

FROM TRADITIONAL MARKETS TO DIGITAL TRANSFORMATION: A BIBLIOMETRIC ANALYSIS AND CONCEPTUAL FRAMEWORK DEVELOPMENT OF THE STIMULUS-ORGANISM-RESPONSE (S-O-R) MODEL (2012-2024)

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ABSTRACT

Consumer engagement in social media is increasingly shaped by digital marketing, influencer strategies, and AI-driven content personalization. The Stimulus-Organism-Response (S-O-R) model explains how external stimuli influence cognitive and emotional processes, leading to behaviors such as electronic word-of-mouth (eWOM) and purchase intention. Despite its extensive adoption, a bibliometric synthesis of S-O-R research in social media remains limited. This study conducts a systematic bibliometric review of 1,709 Scopus-indexed publications (2012–2024), mapping key themes such as AI-driven personalization, digital marketing, trust-building, brand communities, and metaverse-driven consumer experiences. Findings highlight emerging research areas of behavioral analytics, affective engagement, and social commerce. By advancing the S-O-R model, this study offers insights for academics, digital marketers, and platform strategists. The proposed conceptual framework integrates AI-enhanced stimuli, cognitive-affective mechanisms, and behavioral responses, contributing to future research in social media engagement, AI-driven marketing, and consumer psychology.

Keywords: Consumer engagement, S-O-R model, bibliometric analysis, social media marketing

INTRODUCTION

The Stimulus-Organism-Response (S-O-R) model, initially proposed by Mehrabian and Russell (1974), has been widely utilized in consumer behavior research to explain how external stimuli influence individuals' internal cognitive and emotional processes, leading to specific behavioral responses. The rapid growth of social media platforms has transformed digital interactions, providing new environments where the S-O-R framework is increasingly applied to understand user behavior (Treisman, Sykes & Gelade, 2022).

Social media serve as rich environments where various stimuli—such as influencer endorsements, brand promotions, AI-driven content, and user-generated reviews—trigger cognitive and emotional engagement among users (Erensoy et al., 2024; Pham, Ngo, & Alomari, 2024; Prabowo, Gultom, & Pratiwi, 2024; Yang, Yuan & Yang, 2024). These responses then lead to behaviors such as eWOM (electronic word-of-mouth) and purchase intention, and social commerce participation (Mohapatra et al., 2024; Zhang et al., 2022).

Integrating artificial intelligence (AI), virtual influencers, and immersive metaverse experiences reshapes consumer engagement strategies in this digital era (Pan, Ishak, and Qin, 2024). The S-O-R model has evolved beyond traditional marketing applications, making it critical to analyze its theoretical expansion, application trends, and academic impact in social media.

Despite the increasing adoption of the S-O-R framework in digital and social media contexts, few comprehensive bibliometric reviews exist. Several research gaps exist. Firstly, studies applying the S-O-R model to social media are dispersed across multiple disciplines, including marketing, psychology,

business, and information systems (Brodie et al., 2013; Laroche et al., 2012; Xia & Shannon, 2025), making it challenging to track overarching trends (Wang & Kim, 2017). Secondly, numerous studies have explored social media engagement, influencer marketing, and online purchasing behavior, but their theoretical connections remain unclear due to a lack of bibliometric synthesis. Lastly, the impact of AI-driven personalization, virtual influencers, and metaverse-based consumer experiences on user engagement within the S-O-R framework remains underexplored (Hollebeek et al., 2024).

This study analyzes the evolution, impact, and research gaps in the S-O-R framework applied to social media by conducting a bibliometric review of Scopus-indexed publications from 2014-2024.

OBJECTIVE

1. Using citation analysis, identify key authors, influential papers, and leading journals.
2. To explore research themes through keyword co-occurrence analysis.
3. To construct an updated conceptual framework that integrates AI-enhanced social media stimuli, behavioral analytics, and trust-building mechanisms in digital environments.

METHODOLOGY

This study employs a bibliometric analysis to systematically evaluate the evolution and intellectual structure of research applying the Stimulus-Organism-Response (S-O-R) model in social media studies from 2014 to 2024. Bibliometric methods offer a quantitative assessment of academic literature, enabling the identification of key trends, influential authors, citation relationships, and emerging themes within the field. Given the interdisciplinary nature of social media research, bibliometric analysis is essential for mapping research clusters, identifying theoretical foundations, and uncovering knowledge gaps in applying the S-O-R framework.

Research design

To achieve these objectives, a structured five-step process was followed. First, data collection was conducted using the Scopus database, ensuring the inclusion of high-quality, peer-reviewed studies. Second, the retrieved dataset was refined by removing duplicate records and filtering studies that did not meet predefined inclusion criteria. Third, citation and co-citation analyses were performed to identify the field's most influential papers and intellectual linkages. Fourth, keyword co-occurrence analysis was applied to detect emerging themes and evolving research directions. Finally, findings from the bibliometric review were synthesized into an updated conceptual framework, offering insights into how the S-O-R model has been applied and extended in social media research. The data collection followed a structured approach, beginning with an initial search query using relevant keywords such as Stimulus-Organism-Response. The following filtering steps were implemented to ensure that only relevant and high-quality studies were included. The first screening phase applied Scopus filtering criteria to refine the search results. Filters applied publication year, document types, and relevance screening. After this final exclusion, 1,707 papers were included in the final review database, forming the foundation for bibliometric analysis. Figure 1 shows the process of identifying the S-O-R model via Scopus.

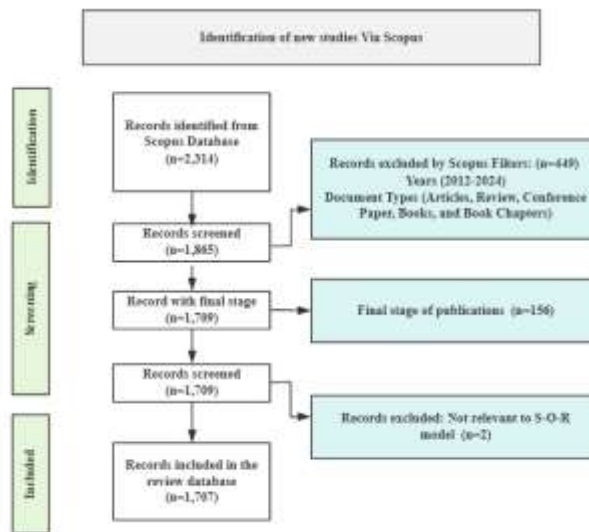


Figure 1: The PRISMA diagram of S-O-R model

Data analysis

Following the rigorous screening and selection, the final dataset comprised 1,709 Scopus-indexed publications that met all inclusion criteria. These studies formed the basis for citation and keyword trend analysis using VOSviewer. This structured data collection approach ensures that the study provides accurate, high-quality insights into the evolution, intellectual structure, and future directions of S-O-R research in social media. Then, the researchers develop the conceptual framework based on the citation analysis.

RESULTS

Citations analysis (2012-2024)

The Stimulus-Organism-Response (S-O-R) model was utilized in various disciplines, including psychology, consumer behavior, environmental studies, and digital marketing. This model provides a comprehensive framework for understanding how external stimuli (S) influence internal organismic states (O), which in turn shape individuals' behavioral responses (R). Over the decades, the S-O-R model has evolved, with researchers expanding its application to online consumer engagement, emotional responses to stimuli, and decision-making in digital environments (Rahmadini and Masnita, 2024).

Identifying the top-cited authors in S-O-R research is essential to understanding the key contributions, theoretical advancements, and emerging trends in this field. Citation analysis helps highlight the most influential scholars whose work has shaped contemporary discussions and applications of the S-O-R framework. These scholars have provided significant insights into consumer emotions, cognitive processing, and behavioral responses, particularly in e-commerce, social media, and immersive digital experiences. Table 1 shows the top 15 cited authors of stimulus-organism-response research.

Table 1. The Top Cited Author of Stimulus-Organism-Response Research, 2012 to 2024 (n=1,709)

Rank	Authors	Citations	Total link strength	Focus	Nationality
1	Sarstedt M.	1892	108943	Customer Behavior	Germany
2	Ringle C.M.	1791	102920	Psychology	Germany
3	Hair J.F.	1788	99105	Customer Behavior	USA
4	Mehrabian A.	1400	65287	Customer Behavior	USA
5	Russell J.A.	1354	64175	Psychology	Canada
6	Fornell C.	916	47936	Customer Satisfaction	USA
7	Wang Y.	816	45254	Customer Behavior	China
8	Larcker D.F.	805	42109	Digital Marketing	USA
9	Han H.	709	39299	Customer Behavior	China
10	Henseler J.	707	41701	Brand Management	Netherlands
11	Liu Y.	707	41562	Digital Marketing	China
12	Kim J.	692	36258	Psychology	South Korea
13	Bagozzi R.P.	690	36652	Social Psychology	USA
14	Babin B.J.	671	33830	Customer Service	USA
15	Podsakoff P.M.	637	36170	Customer Behavior	U.S.A

From 2012 to 2024, the top scholars in Stimulus-Organism-Response (SOR) research have made significant contributions. Sarstedt M. (Germany) ranks first with 1,892 citations and a link strength of 108,943, indicating his significant influence in the field. Ringle C.M. (Germany) follows closely with 1,791 citations and a total link strength 102,920. Hair J.F. (USA) is third with 1,788 citations. These three scholars stand out with significantly higher citation counts, demonstrating their substantial impact on the field.

Among the most cited scholars, the dominant research focus is "Customer Behavior," with six scholars specializing in this area. Notable figures include Sarstedt M., Hair J.F., and Mehrabian A.

Psychology is another popular research field, with three highly cited scholars: Ringle C.M., Russell J.A., and Kim J.. Other areas such as Digital Marketing, Brand Management, Customer Satisfaction, and Customer Service have fewer top-cited scholars.

Regarding nationality, the USA has the highest number of top-cited scholars, with seven researchers on the list, demonstrating its dominance in SOR research. China follows with three scholars, indicating its rising influence in the field. Germany contributes two leading scholars, Sarstedt M. and Ringle C.M., both of whom hold a significant global impact. Additionally, Canada, the Netherlands, and South Korea each have one scholar in the ranking.

While citation count measures the popularity of a scholar's research, total link strength (network strength) better reflects the scholar's academic influence and collaboration. For example, Sarstedt M. has the highest total link strength (108,943), signifying a broad academic network and significant influence beyond just citations. On the other hand, some scholars with relatively lower citation counts, such as Fornell C. (916 citations), still hold strong network influence with a total link strength of 47,936, demonstrating their importance in academic collaborations.

Analyzing the top-cited journals in S-O-R research provides valuable insights into the most influential publication outlets, their thematic focus, and their role in the evolution of the model's applications. Between 2012 and 2024, 1,709 research articles have contributed to the growing body of S-O-R literature, demonstrating its increasing significance in contemporary academic discourse in Table 2.

Table 2. The Top Cited Journal of Stimulus-Organism-Response Research, 2012 to 2024 (n=1,709)

Rank	Sources	Documents	Citations	C/PC
1	<i>Journal Of Retailing And Consumer Services</i>	84	5690	67.73
2	<i>Computers In Human Behavior</i>	29	2371	81.75
3	<i>International Journal Of Information Management</i>	16	2368	148
4	<i>Information And Management</i>	10	1785	178.5
5	<i>Internet Research</i>	22	1752	79.64
6	<i>Journal Of Business Research</i>	13	1526	117.38
7	<i>Electronic Commerce Research And Applications</i>	24	1499	62.45
8	<i>Sustainability (Switzerland)</i>	74	1247	16.85
9	<i>Frontiers In Psychology</i>	77	1082	14.05
10	<i>Journal Of Travel Research</i>	8	1025	128.13
11	<i>Telematics And Informatics</i>	11	972	88.36

Rank	Sources	Documents	Citations	C/PC
12	<i>Asia Pacific Journal Of Marketing And Logistics</i>	35	958	27.37
13	<i>Journal Of Cleaner Production</i>	12	828	69
14	<i>Journal Of Research In Interactive Marketing</i>	9	805	89.44
15	<i>International Journal Of Hospitality Management</i>	14	771	55.07

Note: C/PC: Citation per cited paper

The dataset ranks the top journals publishing Stimulus-Organism-Response (SOR) research based on the number of documents, citations, and citations per cited paper (C/PC). The leading journal is the Journal of Retailing and Consumer Services, which has published 84 documents and received 5,690 citations, indicating its strong academic presence in this field.

Computers in Human Behavior follow closely, with 29 documents and 2,371 citations, achieving a high citation-per-paper rate of 81.75. Meanwhile, the International Journal of Information Management has published only 16 papers but has received 2,368 citations, giving it an impressive C/PC of 148, reflecting its high impact.

The Journal of Retailing and Consumer Services leads in publication volume and citations, whereas Information and Management has the highest citation impact per paper. High-impact journals such as the International Journal of Information Management and the Journal of Travel Research have fewer papers but exert a strong influence. Meanwhile, journals like Sustainability (Switzerland) and Frontiers in Psychology publish many papers but have relatively lower citation impact per article. The analysis highlights the diverse disciplinary contributions to SOR research, with strong influences from marketing, psychology, and business management.

Research on the S-O-R model is highly globalized, with contributions from scholars across different countries and regions. Analyzing the top-cited countries/areas in S-O-R research between 2012 and 2024 (n = 1,709) provides crucial insights into the geographical distribution of influential academic contributions. Identifying these high-impact regions helps highlight the countries leading in S-O-R research, their collaboration networks, and their thematic focus in Table 3.

Table 3. The Top Cited Countries/Areas of Stimulus-Organism-Response Research, 2012 to 2024 (n=1,709)

Rank	Countries/Areas	Documents	Citations	C/PC
1	China	633	21109	33.35
2	United States	204	8869	43.48
3	India	221	6578	29.76
4	Taiwan	143	5789	40.48
5	United Kingdom	99	5442	604

Rank	Countries/Areas	Documents	Citations	C/PC
6	Malaysia	178	3617	20.32
7	South Korea	110	3573	32.48
8	Hong Kong	40	2357	58.93
9	Australia	70	2315	33.07
10	South Africa	41	2199	53.63
11	Pakistan	53	1975	37.26
12	Finland	18	1679	93.27
13	Norway	18	1610	89.44
14	Canada	34	1563	45.97
15	Spain	47	1284	27.32

Note: C/PC: Citation per cited paper

Table 3 ranks the top countries contributing to Stimulus-Organism-Response (SOR) research based on the number of documents, citations, and citations per cited paper (C/PC). China is the leading contributor, with 633 published documents and 21,109 citations, showing its strong academic output in this field. However, its C/PC is 33.35, which is moderate compared to other countries.

Following China, the United States (204 documents, 8,869 citations, C/PC = 43.48) and India (221 documents, 6,578 citations, C/PC = 29.76) are also major contributors. Taiwan, the United Kingdom, Malaysia, and South Korea round out the top seven, with significant numbers of documents and citations.

China is the most significant contributor to SOR research regarding published documents and total citations, but countries like the United Kingdom, Finland, and Norway have higher citation impact per paper. While countries such as India and Malaysia produce many papers, their research impact (C/PC) is comparatively lower. The analysis shows that SOR research is widely distributed across multiple regions, with Asia leading in volume and Europe excelling in research influence.

Keyword Co-occurrence Analysis

Network visualization illustrates the key thematic clusters within Stimulus-Organism-Response (S-O-R) research from 2012 to 2024. The network map is generated based on a co-occurrence analysis of keywords, highlighting the major research themes, interconnections, and emerging trends in the S-O-R framework in Figure 2. Different colors represent distinct clusters of research topics, reflecting thematic groupings within the literature.

The blue cluster primarily focuses on human-related aspects, including research on human behavior, gender differences (male, female), psychological studies (anxiety, cognition, motivation), and methodological approaches (structural equation modeling, questionnaire surveys). Topics related to COVID-19 and its impact on behavioral research are also prominent in this cluster.

The red cluster is centered around consumer psychology and sustainability, featuring key themes such as perception, satisfaction, sustainability, tourist behavior, marketing, and social media engagement. The presence of keywords such as "China," "tourist destination," and "sustainable development" suggests a strong emphasis on regional studies and sustainable consumer behavior.

The green cluster represents research on digital commerce and consumer engagement, with dominant themes such as electronic commerce, purchase intention, social networking (online), sales, and impulse buying. This cluster highlights the increasing integration of digital platforms in S-O-R research, particularly in understanding consumer decision-making and online purchasing behavior.

This bibliometric network analysis underscores the diverse research landscape of S-O-R studies, revealing key thematic areas and their interconnections. The findings suggest that S-O-R research has expanded significantly over the past decade, integrating insights from psychology, marketing, sustainability, and digital commerce. The strong interlinkages among keywords indicate a shift towards a more holistic understanding of consumer behavior in both traditional and digital contexts.

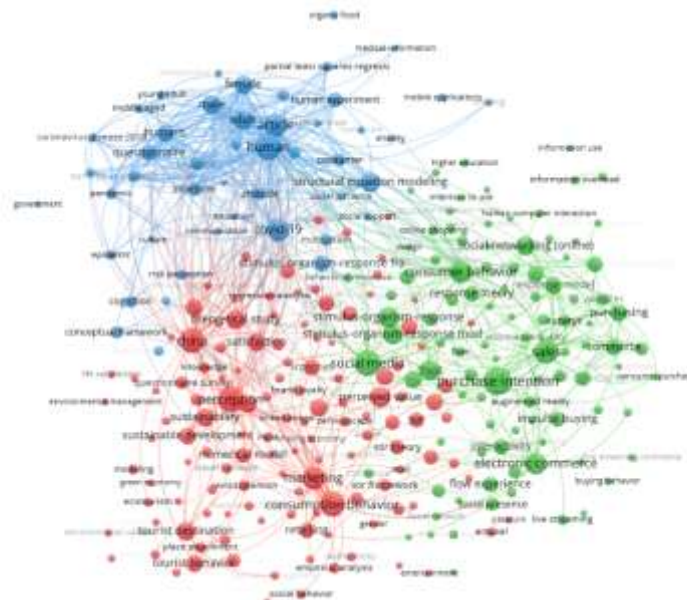


Figure 2 Intellectual Structure of the Stimulus-Organism-Response Research, 2012 to 2024
(n=1,709)

Furthermore, the growing emphasis on digital engagement, social media, and e-commerce reflects the increasing influence of technological advancements in shaping consumer experiences. Meanwhile, the presence of sustainability-related themes suggests that S-O-R research also contributes to discussions on responsible consumerism and sustainable business practices.

CONCLUSION AND FUTURE WORK

This study presents a bibliometric review of the Stimulus-Organism-Response (S-O-R) model applied to consumer engagement in social media from 2012 to 2024. The findings offer several theoretical, managerial, and practical implications.

Theoretical Implications

The study highlights how the S-O-R framework has evolved beyond traditional marketing applications, integrating aspects of artificial intelligence (AI). This expansion provides a deeper

understanding of digital consumer engagement by incorporating emerging technologies as external stimuli (McAlexander et al., 2002; Jaakkola and Alexander, 2014; Verhoef et al., 2010). The bibliometric analysis identifies the intersection of marketing, psychology, and information systems in social media engagement research. The findings emphasize the need for more interdisciplinary approaches in future S-O-R applications. The growing body of research on AI-driven content personalization, chatbots, and virtual influencers underscores the importance of cognitive and emotional engagement in influencing consumer behavior (Xia and Shannon, 2024). Future theoretical models should consider AI as a dynamic stimulus affecting user decision-making. The study highlights perceived value and information quality in fostering trust, engagement, and repurchase intention. Theoretical frameworks should integrate trust-building as a core component in the consumer engagement process.

Managerial Implications

Brands and marketers should leverage virtual influencers to personalize customer interactions and enhance engagement. Businesses should foster cognitive, emotional, and behavioral engagement through interactive social media campaigns, influencer collaborations, and community-driven marketing efforts. Marketers should prioritize providing accurate, relevant, and timely information across digital platforms. High-quality content fosters trust and encourages deeper consumer engagement. As social media influences consumer decisions, brands must integrate ethical considerations and sustainability-driven messaging to align with evolving consumer expectations. To enhance consumer engagement, businesses should explore AI-driven tools, such as personalized recommendation engines, AI-powered customer service, and virtual influencers. To deepen consumer engagement, brands should develop interactive content strategies, such as live Q&A sessions, community forums, and user-generated content campaigns. Companies must adopt advanced analytics tools to track and optimize consumer engagement metrics, including customer retention rates, sentiment analysis, and eWOM impact.

Conclusions

This bibliometric review of the S-O-R model applied to social media engagement provides valuable insights into its evolution, impact, and research gaps. The findings confirm that various external stimuli, including AI-driven content, influencer marketing, and personalized brand interactions, influence consumer engagement in social media. Integrating AI, immersive metaverse experiences, and trust-building mechanisms have significantly shaped consumer engagement strategies. The study reveals that S-O-R research has expanded across multiple disciplines, with an increasing focus on digital marketing, e-commerce, and consumer psychology. Citation and keyword analyses indicate that significant research themes include emotional engagement, digital trust, eWOM, and personalized consumer experiences. Despite the progress, several gaps remain. The impact of AI-driven engagement, virtual influencers' role, and digital marketing's ethical considerations require further exploration. Additionally, while research on social media engagement is growing, a more holistic integration of cognitive and affective factors within the S-O-R framework is needed.

Future study

Future research should focus on empirically testing the conceptual framework proposed in this study. The bibliometric review identified key constructs influencing consumer engagement in social media through the Stimulus-Organism-Response (S-O-R) model. However, future studies should conduct empirical investigations using diverse research methodologies to validate these relationships and advance theoretical contributions.

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