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Artificial intelligence and entrepreneurial innovation: Mapping the intellectual structure of an emerging research field

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Abstract: Artificial intelligence (AI) has rapidly become a strategic force in entrepreneurship, innovation, and digital business transformation. Yet, the rapid growth of publications across management, information systems, and technology studies has made it difficult to identify the dominant themes and evolving knowledge structure of AI-enabled entrepreneurship research. This study addresses that challenge through a bibliometric analysis of Scopus-indexed journal articles published between 2015 and 2025. A PRISMA-based screening procedure was applied to retrieve and filter the dataset, resulting in 623 journal articles for final analysis. Keyword co-occurrence analysis and science mapping were conducted using VOSviewer to identify major thematic clusters, research hotspots, and temporal shifts in topic prominence. The results reveal four major clusters: AI-driven opportunity recognition, technological innovation and digital transformation, machine learning applications in business decision-making, and digital platforms with business model innovation. The overlay analysis further indicates a thematic shift from technically oriented AI topics toward ecosystem-, platform-, and business-model-oriented perspectives. This study contributes to the literature by providing a field-specific bibliometric mapping of AI-enabled entrepreneurship, clarifying its intellectual structure, and proposing a future research agenda centered on entrepreneurial cognition, human-AI collaboration, and digitally mediated innovation ecosystems.

Keywords: *Artificial intelligence, Bibliometric analysis, Digital entrepreneurship, Entrepreneurship, Knowledge mapping, Technological innovation, VOSviewer.*

1. Introduction

In recent years, artificial intelligence (AI) has emerged as a transformative force shaping the landscape of entrepreneurship, innovation, and technology-driven business development. Rapid advances in machine learning, data analytics, and digital platforms have altered the ways in which entrepreneurial opportunities are identified, evaluated, and exploited. AI technologies increasingly enable entrepreneurs to analyze large-scale datasets, automate decision processes, and develop innovative products and services that were previously unattainable through conventional business approaches [1-3].

The integration of artificial intelligence into entrepreneurial processes has attracted growing scholarly attention. Researchers have begun to examine how AI contributes to opportunity recognition, business model transformation, organizational innovation, and digital venture development [4-6]. AI-driven tools such as predictive analytics, recommendation systems, and natural language processing are increasingly embedded within entrepreneurial ecosystems, enabling startups and technology firms to scale rapidly and adapt to highly dynamic market environments.

At the same time, the rapid growth of AI research has generated a substantial body of literature across multiple disciplines, including entrepreneurship, innovation management, information systems, and technology strategy. This interdisciplinary expansion makes it difficult to systematically understand how the intellectual structure of AI-enabled entrepreneurship research has evolved over time. Identifying the

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dominant themes, emerging research streams, and structural relationships among topics is therefore essential for clarifying the development trajectory of this field and for positioning future empirical research more effectively.

Bibliometric analysis has become a widely used approach for examining the evolution of scientific research fields. By analyzing publication metadata such as titles, abstracts, author keywords, and citation relationships, bibliometric methods enable researchers to detect research clusters, thematic structures, and knowledge diffusion patterns within large-scale scholarly datasets [7, 8]. In particular, keyword co-occurrence analysis and network visualization have proven effective in mapping the intellectual landscape of emerging interdisciplinary domains [9].

Previous bibliometric studies have examined AI research in general contexts such as deep learning, data science, and business analytics [10, 11]. However, relatively few studies have systematically investigated the intersection between artificial intelligence and entrepreneurship as a distinct research domain. Existing work often focuses on AI as a broad technological phenomenon or as part of general digital transformation, thereby overlooking entrepreneurship-specific mechanisms such as opportunity recognition, venture scaling, and ecosystem-based value creation.

This limitation is particularly important because entrepreneurship research increasingly intersects with digital innovation, platform strategies, and emerging technologies. The rise of AI-powered startups, platform-based ventures, and data-intensive business models suggests that AI is not merely a technical tool but also a driver of entrepreneurial transformation and strategic renewal. Without a focused mapping of this literature, researchers may overlook important interdisciplinary connections between technological innovation and entrepreneurial strategy [12, 13].

To address this gap, this study conducts a bibliometric analysis of artificial intelligence research in entrepreneurship and innovation using Scopus-indexed journal articles published between 2015 and 2025. By applying a PRISMA-based screening procedure and VOSviewer keyword co-occurrence analysis, the study maps the intellectual structure, thematic clusters, and temporal evolution of AI-enabled entrepreneurship research.

This study addresses the following research questions:

RQ1. How has research on artificial intelligence in entrepreneurship and innovation evolved over time?

RQ2. What thematic clusters define the intellectual structure of AI-enabled entrepreneurship research?

RQ3. What emerging research directions can be identified from the evolution of keyword networks and thematic patterns?

This study contributes to the literature in three ways. First, it provides a field-specific bibliometric mapping of AI-enabled entrepreneurship research, clarifying the intellectual structure of a rapidly expanding but conceptually fragmented domain. Second, it identifies a thematic shift from technical AI-oriented studies toward ecosystem-, platform-, and business-model-oriented research streams. Third, it develops a future research agenda by linking artificial intelligence, entrepreneurial opportunity recognition, and digital innovation more explicitly than prior general AI bibliometric studies.

Figure 1 illustrates the conceptual positioning of this study at the intersection of artificial intelligence, entrepreneurship, and innovation research. As shown in Figure 1, the present study is motivated by the fragmentation of interdisciplinary literature and the limited availability of field-specific knowledge mapping. This conceptual framing supports the need for a focused bibliometric analysis of AI-enabled entrepreneurship.

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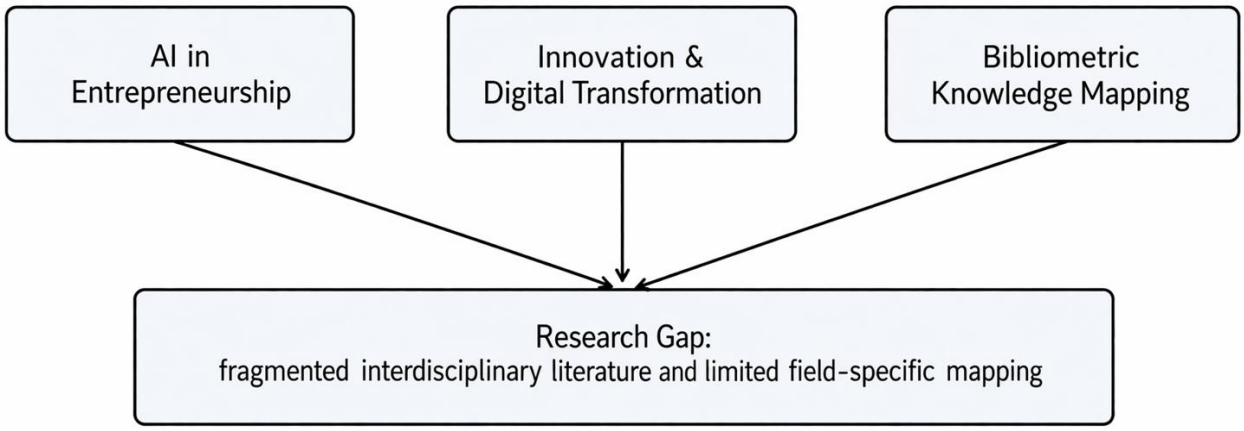

Figure 1.
Conceptual positioning of the study at the intersection of artificial intelligence, entrepreneurship, and innovation research.

2. Literature Review

2.1. Artificial Intelligence in Entrepreneurship

Artificial intelligence has increasingly become a key driver of entrepreneurial innovation and digital transformation. Advances in machine learning, natural language processing, and predictive analytics enable entrepreneurs to identify market opportunities, optimize decision-making, and design data-driven business models [1, 14]. As a result, AI is no longer viewed solely as a support technology; rather, it is increasingly conceptualized as a strategic resource embedded in entrepreneurial processes and digital ecosystems.

Recent studies emphasize that AI functions not only as a technological tool but also as an enabling infrastructure for opportunity recognition and value creation. AI-driven analytics allow entrepreneurs to process large volumes of market and customer data, improving forecasting and strategic decision quality [3]. Predictive algorithms and recommendation systems also help startups develop personalized services and scalable digital platforms. These developments have made AI especially relevant to young ventures operating in volatile and data-rich environments.

Entrepreneurship scholars have further explored how AI influences entrepreneurial cognition and opportunity discovery. AI systems can augment human decision-making by providing real-time pattern recognition and probabilistic reasoning, thereby helping entrepreneurs detect emerging trends and reduce uncertainty [4, 15]. This suggests that AI reshapes not only the informational environment of entrepreneurship but also the cognitive mechanisms through which opportunities are recognized and exploited.

2.2. Artificial Intelligence and Technological Innovation

The innovation literature has long emphasized the transformative role of general-purpose technologies in reshaping industrial trajectories. In this context, artificial intelligence is widely regarded as a general-purpose technology with broad implications for organizational learning, innovation systems, and business model development [2, 16]. Unlike conventional technologies, AI systems can learn recursively from data, enabling firms to improve innovation processes over time.

Within innovation studies, AI is increasingly linked to digital transformation, platform ecosystems, and technology-enabled experimentation. Firms use AI to shorten product development cycles, personalize offerings, and create feedback loops that enhance innovation performance [17, 18]. Platform-based ventures are especially important because they leverage user interactions and ecosystem participation to refine algorithms and generate network-based competitive advantages [19, 20].

Moreover, AI-driven innovation differs from conventional innovation in that it is both cumulative and recursive: once deployed, intelligent systems generate new data that feed subsequent rounds of model

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improvement and strategic adaptation. This recursive characteristic links AI directly to business model innovation, digital service design, and platform governance, making it highly relevant to entrepreneurship research concerned with value creation under conditions of technological acceleration [21].

2.3. Bibliometric and Knowledge Mapping Studies

Bibliometric analysis has become an established method for identifying knowledge structures, research trends, and thematic clusters in rapidly expanding scientific domains. By analyzing publication metadata such as keywords, citations, and co-authorship relationships, bibliometric methods provide a systematic and reproducible means of mapping interdisciplinary research fields [7, 8]. In management and innovation studies, bibliometric approaches are especially useful when a field grows quickly across multiple disciplines and lacks an agreed conceptual structure.

Several studies have applied bibliometric techniques to artificial intelligence research more broadly. Chen et al. [10] mapped the evolution of deep learning research and identified major thematic clusters across data analytics, neural network architectures, and computer vision applications. Dwivedi et al. [11] showed that AI research has expanded into business and management domains, including analytics, digital innovation, and organizational decision-making. These studies confirm that bibliometric tools such as VOSviewer are appropriate for visualizing thematic relationships and tracing research evolution within complex interdisciplinary landscapes [9].

However, only a limited number of studies have focused specifically on the intersection of AI, entrepreneurship, and innovation. Most bibliometric analyses treat AI as a broad technological domain and do not isolate entrepreneurial applications, opportunity-related themes, or platform-based value creation. As a result, the intellectual structure of AI-enabled entrepreneurship remains insufficiently mapped, particularly in terms of its thematic clusters, emerging keywords, and conceptual links to innovation management.

2.4. Research Gap and Analytical Positioning

Although prior studies provide valuable insights into artificial intelligence, digital innovation, and bibliometric methodology, three gaps remain. First, much of the existing literature treats AI as a general technological phenomenon rather than a field-specific driver of entrepreneurial opportunity recognition and venture innovation. Second, bibliometric studies often focus on technical subdomains such as deep learning or data mining, limiting understanding of the broader interplay between AI, entrepreneurship, and business model transformation. Third, the rapid growth of publications in this area makes it difficult to identify emerging research directions without systematic knowledge mapping.

More specifically, prior studies tend to examine AI either as a broad technological phenomenon or as part of general digital transformation, thereby overlooking entrepreneurship-specific mechanisms such as opportunity recognition, venture scaling, and ecosystem-based value creation. Accordingly, a focused bibliometric mapping of AI-enabled entrepreneurship is necessary to clarify the structure, boundaries, and future directions of this emerging research domain.

3. Methodology

3.1. Research Design

This study adopts a bibliometric research design to examine the intellectual structure and thematic evolution of research on artificial intelligence in entrepreneurship and technological innovation. Bibliometric analysis is widely used to identify research patterns, thematic clusters, and knowledge structures in interdisciplinary fields characterized by rapid publication growth [7, 8]. The present study combines performance analysis and science-mapping techniques to provide both descriptive evidence and structural interpretation of the literature.

3.2. Data Source and Search Strategy

The bibliographic dataset was collected from the Scopus database, which offers broad coverage of peer-reviewed journals and standardized metadata suitable for bibliometric analysis. The database search

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was conducted on 10 January 2026. All retrieved records were exported in CSV format, including titles, abstracts, author keywords, publication years, and source titles. The search targeted publications related to artificial intelligence, entrepreneurship, and innovation and was restricted to English-language journal articles published between 2015 and 2025.

3.3. PRISMA-Based Screening Procedure

To ensure methodological transparency and reproducibility, the dataset was filtered using a PRISMA-based screening procedure [22]. The initial Scopus search identified 1,247 records. Duplicate entries and non-article records were removed first. The remaining records were then screened based on title and abstract relevance. Articles were excluded when artificial intelligence was mentioned only peripherally or when the study did not address entrepreneurship, startups, innovation, or digital business contexts in a substantive way. After screening, 742 eligible records remained. Following manual relevance checks, a final dataset of 623 journal articles was retained for analysis.

3.4. Data Preprocessing

Before analysis, the exported records were cleaned and standardized. A manual keyword cleaning process was performed to merge synonymous and abbreviated terms. For example, "AI," "A.I.," and "artificial intelligence" were standardized as "artificial intelligence," while "ML" and "machine-learning" were unified as "machine learning." Plural and singular variants such as "startups" and "startup" were also harmonized. This normalization step reduced lexical fragmentation and improved the interpretability of the co-occurrence network.

3.5. Bibliometric Analysis Procedure

The study primarily focuses on keyword co-occurrence analysis because author keywords are effective indicators of thematic relationships and conceptual proximity among publications [9]. Co-occurrence analysis enables the identification of central topics and cluster structures by mapping the frequency with which keywords appear together in the same articles. Descriptive publication trends were also examined to identify temporal growth patterns within the field.

3.6. VOSviewer Configuration

The bibliometric network was constructed using VOSviewer, a widely used software program for bibliometric mapping and visualization [9]. The analysis type was set to co-occurrence, and the unit of analysis was author keywords. In VOSviewer, the association strength normalization method was applied. A minimum keyword occurrence threshold of five was used, resulting in 78 keywords included in the final analysis. Nodes represent keywords, node size reflects keyword frequency, and links indicate co-occurrence relationships. The default VOS clustering algorithm was used to identify major thematic groups within the literature.

The article selection process is summarized in Figure 2, which presents both the PRISMA-based screening stages and the overall bibliometric workflow. As shown in the left panel of Figure 2, the dataset was reduced from 1,247 initial records to 623 final journal articles through duplicate removal, document-type filtering, and relevance screening. The right panel of Figure 2 shows the analytical workflow from Scopus query construction to data cleaning and VOSviewer-based visualization.

Search Query:
TITLE-ABS-KEY ("artificial intelligence" OR "machine learning" OR "deep learning")
AND TITLE-ABS-KEY ("entrepreneurship" OR "startup" OR "entrepreneurial")
AND TITLE-ABS-KEY ("innovation" OR "technology innovation" OR "digital innovation")
AND PUBYEAR > 2014
AND (LIMIT-TO (DOCTYPE, "ar"))
AND (LIMIT-TO (LANGUAGE, "English"))

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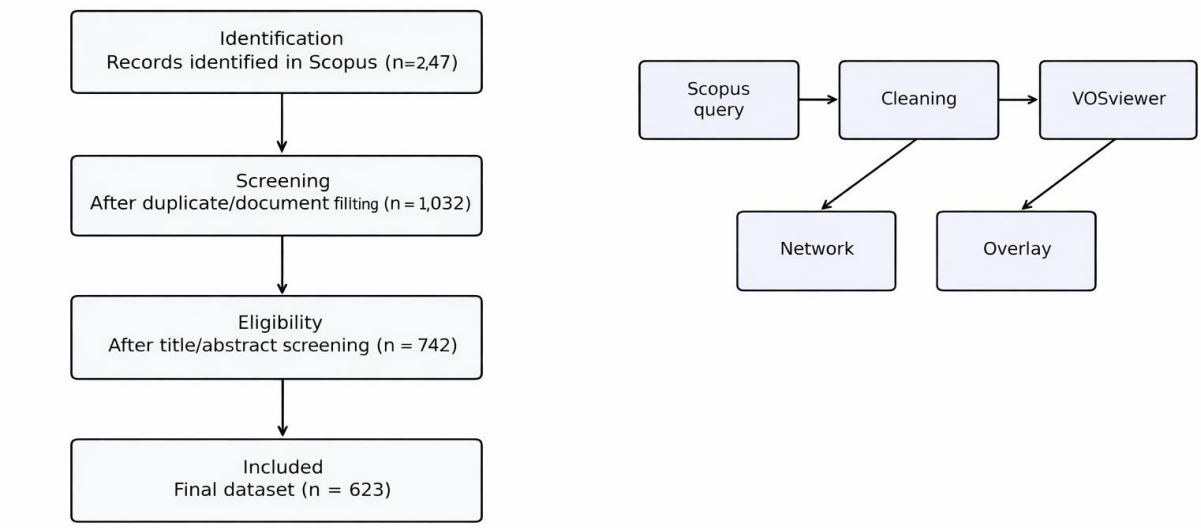

Figure 2.
PRISMA-based article screening process and methodological workflow used to derive the final dataset of 623 Scopus-indexed journal articles.

The numerical details of the screening process are presented more explicitly in Table 1. Table 1 shows that the greatest reduction occurred between the initial retrieval stage and the eligibility stage, indicating that the filtering criteria substantially improved the thematic precision of the final dataset. This step is methodologically important because it increases the reliability of subsequent co-occurrence analysis.

Table 1.
PRISMA-based screening summary of the final Scopus dataset.

Stage	Number of Articles
Initial search	1,247
After duplicates removed	1,032
After eligibility screening	742
Final dataset	623

4. Results

4.1. Descriptive Analysis of Publications

To address RQ1, this section first examines the annual publication trend in AI-enabled entrepreneurship research. Following the PRISMA-based screening procedure, a total of 623 journal articles indexed in the Scopus database were retained for bibliometric analysis. The publications span the period from 2015 to 2025 and show a clear upward trajectory in scholarly attention devoted to artificial intelligence in entrepreneurship and innovation. The field remained relatively small until 2018 but expanded rapidly after 2019, indicating its growing institutionalization within entrepreneurship, innovation, and digital transformation research.

4.2. Keyword Co-occurrence Network

To address RQ2, a keyword co-occurrence analysis was conducted using author keywords extracted from the final Scopus dataset. After applying a minimum occurrence threshold of five, 78 keywords were included in the final co-occurrence network. The keyword "artificial intelligence" emerged as the most central term, followed by entrepreneurship, innovation, machine learning, and digital entrepreneurship. The prominence of these terms indicates that the field is strongly shaped by the intersection of technological capability, entrepreneurial activity, and digital transformation.

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4.3. Thematic Cluster Identification

The clustering procedure identified four major thematic groups. The first cluster centers on AI-driven entrepreneurship and opportunity recognition, including keywords such as artificial intelligence, startup, opportunity recognition, and entrepreneurial ecosystems. The second cluster relates to technological innovation and digital transformation, capturing AI adoption, emerging technologies, and organizational change. The third cluster is associated with machine learning applications in business and industry, emphasizing predictive analytics, big data, and decision support systems. The fourth cluster focuses on digital platforms and business model innovation, highlighting digital entrepreneurship, platform economy, and ecosystem-based value creation.

4.4. Overlay Visualization: Evolution of Research Themes

To address RQ3, an overlay visualization analysis was conducted to examine how research themes have evolved over time. Earlier publications tended to focus on machine learning, data analytics, and technological innovation, whereas more recent work increasingly emphasizes digital entrepreneurship, platform economy, AI-driven innovation, and entrepreneurial ecosystems. This pattern indicates a shift from technically oriented AI topics toward broader ecosystem-level and business-model-oriented research agendas.

4.5. Density Visualization and Research Hotspots

The density distribution of keyword frequencies highlights the concentration of research activity around a relatively small set of dominant themes. Artificial intelligence, entrepreneurship, innovation, and machine learning function as core anchors of the field, while digital entrepreneurship and business model innovation represent rapidly consolidating subdomains. The coexistence of central and emerging themes suggests that the field is both structurally coherent and dynamically expanding.

4.6. Most Influential Journals

An examination of publication outlets indicates that the literature on AI-enabled entrepreneurship is distributed across multiple interdisciplinary journals in entrepreneurship, innovation, and information systems. The most visible outlets include Technological Forecasting and Social Change, Journal of Business Research, Research Policy, Small Business Economics, and Technovation. This distribution confirms that the field is not confined to a single disciplinary journal domain; rather, it is supported by a network of outlets interested in technological change, strategic innovation, and digital entrepreneurship.

4.7. Most Productive Countries

Country-level analysis indicates that research output is concentrated in leading innovation economies. The most productive countries are the United States, China, the United Kingdom, Germany, and India. This pattern reflects the alignment between national AI capabilities, digital infrastructure development, and entrepreneurial ecosystem maturity.

The annual publication trend is presented in Figure 3. As shown in Figure 3, research on AI-enabled entrepreneurship remained relatively limited until 2018, but publication output increased sharply after 2019. This pattern suggests that the field entered a rapid expansion phase in parallel with the growing strategic importance of AI in entrepreneurship, digital transformation, and innovation management.

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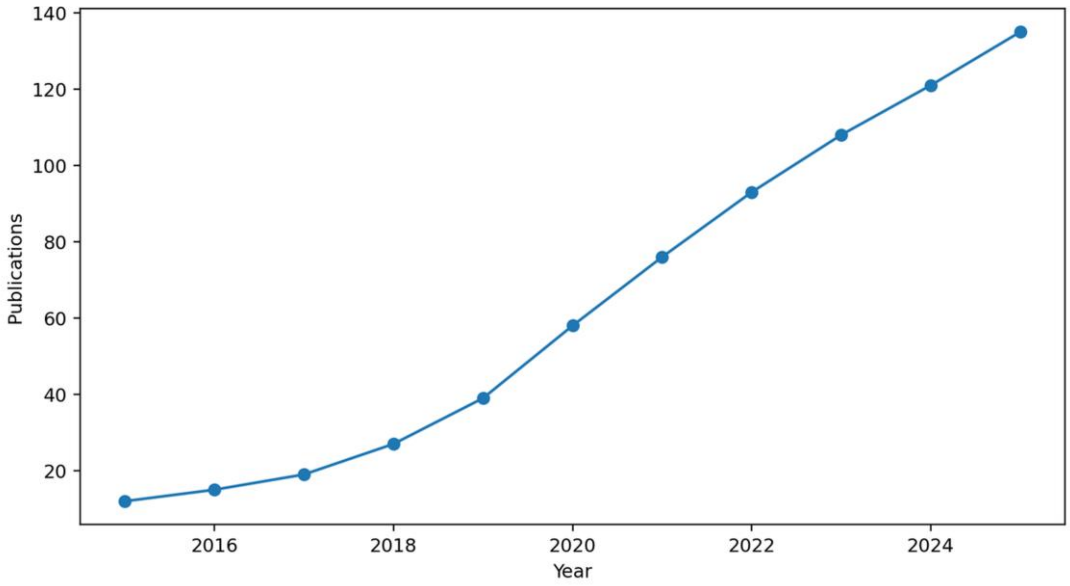

Figure 3.
Annual publication trend in AI-enabled entrepreneurship research based on the final Scopus dataset (2015–2025).

Figure 4 visualizes the author keyword co-occurrence network derived from the final dataset. As shown in Figure 4, the network is organized around several interrelated clusters rather than isolated themes. In particular, the figure highlights the strong conceptual links between AI-related terms, entrepreneurial opportunity recognition, digital transformation, analytics, and business model innovation. This supports the interpretation that AI-enabled entrepreneurship has evolved into a coherent interdisciplinary research domain.

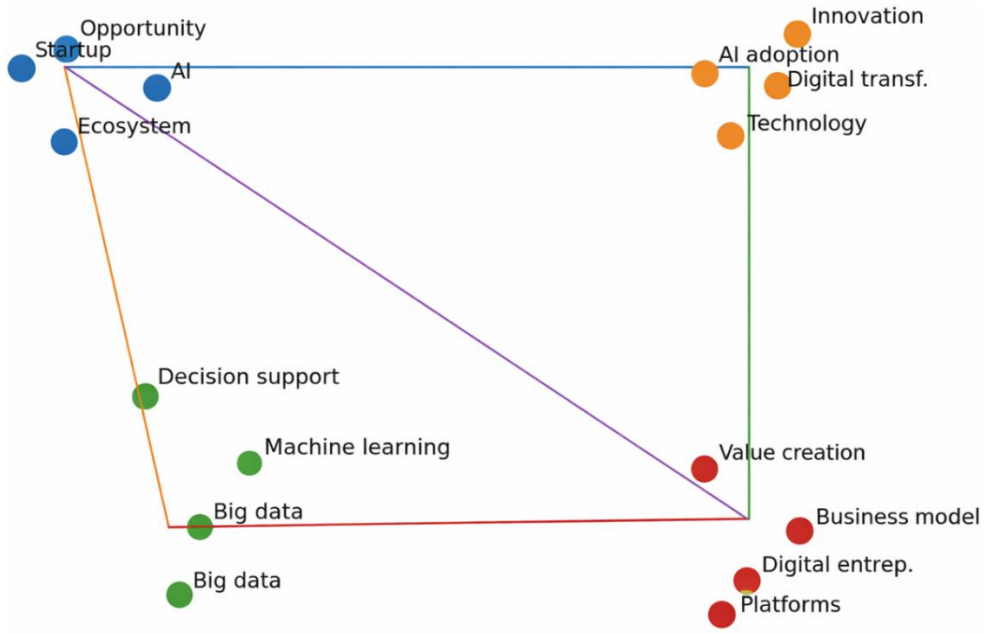

Figure 4.
Author keyword co-occurrence network generated using VOSviewer from the final dataset (minimum occurrence threshold = 5; association strength normalization applied).

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The temporal evolution of research themes is illustrated in Figure 5. As shown in Figure 5, earlier studies focused on machine learning, data analytics, and technological innovation, while more recent publications emphasize digital entrepreneurship, platform economy, AI-driven innovation, and entrepreneurial ecosystems. This shift indicates the field is moving from a predominantly technical orientation toward a broader ecosystem- and strategy-oriented perspective.

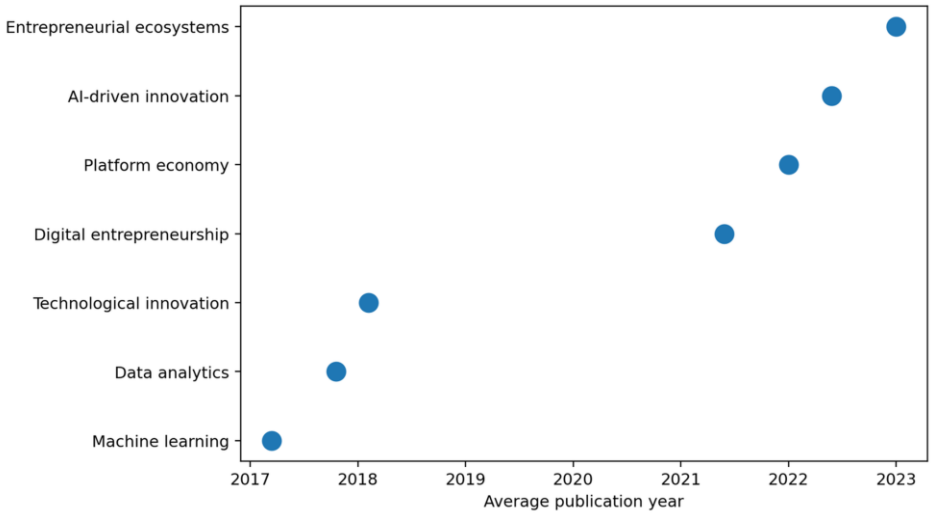

Figure 5.
Overlay visualization of research themes based on the average publication year of author keywords in the final dataset.

Table 2 presents the most influential journals publishing research on AI-enabled entrepreneurship. The table indicates that the leading outlets are interdisciplinary journals located at the intersection of innovation studies, entrepreneurship, and management research. The concentration of publications in journals such as *Technological Forecasting and Social Change* and *Journal of Business Research* suggests that the field is increasingly recognized within mainstream innovation and strategic management scholarship.

Table 2.
Leading publication outlets in AI-enabled entrepreneurship research.

Journal	Publications
Technological Forecasting and Social Change	42
Journal of Business Research	36
Research Policy	28
Small Business Economics	25
Tech novation	21

Table 3 summarizes the most productive countries in AI-enabled entrepreneurship research. As shown, the United States and China account for the largest share of publications, followed by the United Kingdom, Germany, and India. This distribution suggests that research productivity in this domain is concentrated in countries with relatively strong digital infrastructure, AI capability, and entrepreneurial ecosystem development.

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Table 3.
Country-level distribution of publications in AI-enabled entrepreneurship research

Country	Publications
United States	162
China	134
United Kingdom	78
Germany	65
India	51

This point is important for future bibliometric research because it indicates that subsequent work can move beyond descriptive mapping toward more fine-grained analyses of citation influence, collaboration structures, and semantic change. The present results, therefore, provide a useful baseline for future studies that may apply co-citation analysis, bibliographic coupling, or transformer-based text analysis to refine the intellectual boundaries of AI-enabled entrepreneurship research.

The network structure reported in this study should be interpreted as a robust but necessarily simplified representation of the field. Co-occurrence mapping captures dominant conceptual associations across published articles, but it does not fully reveal the depth of theoretical arguments or the causal logic of empirical studies. Even so, the consistency of the cluster pattern across publication trends, keyword prominence, and journal distribution suggests that the identified thematic structure is not an artifact of a single indicator. In other words, AI-enabled entrepreneurship appears to be stabilizing around a recognizable set of interrelated themes rather than fragmenting into disconnected technical subfields.

5. Discussion

The results show that AI-enabled entrepreneurship has developed into a distinct interdisciplinary domain that combines technological capability, entrepreneurial opportunity recognition, and digital business transformation. The centrality of the keywords artificial intelligence, innovation, entrepreneurship, and machine learning indicates that the field has matured beyond isolated technical studies and now reflects a broader conversation about how intelligent systems shape venture creation, strategic adaptation, and ecosystem development.

The four thematic clusters identified in the results align with prior work on digital entrepreneurship and innovation ecosystems while also extending that literature in important ways. The AI-driven opportunity recognition cluster supports the argument that digital technologies alter entrepreneurial cognition and opportunity formation processes [5]. The technological innovation cluster reinforces the view that AI functions as a general-purpose technology with wide-ranging implications for organizational and industrial change [2]. The machine-learning-and-analytics cluster is consistent with research showing that data-intensive systems increasingly support decision-making and strategic learning in firms [3]. The digital-platforms cluster complements the literature on digital transformation by emphasizing ecosystem-based value creation and scalable business model innovation [6].

This study contributes to the literature in three ways. First, it provides a field-specific bibliometric mapping of AI-enabled entrepreneurship, thereby clarifying the intellectual structure of a rapidly expanding but conceptually fragmented domain. Second, the findings extend digital entrepreneurship theory by showing that AI does not simply digitize existing entrepreneurial processes; rather, it reconfigures how entrepreneurs recognize opportunities, mobilize resources, and design platform-based value propositions. Third, the study contributes to innovation management by highlighting how entrepreneurship research on AI is increasingly organized around ecosystem-level and business-model-level concerns, rather than around purely technical subdomains.

The findings offer several practical implications. For entrepreneurs, AI capabilities appear most relevant when linked to opportunity recognition, customer insight generation, and scalable digital-service design. For innovation managers, the cluster structure suggests that AI adoption should be treated as part of a broader transformation strategy involving business models, digital platforms, and ecosystem participation. For policymakers, the country and journal patterns indicate that AI-enabled

entrepreneurship research is concentrated in technologically advanced contexts, implying that public policy should support digital infrastructure, AI literacy, and venture ecosystems to reduce capability gaps.

The discussion also points to several avenues for future inquiry. First, more research is needed on the relationship between AI adoption and entrepreneurial performance outcomes, including growth, survival, and innovation productivity. Second, future studies should examine human–AI collaboration in entrepreneurial decision-making, especially where algorithmic recommendations and human judgment interact under uncertainty. Third, multi-database bibliometric analysis and semantic text-mining approaches could enrich the present findings by incorporating citation structures, abstracts, and full-text content. Finally, comparative studies across countries and sectors may reveal how institutional conditions shape the diffusion and strategic use of AI in entrepreneurial ecosystems.

The findings extend the digital entrepreneurship perspective proposed by Nambisan [5] by demonstrating that artificial intelligence is increasingly treated not merely as a digital tool but as an infrastructural capability that reshapes entrepreneurial opportunity recognition and ecosystem participation. From an innovation management perspective, the observed thematic shift suggests that AI is being repositioned from a productivity-enhancing technology to a strategic enabler of business model transformation. The increasing prominence of platform economy, digital entrepreneurship, and ecosystem innovation keywords indicates that scholars are paying greater attention to AI's role in value creation and inter-organizational coordination.

6. Conclusion

This study examined the intellectual structure and thematic evolution of research on artificial intelligence in entrepreneurship and technological innovation using a bibliometric approach. By analyzing 623 Scopus-indexed journal articles published between 2015 and 2025, the study identified a clear expansion of scholarly interest in AI-enabled entrepreneurship and mapped the conceptual relationships among the dominant themes in the field. The results revealed four major thematic clusters: AI-driven opportunity recognition, technological innovation and digital transformation, machine learning applications in business decision-making, and digital platforms with business model innovation.

This study makes three main contributions. First, it provides a field-specific bibliometric mapping of AI-enabled entrepreneurship research, thereby clarifying the structure of a fragmented but rapidly expanding domain. Second, it reveals a thematic shift from technical AI topics toward ecosystem-, platform-, and business-model-oriented perspectives, showing how the field has matured conceptually. Third, it offers a future research agenda centered on entrepreneurial cognition, human–AI collaboration, and digitally mediated innovation ecosystems.

Despite these contributions, the study has several limitations. The dataset was limited to Scopus-indexed journal articles, which may have excluded relevant studies from other databases. Additionally, the analysis relied on author keywords and bibliometric metadata, which cannot fully capture the conceptual nuance of article-level arguments. Finally, the journal and country analyses should be interpreted as indicative patterns rather than exhaustive representations of the field.

Future research should expand the present study by incorporating citation-based techniques such as co-citation analysis and bibliographic coupling, as well as semantic approaches like topic modeling and transformer-based text analysis. Comparative research across countries, sectors, and policy environments would also be valuable for understanding how AI-enabled entrepreneurship develops under different institutional conditions.

Overall, this study shows that artificial intelligence has become a strategic driver of entrepreneurship and innovation rather than a peripheral technological add-on. The bibliometric patterns identified here indicate that AI-enabled entrepreneurship is increasingly organized around digital ecosystems, business model transformation, and data-driven strategic adaptation. As scholarly attention continues to grow, the field will benefit from stronger theoretical integration and more diverse empirical inquiry.

Taken together, these implications reinforce a central conclusion of the study: AI-enabled entrepreneurship should be understood as a socio-technical and strategic phenomenon rather than a

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purely technical one. This framing has direct implications for how firms design innovation processes, how ecosystems coordinate resources, and how policy systems support digital transformation.

Third, the country-level concentration of publications implies a policy challenge. Research and entrepreneurial experimentation in AI remain clustered in economies with relatively strong digital infrastructure and institutional support. Policymakers aiming to cultivate AI-enabled entrepreneurship should therefore combine support for venture financing with investments in digital infrastructure, AI literacy, interdisciplinary education, and translational mechanisms that connect universities, startups, and industrial partners. Such measures may reduce capability gaps and broaden participation in AI-driven entrepreneurial ecosystems.

Second, the thematic structure identified in this study suggests that capability development must extend beyond technical skills. Startups and innovation-oriented firms require complementary investments in data governance, digital experimentation routines, and managerial judgment regarding when algorithmic recommendations should complement rather than replace human expertise. This is especially important in resource-constrained ventures, where strategic focus and ecosystem leverage may matter more than scale in determining AI-enabled competitive advantage.

Beyond its theoretical contribution, the present study also highlights several managerial priorities for organizations seeking to integrate AI into entrepreneurial and innovation processes. First, firms should avoid treating AI adoption as an isolated technology initiative. Instead, AI capability should be aligned with market sensing, business-model redesign, and platform participation. In entrepreneurial settings, the strategic value of AI lies less in automation alone and more in the ability to accelerate learning, sharpen opportunity recognition, and coordinate value creation across distributed digital ecosystems.

Transparency:

The author confirms that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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Appendix A.
Search Query.

TITLE-ABS-KEY ("artificial intelligence" OR "machine learning" OR "deep learning")
AND TITLE-ABS-KEY ("entrepreneurship" OR "startup" OR "entrepreneurial")
AND TITLE-ABS-KEY ("innovation" OR "technology innovation" OR "digital innovation")
AND PUBYEAR > 2014
AND (LIMIT-TO (DOCTYPE, "ar"))
AND (LIMIT-TO (LANGUAGE, "English"))

Appendix B.
Keyword Normalization Examples.

AI -> artificial intelligence
A.I. -> artificial intelligence
ML -> machine learning
startups -> startup
digital entrepreneurs -> digital entrepreneurship

Appendix C.
Inclusion and Exclusion Criteria.

Included: English-language journal articles addressing artificial intelligence, entrepreneurship, innovation, startups, and digital business contexts.

Excluded: conference papers, book chapters, editorials, and studies in which artificial intelligence appeared only marginally or without substantive entrepreneurial relevance.