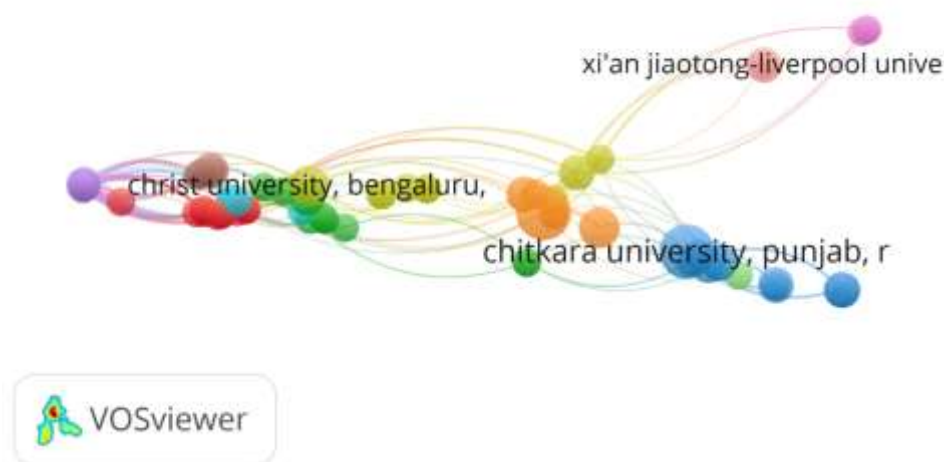

Figure 5. Affiliation Visualization
Source: Data Analysis Result, 2025

The affiliation network visualization depicts a moderately interconnected yet regionally clustered collaboration framework among universities engaged in consumer behavior research in the digital age. The leading institutions—namely Christ University in Bengaluru, Chitkara University in Punjab, and Xi'an Jiaotong–Liverpool University—function as pivotal centers within their clusters, signifying elevated research output and enhanced collaborative connections. The concentrated presence of Christ University and Chitkara University indicates that Indian institutions are notably engaged and integrated in this domain, establishing a dynamic regional research community. Conversely, Xi'an Jiaotong–Liverpool University presents itself as a more globally connected yet less densely concentrated node, indicative of targeted, high-impact connections across many locations. The diverse hues and directional flow of links signify cross-institutional collaborations that transcend national borders; nonetheless, the overall image still reveals discrete, semi-autonomous institutional clusters rather than a wholly integrated global network. This trend underscores the increasing involvement of Asian institutions in digital consumer research and the opportunity for further international collaboration to strengthen the field's global unity.
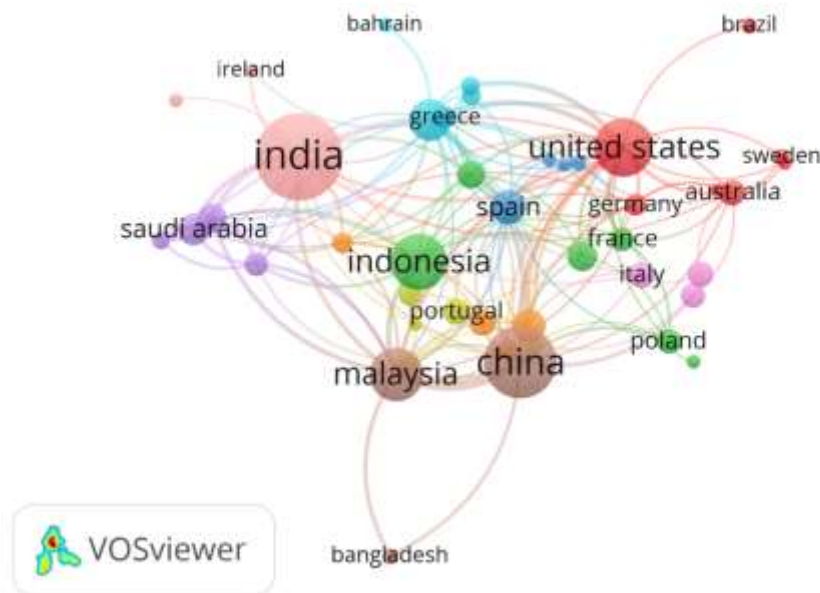
Figure 6. Country Visualization
Source: Data Analysis Result, 2025

The nation collaboration map illustrates a highly integrated and globally spread research network, featuring numerous prominent regional centers that influence the conceptual framework of consumer behavior studies in the digital age. India, China, and the United States emerge as the predominant and pivotal nodes, signifying their substantial research output and broad global collaboration. The robust, multihued connections originating from these nations indicate regular co-authorship and collaborative publications with a diverse array of international partners. Southeast Asian nations—especially Indonesia and Malaysia—occupy prominent roles in the network, underscoring their increasing contributions to research on digital consumer behavior inside swiftly evolving digital economies. European nations including Spain, Germany, France, Italy, and Portugal constitute a closely interconnected cluster, indicating robust regional collaboration and common research interests in digital platforms, marketing analytics, and consumer psychology. Minor yet significant contributors, such as Saudi Arabia, Australia, Sweden, Ireland, and Brazil, emerge as strategically linked nodes, frequently partnering with big hubs instead than creating isolated clusters. The picture demonstrates a strong and varied international research environment, with Asia emerging as a notably significant location and global collaboration acting as a crucial catalyst for knowledge advancement in the subject.

3.6 Discussions

a. Practical Implications

This bibliometric mapping offers various tangible insights for practitioners, policymakers, and institutional leaders. For managers and marketers, the prevalence of topics such as social media, artificial intelligence, big data, and digital platforms signifies where strategic investments in capabilities, analytics, and talent will provide the most significant leverage in comprehending and influencing customer behavior. Companies can utilize the identified research hotspots—such as AI-driven personalization, social media marketing, data privacy, and online purchase intention—to enhance customer experience strategies, create more focused digital

campaigns, and predict evolving consumer expectations in immersive settings like virtual reality and the metaverse. The prominence of data privacy and digital trust highlights the necessity for politicians and regulators to provide comprehensive governance frameworks, consumer protection rules, and digital literacy initiatives that align with technical advancements. Universities and research institutions can utilize the country, institution, and author maps to discover prospective collaborators, establish international consortia, and synchronize their research agendas with worldwide trends in digital consumer behavior.

b. **Theoretical Contributions**

The work provides a theoretical contribution by presenting a comprehensive, data-driven analysis of the evolution and recombination of consumer behavior theories in the digital age. The analysis demonstrates that traditional paradigms—such as technology adoption models, experiential consumption, and social influence theories—are becoming increasingly interconnected with concepts from data science, artificial intelligence, platform economics, and privacy research through the mapping of keyword co-occurrence and co-citation patterns. The delineation of theme clusters concerning social media, cognitive technologies, big data, and immersive settings elucidates the conceptual parameters of "digital consumer behavior" as a unique yet interdisciplinary field. This mapping enables scholars to identify important theoretical lenses, emergent ones (e.g., metaverse, virtual reality, algorithmic persuasion), and areas with conceptual gaps or underdeveloped interconnections. The study establishes a systematic basis for future theoretical development, promoting more cohesive frameworks that link psychological processes, technological affordances, and socio-cultural settings in digital consumption.

c. **Limitations and Directions for Future Research**

This study, despite its merits, has some limitations that must be recognized and may inform future research. The analysis predominantly depends on a singular or a restricted selection of bibliographic databases and English-language publications, potentially neglecting regional journals, non-English academics, and practitioner-oriented outputs that contribute to the comprehension of digital consumer behavior. Secondly, bibliometric methods emphasize publication and citation trends, which illuminate structural and thematic connections but fail to adequately reflect the depth, quality, or methodological rigor of individual studies; qualitative or systematic reviews remain essential for a critical assessment of prevailing theories and empirical results. The keyword-based methodology relies on the terminology selected by writers and their indexing techniques, which may conflate disparate concepts or divide analogous ones, so introducing bias into cluster creation. The swiftly advancing landscape of digital technologies indicates that emerging subjects—such as generative AI, Web3, and sophisticated biometric tracking—may not yet be comprehensively represented in the dataset. Subsequent research may rectify these limitations by integrating bibliometrics with content analysis, utilizing supplementary databases and languages, routinely updating the dataset, and performing comparative mappings across sectors or regions to encapsulate the dynamic, global evolution of consumer behavior in the digital age.

4. CONCLUSIONS

This bibliometric analysis offers a thorough examination of the evolution of consumer behavior research in the digital age and the organization of knowledge within this domain. The analysis of papers indexed in prominent academic databases, utilizing science-mapping tools like VOSviewer and Bibliometric, demonstrates that "consumer behavior" serves as the intellectual core around which numerous significant themes converge. Social media, digital platforms, artificial intelligence, big data, purchase intention, and data privacy have emerged as pivotal research focal points, signifying that digital technologies and data-driven marketing strategies are integral to modern interpretations of consumer cognition, emotion, and behavior. The findings indicate that research output and collaboration are widely dispersed yet not uniform. Countries include India, China, the United States, Indonesia, and Malaysia are significant contributors, exhibiting robust regional and worldwide co-authorship networks. Institutional and author-level maps demonstrate that the discipline is underpinned by a combination of robust local cooperation and more discerning international relationships. The observed patterns indicate that digital consumer behavior constitutes a truly global research domain, influenced by both developed and developing economies undergoing swift digitization and platform expansion. In addition to delineating patterns, the mapping provides strategic direction for academics and practitioners. Researchers may utilize the observed clusters and gaps to orient future endeavors, construct integrative theoretical frameworks, and concentrate on underexplored intersections, such as those involving immersive technologies, ethical AI, and consumer well-being. Practitioners and policymakers can synchronize their tactics with the prevailing themes of social media engagement, AI-driven personalization, and data governance, while staying cognizant of issues related to privacy, trust, and digital inclusion. The findings together emphasize that digital consumer behavior is a fluid and evolving field, consistently influenced by technical innovation, methodological progress, and societal transformation, which continually redefine the study topic.

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