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Artificial Intelligence (AI) and social commerce in digital business ecosystems: A science-mapping analysis of global research evolution and emerging trends

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ABSTRACT

The current study presents a comprehensive science-mapping analysis of global research on the intersection of Artificial Intelligence (AI) and social commerce within digital business ecosystems. Through systematic analysis of bibliometric data from the Scopus database between 2000 and February 8, 2026, we identify the intellectual structure, thematic evolution, and emerging trends in this rapidly changing field. Using sequential bibliometric mapping and Latent Dirichlet Allocation (LDA) topic modelling, we reveal five key research clusters that illustrate the ways AI-enabled technologies (machine learning, recommendation systems, natural language processing) are discussed in relation to social commerce practices, including personalization, consumer engagement, and transactional efficiency. The study makes three interconnected contributions. First, it sequentially integrates

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bibliometric mapping with LDA topic modelling, using bibliometrics to establish the field's intellectual structure (who, where, when) and LDA to uncover its latent thematic content (what). Second, it empirically grounds the Technology-Organization-Environment (TOE) framework in AI-enabled social commerce, demonstrating that the three TOE dimensions are not static adoption factors but deeply interlinked, co-evolving forces. Third, it proposes a conceptually coherent framework derived directly from the five LDA topics, mapping each topic to a TOE dimension and identifying relationships suggested by the temporal patterns in our bibliometric data. These are presented as testable propositions for future research, not as confirmed causal mechanisms. These proposed relationships, drawn from observed patterns in the literature, offer hypotheses for future empirical testing rather than confirmed causal pathways. The study discusses disciplinary and geographic trends, showing rising contributions from Asia and Europe and collaborative interdisciplinary work across business strategy, information systems, and marketing domains. Future research avenues focus on algorithmic fairness, data privacy, and sustainability in AI-enhanced social commerce. This science-mapping analysis provides a holistic perspective on the research landscape, offering academics, practitioners, and pracademics actionable insights into the trajectory of AI and social commerce scholarship within digital business ecosystems.

Introduction

In this age, the digital economy is undergoing unprecedented transition as companies are rapidly integrating advanced technologies to create new value propositions, enhance consumer engagement and reconfigure traditional business models (Zhang et al., 2026). At the core of this transformation is Artificial Intelligence (AI), where computational systems (such as Machine Learning (ML), recommendation systems, natural language processing) are now capable of executing tasks that typically require human interaction and intelligence, inclusive of adaptive learning, pattern recognition and autonomous decision making (Rodriguez et al., 2025). In digital business contexts, AI applications are rapidly changing the way the organisations personalise services, optimise operations and interact with consumers, driving both economic growth and competitive differentiation (Saleh and Zeebaree, 2025a). Social commerce has similarly emerged as a salient extension of traditional digital business and e-commerce by embedding social interaction mechanisms and user-generated content (UGC) directly into the commercial transaction process (Herzallah et al., 2025). It has been defined as e-commerce activities enabled by social media, peer engagement, and networked interaction (Martínez-López et al., 2024; Zhang et al., 2026). Social media commerce enables consumers to discover, evaluate, and purchase products and services through interactive, socially mediated environments which leverage consumer trust and social influence (Dixit et al., 2025).

Global research shows that social commerce is not only focused on consumer behaviour and engagement, but also around technological enablers such as live streaming, platform design, and perceived risk mitigation (Schmitt, 2026). Consequently, these phenomena unfold within expanding digital business ecosystems (DBE), which is deemed to be the networks of interconnected organizations, technologies and stakeholders that co-create value through shared digital platforms, infrastructures, and collaborative relationships (Senyo et al., 2019). DBEs extend traditional business ecosystems by emphasising the digital integration of actors, data flows and platform-mediated interactions which enable innovation, scalability, and competitive advantage across industries (Tykea, 2025a).

Study rationale

The advent of Artificial Intelligence (AI) and social commerce convergence with digital business ecosystems represents a rapidly growing and transformative field of academic inquiry (Rodriguez et al., 2025). AI enabled technologies such as Machine Learning (ML), recommendation systems and natural language processing are significantly transforming how consumers interact with digital platforms and the ways in which corporations personalise services, streamline transactions and foster engagement (Epie Bawack et al., 2022). However, despite the fast-rising growth of research in this field, prior literature suffers from fragmentation, with studies often addressing isolated

aspects such as personalisation, algorithmic performance, or consumer behaviour rather than providing an integrated perspective of the field's intellectual structure and evolution (Zhang et al., 2026).

In addition, while AI-enabled recommendation systems and personalisation have been shown to improve customer experience (CX) and engagement, they also pose serious challenges related to governance and ethics (Deldjoo et al., 2023). Matters such as algorithmic fairness, data privacy and trust are increasingly acknowledged as central concerns in both AI research and the broader digital commerce environment (Milano et al., 2020). These issues are among the amplified in social commerce contexts that rely heavily on user-generated content (UGC) and network effects, yet systematic analyses that track these themes over time and across disciplines are lacking.

This study is guided by the following research questions:

1. *How has artificial intelligence shaped the evolution of social commerce practices within digital business ecosystems from 2000 to February 8, 2026, as reflected in global research trends and thematic developments?*
2. *In what ways does artificial intelligence driven by mechanisms, impact consumer engagement, trust and purchase behaviour in social commerce platforms?*
3. *What are the key ethical, social and strategic challenges related to artificial intelligence integration in social commerce, and can future frameworks address issues of data privacy, fairness and long-term digital business ecosystem sustainability?*

Science-mapping methodologies and technologies such as co-citation and network analysis give a way to synthesis of diverse research strands and to uncover emerging trends, disciplinary shifts and geographic patterns within the literature. Through this, the current study seeks to provide a holistic overview of the ways in which research at the intersection of AI and social commerce has evolved, identify gaps in the existing knowledge base and propose meaningful directions for future research that integrate technological advancement with responsible and sustainable practice.

To address the fragmentation in prior literature, this study makes three interconnected contributions. First, it sequentially integrates bibliometric mapping with Latent Dirichlet Allocation (LDA) topic modelling, using bibliometrics to establish the field's intellectual structure (who, where, when) and LDA to uncover its latent thematic content (what). Second, it applies the Technology-Organization-Environment (TOE) framework to organize our findings, showing that the three TOE dimensions appear in the literature as deeply interlinked and co-evolving rather than as static adoption factors. Third, it proposes a conceptually coherent framework derived directly from the five LDA topics, mapping each topic to a TOE dimension and identifying directional relationships suggested by the temporal patterns in our bibliometric data. These relationships are presented as testable propositions for future research, not as empirically confirmed causal mechanisms. Together, these contributions move beyond prior descriptive reviews to

offer an integrated, theory-anchored, empirically derived understanding of how AI is reshaping social commerce.

Theory

Technology-Environment-Organisation (TOE) framework

The current study is theoretically grounded in the Technology-Environment-Organisation (TOE) framework, which originally explains the ways in which technological innovation adoption is shaped by technological capabilities, organisational readiness and environmental conditions (Tornatzky and Fleischer, 1990a). In the context of digital commerce, the Technology-Environment-Organisation (TOE) framework provides a comprehensive trajectory for understanding the integration of Artificial Intelligence (AI) in social commerce platforms operating within digital business ecosystems. The technological dimension highlights the role of AI-driven tools such as Machine Learning (ML), recommendation systems, and natural language processing in enhancing personalisation, consumer engagement and decision-making processes in digital markets. The organisational dimension focuses on firms' internal capabilities, which include technological expertise, digital infrastructure and strategic commitment to innovation, which influence the successful adoption and implementation of AI-enabled solutions (Baker, 2012; Oliveira and Martins, 2011). On the other hand, the environmental dimension concentrates on external forces such as market competition, regulatory frameworks and ecosystem dynamics that shape the diffusion of artificial intelligence technologies in social commerce environments (Milano et al., 2020). Through integrating these three perspectives, the Technology-Environment-Organisation (TOE) framework provides a robust theoretical foundation for analysing the way in which technological innovations, organisational capabilities and ecosystem-level factors influence the evolution of research on AI-driven social commerce within digital business ecosystems.

Conceptual background

Artificial Intelligence (AI) in digital business

The role of Artificial Intelligence (AI) in digital business has evolved from a purely technological innovation into a strategic enabler of social commerce ecosystems. Rather than viewing social commerce only as an extension of social networking platforms, recent literature positions it as a technology-driven business environment where AI capabilities support personalization, automation, customer engagement, and data-driven decision making. This evolution aligns closely with the Technology-Organization-Environment (TOE) framework, particularly the technological dimension, which emphasizes how digital technologies influence organizational adoption and competitive transformation. The framing and conceptualization of social commerce within digital business ecosystems continues to generate considerable debate among scholars and practitioners. The integration of Artificial Intelligence (AI), social media technologies, and data driven digital platforms are the enablers to social commerce evolution and emergence. Within the technological context of TOE, AI functions as the core infrastructure that enhances the efficiency and intelligence of social commerce systems through predictive analytics, recommendation algorithms, machine learning, and automated customer interaction tools. The integration of AI with social media technologies and digital platforms has therefore accelerated the transformation of traditional e-commerce into interactive and intelligent commerce ecosystems. Liang and Turban (2011) argued that the increasing popularity of social networking platforms such as LinkedIn, Facebook, and Twitter contributed to the emergence of social commerce as a new digital business frontier. However, beyond enabling social interaction, AI technologies increasingly facilitate personalized consumer experiences and real-time decision support,

thereby strengthening firms' digital capabilities and market responsiveness. Consequently, the evolution of social commerce in digital business ecosystems is traceable to the different growth and interrelated phases that defined the period, social interaction enablement, intelligent personalization, and autonomous commerce ecosystems. The evolution of AI-enabled social commerce can be analytically categorized into interconnected developmental phases: social interaction enablement, intelligent personalization, and autonomous commerce ecosystems. The first phase (2010 to 2015) was characterized by the integration of Web 2.0 technologies with e-commerce platforms, where social networking functionalities enabled consumer participation and peer influence. Stephen and Toubia (2010) described this phase as an environment in which sellers operated within online social networks as individuals rather than traditional corporate entities. During this period, ratings, referrals, reviews, and community discussions reduced purchase uncertainty and shifted market influence toward digitally connected consumers. Haiji and Sims (2015) further highlighted that this transformation redistributed market power from firms to consumers through digitally mediated interactions.

From an analytical perspective, these developments demonstrate how AI and social technologies collectively reshaped the technological and environmental dimensions of the TOE framework. Technologically, firms adopted AI-driven tools to improve customer engagement and platform intelligence, while environmentally, increasing consumer digital participation and competitive pressure accelerated social commerce adoption. These patterns are also consistent with the bibliometric findings of the present study, which identify AI integration, digital platforms, consumer analytics, and intelligent personalization as dominant thematic clusters within contemporary digital business research. Thus, literature not only explains the historical evolution of social commerce but also provides theoretical support for understanding how AI capabilities influence digital business transformation within the TOE framework.

Social commerce

Significant development in both conceptual understanding and empirical research has been observed in social commerce since it emerged as a significant concept in the mid-2000s. Initially, social commerce was understood as a simple extension of electronic commerce with limited distinguishing factors such as ratings and reviews within online business environments (Liang and Turban, 2011). However, in recent years, the concept has witnessed significant development in understanding and incorporating a wide array of business-related activities within the broader framework of social interaction and user-generated content in online business environments (Strycharz et al., 2024). Today, social commerce is understood as a system in which technology and business incentives have significant interdependent relationships. This development in understanding and conceptualization represents a significant paradigm shift in the broader framework of electronic business from a simple transactional model to a more relational model in which business and technology are interdependent (Liu et al., 2024).

Digital business ecosystems

Integrating Artificial Intelligence (AI) technologies into daily business operations enables a crucial transformation in business structures, processes, work methods, and partnerships, ultimately leading to the creation of new AI-driven business models (Hwang et al., 2026; Wamba-Taguimdje et al., 2020) that create, deliver, and benefit from value (Alkhalaf et al., 2025), that stimulate economic growth and generate new competitive advantages (Saleh and Zeebaree, 2025a). Previous literature indicates that emerging technologies are proliferating and expanding into diverse fields, including social commerce (Abed, 2020), where intelligent algorithm-based social interaction mechanisms and machine language are integrated into business

transactions (Li et al., 2023; Palmié et al., 2022). Intelligent software is crucial for companies, enabling them to create a new ecosystem that helps them survive and compete in the market, not only based on the characteristics and differentiation of their products but also by continuously attracting new developments in all fields (Subramaniam et al., 2019; Volz et al., 2025). One of the advantages of smart technologies in social commerce is their ability to generate content and facilitate direct communication across social media platforms (Um et al., 2015) they allow customers to discover new product and service offerings, sometimes designed to be managed in real time (Tykea, 2025a).

Role of digital platforms and emerging technologies in digital business ecosystems

Digital platforms are the foundational infrastructure of digital business ecosystems (DBEs), enabling interactions among firms, consumers, and other stakeholders (Aksoy, 2023). Unlike traditional linear value chains, platforms operate as multi-sided markets that facilitate exchanges between different user groups, such as producers, consumers, and third-party developers. By reducing transaction costs and enabling real-time connectivity, platforms create environments where value is co-created rather than produced in isolation. This shift has fundamentally transformed how businesses operate, moving from firm-centric models to network-centric systems (Michalke et al., 2022). A key function of digital platforms is their ability to orchestrate participation across ecosystems, where platform owners establish rules, standards, and governance mechanisms that regulate access, interaction, and value distribution within those ecosystems (Michalke et al., 2022). These governance structures determine who can participate, how data is shared, and how innovation is coordinated. For instance, open platforms may encourage widespread participation and innovation, while closed platforms may prioritise control and quality assurance (Michalke et al., 2022; Aksoy, 2023). As such, platforms play a dual role as both enablers of collaboration and controllers of ecosystem dynamics. Network effects further reinforce the centrality of platforms in DBEs because, as more users join a platform, its value increases for all participants, creating a self-reinforcing cycle of growth (Bartels and Schmitt, 2022; Aksoy, 2023). Positive network effects can lead to rapid scaling and market dominance, often resulting in winner-takes-most outcomes, while this concentration of power also raises concerns about competition, data ownership, and equitable value distribution (Bartels and Schmitt, 2022; Aksoy, 2023).

Intersection of AI and social commerce

AI has been classified as a disruptive technology (Makudza et al., 2024) that has radically transformed business and social media engagement (Riandhi et al., 2025). Social commerce has also been revolutionized by its convergence with AI. The convergence has blurred the distinction between social commerce and e-commerce. In other words, AI has enabled e-commerce to intrude into online social marketplaces (Houcheimi, 2026) where consumers will be surfing on social media platforms including social shopping. Artificial Intelligence (AI) dates to the 1950s, but breakthroughs in computing power, algorithms, and complementary technologies accelerated its growth (Gouveia and Santos, 2025). AI now drives innovation across academia, healthcare, and business, particularly in customer experience and marketing (Ruslan and Aziz, 2025a). Unlike traditional e-commerce focused on transactions, AI integration with social media reshaped commerce into social commerce (Singh and Adhikari, 2023). AI automates processes, enhances segmentation, and boosts performance (Papastamoulou and Antonopoulos, 2025). Platforms process 87% of customer data, raising return on investment by 267% (Khy, 2025). Corporate AI investment hit \$252.3 billion in 2024, expanding thirteenfold since 2014 (Gouveia and Santos, 2025). The combination of AI and social commerce has been credited with rapid growth of sales revenue emanating from social

commerce (Zhao et al., 2023). AI-driven social commerce has been projected to exceed USD8,5 trillion globally by 2030 (ResearchAndMarkets.Com, 2023). AI enables highly accurate personalisation (Guo et al., 2024) and algorithmic precision on consumer surfing history, which facilitates social commerce consumers to get immediate recommendations on products, services and brands.

AI-driven mechanisms, consumer engagement, trust and purchase behaviour in social commerce platforms

AI-driven mechanisms are reshaping consumer engagement, trust, and buying behaviour on social commerce platforms (Żymkowska and Zachurzk-Srebrny, 2025). The AI-driven mechanisms encompassing predictive analysis (Khy, 2025), descriptive analysis, personalized recommendation algorithms, chatbots, and sentiment analysis. AI-driven mechanism is an objective to enhance user involvement by forecasting customer requirements, optimizing communication and customizing content (Sharma et al., 2025). AI-driven mechanisms facilitate user various offers such as interactive features, real-time responses and customers relevant products (Bijalwan et al., 2025). These emerging AI-driven technologies significantly enhance consumer engagement while dropping search expenses and cognitive effort (Singh, 2025). AI intensified consumer engagement interprets into accelerated purchase intentions that lead the consumers to be more likely to act on recommendations that appear customized and well timed through the social commerce platform (Singh, 2025; Shafiquzzaman, 2024). In modern business environment customers discover suggestions, recommendations and seek information on social commerce platforms (Sintia et al., 2023). Social commerce enables businesses to rapidly disseminate user-generated content, serving businesses function more effectively and efficiently (Singh, 2025). The firms adopted the AI-driven mechanism to stimulate customer engagement through social commerce platforms. The transformation and adopting new technologies require trust. Advancement in technology triggers paradigm shifts that reform the nature of trust.

Key ethical, social and strategic challenges: future frameworks addressing data privacy, fairness and long-term ecosystems sustainability

The convergence of Artificial Intelligence (AI) and social commerce has given rise to digital business ecosystems that are increasingly intelligent, adaptive and datafied. While this integration unlocks unprecedented opportunities for personalization, engagement and value co-creation, it simultaneously generates a complex constellation of ethical, social and strategic challenges. Consequently, platforms evolve from neutral marketplaces into active arbiters of consumer attention, where value creation is increasingly determined by data liquidity and algorithmic precision (O'Reilly et al., 2024). AI-driven personalisation in social commerce raises profound ethical concerns regarding user autonomy, manipulation and the adequacy of informed consent (Karami et al., 2024). Fagan (2024) posited that algorithms are frequently optimised to maximise engagement and conversion, giving rise to persuasive techniques such as hyper-targeted nudges, real-time dynamic pricing based on behavioural profiling and infinitely scrolling, algorithmically curated feeds that exploit cognitive biases and encourage impulsive. Current data practices in AI-powered social commerce are characterised by pervasive surveillance and the systematic aggregation of personal, behavioural and social data into granular consumer profiles (Srivastava and Gurme, 2025). Lie et al. (2022) opined that this data is often collected, processed and monetised in ways that extend beyond reasonable user expectations, with privacy policies designed for legal compliance rather than genuine transparency.

Materials and methods

Database selection

This study used the Scopus database as the sole source of bibliometric data. Scopus was selected for three reasons. First, it provides extensive indexing of peer-reviewed literature across social sciences, management, business, and interdisciplinary artificial intelligence research. Second, it offers broader coverage of conference proceedings than Web of Science, which is critical for emerging fields where cutting-edge research often appears first in conference outlets. Third, Scopus has been validated in prior bibliometric studies as having strong methodological rigor for social science research. The search was conducted on February 8, 2026, and included publications published up to that date.

Search strategy

The search strategy employed a Boolean keyword combination applied to the TITLE-ABS-KEY fields (title, abstract, and author keywords) in Scopus. We built the search string around three conceptual domains.

For artificial intelligence, we included the core terms like "artificial intelligence" and "AI" plus specific technologies such as "machine learning," "deep learning," "neural networks," "natural language processing," "recommendation system," "recommender algorithm," "predictive analytics," "sentiment analysis," "chatbot," "conversational AI," "generative AI," "computer vision," and "pattern recognition." We also added broader phrases like "intelligent system" and "algorithmic decision making" to catch papers that don't use the exact AI label but clearly deal with AI capabilities.

For social commerce, we used "social commerce," "s-commerce," "social shopping," "social media commerce," "social network commerce," "peer-to-peer commerce," "community-based commerce," "live commerce," "live streaming commerce," and "social platform commerce." We also included related activities like "user-generated content," "social recommendation," "social transaction," and "social selling" to make sure we captured papers that describe social commerce practices without necessarily using the exact phrase.

For digital business ecosystems, we used "digital ecosystem," "business ecosystem," "digital platform," "platform ecosystem," "online ecosystem," "digital business environment," "digital network," "multi-sided platform," "platform-mediated ecosystem," and "digital infrastructure." The idea was to capture any paper that talks about the interconnected, platform-based environment where digital business happens.

We combined these three groups with AND operators, meaning each paper had to touch on all three areas in some way. No additional filters on trends, evolution, or bibliometrics were applied at the search stage because we wanted the full corpus first and subsequently analysed trends through the methods themselves.

Study period

The study period spanned from 2000 to February 8, 2026. The start year of 2000 was chosen to capture early foundational work on digital commerce and early AI applications that preceded the formal emergence of the social commerce concept. The end date of February 8, 2026, ensured inclusion of the most recent publications available at the time of analysis. While the full-time span is 26 years. Documents published between 2000 and 2009 represented fewer than five percent of the dataset and were retained only for historical context.

Inclusion criteria

Documents were included in the analysis if they satisfied all four of the following conditions. First, the document had to be peer-reviewed,

meaning it was published in a peer-reviewed journal, conference proceeding, or as a peer-reviewed book chapter. Preprints, white papers, and industry reports were excluded. Second, the document had to be written in English, as non-English publications could not be reliably coded and interpreted by the research team. Third, the publication date had to fall between 2000 and February 8, 2026. Fourth, the document's central theme had to address the application of artificial intelligence in social commerce within digital business ecosystems. Operationally, this meant that at least two of the three core concepts, artificial intelligence, social commerce, and digital business ecosystems, had to be central to the research, not merely mentioned in passing.

Clarification of retrieval vs. screening logic

The search string used AND operators to require the presence of all three conceptual domains (AI, social commerce, digital business ecosystems) at the retrieval stage, ensuring broad capture of potentially relevant papers. However, the inclusion criteria applied a less restrictive threshold (at least two of three core concepts central to the research) during manual abstract screening. This two-stage approach is deliberate: retrieval prioritizes sensitivity to avoid missing relevant papers, while screening prioritizes specificity to exclude marginal mentions. A paper could be retrieved with all three terms present but later excluded if, upon reading the abstract, only one concept proved central to the research contribution.

Exclusion criteria

Documents were excluded for any of the following five reasons. First, non-English documents were excluded due to language barriers for consistent coding. Second, editorials, notes, errata, retractions, and corrections were excluded because they do not represent original research contributions. Third, purely technical artificial intelligence papers that focused exclusively on algorithm development without any connection to commerce, business, or social platforms were excluded. Fourth, duplicate records of the same document appearing multiple times in the initial export were removed. Fifth, documents without an accessible abstract were excluded because insufficient metadata prevented reliable topic modelling and screening.

Screening process

The screening process followed the PRISMA 2020 guidelines across four phases: identification, screening, eligibility, and inclusion. Two authors conducted the screening independently, and a third reviewer was consulted to resolve any disagreements.

In the identification phase, the Scopus search string was executed, and all results were exported to a central database. This yielded 1,432 raw records.

In the deduplication step, we performed automated deduplication using Excel, followed by manual checking for near duplicates based on identical DOIs or highly similar titles. This removed 68 duplicate records, leaving 1,364 unique records.

In the title screening phase, each reviewer independently assessed the titles of all 1,364 records against the inclusion criteria, excluding records that were clearly irrelevant. After title screening, 23 records were removed and 1,341 records remained. The agreement rate between reviewers at this phase was 94.2 percent, with a Cohen's kappa of 0.87, indicating almost perfect agreement.

In the abstract screening phase, the two reviewers independently assessed the abstracts of the remaining 1,341 records, applying the full inclusion and exclusion criteria. Records were excluded if the central theme did not combine artificial intelligence with social commerce within digital business ecosystems, or if any exclusion criteria applied. Specifically, we excluded records where at least two of the three core concepts (AI, social commerce, digital business ecosystems) were not

central to the research. We also excluded editorials, notes, errata, retractions, corrections, preprints, white papers, industry reports, non-English documents, and records without an accessible abstract. A total of 467 records were excluded at this phase for the following reasons: 213 records lacked a central theme combining AI with social commerce (they addressed only one of the two core concepts), 215 records were non-original research document types (book chapters, short notes, editorials, etc.), and 39 records were in languages other than English. After abstract screening, 874 records remained. The agreement rate between reviewers was 91.5 percent, with a Cohen's kappa of 0.82, again indicating almost perfect agreement.

These 874 records met all inclusion criteria and formed the final dataset for bibliometric analysis and Latent Dirichlet Allocation topic modelling. Disagreements between reviewers at the title and abstract phases were resolved through discussion. A total of 47 disputed records were discussed, and consensus was reached on all of them. No records required third-reviewer adjudication.

The screening process is summarized in the PRISMA flow diagram (Fig. 1).

Methodological choices

Several key decisions shaped our approach. First, we used Scopus as the sole database because it offers broader coverage of conference proceedings than Web of Science, which matters for an emerging field where cutting-edge research often appears first in conferences. Second, we included peer-reviewed conference papers alongside journal articles

for the same reason. Third, we deliberately excluded trend-related terms (such as "bibliometric" or "science mapping") from the search string itself, because those terms belong to the analysis phase, not the retrieval phase.

Data extraction and preprocess

Using the specified Boolean keyword combinations, data were extracted from the Scopus database, selected for its extensive indexing of peer-reviewed literature and methodological rigor in social science research (Bashar et al., 2024). A total of 1432 articles published between 2000 and February 8, 2026, were identified through the search. After implementing the screening protocol, 874 publications met all inclusion requirements and formed the final dataset as shown in Table 1.

Bibliometric analysis

Bibliometric analysis was performed using the Biblioshiny application within the R package, which effectively manages large datasets and generates tabular and graphical outputs to enhance clarity and interpretation (Rabbani et al., 2024). The analysis examined current publication trends, leading authors, influential documents, top contributing countries, and citation patterns.

LDA based topic modelling

Latent Dirichlet Allocation (LDA) topic modelling was applied to

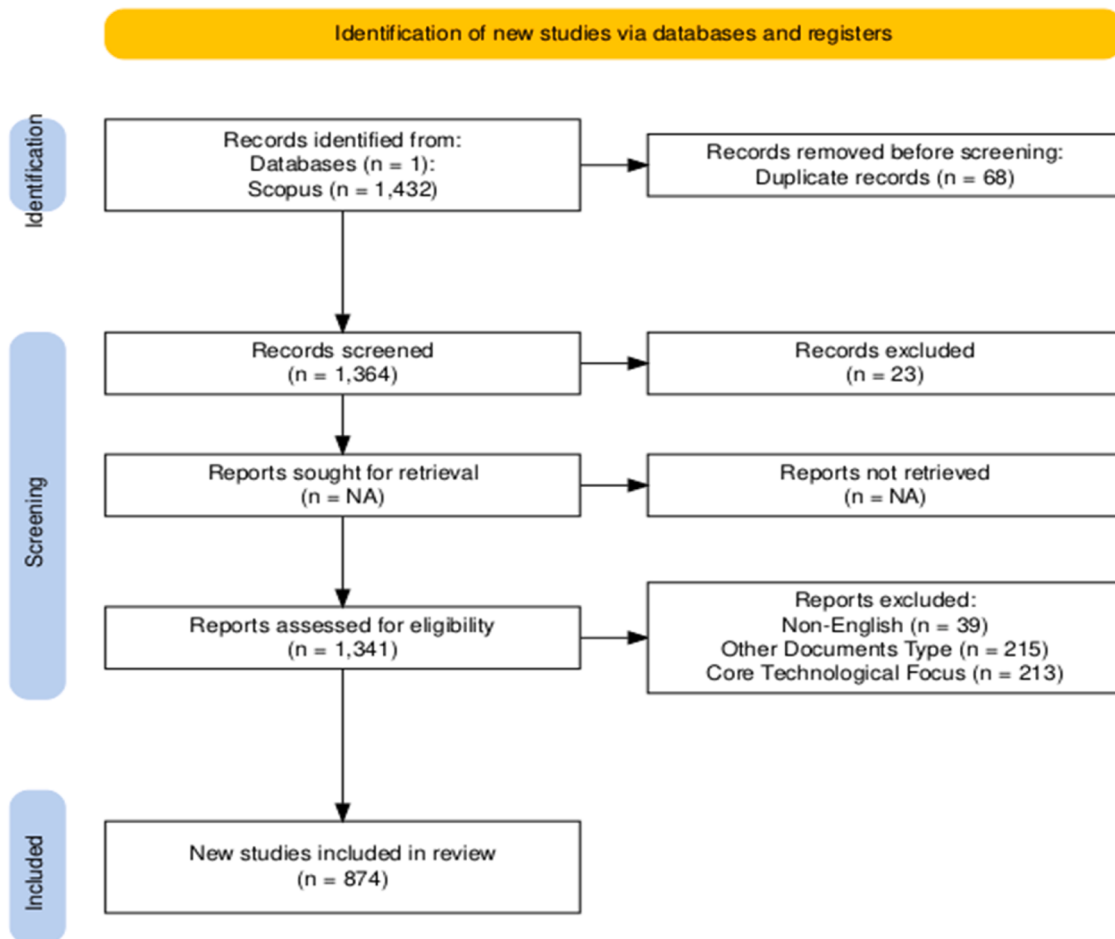


Fig. 1. PRISMA 2020 flow diagram illustrating the identification, screening, eligibility, and inclusion process for Artificial Intelligence (AI) and Social Commerce in Digital Business Ecosystems from Scopus Database between 2000 and February 8, 2026.

Source: Authors' conception (2026).

Table 1
The systematic research methodology process.

Step	Purpose	Tools	Key Activity	Outcome
1. Data Extraction	Identify relevant AI and Social Commerce Literature	Scopus	Boolean search and Metadata download	Initial dataset of 1432 documents
2. Data Cleaning	Ensure high-relevance and quality	Excel / Manual	Removal of non-English/technical-only papers	Refined dataset of 874 documents
3. Bibliometric Analysis	Mapping of scientific productivity and future trends	Biblioshiny (R)	Analysis of citations, authors, Countries, documents and journals	Comprehensive research productivity and influence landscape
4. LDA based Topic Modelling Analysis	Identification of dominant topics/themes and subthemes	Python / Excel	Topics extraction using LDA method to establish the core topics in Artificial Intelligence (AI) and Social Commerce in Digital Business Ecosystems.	Identification of key research topics and structured future research directions

Source: Authors’ conception (2026).

reveal the underlying thematic structure of the bibliometric dataset. As an unsupervised probabilistic method, LDA treats documents as mixtures of topics, each defined by a distribution of keywords (Wasiq et al., 2023). By examining term co-occurrence patterns across titles, abstracts, and keywords, LDA identifies dominant research themes and their relative prominence. The optimal number of topics was determined by maximizing coherence scores, with a five-topic solution yielding the highest coherence score of 0.4652.

Results and discussion

Bibliometric analysis

Data characteristics

The results from the bibliometric analysis show that it is an emerging research domain with significant growth at the intersection of artificial intelligence and social commerce within digital business ecosystems. Table 2 shows the descriptive statistics for the bibliometric results used for the current research. The analysis reveals that the research domain has used a total of 874 publications within the period from 2000 to 2026. The publications are from 565 different sources, showing that it is an extremely diverse research domain. The research domain is showing an exceptionally high growth rate, at 16.01%, indicating that it is gaining significant recognition regarding artificial intelligence and social commerce within digital business ecosystems. The research domain is relatively recent, with an average age of 2.63 years. This shows that it is an emerging research domain. In addition, it is showing moderate academic recognition, with an average of 18.95 citations per document. The research domain is showing significant development, with 77,540 references.

Table 2
Data Characteristics.

MAIN INFORMATION ABOUT DATA	
Description	Results
Timespan	2000 to February 8, 2026
Sources (Journals, Books, etc)	565
Documents	874
Annual Growth Rate %	16.01
Document Average Age	2.63
Average citations per doc	18.95
References	77540
Keywords Plus (ID)	5350
Author's Keywords (DE)	2875
Authors	3042
Authors of single-authored docs	107
Single-authored docs	111
Co-Authors per Doc	3.62
International co-authorships %	26.66
Article	340
Conference Paper	491
Review	43

Source: Authors’ conception (2026).

The findings demonstrate that this is an emerging research domain with significant growth at the intersection of artificial intelligence and social commerce within digital business ecosystems. The field demonstrates strong collaboration (3.62 co-authors per document) and increasing international co-authorship (26.66%). Conference papers dominate the research output (491), followed by journal articles (340) and review papers (43), confirming the emerging nature of this domain. It is necessary to address the fact that conference papers (491 or 56. 2 percent) outnumber journal articles (340 or 38. 9 percent). This distribution is typical of a rapidly developing field where new research frequently makes its appearance in conference proceedings before developing into journal publications. There are three implications. The fields moderate average of 18. 95 citations per document, despite high annual growth, is partially explained by the fact that conference papers generally receive fewer total citations due to shorter indexing windows and lower perceived prestige. Second, thematic volatility is greater: conference proceedings document quick changes in AI methodologies (for example generative AI agentic systems) and platform-specific social commerce innovations more quickly than journals resulting in a more dynamic but less stable body of knowledge in the field. Third the field is still in its infancy, the high conference share and low average document age (2. 63 years) indicate that current conclusions are tentative, and consolidation is anticipated as journal articles take center stage over the next five to ten years.

Annual publications and citations trends

The evolution of publications and citations in this field of study over time is shown in Fig. 2. Publications have been trending upward over time as this figure illustrates with a noticeable acceleration following 2015. This expansion corresponds with the development of artificial intelligence technologies and their integration into online marketplaces. Although there are some noticeable spikes citation patterns also show an increasing trend. A brief contextualization of three citation peaks is warranted. The early foundational work on social commerce frameworks and Web 2. 0 integration is probably responsible for the 2010 spike.

The surge in 2016 is associated with advances in deep learning, the increasing use of sentiment analysis in marketing settings (Cambria, 2016) and expanding studies on AI-powered personalization. The rapid growth of AI chatbots early large language models and the acceleration of the transformation of digital commerce during the COVID-19 pandemic which sparked intense research interest across information systems and marketing disciplines all contribute to the spikes around 2021. Recent publications exhibit lower citation accumulation as shown in Fig. 2 which is expected to have shorter citation windows rather than lower scholarly impact.

Most influential authors

Table 3 shows the most prolific and influential authors in terms of the number of publications, h-index, and total citations. The findings

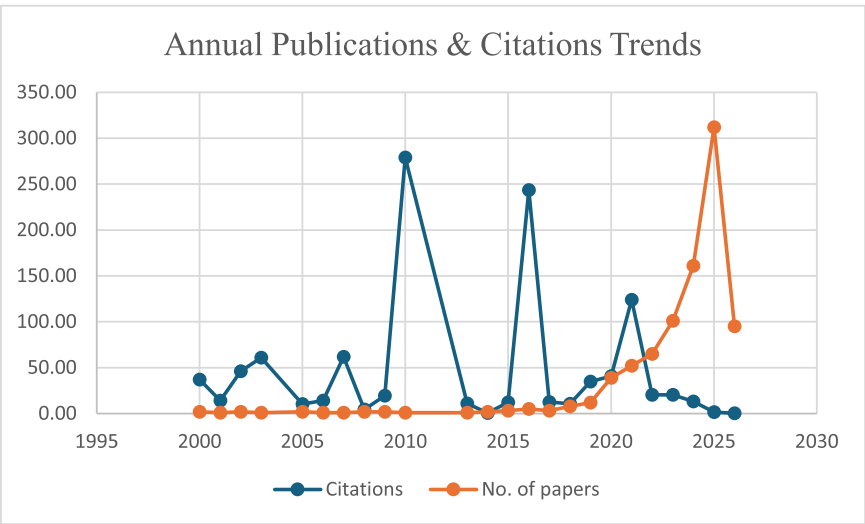


Fig. 2. Annual publications and citations trends.
Source: Authors’ conception (2026).

Table 3
Most Prolific Authors.

10 Most Influential Authors					
Based on No. of Papers		Based on h-index		Based on Total Citations	
Authors	Papers	Author	h-index	Author	Total Citations
Farseev Aleksandr	4	Farseev Aleksandr	4	Sarker Iqbal H.	4458
Cambria Erik	4	Cambria Erik	3	Cambria Erik	1431
Jin Seunga	4	Jin Seunga	3	Adam Martin	854
Venus		Venus			
Lepikhin Kirill	3	Lepikhin Kirill	3	Benlian Alexander	854
Yang Qi	3	Yang Qi	3	Wessel Michael	854
Abate D.	2	Abate D.	2	Li Kai	373
Agapiou A.	2	Agapiou A.	2	Kauffman Robert J.	298
Akter Shahriar	2	Akter Shahriar	2	Kim Dan J.	298
Bosch Jan	2	Bosch Jan	2	Lang Karl R.	298
Capatina Alexandru	2	Capatina Alexandru	2	Naldi Maurizio	298

Source: Authors’ conception (2026).

suggest that the number of publications and their impact may not necessarily correlate in all cases, as some authors have managed to publish fewer papers but have received many citations. The findings on the analysis of the most influential authors suggest that even though some authors have managed to contribute fewer publications to the field, their impact is relatively high. For instance, Iqbal H. Sarker is the most cited author in the field, having been cited 4,458 times in various publications. The second most cited author in the field is Erik Cambria, having been cited 1,431 times in various publications. Other authors who have been ranked among the most influential in the field include Martin Adam, Alexander Benlian, and Michael Wessel. The most influential documents also show that the field is technology driven. For instance, some of the most influential documents include Sarker (2021) on the applications of machine learning and Cambria (2016) on sentiment analysis, which have been cited 4,458 and 1,431 times, respectively. Other documents include Adam et al. (2021) on AI-driven chatbots, Yen on trust, and Asante et al. (2023) on consumer behaviour, which have been cited 100 times, 51 times, and 101 times, respectively.

Most important documents

Table 4 presents a summary of the most influential works based on their total and annual citation counts. From the results, it is evident that foundational works on machine learning, sentiment analysis, and AI-based application development are highly influential. For instance, Sarker (2021), a work on machine learning application, has the highest citation count, followed by Cambria (2016), a work on sentiment analysis. Other influential works include AI-based chatbots, trust, and consumer behaviour, indicating the significance of human-AI interaction in social commerce research. The inclusion of recent influential works also implies that social commerce research is a dynamic field, where recent works are gaining popularity quickly. Overall, Table 4 reflects a strong technological orientation of social commerce research, where AI-based application development for personalization, engagement, and decision-making in digital business ecosystems is crucial.

Countries’ scientific contribution

Fig. 3 illustrates publication and citation counts by country. China (519 publications) and India (690 publications) show the highest research activity in terms of volume. Bangladesh (2,223 citations) and China (2,123 citations) show the highest citation counts. The United Kingdom (107 publications, 1,283 citations) and United States (384 publications, 779 citations) also demonstrate substantial activity. When directly equating these counts with academic influence there are several biases that should be considered. First regardless of their scholarly caliber non-English research outputs from non-Anglophone nations may be underrepresented because Scopus primarily indexes English-language journals. Second, different countries have different citation windows. Older publications have had more time to accrue citations which benefit nations that entered the field earlier. Third, raw citation counts may be inflated by self-citations and international collaboration patterns, but this does not always translate into increased influence per paper. Fourth research, quality novelty and practical impact are not taken into consideration by publication volume. As a result, we interpret these numbers as markers of research activity and visibility in the literature that is indexed by Scopus rather than as conclusive indicators of scholarly influence or contribution quality. Geographically the field exhibits widespread participation from both emerging economies (India China Malaysia Indonesia) and developed economies (USA UK Germany Italy) demonstrating its global relevance. However, the cautions should be taken into consideration when interpreting the seeming dominance of

Table 4
The Influential Documents.

Authors	Year	Journal	Title of the Document	Total Citations	Annual Citations
Sarker, IH	2021	SN computer science	Machine learning: Algorithms, real-world applications and research directions	4458	743
Cambria, E	2016	A practical guide to sentiment analysis	Affective computing and sentiment analysis	1115	101
Adam, M	2021	Electronic markets	AI-based chatbots in customer service and their effects on user compliance	854	142
Li, K	2020	Electronic commerce research and applications	How should we understand the digital economy in Asia? Critical assessment and research agenda	298	43
Yen, C	2021	Behaviour & Information Technology	Trust me, if you can: a study on the factors that influence consumers' purchase intention triggered by chatbots based on brain image evidence and self-reported assessments.	225	38
Zhang, D	2021	International Journal of Information Management	Artificial intelligence in E-commerce fulfillment: A case study of resource orchestration at Alibaba's Smart Warehouse.	209	35
King, TC	2020	Science and engineering ethics	Artificial intelligence crime: An interdisciplinary analysis of foreseeable threats and solutions	187	27
Seshia, SA	2022	Communications of the ACM	Toward verified artificial intelligence.	152	30
Sujood	2024	Journal of Hospitality and Tourism Insights	Consumers' intention towards the use of smart technologies in tourism and hospitality (T&H) industry: a deeper insight into the integration of TAM, TPB and trust.	138	46
Jiang, Y	2023	Computers in Human Behaviour	Make chatbots more adaptive: Dual pathways linking human-like cues and tailored response to trust in interactions with chatbots.	130	33

Source: Authors' conception (2026).

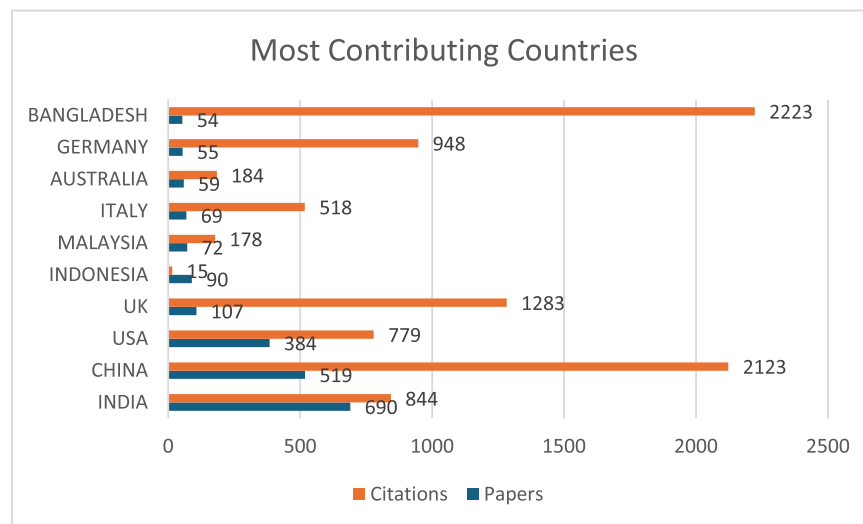


Fig. 3. Most Contributing Countries.
Source: Authors' conception (2026).

Asian nations in raw counts especially given the substantial amount of conference proceedings from these regions that Scopus has collected.

Most contributing affiliations

Fig. 4 depicts the most productive institutional affiliations for the research domain. The results indicate that universities in Asia and Europe dominate the list, while BINUS Nusantara University and Symbiosis International (Deemed University) emerge as the most productive institutions in terms of publication output. Other notable institutions in the list are the University of Twente and Universiti Utara Malaysia, indicating the presence of interdisciplinary research in the domain of information systems and business studies. The distribution of affiliations in Fig. 4 indicates that the research in AI and social commerce is not limited to a handful of institutions, as it is widely spread across global academic networks. Moreover, the presence of institutions from emerging economies also reflects the relevance of the research domain in a variety of economic scenarios.

Influential sources of publications

Fig. 5 illustrates the most important sources of academic literature for this research. According to the results, there is a strong presence of

journals related to information systems, electronic commerce, and technology studies. This can be explained by the technological nature of this field of research, in which there is a need to explore artificial intelligence application possibilities within digital commerce environments. The strong presence of high-impact factor journals indicates a strong focus on research themes such as machine learning, sentiment analysis, and platform-based business models. Fig. 4 illustrates a strong variety of sources for this research domain, indicating its technology-oriented nature.

The word cloud

Fig. 6 shows a word cloud created using author keywords and Keywords Plus, providing a visual representation of the major research themes. The major keywords included artificial intelligence, machine learning, social commerce, sentiment analysis, chatbots, and digital platforms, among others, reflecting the major focus of this domain. The major focus on consumer behaviour and trust also reflects an integration of technological and behavioural aspects. Furthermore, new keywords like generative AI and intelligent systems also reflect a shift towards more advanced and intelligent technologies.

From a broad perspective, the research field has been characterized

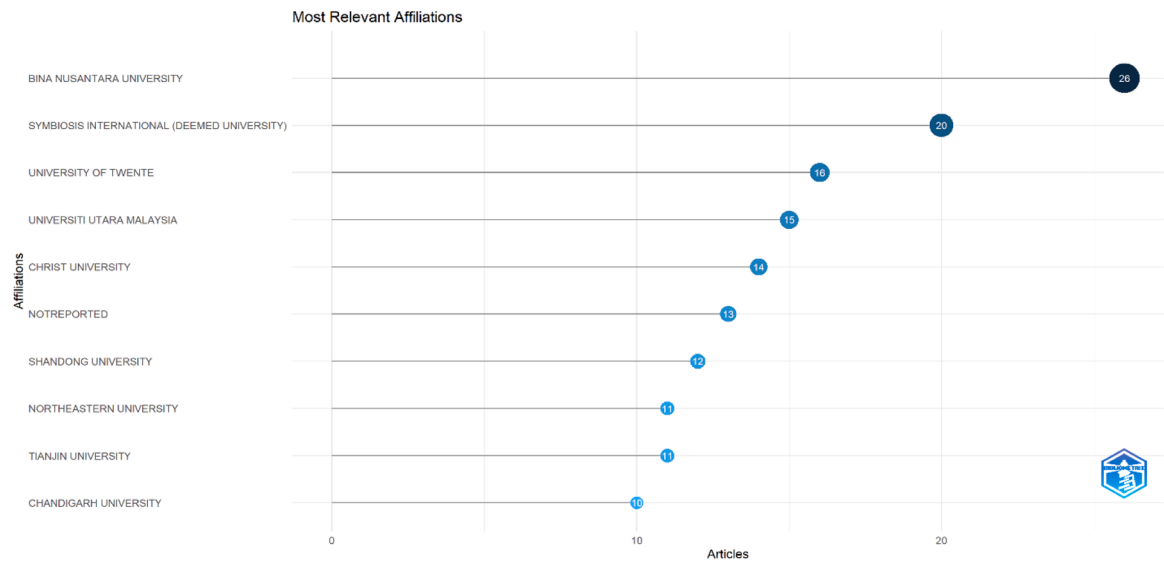


Fig. 4. Most Relevant Affiliations.
Source: Authors' conception (2026).

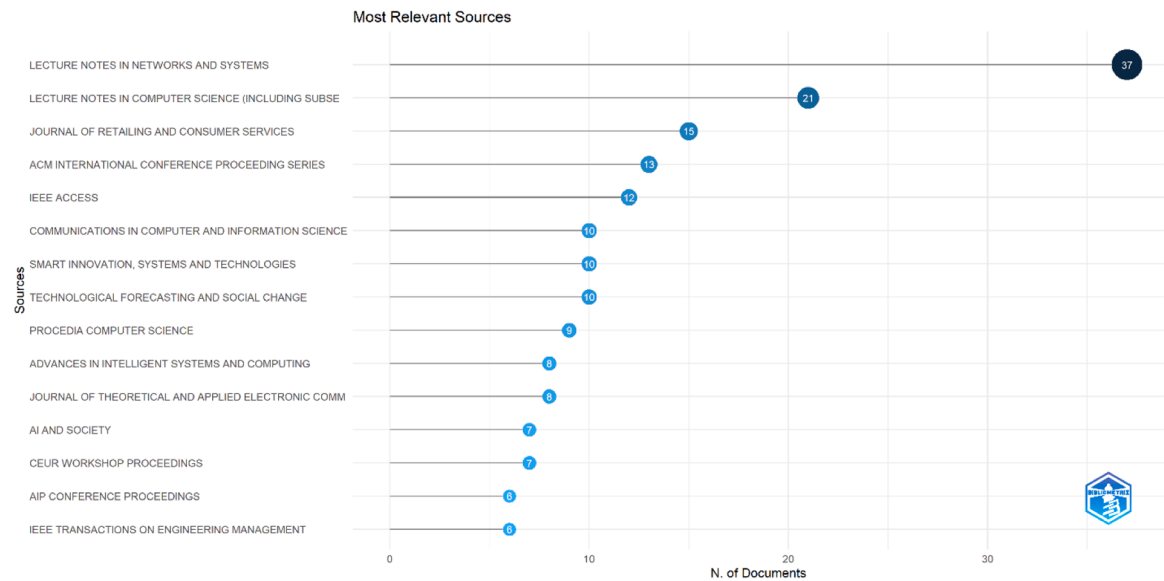


Fig. 5. Most Relevant Sources.
Source: Authors' conception (2026).

by rapid growth, strong collaboration, and a technology-centric knowledge base. The strong representation of AI-related themes such as machine learning, sentiment analysis, and chatbots implies that the development of social commerce research has been closely associated with the development of intelligent technologies. At the same time, the recent growth in research output and strong reliance on conference publications imply a relatively young research field with much growth potential.

Latent Dirichlet Allocation (LDA) topic modelling results

Latent Dirichlet Allocation (LDA), an unsupervised probabilistic method, was applied to reveal the latent thematic structure of the 874-document corpus. The optimal number of topics was determined by maximizing coherence scores across two- to ten-topic solutions. The five-topic solution yielded the highest coherence score (0.4652), after which coherence declined, indicating that additional topics introduced redundancy (Fig. 7). Fig. 8 presents the intertopic distance map from

multidimensional scaling, showing five distinct but semantically related topics. Table 5 summarizes each topic's dominant keywords and weight. The five topics are:

- **Topic 1 (Foundational AI & Data Analytics):** Centred on AI, social media, marketing, and behavioural analytics.
- **Topic 2 (AI-Driven Machine Learning in Marketing):** Focused on machine learning applications, marketing competencies, and chatbots.
- **Topic 3 (Social Commerce, Content & Trust):** Emphasizing trust, user-generated content, and platform governance.
- **Topic 4 (Consumer Insights & Sentiment Analytics):** Concentrated on sentiment analysis, customer engagement, and purchase intention.
- **Topic 5 (Hybrid & Cross-Cultural AI Models):** Addressing hybrid human-AI systems, cross-cultural adaptation, and non-Western contexts.



Fig. 6. The Word Cloud.
Source: Authors' conception (2026).

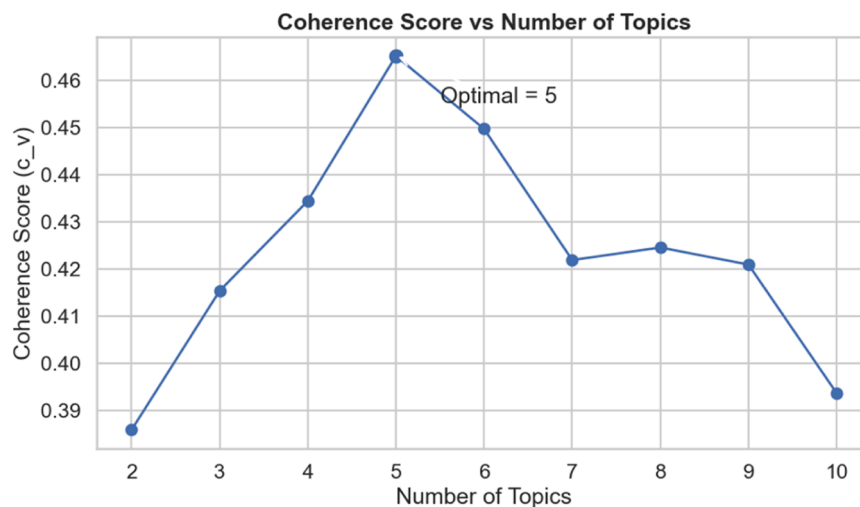


Fig. 7. . The Coherence Score Vs No. of Topics.
Source: Authors' conception (2026).

Fig. 9 provides word clouds for each topic, visually confirming the distinct thematic emphasis. The temporal sequencing of these topics - technological enablers (Topics 1, 4, 5) appear earliest, organizational competencies (Topic 2) emerging in the mid-period, and environmental governance (Topic 3) surfacing most recently - informs the directional relationships in our conceptual framework (Fig. 15).

Topic wise word cloud

Fig. 8 depicts the word clouds for the five topics identified through the LDA model. For Topic 1, “Foundational AI & Data Analytics,” the most dominant words are “social,” “media,” “AI,” “marketing,” and “behaviour.” This highlights that the foundational literature is heavily grounded in using AI and analytics in understanding social media interactions and consumer behaviours in marketing contexts.

The other dominant words (Fig. 9), such as “commerce,” “role,” and “analysing,” further reveal that this topic is centred on the analytical foundation of AI-based marketing research. For Topic 2, “AI-Driven Machine Learning in Marketing,” the most dominant words are “artificial,” “intelligence,” “machine,” “marketing,” and “competencies.” The occurrence of words such as “consumer,” “design,” “chatbots,” and

“powered” further reveals that this topic is centred on using AI and machine learning tools in advancing marketing strategies.

The dominant occurrence of these words further reveals that this topic is centred on using chatbots in advancing marketing strategies, which is a new trend in using AI in marketing contexts. The word cloud for Topic 3, which is centred on “Social Commerce, Content & Trust,” indicates a focus on words such as “artificial,” “analysis,” “intelligence,” “role,” “retail,” and “tool.” These words suggest a focus on the role of AI-based content, tools, and analysis in building trust in social commerce and retail environments. The prominence of terms such as “performance,” “business,” and “sustainable” suggests a focus on broader business implications than those related to consumer interaction.

The word cloud for Topic 4, which is centred on “Consumer Insights & Sentiment Analytics,” indicates a focus on words such as “AI,” “using,” “framework,” “chatbots,” “customer,” and “social.” This suggests a focus on using AI-based sentiment analysis, chatbots, and social media data to gain insights from consumers. Frequent occurrence of terms including “engagement,” “purchase,” and “technologies” suggests a shift in the research focus of this topic toward using AI-based sentiment analysis to determine consumer intentions and potential behaviours.

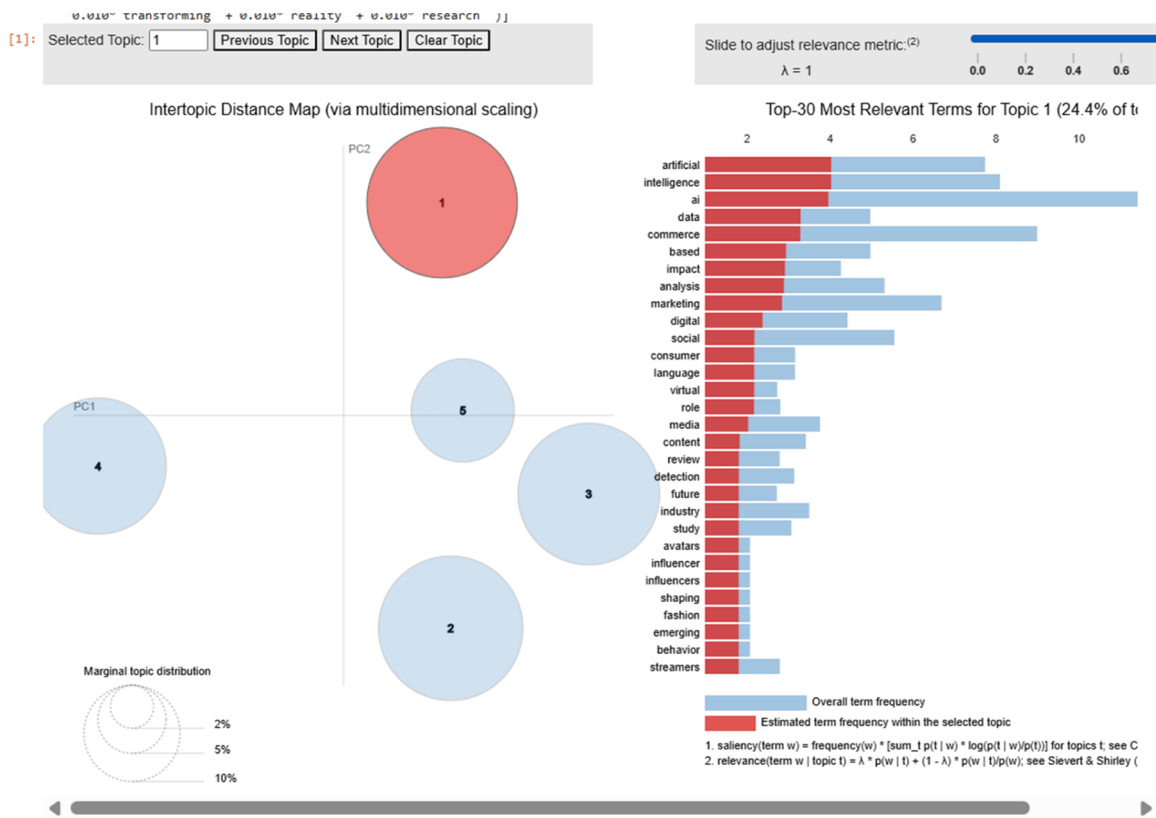


Fig. 8. The LDA Model.
Source: Authors' conception (2026).

Finally, the word cloud for Topic 5, which is centred on “Digital Transformation & Experience Innovation,” indicates a focus on words such as “market,” “human,” “hybrid,” “model,” and “integrating.” These words suggest a broader business perspective in which AI-based technologies are integrated with human capabilities to drive business and consumer experiences. The presence of words such as “learning,” “ecosystem,” and “services” suggests a particular focus on hybrid human-AI technologies and digital transformation in building innovative service environments. Fig. 5 confirms that the five-topic solution identifies distinct but related aspects of this research field.

Topic weights and keywords

Topic 1: AI & social media marketing

This topic centres on the convergence of artificial intelligence, social media, and marketing. With high-weight terms including ai, social, media, marketing, and learning, it captures research examining how AI technologies (Fig. 10) are deployed across social platforms to drive marketing strategies. The presence of evolution and techniques suggests a focus on the developmental trajectory and methodological approaches within this domain.

Topic 2: Human-centred AI & competencies

Characterized by terms such as artificial intelligence, ai, user marketing competencies, and human powered design industry, this topic emphasizes the human dimension of AI adoption. It captures research concerned with the skills, competencies, and human-centric design principles necessary for effectively integrating AI into marketing and industry contexts (Fig. 11). The focus on human powered indicates attention to the interplay between human expertise and artificial intelligence.

Topic 3: Data-driven intelligence & enterprise applications

This topic centres on the analytical and enterprise-oriented aspects of AI. Key terms analysis, intelligence, artificial, based, data, retail, and enterprises highlight research focused on leveraging AI for data-driven decision-making within organizational settings (Fig. 12). The presence of sustainable and using suggests attention to both applied implementation and longer-term viability of AI solutions in retail and enterprise contexts.

Topic 4: AI-powered customer engagement & chatbots

This topic captures research on conversational AI and customer interaction. Dominant terms include ai framework, using chatbots, intention, customer engagement, and media technologies (Fig. 13). It represents studies examining how chatbot technologies and AI frameworks facilitate customer engagement, influence consumer intention, and operate within social media environments. The emphasis on using chatbots indicates a specific focus on conversational agents as a primary interface for customer interaction.

Topic 5: Hybrid and cross-cultural AI models

This topic is distinguished by its focus on model development and contextual adaptation. Terms such as model, human, hybrid, integrating, selection, sea, non, and western suggest research addressing the integration of human and machine intelligence, hybrid modelling approaches, and cross-cultural or regional considerations in AI implementation (Fig. 14). The presence of non and western indicates attention to non-Western contexts, highlighting the importance of geographical and cultural diversity in AI research and application.

From thematic mapping to conceptual framework: derivation method

The conceptual framework presented in Fig. 15 is a theoretically grounded synthesis derived directly from the empirical patterns



Fig. 9. The Word Cloud for each topic.

Source: Authors' conception (2026).

identified in the LDA analysis. The derivation followed three steps.

First, the five LDA topics were independently coded by two authors to identify their core constructs. Topic 1 (AI & Social Media Marketing) centred on technological capabilities; Topic 2 (Human-Centred AI & Competencies) focused on organizational skills and workforce development; Topic 3 (Social Commerce, Content & Trust) addressed environmental forces including platform governance and consumer trust; Topic 4 (AI-Powered Customer Engagement & Chatbots) emphasized technological applications; and Topic 5 (Hybrid & Cross-Cultural AI Models) covered advanced technological adaptations.

Second, these constructs were mapped to the three dimensions of the TOE framework using pattern matching. Topics 1, 4, and 5 shared

predominantly technological attributes (AI capabilities, chatbots, hybrid models) and were therefore assigned to the Technological Dimension. Topic 2 exclusively focused on organizational competencies (data skills, human-AI collaboration, dynamic capabilities) and was assigned to the Organizational Dimension. Topic 3 centered on environmental forces (market dynamics, regulation, ethics, consumer trust) and was assigned to the Environmental Dimension.

Third, the directional relationships between these dimensions were inferred from the temporal evolution revealed in the bibliometric analysis. The annual publication trends (Fig. 2) show that research on technological enablers (Topics 1, 4, 5) emerged first (pre-2015), followed by organizational responses (Topic 2, 2015-2020), and most

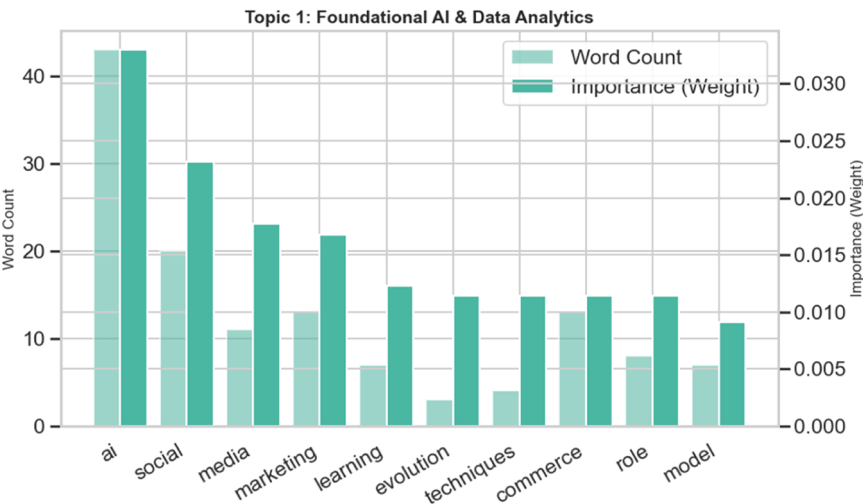


Fig. 10. Topic 1: AI & Social Media Marketing.
Source: Authors' conception (2026).

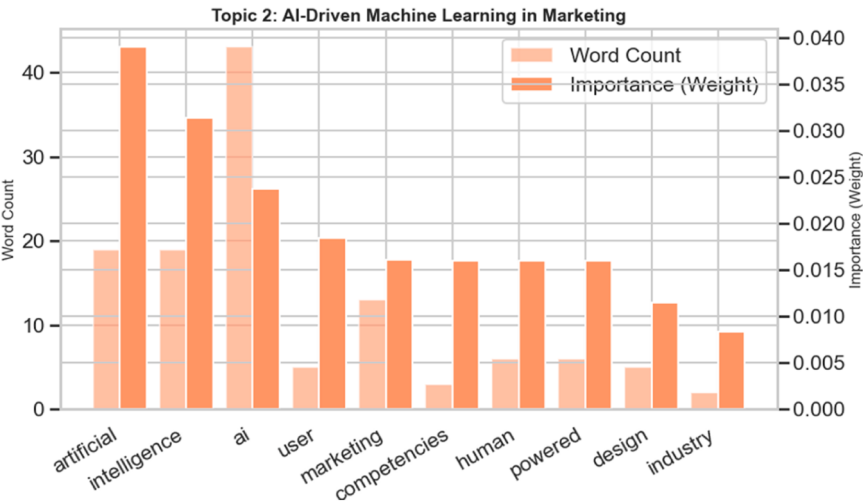


Fig. 11. Human-Centred AI & Competencies.
Source: Authors' conception (2026).

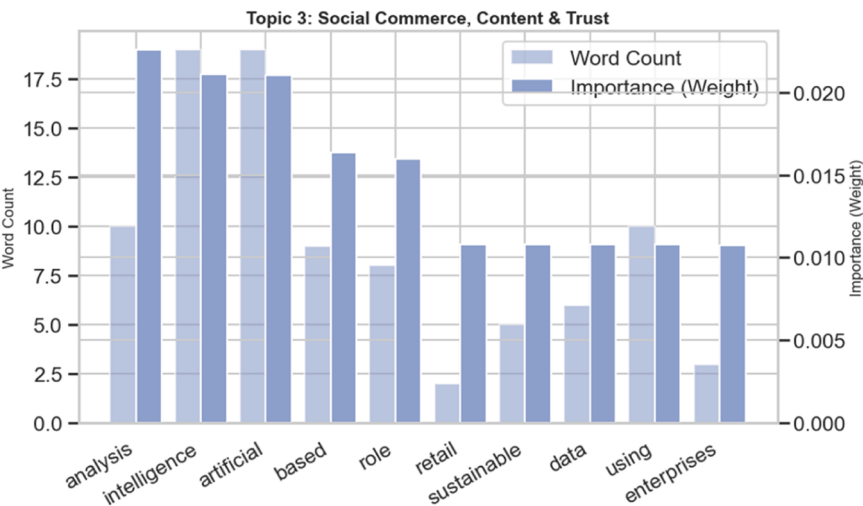


Fig. 12. Data-Driven Intelligence & Enterprise Applications.
Source: Authors' conception (2026).

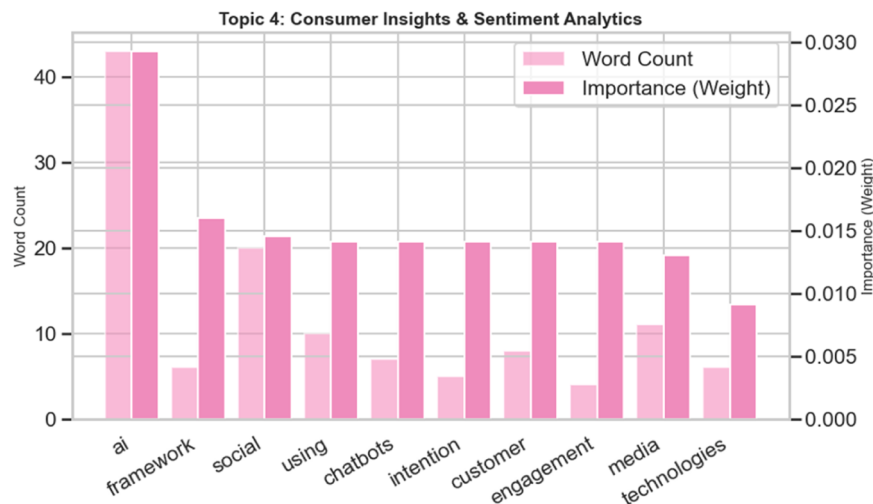


Fig. 13. AI-Powered Customer Engagement & Chatbots.
Source: Authors' conception (2026).

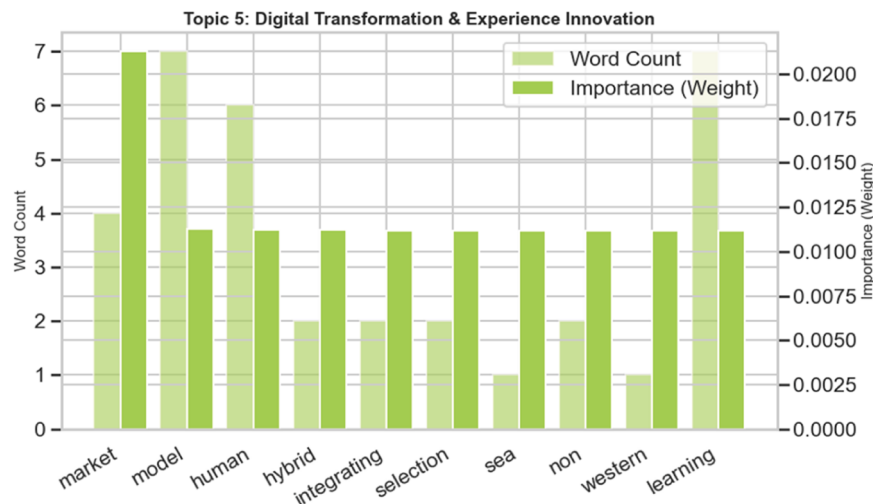


Fig. 14. Hybrid and Cross-Cultural AI Models.
Source: Authors' conception (2026).

recently environmental outcomes (Topic 3, 2020-present). This temporal sequencing informed the causal flow from technological and organizational inputs through the digital business ecosystem mediator to consumer and business outcomes, with environmental factors acting as both inputs and feedback recipients.

This sequential derivation ensures that the framework is empirically grounded rather than purely speculative, directly addressing the fragmentation identified in prior literature. A final caveat is necessary: the directional arrows in Fig. 15 represent relationships inferred from temporal sequencing in the bibliometric data and from thematic associations in the LDA output. They do not represent statistically confirmed causal effects. The framework is empirically grounded but remains propositional.

Conceptual modelling framework

AI-driven social commerce in digital business ecosystems is shaped by several interrelated factors as shown by the conceptual framework in Fig. 15. The model consists of five interconnected layers that are based on the Technology-Organization-Environment (TOE) framework (Tornatzky and Fleischer, 1990a) and informed by the five LDA topics

identified in this study. The environmental dimension includes socio-cultural elements like consumer expectations and trust as well as external forces like market dynamics governance and ethical considerations. These outside factors impact the larger ecosystem context and organizational strategic decisions. The Organizational Dimension encompasses internal firm capabilities that are crucial for AI adoption such as workforce competencies (human-AI collaboration and hybrid skills) organizational culture (innovation and agility) and dynamic capabilities (data competency and strategic alignment). An organization's ability to successfully use AI technologies is determined by these factors.

The LDA topics of foundational AI and analytics (Topic 1) AI-driven marketing (Topic 2) consumer and sentiment AI (Topic 4) and advanced AI frontiers like generative and agentic AI (Topic 5) are directly mapped to the Technological Dimension which represents the AI technologies propelling social commerce. Value creation is facilitated by these technologies. The central mediating layer where technology organizations and the environment come together is the Digital Business Ecosystem. It consists of network orchestration (value co-creation and interdependencies) data flows (user-generated content and behavioural data) and digital platforms (infrastructure and governance). This layer incorporates LDA Topic 3 (social commerce content and trust).

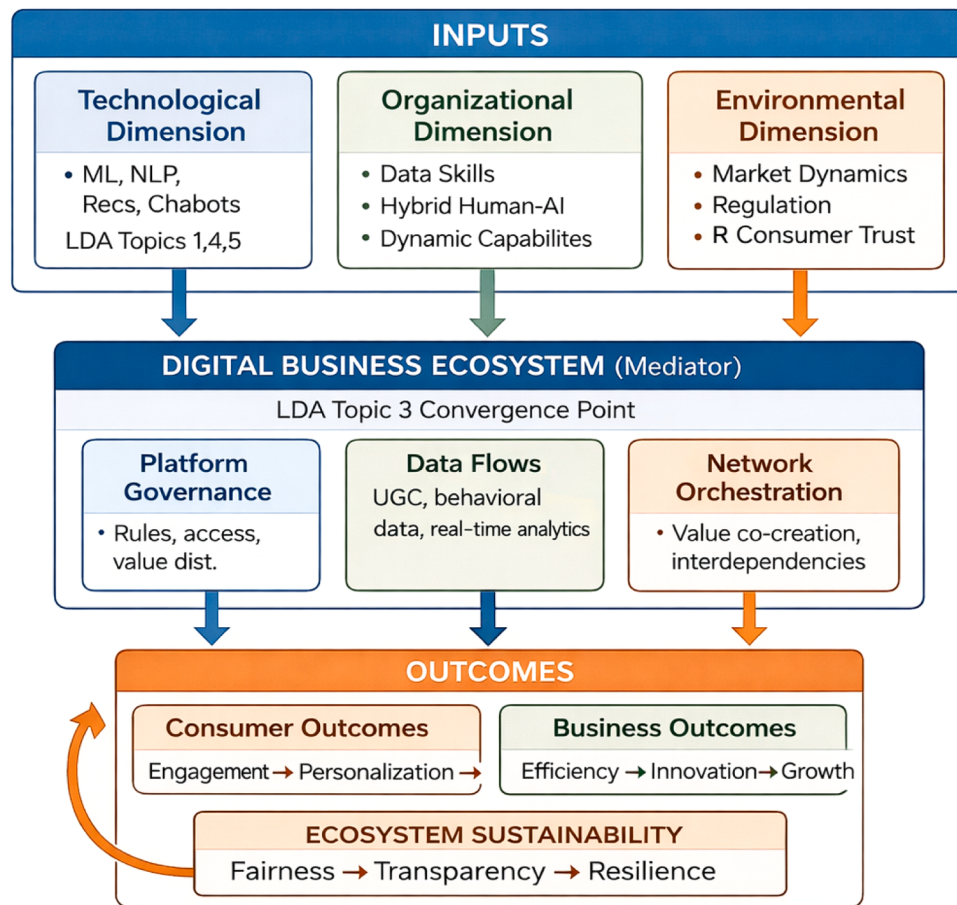


Fig. 15. Conceptual modelling framework.

Source: Authors' conception (2026).

Improved consumer experience (engagement personalisation trust) improved business performance (efficiency innovation growth) and long-term ecosystem sustainability (fairness transparency resilience) are examples of outcomes and impacts that result from ecosystem interactions.

Mapping findings to contributions

Before turning to the discussion, we briefly show how our results address the three contributions stated at the outset. First, the bibliometric analysis revealed that this research domain is growing at 16.01 percent annually, with strong collaboration averaging 3.62 co-authors per document, and geographic concentration in Asia and Europe. These patterns establish the field's intellectual structure in terms of who is publishing, where, and when. Second, the LDA topic modelling uncovered five latent thematic clusters. Topic 1 (Foundational AI & Data Analytics), Topic 4 (AI-Powered Customer Engagement & Chatbots), and Topic 5 (Hybrid and Cross-Cultural AI Models) center on technological capabilities. Topic 2 (Human-Centred AI & Competencies) focuses on organisational factors. Topic 3 (Social Commerce, Content & Trust) addresses environmental conditions. These five topics emerged from the data rather than being imposed by the researchers. Third, when we map these five topics onto the TOE framework, the temporal patterns in our bibliometric data suggest that research attention has shifted over time. Work on technological enablers (Topics 1, 4, and 5) appeared earliest, followed by organisational competencies (Topic 2), with environmental governance (Topic 3) emerging most recently. This sequence informs the directional relationships proposed in our conceptual framework (Fig. 15). Together, these three findings form the building

blocks of our integrated framework.

Practical implications

The findings of this science-mapping analysis carry significant practical implications for firms seeking to strategically integrate Artificial Intelligence (AI) technologies into their social commerce operations within digital business ecosystems. AI-enabled tools such as recommendation systems, chatbots, natural language processing, and predictive analytics have become foundational to transforming consumer-platform interactions. AI adoption in social commerce should not be treated as an isolated technological upgrade but rather as an ecosystem-wide strategic initiative that permeates all dimensions of business operations. A critical area of practical value concerns AI-driven personalisation and its capacity to enhance customer experience within social commerce environments. Recommendation engines and machine learning algorithms enable platforms to deliver highly tailored product suggestions and contextually relevant promotions that resonate with individual consumer preferences (Bhagat et al., 2023; Jin and Zhang, 2025). Personalisation strengthens the trust-satisfaction-loyalty dynamic, with AI features reshaping consumer perceptions and decision-making in e-commerce (Malhotra and Kharub, 2025). Digital businesses can leverage these insights by investing in robust data analytics architectures that capture real-time behavioural signals, including browsing patterns, purchase histories, and social interaction data. AI-powered chatbots further facilitate consumer trust through conversational naturalness, empathy, and personalisation, with accuracy, transparency, and responsiveness emerging as core elements of cognitive trust (Cai et al., 2024). Firms prioritising such personalisation

capabilities are better positioned to convert casual browsers into loyal customers, driving both revenue growth and long-term retention. The research landscape also underscores that AI-generated insights derived from social data inclusive of user-generated content, sentiment trends, and network interaction patterns represent a potent resource for enhancing organisational decision-making. Predictive analytics enables businesses to anticipate market trends, optimise operations, and enhance consumer experiences through advanced algorithms that analyse historical and behavioural data (Ige et al., 2024; Kwakye et al., 2024). Machine learning has become a potent predictive analytics tool for social media data, enabling the identification of significant trends and the forecasting of user behaviour across major platforms (E3S Web of Conferences, 2023). Predictive analytics empowers firms to transition from reactive to proactive strategy formulation, improving operational efficiency and competitive positioning. Managers should therefore establish dedicated analytics teams and invest in scalable AI infrastructure enabling the continuous transformation of social data into actionable commercial intelligence (Spais et al., 2024). More so, digital businesses must remain attentive to the ethical and governance challenges accompanying AI deployment. Firms are advised to embed responsible AI principles into their operational frameworks, adopting transparent algorithmic practices, robust data protection protocols, and inclusive design standards. In doing so, organisations can ensure that the benefits of AI-enhanced social commerce are realised sustainably, equitably, and in alignment with the evolving expectations of consumers, regulators, and broader stakeholder communities within digital business ecosystems.

Theoretical implications

This study contributes theoretically by rethinking how the Technology-Organisation-Environment (TOE) framework operates in a context where Artificial Intelligence (AI) is no longer a supporting tool, but a key driver of value creation in social commerce ecosystems. This study's triple contribution, sequential method design (bibliometric → LDA), theoretical extension of TOE to dynamic ecosystems, and an empirically grounded conceptual framework, directly addresses the fragmentation identified in prior literature. Unlike previous reviews that describe the field's growth or identify themes in isolation, our framework specifies causal pathways derived directly from five LDA topics mapped to three TOE dimensions. This integrated approach moves beyond prior descriptive accounts to offer a theory-anchored, empirically derived understanding of how AI reshapes social commerce. However, instead of viewing technology, organisation and environment as static factors, the study's findings suggest that AI introduces a level of enthusiasm that reshapes all three simultaneously (Tornatzky and Fleischer, 1990a; Dwivedi et al., 2021). Another significant contribution of this study proclaims that the external environment also impacts the relationship between technology and the company. The level of competition, the rules for platforms, laws about data privacy and how clear AI workings should be, and what customers expect regarding personalisation and using AI ethically all put pressure on things, speeding up or slowing down AI use (Ajakaye, 2022). In more advanced digital environments, companies often adopt AI not just to be more efficient, but also to be seen as legitimate and stay competitive in marketplaces based on platforms (Stahl, 2021). Therefore, AI in social commerce does not come from technological advances alone; but rather, it is a combined development of what a company can do internally and the external rules and conditions (Mensah, et al 2025). The TOE framework is a strong way to theoretically explain why AI is taken up in different ways in different places and industries, showing how the possibilities of the technology, a company's readiness and the external situation all together determine how AI-powered social commerce evolves (Stahl, 2021). AI capabilities, such as machine learning, natural language processing and predictive analytics advance the conventional idea of "technology readiness." These capabilities learn and evolve through

data, meaning technology is no longer static but continuously shaped by user interactions and platform activity (Jordan and Mitchell, 2015; Davenport, 2018). In this sense, AI shifts the technological dimension from infrastructure to intelligence viewing AI as transformative in digital business rather than passive (Vial, 2019; Raisch and Krakowski, 2021). Consequently, TOE can be refined to account for adaptive, self-improving technologies that underpin Personalisation and real-time decision-making in digital ecosystems (Zhang et al., 2026; Gouveia, 2025).

Future research agenda

The intersection between AI and social commerce in the digital business ecosystems reflects a dynamic and rapidly evolving area of study in current research. Despite these dynamic changes the field remains fragmented with substantial gaps in methodological, contextual and theoretical gaps. The theoretical and conceptual gaps show the lack of unified theoretical frameworks that combine AI capabilities with dynamics of social commerce. The impact of AI in aiding decision making is now a contemporary aspect, hence the need for research on how AI support decision making. In addition, science mapping analysis shows a shift towards ethics, sustainability and societal impact within AI research (Sekaki et al., 2025). So, future theoretical models may include digital trust, responsible innovation and ethical AI in the context of social commerce where algorithm and user generated content influence interconnect. AI-driven personalisation is emerging as a dominant theme in AI and social commerce research, but current studies focus more on technological capabilities other than behavioural outcomes. Bibliometric analysis reflects that AI-driven recommendation systems, predictive analysis and sentimental analysis are fundamental to e-commerce (Koç, 2024). Therefore, future research should consider examining how hyper-personalisation influences long term psychological well-being, loyalty and customer trust. Another future area of research is algorithm fatigue and customer resistance, mainly as AI systems become more invasive and predictive. Also, future studies should examine how AI reconfigures ecosystems structures, value distribution and governance for social commerce (Zhang et al., 2026). In addition, future studies may focus on platform ecosystems and network effects and the implications of AI-driven ecosystems for inclusivity, innovation and competition. Also, the integration of AI with augmented reality, internet of things and block chain creates rooms for researchers to examine how these emerging technologies create decentralised and immersive experiences within the digital ecosystems. In addition, future studies should examine how emerging technologies and innovation trajectories influence social commerce. Social commerce is a rapidly evolving field of study in business and management that has introduced several new perspectives, including new forms of value creation, exchange mechanisms and digital platforms. Another area to explore is Generative and Conversational AI in the context of the consumer journey. As such, it is important to investigate the impact of these novel forms of interaction on consumer trust, the quality of engagement, co-creation processes, and authenticity perception in social commerce. Future research should go beyond individual level recommendation evaluation and consider how the recommended items influence the behaviour of other users in the ecosystem, thus affecting the overall social and economic behaviour in the platform. In addition, more research on the relations between organisations and AI is required, especially regarding governance, sustainability and ecosystem strategy. As discussed earlier, the impact and adoption of AI is not easily predictable and is highly dependent on the way that the technology is integrated with the firm's business model and activities, and the expectations of its stakeholders (Katsamakos, 2024).

Limitations

Despite offering a comprehensive science-mapping analysis of the

intersection between Artificial Intelligence (AI) and social commerce within digital business ecosystems, this study is subject to several methodological, data-related, and generalizability constraints that warrant careful consideration. From a methodological standpoint, the study relies predominantly on bibliometric and science-mapping techniques, including co-citation, co-occurrence, and network analyses. While these approaches are well established for uncovering intellectual structures and thematic evolution, they are inherently reductive in nature. Specifically, they prioritise relational patterns within publication metadata (e.g., citations, keywords, authorship networks) over the substantive content of individual studies. In terms of data-related constraints, the study is contingent upon the selection of specific academic databases and predefined indexing criteria, which may introduce selection bias. Although major databases were utilised to ensure broad scholarly coverage, no single repository can comprehensively capture the full spectrum of knowledge production in a rapidly evolving domain such as AI-enabled social commerce. Given the global and culturally contingent nature of social commerce practices, this constraint may limit the inclusivity and representativeness of the analysed corpus. The temporal scope of the analysis between 2000 and February 8, 2026 constitutes an additional limitation. Lastly, the reliance on citation-based metrics introduces additional biases associated with academic visibility and knowledge diffusion. Our bibliometric and topic modelling design is descriptive and relational, not causal. The directional relationships proposed in our conceptual framework are derived from patterns in the literature and offered as testable propositions, not as empirically confirmed causal pathways. Additionally, reliance on Scopus as the sole data source, while justified for its broad coverage of peer-reviewed literature and conference proceedings, means that relevant publications indexed exclusively in other databases (e.g., Web of Science, Google Scholar, Crossref) may have been omitted, potentially introducing selection bias.

Conclusion

This study set out to examine comprehensively science-mapping analysis of global research on the intersection of Artificial Intelligence (AI) and social commerce within the digital business ecosystems. Through systematic analysis of bibliometric data from Scopus database between 2000 and February 8, 2026, we identify the intellectual structure, thematic evolution, and emerging in this rapidly changing field. The contribution of this study is threefold and empirically grounded. First, the bibliometric analysis revealed that the field is growing at 16.01% annually, with strong collaboration (3.62 co-authors per document) and geographic concentration in Asia and Europe, patterns that prior narrative reviews could not quantify. Second, the LDA topic modelling uncovered five latent thematic clusters that bibliometric methods alone cannot detect, showing that research has shifted from technological enablers (Topics 1,4,5) to organisational competencies (Topic 2) and most recently to environmental governance (Topic 3). Third, the conceptual framework (Fig. 15) specifies causal pathways through which these five topics interact via digital business ecosystem mechanisms to produce consumer outcomes (engagement, personalisation, trust), business outcomes (efficiency, innovation, growth), and long-term ecosystem sustainability (fairness, transparency, resilience). Importantly, the findings reported here are descriptive and relational, not causal. The directional relationships proposed in our conceptual framework (Fig. 15) are derived from observed temporal patterns in the bibliometric data and from thematic associations uncovered by LDA topic modelling. These relationships are offered as testable propositions for future empirical research, not as empirically confirmed causal pathways. Subsequent studies employing experimental, longitudinal, or quasi-experimental designs are needed to validate the directional effects we have hypothesized. Together, these contributions provide an integrated foundation for future research that prior descriptive reviews could not offer.

Authors' contributions and consent for publication

All authors contributed equally to this work and have read and approved the final manuscript.

Ethical approval

This article does not involve any studies with human participants or animals performed by any of the authors. Therefore, ethical approval was not required. All data and materials used in this work are publicly available or obtained through legal and ethical means.

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Declaration of competing interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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