

The Impact of AI-Enhanced Social Media Strategies on Entrepreneurial Performance

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ABSTRACT

This research aims to explore the influence of AI-enhanced social media strategies on entrepreneurial performance. The study incorporates a bibliometric analysis in the research methodology to provide a comprehensive understanding of existing literature, identify key themes, and contribute to the current knowledge base. Both China and the United States emerge as frontrunners in contributing to the scholarly discourse. The suggested insights offer promising avenues for future research, encouraging scholars to delve deeper into the strategic, human-centric, precision-oriented, collaborative, ethical, and methodological dimensions of AI-enhanced social media strategies in the entrepreneurial context.

Keywords-- AI, Social Media, Entrepreneurship, Bibliometric Analysis, Performance Metrics

Consequently, firms have incorporated online infrastructure into their business models, adapting their revenue models to capitalize on the significant returns offered by the Internet. This transformative period has also prompted the modification and renewal of key elements in traditional marketing practices. Amid these groundbreaking developments, social media has emerged as a pivotal factor, providing realistic business opportunities such as cost-effectiveness, time efficiency, and enhanced customer engagement.

In an era marked by the symbiosis of artificial intelligence (AI) and digital dynamics, the intersection of AI and social media has emerged as a fulcrum for entrepreneurial endeavours. This study delves into the nuanced interplay between AI-enhanced social media strategies and entrepreneurial performance, presenting a scholarly investigation poised at the confluence of innovation, digital engagement, and business efficacy. As we traverse through the constantly changing terrain of technology, entrepreneurs are at the forefront of utilizing AI to enhance their social media tactics. The strategic infusion of AI into social media platforms has become a pivotal driver for entrepreneurial success, influencing brand visibility, customer engagement, and, ultimately, business outcomes. This research seeks to unravel the intricate connections and repercussions of this transformative alliance.

I. INTRODUCTION

The Internet offers a myriad of opportunities, including connecting with people worldwide, creating, sharing, and disseminating content, as well as accessing unlimited information on various subjects to stay updated. Undoubtedly, the widespread use of social media has led to significant outcomes and transformations, particularly in business models. (Öztamur & Karakadilar, 2014)

Since the early 21st century, the integration of the Internet and social media has become an integral part of business strategies. Companies have harnessed the unique features of the web, resulting in a shift toward e-commerce in their market strategies. The web has emerged as a highly profitable tool for promoting products and services to reach the target audience. Some businesses have entered the market as e-retailers, while others have taken on roles such as content providers, transaction brokers, market creators, or service providers. The relatively low barriers to entry have facilitated the entry of many small and medium-sized enterprises (SMEs) into the online space, where they showcase products or adopt various internet-based business models.

II. CONTEXTUALIZING THROUGH BIBLIOMETRIC ANALYSIS

This study uses a strong bibliometric analysis to support our investigation and provides a broad overview of the body of knowledge already in existence. Through this methodological lens, we aim to scrutinize the scholarly landscape, discern seminal contributions, and map thematic evolutions. By engaging in a bibliometric inquiry, we not only underscore the scholarly rigour of our investigation but also position our work within the broader context of extant literature.

III. RATIONALE AND SIGNIFICANCE

Understanding the symbiotic relationship between AI and social media in the entrepreneurial domain is imperative. As businesses increasingly pivot towards digitalization, elucidating the dynamics of AI-enhanced social media strategies becomes pivotal for both scholars and practitioners. This research not only addresses this imperative but, through the integration of bibliometric analysis, contributes a meta-level understanding of the intellectual trajectory within this domain.

IV. RESEARCH OBJECTIVES

Our study is poised to achieve the following objectives:

1. Investigate the contemporary landscape of AI-infused social media strategies in entrepreneurship.
2. Evaluate the impact of AI technologies on the reach and resonance of social media campaigns.
3. Explore hidden dynamics of social media impact on entrepreneurial outcomes, focusing on engagement, reach, and interactions through AI-mediated channels.
4. Conduct a meticulous bibliometric analysis to discern key themes, intellectual structures, and emerging trends.

V. BACKGROUND OF LITERATURE

Artificial intelligence (AI) is already regarded as a revolutionary technology with the power to alter markets, industries, and day-to-day business operations drastically. It is believed to have unmatched disruptive and innovative potential compared to any existing technology. However, the bar for AI research and application is still high. (Marr & Ward, 2019)

Connecting with important consumer influencers, interacting with them, and creating brand advocates can all be achieved through Web 2.0 social media. However, trust needs to be built and then reinforced in order to overcome any reluctance on the part of the potential customer in order to create viral campaigns and promote online word-of-mouth marketing (WOM) (Miller & Lamma, n.d.).

Numerous studies have shown that social media is an inexpensive, powerful tool for telecommuting and marketing. Social media marketing has a strong track record of raising consumer engagement and brand awareness (Kaplan & Haenlein, 2010). Businesses have also discovered that social media is a useful tool for getting client feedback and insights (Dellarocas, 2003).

However, using social media for business purposes has not been without its difficulties. According to research, social media generates massive amounts of data, which can make it difficult for businesses to effectively analyse and use the information.

It is no longer an option for a small business or startup to ignore social media as a tool for marketing, recruitment, and communication. That also applies to any business that is brand-new to the internet. However, jumping into the vast, ever-expanding world of social media networks headfirst can feel daunting at best. Every platform has its peculiarities regarding usernames, imagery, and usage, in addition to having a distinct user base. (Akula SC, 2015)

One way to find well-known researchers, significant research findings, and organizations that support excellent research is through bibliometric analysis. The data banks are a useful tool for studies of communication patterns and for evaluating research as they appear in publications. So-called bibliometric indicators have been developed for this purpose. (Ellegaard & Wallin, 2015)

A crucial statistical tool for mapping the current state of knowledge in a particular field of science is bibliometric analysis, which also helps to identify key data for a variety of other uses, including identifying potential areas for future research and supporting scientific findings. (Oliveira et al., 2019)

VI. SEARCH PROCEDURE AND DATABASE AND KEYWORDS SELECTION

The chosen database is the Thomson Reuters Web of Science bibliographic database, which contains the oldest and most comprehensive records of citation indexes in addition to articles from esteemed journals in a number of disciplines.

The terms' synonyms are used to improve the likelihood of including all articles about artificial intelligence, social media, and entrepreneurial performance. The outcome is the algorithm shown below:

(AI OR Machine Learning OR Neural Networks OR Deep Learning OR Natural Language Processing OR Computer Vision OR Cognitive Computing OR AI Technologies) AND (social media) AND (Business Performance OR Startup Success OR Firm Performance OR Entrepreneurial Outcomes OR Small Business Success OR New Venture Performance OR Company Performance)

We limit our search to end of 2022 in order to eliminate a potential of bias arising from more recent articles. No other filters were applied in the database.

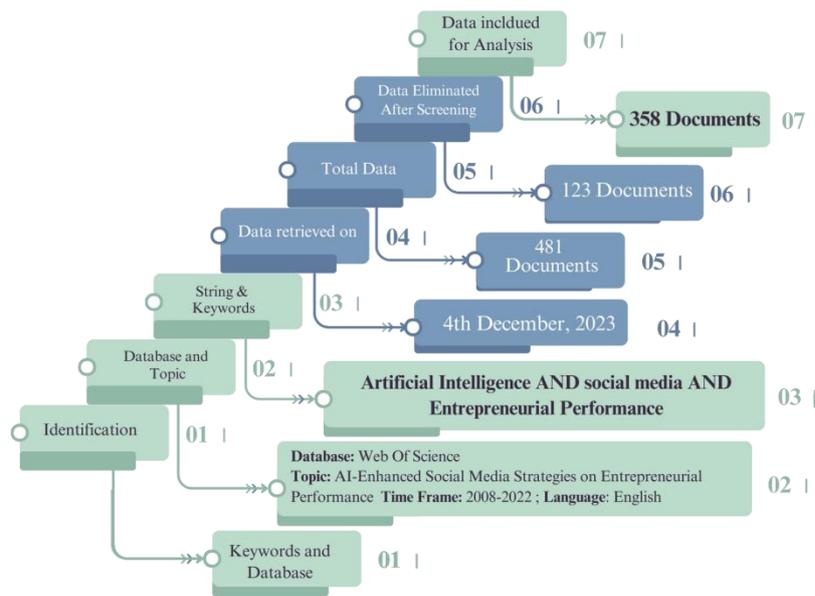


Figure 1: Research Procedure

VII. BIBLIOMETRIC TOOLS USED FOR RESEARCH

In 2017, Professor Massimo created the bibliometric software package known as bibliometrics, which is based on the R programming language (Aria & Cuccurullo, 2017). It can be used for visual display and whole-process bibliometric analysis. On documents from the Scopus and Web of Science databases, statistical analysis, data preprocessing, co-occurrence matrix building, co-citation analysis, coupling analysis, co-word analysis, and cluster analysis are also possible. Bibliometrics offers a full set of literature information analysis and the visualization of results by combining the visualization capabilities of numerous scientific mapping tools.

Massimo Aria used the shiny software package for the R language to create bibliophily, which was based on the secondary development of bibliometrics. The two programs differ in that bibliometrics operates

using code commands, whereas bibliophily encapsulates data using the shiny package.

VOS viewer, A software program for creating and visualizing bibliometric networks, is also used in the study VOS viewer (van Eck & Waltman, 2010). It was developed at the Centre for Science and Technology Studies (CWTS) of Leiden University. The software allows users to perform various bibliometric analyses, such as co-citation analysis, bibliographic coupling analysis, and co-authorship analysis. It also provides powerful visualization features that allow users to create and customize network maps, cluster maps, and density maps. The software is free to download and use for non-commercial purposes. It has been widely used in bibliometric research and has been cited in many academic publications.

For results, we use a combination of VOS viewer software and Biblioshiny.

VIII. RESULTS AND DISCUSSION



Figure 1: Key Bibliometric Insights: 2008-2022 by Biblioshiny

The primary information regarding the data in Biblioshiny spans from 2008 to 2022, encompassing a diverse range of 209 sources, including journals and books. The dataset comprises 358 documents, demonstrating a notable annual growth rate of 40.26%. The average age of these documents is 2.88 years, and each document receives an average of 25.2 citations, indicating a considerable impact.

In terms of document contents, the dataset includes 946 Keywords Plus (ID) and 1321 Author's Keywords (DE), providing a rich array of descriptive elements. A total of 1540 authors have contributed to the dataset, with 11 single-authored documents. Collaboration among authors is evident, with an average of 4.66 co-authors per document, and international co-authorships constitute 47.49%.

Various document types are present, including 323 articles, 13 early access articles, 3 proceedings papers, 1 retracted publication, 1 editorial material, and 17 reviews, reflecting the diversity of scholarly

contributions within the dataset. Overall, this comprehensive dataset in Biblioshiny offers a wealth of information for bibliometric analysis, showcasing substantial growth, international collaboration, and a varied range of document types.

Annual Growth Rate

Scholars initially encountered the intersection of artificial intelligence (AI) and social media platforms in the 2000s. However, it was not until 2012 that a substantial exploration of the impact of these technologies on business performance began to unfold. The scholarly interest in investigating the nexus between AI and entrepreneurial performance has exhibited gradual growth over the past two decades. Notably, the publication landscape reflects this progression, with only five documents emerging in 2014 compared to a substantial surge to 67 publications in 2020. The temporal concentration of over 99% of this literature between 2012 and 2022 underscores the rapid evolution of this field.

Articles vs Year

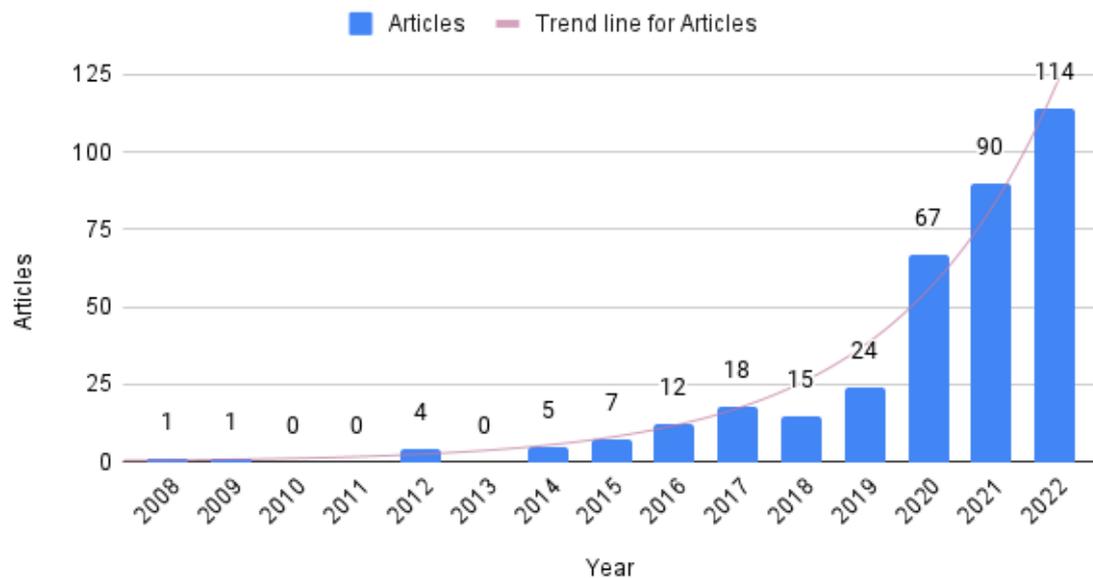


Figure 2: AI, Social Media and Entrepreneurial Performance documents from 2008-2022

Countries

The distribution of the 358 documents across 58 countries indicates a global interest in the intersection of AI, social media, and entrepreneurial performance. The

scientific production of the top 10 countries is illustrated in Figure 3, with China and the USA leading the list, followed by the UK and India in the third and fourth spots, respectively.

Articles vs Countries

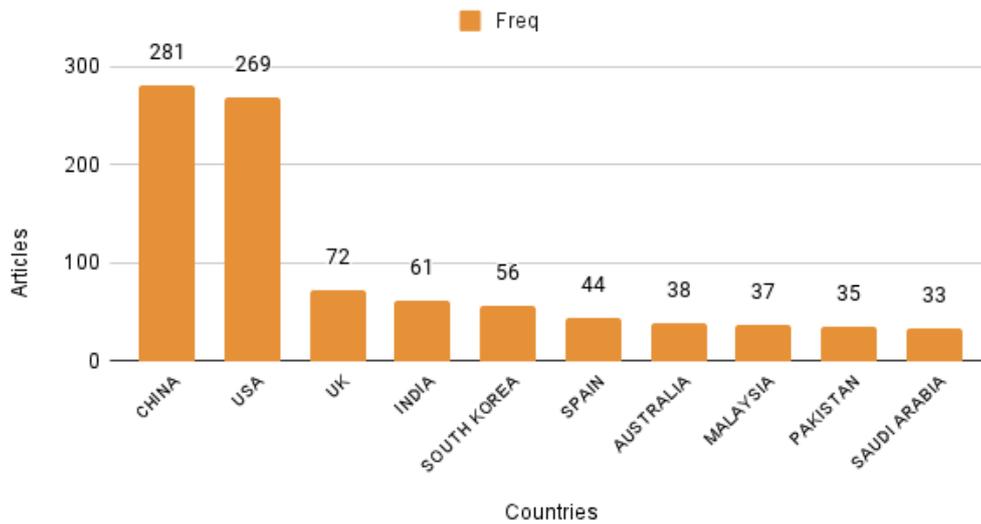


Figure 3: Top 10 Countries' Scientific Production

Co-Authorship of Countries

The overall link strength in the co-authorship investigation signifies the comprehensive strength of co-authorship relationships between a specific country and others. On the contrary, the link strength between countries indicates the number of publications that two

associated countries have co-authored. The United States emerged as the leader in instances of international cooperation, boasting 110 links, 109 documents, and 4090 citations. China secured the second position with 82 links while coming in third with 73.

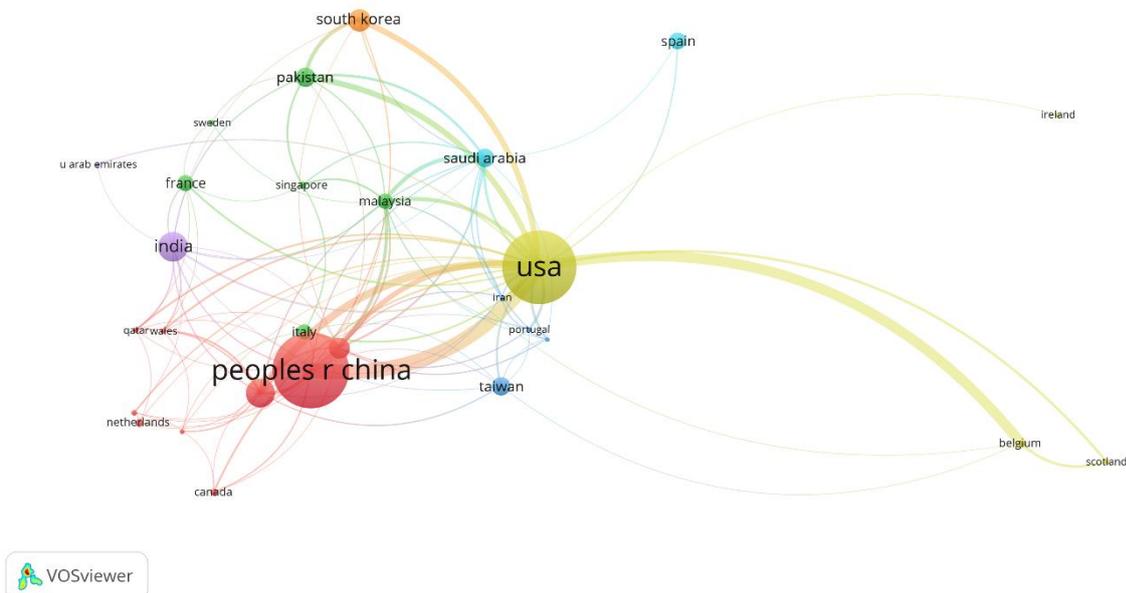
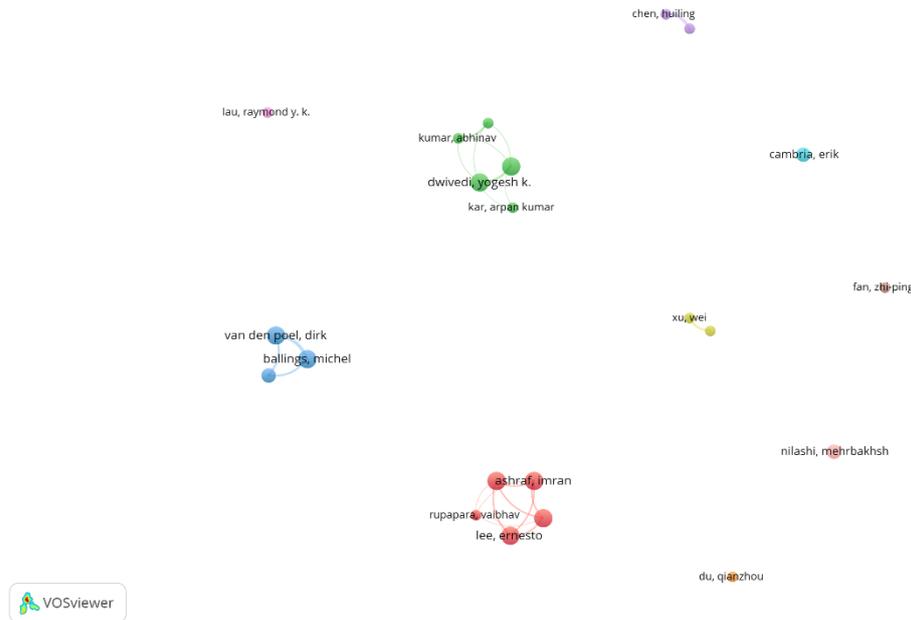


Figure 4: Network visualization map of the co-authorship by VOS Viewer

Unit of analysis = Countries; Counting method: Full counting; Minimum number of documents of a country = 5
 Minimum number of citations of a country = 5

Co-Authorship of Authors

Twenty-two authors surpassed the minimum threshold of three documents and five citations for inclusion in the VOS viewer mapping. See Fig 5.



Unit of analysis = Authors; Counting method: Fractional counting; Minimum number of documents of an author = 3
 Minimum number of citations of an author = 5. The figure shows all authors, irrespective of whether they are connected sets.

The co-authorship data serves as a valuable resource for understanding collaborative networks, identifying influential authors, and exploring thematic concentrations in the field of AI, social media, and entrepreneurial performance.

Ashraf, Imran stands out within the research landscape, as evidenced by his position in Cluster 1, characterized by a robust co-citation network and high link strength. This positioning, along with commendable scores, indicates substantial contributions and impact within the field of study. In a similar vein, Chen and Huiling distinguish themselves with a notable volume of documents, citations, and active participation in international collaborations. These factors collectively underscore the significance and global reach of Chen's contributions to the domain. On the other hand, Van den

Poel's affiliation with Cluster 3, coupled with substantial link strength, signifies a specific thematic focus or collaborative network within the broader research context. Each researcher's unique profile contributes to the rich tapestry of knowledge in the studied field, showcasing diverse expertise and impactful contributions.

Most Significant Authors

Research on AI, social media, and entrepreneurial performance across their domains involved approximately 1540 authors. Notably, Ashraf I, Ballings M, Rustam F, Van Den Poel D, and Washington PB each contributed to 5 articles, while Bogaert M, Cambria E, and Rana NP each had 4 articles. There were 1450 authors with 1 article each.

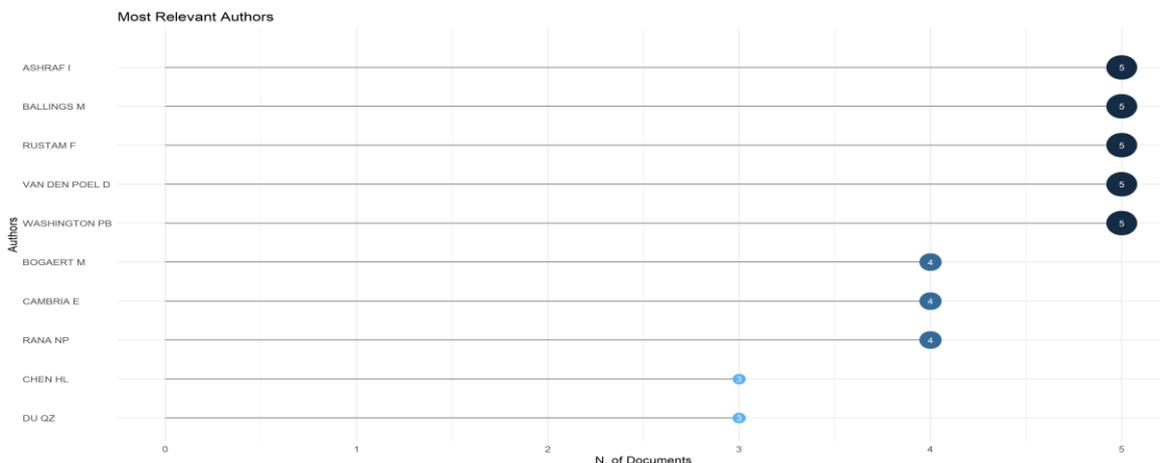


Figure 6: Top 15 authors by Biblioshiny

Citations

The citation of countries in bibliometric is crucial for several reasons:

- It enables a comprehensive global impact assessment, providing insights into the reach and influence of a country's research output.
- It serves as a key indicator of international collaboration, shedding light on the strength of collaborative networks between countries.
- It aids in identifying research hubs, revealing regions that excel in specific research domains. The information derived from country citations is instrumental in strategic planning, informing

policymakers about effective research strategies and resource allocation.

- It facilitates benchmarking and ranking exercises, allowing for comparisons between countries and institutions. The citation data enhances the international visibility of a country's research contributions, contributing to its standing in the global research landscape.
- The citation of countries in bibliometric plays a role in scientific diplomacy, influencing diplomatic relations through the recognition of scientific achievements.

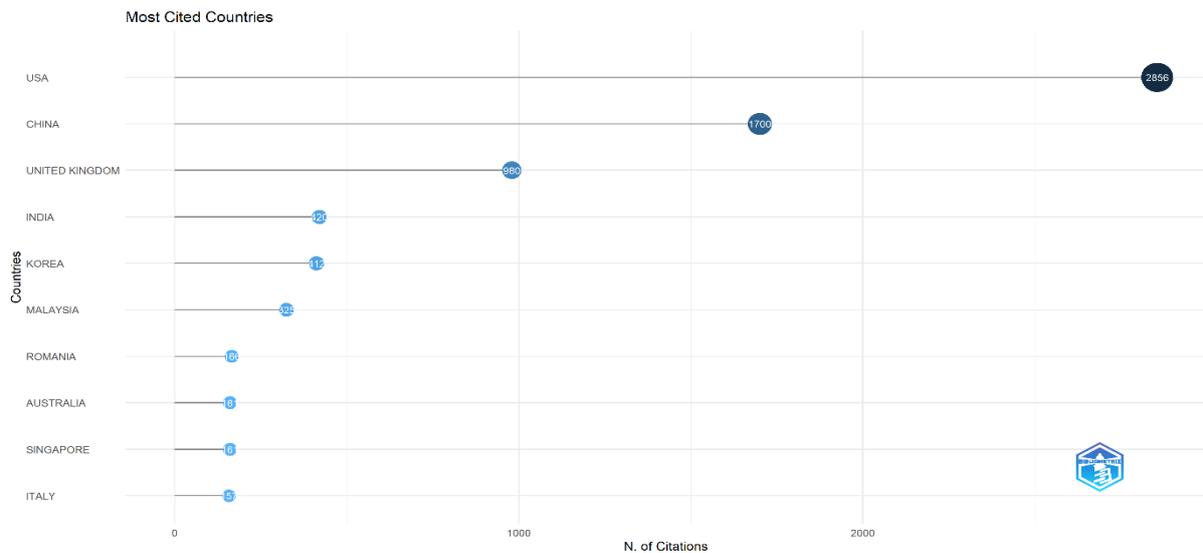


Figure 7: Top 10 cited countries by Biblioshiny

In examining the data on total citations and average article citations across different countries, the United States (USA) emerges as the leading contributor to research impact, with the highest total citations of 2856 and an impressive average of 52.89 citations per article. China follows with a total of 1700 citations, reflecting an average of 17.35 citations per article. The

United Kingdom demonstrates a substantial impact with a total citation of 980 and a notably high average of 49.00 citations per article. India, Korea, Malaysia, Romania, Australia, and Singapore also play significant roles in the global research landscape, each presenting distinctive patterns in total and average citations.

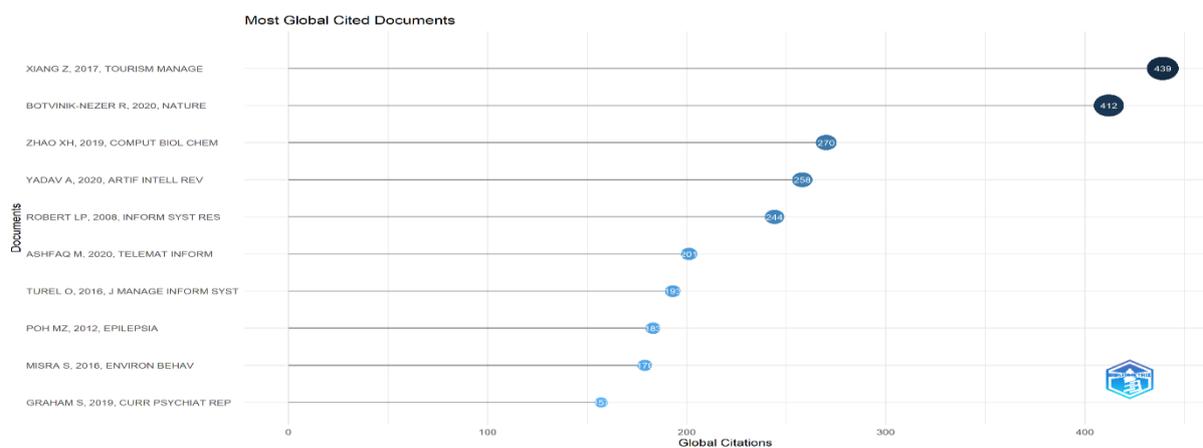


Figure 8: Top 10 cited documents by Biblioshiny

When comparing the impact of different papers, total citations (TC), citations per year (TC per Year), and normalised TC are used as metrics. Notably, the 2017 Tourism Management paper by Xiang Z stands out with 439 citations overall, an amazing 62.71 citations per

year, and a normalised TC of 8.45. This shows that people have been interested in the topic for a long time and widely.

Keywords



Figure 9: Words Tree Map of Keywords Plus by Biblioshiny



Figure 10: Word Cloud by Biblioshiny

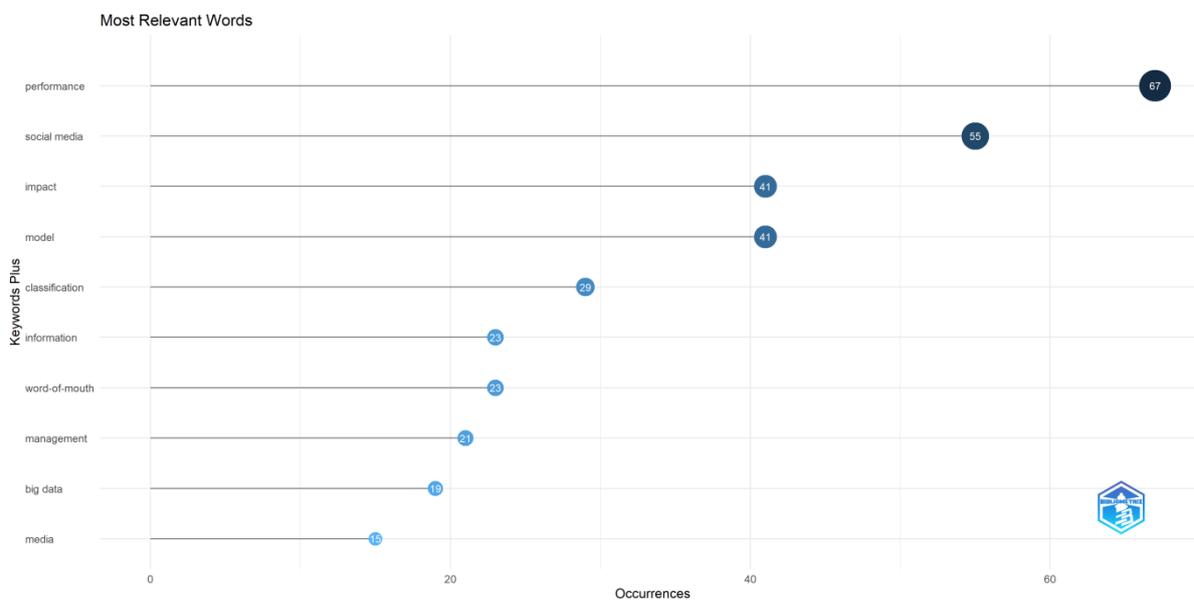


Figure 11: Most relevant words by Biblioshiny

The analysis of Words Tree Map of Keywords Plus by Biblioshiny reveals several critical terms and their respective frequencies:

- **Performance (67):** The high frequency of the term "performance" underscores the central

focus on evaluating and optimizing outcomes within the entrepreneurial context. This could relate to the overall effectiveness of AI-enhanced social media strategies in achieving business goals.

- **Social Media (55):** The substantial presence of "social media" highlights the pivotal role of these platforms in the context of entrepreneurial performance. The research likely delves into how AI technologies impact engagement, reach, and interactions on social media channels.
- **Impact (41):** The term "impact" is central to the research theme, indicating a focus on understanding the broader consequences and effects of employing AI-enhanced strategies in social media on entrepreneurial outcomes.
- **Model (41):** The frequent occurrence of "model" suggests an exploration of conceptual or computational frameworks guiding the integration of AI into social media strategies for entrepreneurs.
- **Classification (29):** The presence of "classification" implies an investigation into how AI contributes to the categorization or grouping of content, users, or strategies within the realm of social media and entrepreneurial endeavors.
- **Information (23):** The term "information" suggests a focus on managing and leveraging data in the context of AI-enhanced social media strategies for entrepreneurial success.
- **Word-of-Mouth (23):** The recurrence of "word-of-mouth" points to a recognition of the importance of informal communication and recommendations, possibly through AI-mediated channels, in influencing entrepreneurial performance.
- **Management (21):** The term "management" underscores the organizational aspect of implementing AI in social media strategies within an entrepreneurial framework.
- **Big Data (19):** The significance of "big data" implies an exploration of large-scale data

processing and analytics, likely linked to the utilization of AI in handling substantial amounts of data for entrepreneurial benefits.

- **Media (15):** The term "media" indicates a consideration of multimedia elements or the integration of various media types in the AI-enhanced strategies employed in social media for entrepreneurial impact.

Thematic Analysis

Thematic analysis in Biblioshiny serves several purposes. It aids in identifying and extracting recurrent themes or topics within a body of literature, facilitating content summarization, and providing insights into emerging trends.

This method allows for the comparison of themes across different parameters, supporting researchers in exploring variations and commonalities in research topics. Thematic analysis is instrumental in literature reviews, offering a structured approach to understanding key themes explored in existing research.

1. **Motor Themes:** Represent well-established and crucial research fields that contribute significantly to the structure of academic literature. These themes are positioned in the upper right quadrant of the strategic map, signifying their importance and maturity.
2. **Niche Themes:** Signify highly specialized and peripheral topics within a field. Positioned in the upper left quadrant, these themes have a narrow focus and are distinct from mainstream research areas.
3. **Emerging or Declining Themes:** Themes in this category, characterized by low density and centrality, indicate areas that are either emerging or declining. Found in the lower left quadrant, these themes represent trends that are still evolving or losing prominence.
4. **Basic Themes:** Represent important themes that are yet to be fully developed in the research field. Positioned in the lower right quadrant, these themes are fundamental, general, and transversal, indicating their foundational nature within the domain.

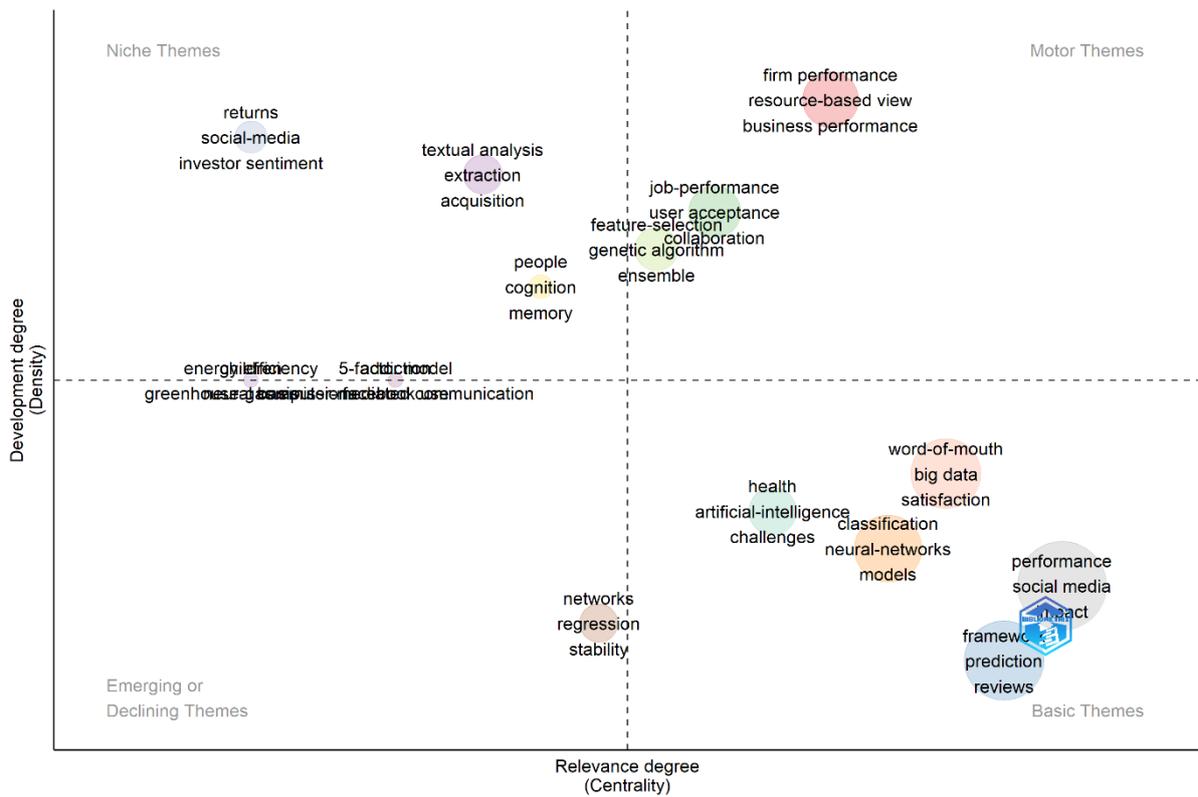


Figure 12: Thematic map by Biblioshiny

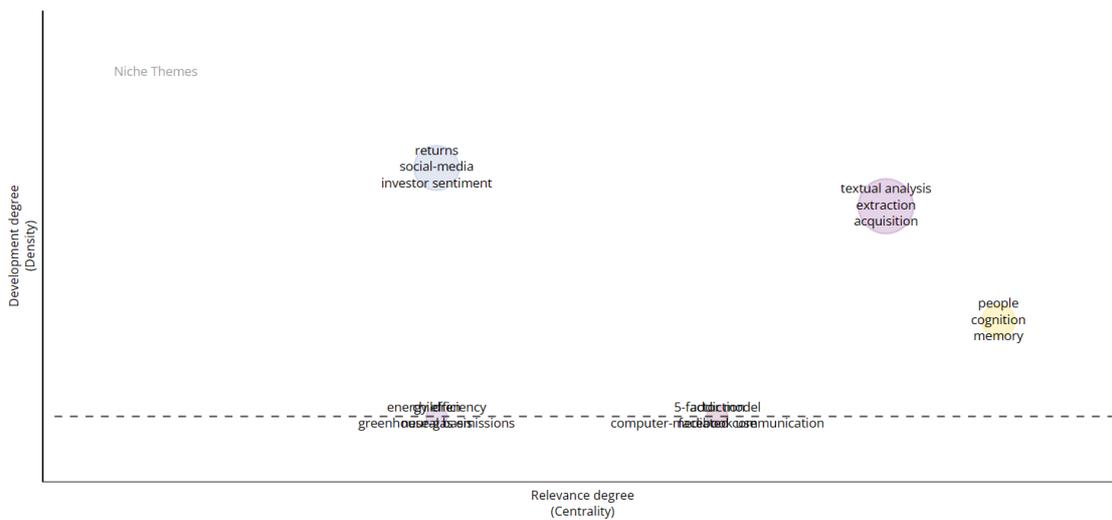


Figure 12.1: Niche Themes by Biblioshiny

The examination of niche themes in the dataset reveals distinctive areas of research focus. The term "textual analysis" appears four times, indicating a concentrated interest in methodologies related to the examination and interpretation of textual content. This suggests niche expertise or specialization within the broader research field, potentially emphasizing qualitative analytical techniques applied to textual data. The thematic occurrences of "extraction" (three times) and "acquisition" (two times) imply a niche focus on data extraction and acquisition methodologies,

emphasizing a specialized exploration of methods for gathering and obtaining specific types of information. This suggests a particular emphasis on precision and sophistication in handling data, contributing to the refinement of research methodologies.

Moreover, the repetition of terms like "people" (three times), "cognition" (two times), and "memory" (two times) indicates a niche interest in the psychological aspects of human behavior, cognition, and memory within the research domain. These niche themes likely signify a focused exploration of the human

dimension in various contexts, potentially contributing to the development of theories or applications related to

human-centered aspects of the studied phenomena.

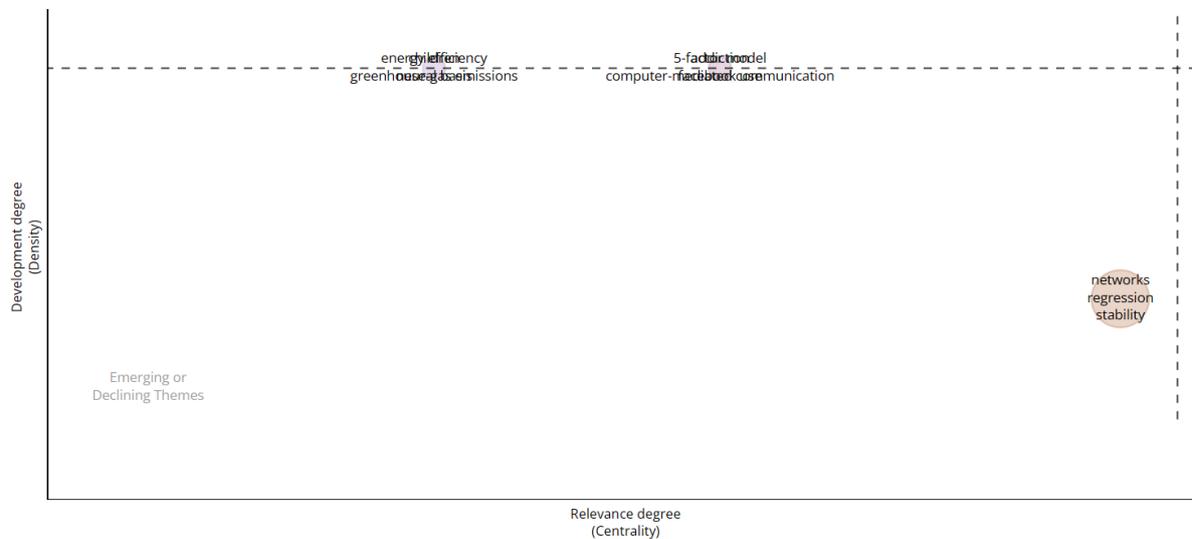


Figure 12.2: Emerging or Declining Themes by Biblioshiny

The examination of emerging or declining themes within the dataset reveals a diversified landscape of research interests. The term "regression" and its associated concepts appear four times, indicating a sustained interest in statistical modeling and analysis methods. The thematic occurrence of "stability" four times suggests a growing emphasis on investigating the stability aspects within the research domain.

Furthermore, the presence of terms like "model selection," "5-factor model," "computer-mediated communication," "energy efficiency," and "greenhouse-

gas emissions" (each appearing two times) underscores a spectrum of emerging topics. These repetitions imply a burgeoning exploration of contemporary issues such as model optimization, communication in digital contexts, and ecological concerns like energy efficiency and greenhouse gas emissions. This nuanced analysis provides a glimpse into the evolving landscape of research, offering valuable cues for researchers to engage with emerging themes and contribute to the scholarly discourse.

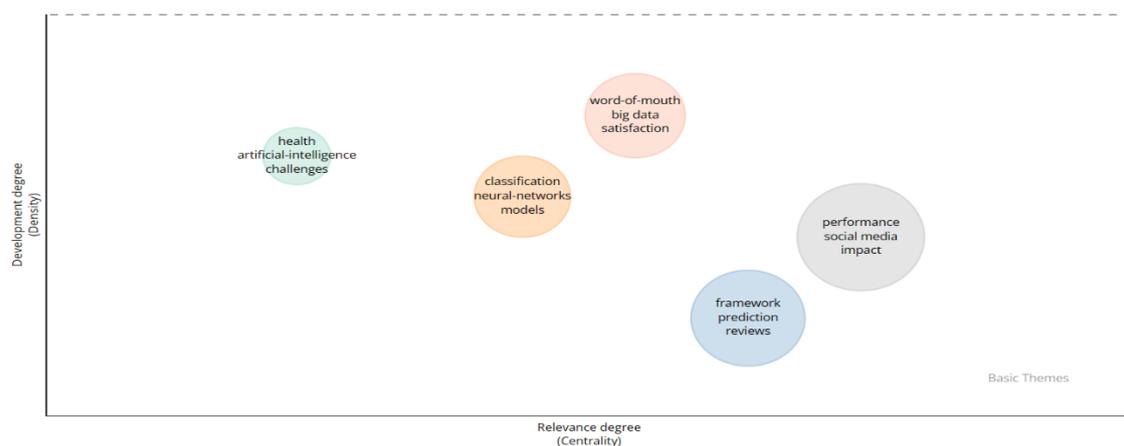


Figure 12.3: Basic Themes by Biblioshiny

The analysis of basic themes within the dataset reflects a nuanced exploration of foundational concepts in the research field. The term "performance" stands out prominently with 67 occurrences, underscoring its central role as a key focus of investigation. The recurrent emphasis on "social media" with 55 occurrences highlights the significance of digital platforms in the

context of the studied themes. The frequent appearance of "impact" (41 occurrences) suggests a consistent interest in understanding the consequences and effects associated with the subject matter.

Additionally, the presence of terms like "framework," "prediction," and "reviews" (13 occurrences each) indicates a parallel exploration of

methodological approaches and evaluative aspects. The repetition of these terms suggests a shared recognition within the literature regarding their importance in shaping the discourse around basic themes. This

comprehensive analysis offers valuable insights into the foundational elements of the research domain, providing a robust foundation for further inquiry and scholarly exploration.

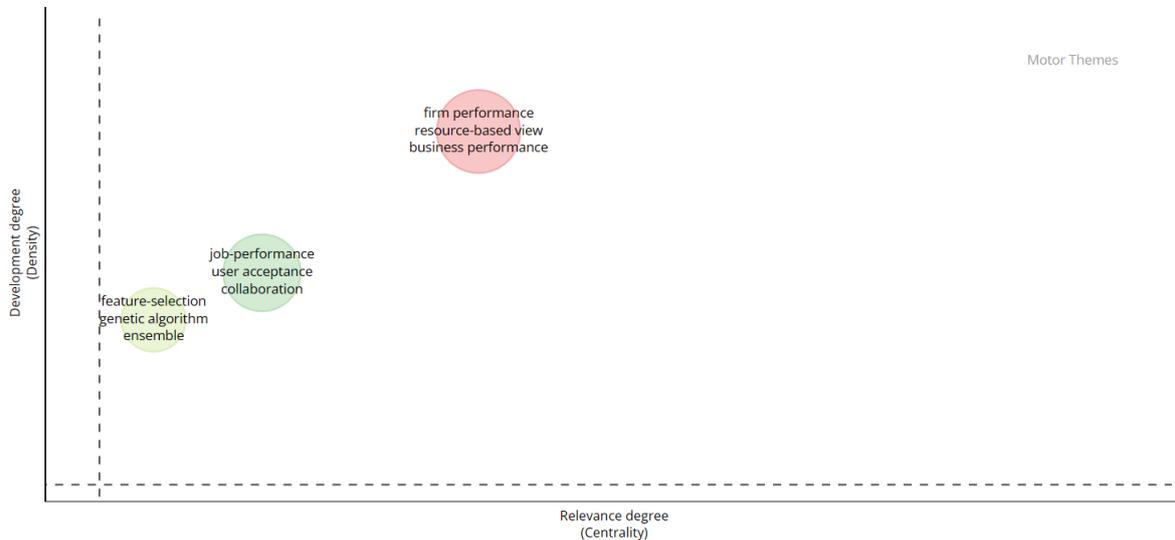


Figure 12.4: Motor Themes by Biblioshiny

The occurrences of motor themes within the dataset reveal a diverse and comprehensive exploration of key concepts in the field. Notably, the term "firm performance" and its variations appear five times, underscoring a significant focus on evaluating and understanding the performance dynamics of businesses. The recurrent emphasis on the "resource-based view" (five occurrences) indicates a strong interest in examining organizational resources as a critical lens for assessing performance. Additionally, the repeated appearance of terms like "business performance" and "job performance" (four occurrences each) highlights a nuanced exploration of performance metrics across different organizational dimensions. The three occurrences of "collaboration" suggest recognition of the collaborative aspects influencing performance outcomes.

Furthermore, the prevalence of terms such as "user acceptance," "feature selection," "genetic algorithm," and "ensemble" (four to five occurrences each) indicates a notable attention to methodologies and factors influencing performance assessment. The repetition of these terms suggests a consensus within the literature on their significance in studying motor themes. This comprehensive analysis provides valuable insights into the multifaceted nature of motor themes, offering a rich foundation for future research in the field.

IX. CONCLUSION

In conclusion, this thorough analysis unveils a myriad of novel and concealed insights:

1. **Strategic Alignment with AI:** The recurring theme of "Model" suggests not only a technical

exploration but also a strategic alignment of AI within social media strategies. Understanding the underlying models may unveil strategic decisions guiding the integration of AI into entrepreneurial processes.

2. **Human-Centric AI Approaches:** The thematic occurrences related to "People," "Cognition," and "Memory" point towards a potential human-centric approach in AI-enhanced social media strategies. Research in these areas may uncover how AI is being designed to resonate with human behavior and memory processes.
3. **Precision in Data Handling:** The thematic occurrences of "Extraction" and "Acquisition" highlight a nuanced focus on precision in data handling. This suggests that researchers in this domain are not only concerned with the volume of data but also with the precision and specificity of the information acquired, contributing to methodological advancements.
4. **Collaboration Dynamics:** The repeated emphasis on "Collaboration" in motor themes suggests an acknowledgment of collaboration dynamics influencing performance outcomes. Further exploration into how collaborative strategies, possibly AI-mediated, impact entrepreneurial performance could yield practical insights for businesses.
5. **Contemporary Issues in AI Integration:** The emerging themes such as "Energy Efficiency" and "Greenhouse gas Emissions" indicate a growing awareness of the environmental impact of AI-enhanced strategies. Exploring how entrepreneurs are addressing these concerns

provides a lens into the ethical dimensions of AI application in business.

6. **Statistical Modeling Evolution:** The repeated appearance of "Regression" and "Stability" in emerging themes hints at an evolution in statistical modeling approaches. Research in this area can uncover how researchers are refining their methodologies to enhance the predictive and stabilizing capacities of AI models.

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