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EXPLORING DISRUPTIVE INNOVATION AS A RESEARCH DOMAIN: A SCIENTOMETRIC EXAMINATION

VIVEK PAULOSE

Research Scholar, Department of Business Administration, Annamalai University.

Dr. I. JOSEPHRAJ

Assistant Professor, Department of Business Administration, Annamalai University.

Dr. JACOB P.M

HOD & Professor, Naipunnya Business School.

Abstract

Disruptive innovation constitutes a transformative process that reshapes entire industries through groundbreaking advancements. Notably, within emerging enterprises, market disruption has evolved into a growth catalyst for technology and its diverse applications. While scholarly interest in theoretical and empirical studies concerning this realm persists, scant attention has been directed towards comprehending its underlying structural dimensions. This article endeavours to delve into the pivotal research themes of disruptive innovation spanning the period from 1992 to 2023. Employing bibliometric data sourced from 4212 articles within Clarivate Analytics (Web of Science) through the keyword "Disruptive Innovation," our analysis delves into the landscape. Our research employs a range of Scientometric analytical tools, encompassing topic mapping, overlay visualization, keyword co-occurrence, and journal co-citation. Through these methods, our study discerns emerging trends and the dynamic terrain of disruptive innovation. By doing so, this paper plays a pivotal role in not only identifying prevailing trajectories but also illuminating the transformative potential of disruptive innovation. In essence, it guides forthcoming scholars in envisioning the key areas for future exploration within the realm of disruptive innovation.

Keywords: Disruptive Innovation, Scientometric Analysis, Bibliometric Analysis, Topic Mapping, Co-Citation.

INTRODUCTION

The concept of disruptive innovation has emerged as an offshoot of the broader innovation framework, giving rise to diverse interpretations and debates. While early discussions in the 1980s introduced notions like incremental and breakthrough innovation, a comprehensive classification was lacking until the distinction between sustainable and disruptive innovation was highlighted. This gap ultimately initiated the creation of the Disruptive Innovation Theory by Christensen in 1997. Despite numerous subsequent endeavors to broaden, clarify, and validate this theory across various scenarios, the field still exhibits differing standpoints and patchy literature.

The uneven nature of studies on disruptive innovation can be attributed to several key factors. Firstly, a lack of systematic advancement has impeded a unified understanding, leading to various interpretations across diverse frameworks. Moreover, the field has primarily relied on qualitative explorations, with limited exploration into quantitative research. Additionally, the

The Seybold Report
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inherent ambiguity of the concept has attracted scholars from diverse disciplines, further contributing to the disjointed and contrasting nature of the literature.

In light of these challenges, utilizing a scientometric analysis becomes a valuable tool for untangling the intricate landscape of disruptive innovation research. Examining the organization of various thought schools and the interconnectedness within the field can offer comprehensive insights into research gaps and potential avenues for advancement. This article aims to address the existing gaps in disruptive innovation literature through a scientometric lens. By employing various techniques such as Co-citation Network Analysis, Historical Direct Citation Mapping, Keyword Co-occurrence, and Conceptual Mapping, it seeks to achieve the following research objectives:

1. Understand the growth trajectory of disruptive innovation as an academic discipline.
2. Identify influential documents, authors, and journals shaping the field of disruptive innovation.
3. Trace the evolution of disruptive innovation by exploring connections among key documents over time.
4. Uncover the conceptual structure and development of the disruptive innovation domain.

The accomplishment of these objectives collectively constructs an "intellectual structure" map of disruptive innovation. Leveraging bibliometric data extracted from 4212 articles using the keyword "Disruptive Innovation" from Clarivate Analytics (Web of Science), the analysis encompasses a conceptual structure map, two significant clusters representing the domain's intellectual structure, citation analysis identifying top-cited papers, historiographic mapping for understanding evolution, and network analysis to uncover relationships among frequently cited documents.

This research contributes to the existing literature in several ways. It provides a holistic assessment of scholarly contributions in the disruptive innovation field, identifies interdisciplinary influences, examines co-citation patterns that reflect the field's social construction, and delves into the domain's conceptual structure. The subsequent sections delve into disruptive innovation and scientometric analysis, outlining the techniques employed. The methodology, data analysis, implications, and discussions are sequentially presented, culminating in a conclusion that underscores the research's significance and hints at potential avenues for future exploration.

LITERATURE REVIEW

The literature review section is divided into two key subsections, each shedding light on distinct aspects: the literature pertinent to disruptive innovation and the literature relevant to the scientometric analysis. These subsections collectively contribute to a comprehensive understanding of the research landscape.

The Seybold Report
ISSN 1533-9211
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Disruptive Innovation:

The examination of literature on disruptive innovation immerses us in multifaceted discussions surrounding this dynamic concept. In the early 1980s, dialogues revolved around incremental and breakthrough innovations. However, the journey towards a comprehensive understanding reached fruition with the differentiation between sustainable and disruptive innovation. This pivotal distinction gave birth to the Disruptive Innovation Theory as expounded by Christensen in 1997. Subsequent researchers have continued to expand, refine, and test this theory across diverse contexts, yielding a spectrum of perspectives (Adner, 2002; Danneels, 2004; Tellis, 2006).

Coined by Christensen in 1995, disruptive innovation involves transforming intricate, high-cost offerings into simplified, affordable alternatives. This pioneering term has been lauded as a paramount business concept of the 21st century. From a business standpoint, it signifies innovations that carve out new market segments and value networks, leading to a reconfiguration of established market dynamics. Furthermore, disruptive innovation serves as a catalyst for the emergence of novel markets and distinctive business niches, often introducing fresh paradigms of product value that challenge conventional norms. Nevertheless, the inherent ambiguity within this realm has sparked discussions among scholars hailing from diverse disciplines.

Scientometric Analysis:

The domain of scientometric analysis delves into methodologies designed to quantify and comprehend the ever-evolving corpus of research. Scientometrics, rooted in the quantitative examination of science and technology's informational evolution, encompasses a diverse array of techniques, including citation and co-citation analysis, keyword co-occurrence analysis, historiographs, and conceptual structure mapping. Pioneering efforts in this field visualized bibliometric networks, charting intellectual origins and connections among relevant papers. Notably, co-citation analysis, stemming from Small's definition in 1973, illuminates the frequency with which two earlier literature items are jointly cited in subsequent works, thereby offering insights into evolving intellectual domains and trends.

The historiographic analysis constructs chronologically ordered linkages between intellectual contributions via direct citations, unveiling pivotal works that have shaped the evolution of the field. Concurrently, keyword co-occurrence analysis clusters related keywords into thematic groups, revealing latent connections and associations.

This approach draws from actor network theory and is facilitated by algorithms like the Blondel algorithm (Blondel et al., 2008). Conceptual structure analysis, often employing network or correspondence analysis, maps the evolving topics covered by scholars, allowing for an exploration of how these themes evolve over time. Our study utilizes the Bibliometrix package to analyze keywords, titles, and abstracts, employing network or correspondence analysis to visualize the conceptual structure.

The Seybold Report
ISSN 1533-9211
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In essence, this research navigates the intellectual landscape of disruptive innovation through the lens of scientometric analysis. The ensuing sections delve into the bedrock of disruptive innovation and scientometric techniques, followed by an in-depth exploration of methodology, data analysis, implications, and discussions. The conclusion underscores the invaluable contributions of this research and paves the way for future explorations in this dynamic realm.

METHODOLOGY

This study's methodology involves the meticulous extraction and collection of bibliometric data from the reputable Clarivate Analytics, formerly known as the Web of Science (WoS) Core Collection database. The Web of Science database stands as an authoritative data source extensively utilized for various bibliometric and scientometric analyses, primarily employed to illuminate the evolutionary trajectories of diverse research domains (Waltman & Eck, 2012).

Data collection was executed during July 2023, encompassing a substantial timespan from 1992 to 2023 encompassing a repository of 4421 articles. To ensure relevance and contemporaneity, data selection focused on the years 1992 to 2023.

This data was extracted using the keyword "Disruptive innovation," and only articles written in English language were considered across all subject domains. This refined dataset comprised a total of 4212 articles, with a deliberate emphasis on journal articles due to their stature as certified knowledge that has undergone critical peer review processes (Rodríguez & Navarro, 2004).

The harvested bibliometric data was then consolidated into a unified file, serving as the input for the R programming language and the Bibliometrix package. Leveraging R programming, an open-source language renowned for its statistical analysis capabilities within comprehensive scientific studies (Aria and Cuccurullo, 2017), we conducted a range of complementary analyses, including co-citation analysis, conceptual structure mapping, historical direct citation analysis, and topic evolution assessment.

The Bibliometrix package, harnessed through R programming, facilitated the calculation of a diverse array of bibliometric statistics. These encompassed not only summary statistics of the articles but also comprehensive analyses of citations and keywords.

Specifically, the study employed Multiple Correspondence Analysis (MCA), a technique applicable to categorical data. This analytical approach effectively identified thematic structures inherent within a set of keywords, thereby offering insights into the evolution of concepts over time.

Employing the MCA technique, keywords were systematically clustered to reveal the dynamic evolution of concepts throughout the dataset. This methodological framework enhances our understanding of thematic trends and their evolution within the realm of disruptive innovation research.

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.10297737

DATA ANALYSIS

The data analysis phase of this study is divided into three distinct subsections, each dedicated to exploring specific aspects of the disruptive innovation domain and its evolutionary trends:

a) **Growth of Disruptive innovation domain:** This section delves into the developmental trajectory of the disruptive innovation domain. It involves analyzing the continuous flow of scholarly contributions over time, deciphering emerging patterns, and documenting the field's expansion. The objective is to offer valuable insights into the evolutionary journey of disruptive innovation research.

b) **Keyword Co-occurrence and Conceptual Boundaries:** This section shifts focus to the intricate network of keyword co-occurrences and the delineation of conceptual boundaries within the disruptive innovation domain. Through rigorous analysis, clusters of interrelated keywords are uncovered, providing a glimpse into the thematic landscapes that define the field's discourse. This exploration offers a nuanced understanding of the multidimensional facets shaping disruptive innovation research.

c) **Influences of Significant Authors, Journals, and Articles in Shaping the Domain:** Within this subsection, our attention turns to the key actors propelling the disruptive innovation domain's evolution. We delve into the notable authors, influential journals, and pivotal articles that have left a discernible mark on the shaping of this field. By discerning these influential forces, we gain insights into the intellectual currents steering the course of disruptive innovation research.

Through these three analytical subsections, we traverse the multifaceted terrain of the disruptive innovation domain, uncovering its growth patterns, thematic underpinnings, and the influential voices that have significantly contributed to its development. This comprehensive analysis lays the foundation for a deeper comprehension of the domain's dynamics and its position within the broader scholarly landscape.

Growth of Disruptive innovation domain

As elucidated in the literature, the term "disruptive innovation" was initially introduced in a 1995 article published in the Harvard Business Review. However, it wasn't until the turn of the millennium that contemporary interest in this concept began to gain momentum. Notably, researchers in the disruptive innovation field didn't wholeheartedly embrace the concept until around 2014. To effectively capture the emergence of scholarly publications, we categorize them into four distinct time periods: 2000-2006, 2007-2010, 2011-2014, and 2015-2023. This chronological framework allows us to discern how the concept's exploration evolved over time, reflecting changing scholarly engagement and deeper understanding.

ISSN 1533-9211

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Table 1: Summary bibliographic statistics for Disruptive innovation journals indexed in Web of science 1992-2023

Articles	4212
Sources	1929
Author's Keywords	12008
Period	1992 - 2023
Authors	17414
Authors of multi-authored documents	2740
Single-authored documents	582
Documents per Author	0.412

In the initial phase from 2000 to 2006, the yearly count of publications remained modest, totaling 20 or fewer articles per annum, with an average of 13.42 articles. Moving into the subsequent span of 2007 to 2010, scholarly contributions gained momentum, with authors producing an average of 32.2 articles annually on the subject of disruptive innovation. The turning point arrived in 2014 when the number of published articles doubled, surging from 35 in 2007 to an impressive 81. This marked the commencement of a remarkable ascent, with publications continuing to escalate. Notably, by 2015, the count reached a notable 154 articles, and this growth trajectory persisted, culminating in a substantial figure of 221 articles by the year 2023. This chronology underscores the dynamic evolution of research engagement with disruptive innovation, emphasizing the mounting interest and scholarly commitment to exploring this intricate concept.

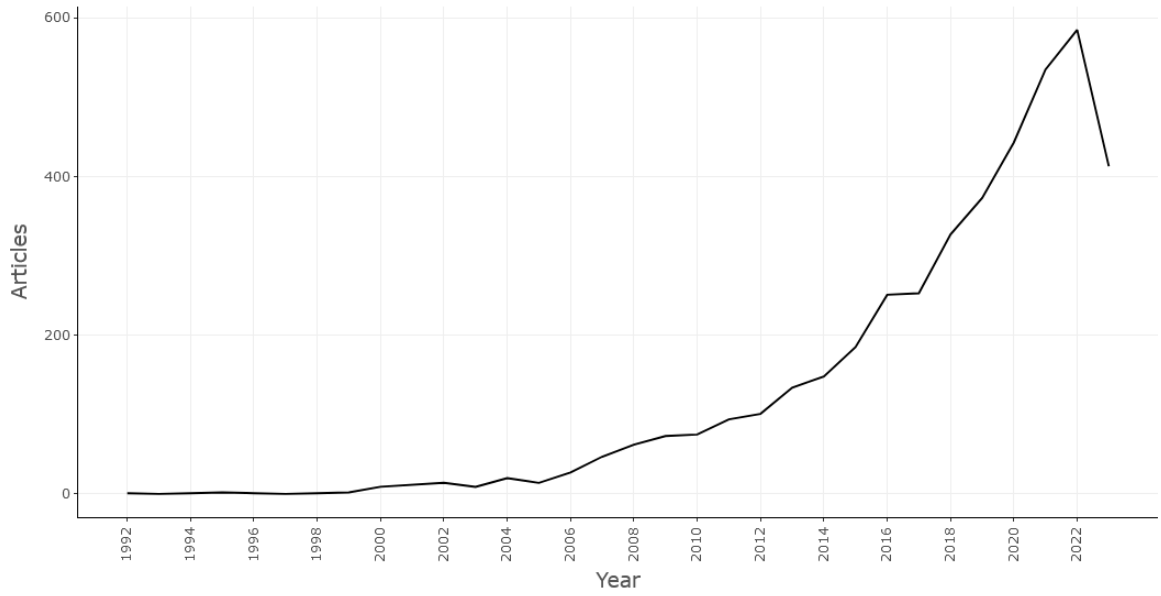

Figure 1: Annual number of disruptive innovation articles published in journals indexed in WoS, 1992–2023

ISSN 1533-9211

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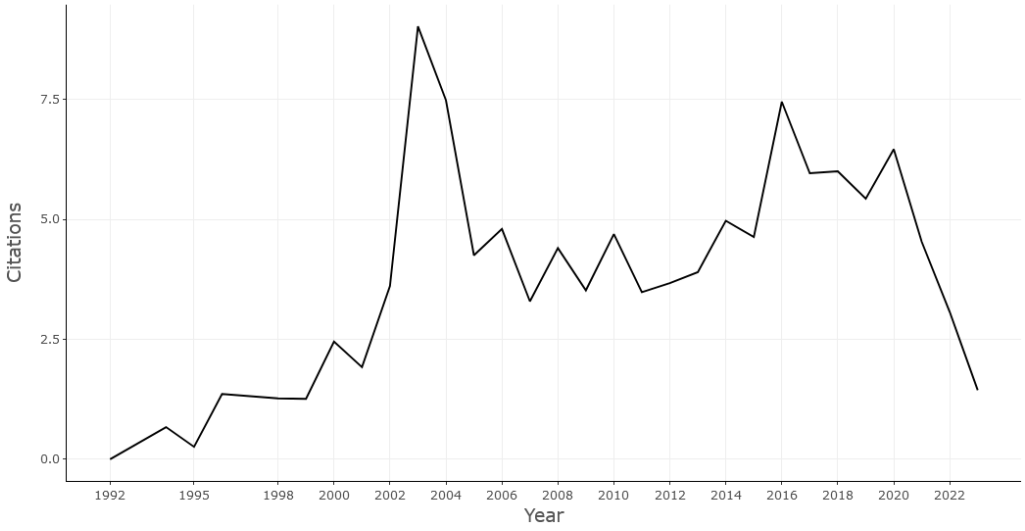

Figure 2: Average Citations per articles published in journals indexed in WoS, 1992–2023

Altogether the dataset indicates that a total of 4212 were published about disruptive innovation in various journals between 1992 and 2023, which represents an average of 67.16 articles per year. A total of 17414 authors and 582 single authors have contributed to the domain. Disruptive innovation articles are published in total number 727 journals. While considering the most productive country USA is positioned in the first place with 455 articles followed by UK with 149 articles and India is positioned in the 20th place with 13 articles. In the case of the most productive author in the area of disruptive innovation *STEVENS M* and followed by CUTHILL IC.

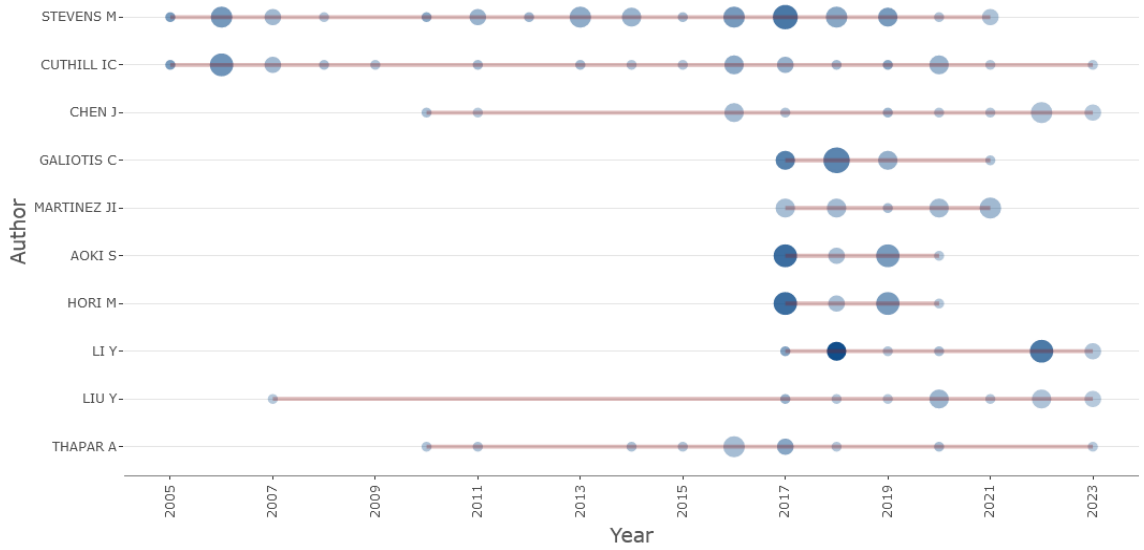

Figure 3: Authors' productivity over the time period 1992–2023

ISSN 1533-9211

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The dataset encompasses a comprehensive total of 4,212 publications on the subject of disruptive innovation across various journals spanning the period from 1992 to 2023. This signifies an average annual output of 67.16 articles. Within this expansive body of work, a cumulative count of 17,414 authors participated, with 582 individuals contributing as sole authors. The exploration of disruptive innovation has unfolded within the pages of 727 distinct journals.

When examining the productivity by country, the United States emerges as the frontrunner, boasting 455 articles on disruptive innovation. Following closely, the United Kingdom contributes 149 articles, while India secures the 20th position with a count of 13 articles. Within the realm of prolific authors in the disruptive innovation domain, STEVENS M stands as the most prolific, followed by CUTHILL IC. This insightful analysis sheds light on the extensive scholarly engagement, global reach, and noteworthy contributors within the realm of disruptive innovation research.

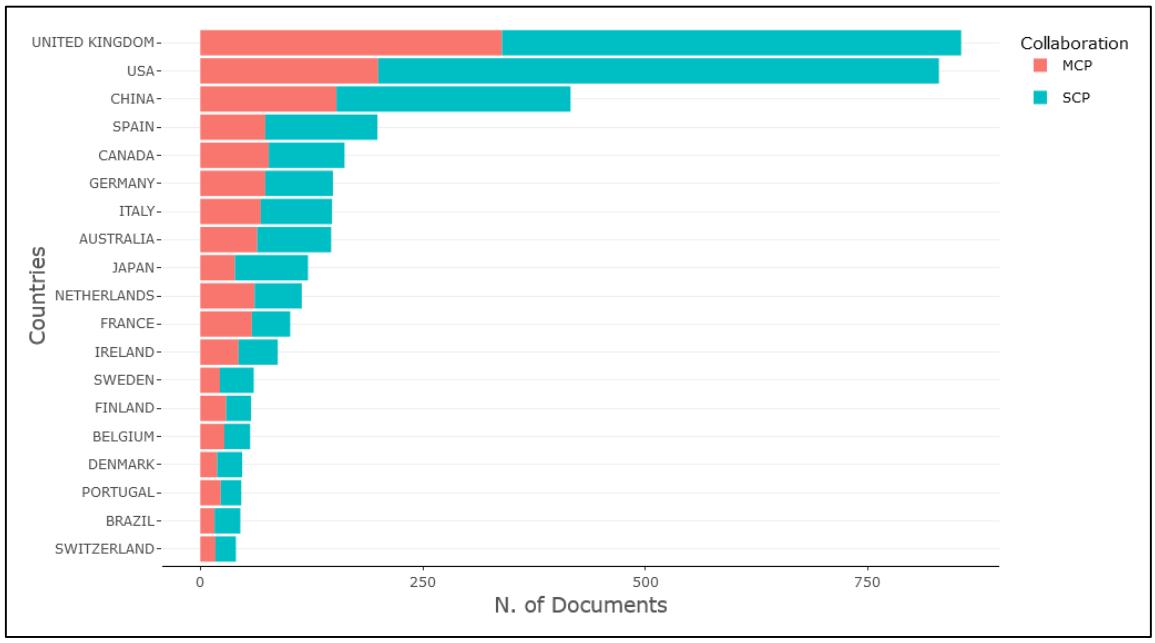

Figure 4: Country productivity over the time period 1992–2023

ISSN 1533-9211

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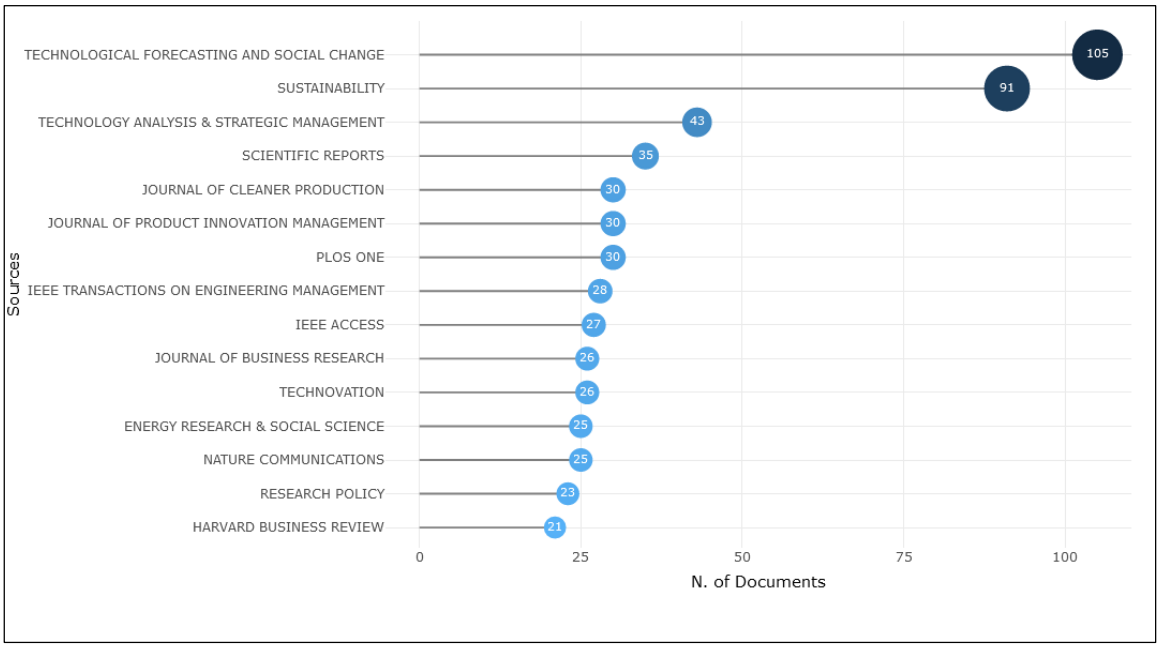

Figure 5: Most predominant sources for disruptive innovation articles published in journals indexed in web of Science, 1992-2023

At the forefront of sources for articles related to the topic of disruptive innovation, Technological Forecasting and Social Change takes the lead with an impressive count of 105 articles. Following closely, Sustainability secures a notable position with 91 articles, underscoring its significance as a prominent contributor to the discourse on disruptive innovation.

Keyword co-occurrence and conceptual boundaries

For a comprehensive understanding of the domain, this study employed Multiple Correspondence Analysis (MCA) and analyzed the co-occurrence of keywords within the extracted data. The resulting keyword co-occurrence map is illustrated in Figure 5, while Figure 3 offers insight into the conceptual structure of keywords tied to disruptive innovation-related articles included in the study.

Through the examination of the Conceptual Structure Map, it becomes evident that three distinct clusters have surfaced within the disruptive innovation theme. Conversely, the Keyword Co-occurrence analysis reveals the formation of five primary clusters, collectively delineating the intellectual landscape of disruptive innovation discourse across various journals.

At the apex of our analysis emerges the largest cluster, spotlighting keywords affiliated with articles that underscore the managerial and technological dimensions of disruptive innovation. Within this cluster, 32 distinct keywords find representation. Notable terms encapsulated within this cluster encompass disruptive technology, management, product development,

ISSN 1533-9211

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innovation, strategy, diffusion, business, capabilities performance, firm policy, and industry evolution, among others. This comprehensive exploration provides a nuanced understanding of the multifaceted perspectives encapsulated within the realm of disruptive innovation.

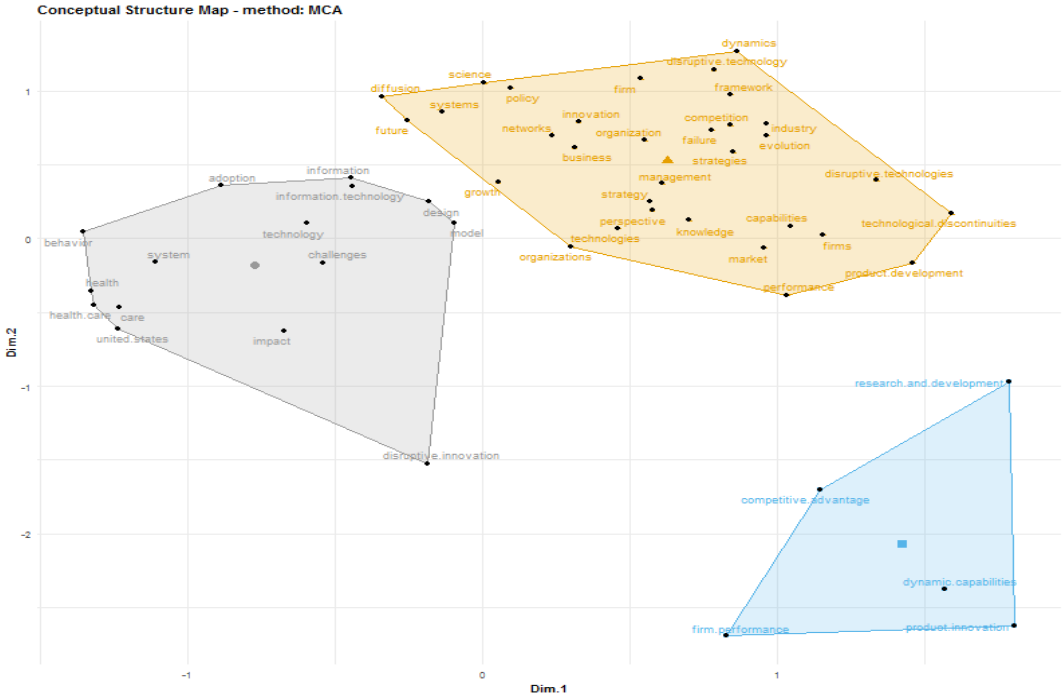

Figure 6: Conceptual map of author keywords in disruptive innovation articles published in journals indexed in Web of science, 1992–2023

Conversely, the middle cluster showcases keywords that align with articles underscoring the models, challenges, and outcomes linked to the integration of disruptive innovation. Within this cluster, a set of 14 distinct keywords is discerned, encompassing terms like disruptive innovation, impact, challenges, adoption, Information technology, and health care. This spotlight on diverse sectors, particularly health care, underscores the various impacts of adopting disruptive technologies.

The third cluster, albeit the smallest in our analysis, encapsulates keywords intrinsic to the domain of firms' innovative behavior. Comprising just 5 distinct keywords, this cluster encompasses terms such as firm performance, innovation, dynamic capabilities, competitive advantage, and product innovation.

In sum, the mapping of the conceptual structure within the disruptive innovation domain highlights three principal concepts: a) the management and technological facets of disruptive innovation, b) the challenges and consequences associated with its adoption, and c) the innovative behavior exhibited by firms. This comprehensive analysis brings to light the multidimensional perspectives that converge within the realm of disruptive innovation

ISSN 1533-9211

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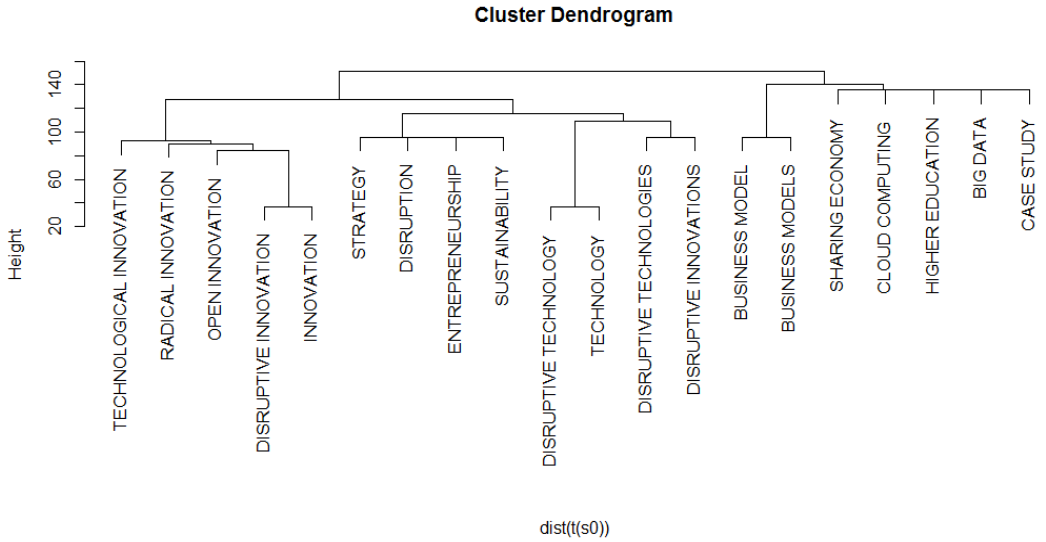

Figure 7: Cluster dendogram of abstract keywords in disruptive innovation articles published in journals indexed in web of science, 1992-2023

In order to provide a more comprehensive understanding of the evolving concepts within the disruptive innovation domain, we employed two additional analyses: keyword co-occurrence analysis and a cluster dendrogram of abstract keywords. These supplementary analyses served to further elucidate the progression of concepts and validate the outcomes of the conceptual evolution observed. The cluster dendrogram, depicted in Figure 4, unveils the existence of two major clusters within the domain. The first cluster revolves around the management dimension of disruptive innovation, while the second cluster delves into its technological facet. Intriguingly, the technological aspect can be further subdivided into two distinct clusters: innovation and sustainability dimensions of disruptive innovation. On the other hand, the management aspect can be dissected into two subclusters: business models and the various types of technologies capable of disrupting these models. This granular analysis not only accentuates the multifaceted nature of the field but also underscores the interplay between its diverse dimensions.

ISSN 1533-9211

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Keyword Co-occurance

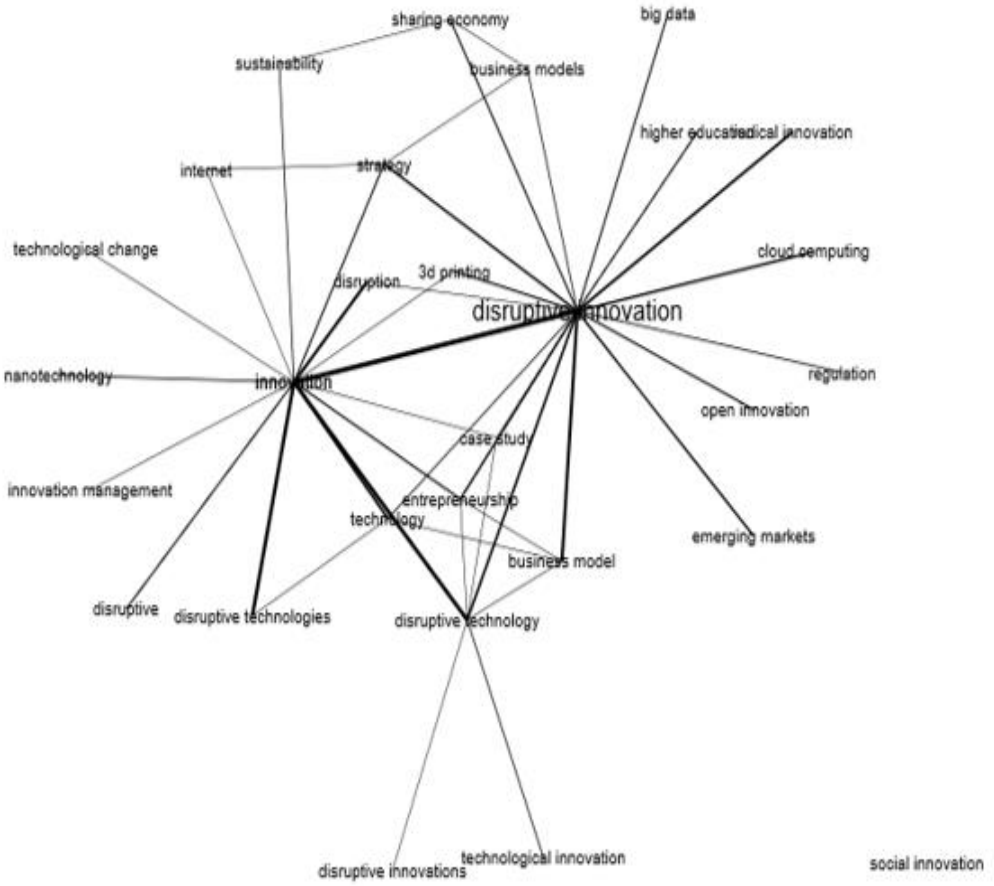

Figure 8: Key word Co-occurance of author keywords in disruptive innovation articles published in journals indexed in web of science, 1992-2023

The outcomes derived from our comprehensive analysis reveal the emergence of five distinct clusters that effectively categorize the diverse dimensions of disruptive innovation research. These clusters encapsulate the multifaceted facets that contribute to the expansive domain of disruptive innovation.

The first cluster, characterized by keywords such as "technological innovation," "disruptive technology," and "disruptive innovation of emerging markets," pertains to the dynamic realm of technological advancements and their transformative potential. The second cluster is centered around the realm of "innovation management," encompassing keywords that underscore the strategic and organizational aspects of guiding innovation processes.

The third cluster is entrenched in the "technological aspects" of disruptive innovation, indicating a specific focus on the technical underpinnings that drive innovation and disruption within various industries.

The Seybold Report
ISSN 1533-9211
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The fourth cluster encompasses keywords that delve into the realm of entrepreneurial endeavors and their interactions with different technologies, further exploring the regulatory landscape associated with open innovation.

The fifth and final cluster revolves around the multifaceted world of "business models" that have emerged as a direct outcome of disruptive innovation. Within this cluster, the themes of "sustainability" and "social innovation" come to the fore, underscoring the broader implications of disruptive innovation beyond mere technological advancements.

This clustering of keywords not only underscores the intricate dimensions of disruptive innovation but also provides a holistic perspective on the varied aspects that contribute to its transformative potential across industries and sectors.

Influences of significant authors, journals, articles in shaping the domain

The examination of the impact of influential authors within the disruptive innovation domain is facilitated through the utilization of author co-citation analysis and 'historiographs,' while the assessment of journal influence is carried out via journal co-citation analysis. These analytical approaches serve to unravel the intricate relationships between citing and cited articles, shedding light on the extensive network of publications that incorporate these citations (Culnan 1987; Culnan et al. 1990; Gundolf and Filser 2013).

To investigate into author influence, we employ two analytical methods: author co-citation analysis and historiographs. The author co-citation technique identifies networks among authors based on the frequency of co-citations of their works, enabling us to map the intellectual landscape shaped by influential scholars. Conversely, historiographs offer a historical visualization of citations, illustrating the evolution of influential works over time and highlighting critical contributions that have moulded the discourse on disruptive innovation.

Simultaneously, we can accurately evaluate the influence of journals using journal co-citation analysis. This method reveals relationships among journals by examining the frequency of their co-citations, offering insights into the interconnectedness within the scholarly ecosystem. Utilizing data from the top 200 most cited articles, we build co-citation networks that unveil the intricate web of scholarly influence and contributions within the disruptive innovation domain.

These analytical techniques function as robust tools, allowing us to unveil the complex network of scholarly relationships, contributions, and influences that have shaped the disruptive innovation landscape over time.

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.10297737

Author Co - Citation

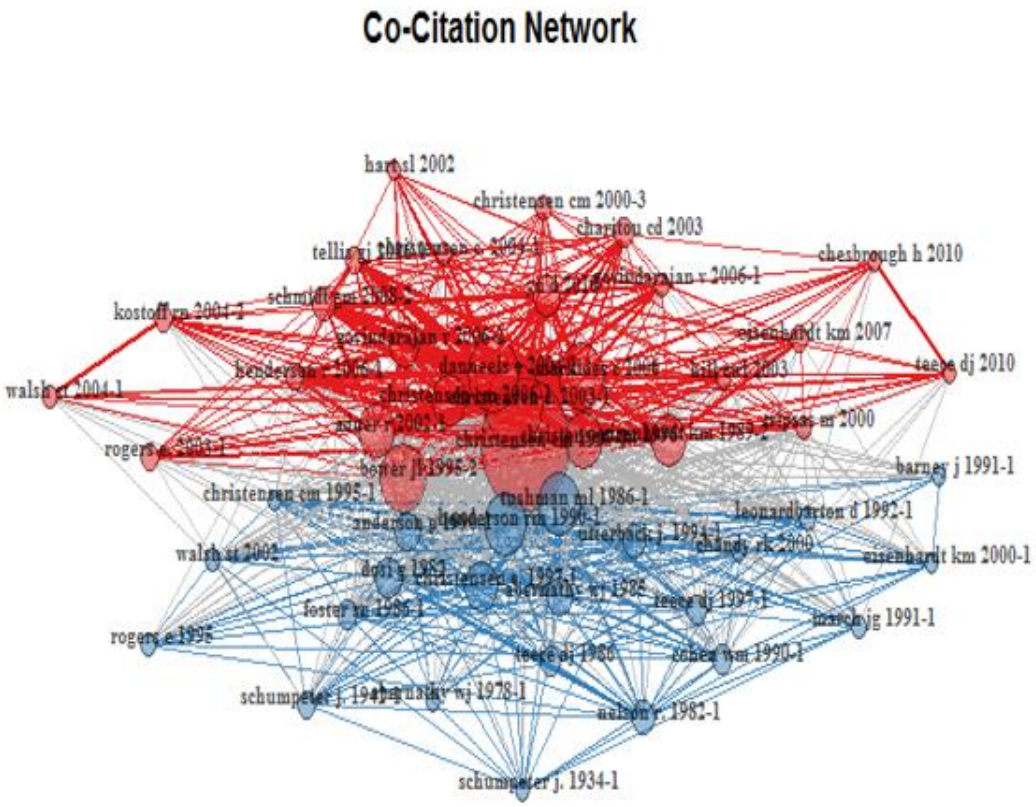

Figure 9: Co-Citation network of authors in disruptive innovation articles published in journals indexed in web of science, 1992-2023

Author co-citation analysis serves as a valuable tool for scholars seeking to unravel the influence of prominent authors within a specific research domain. Illustrated in Figure 6, the author co-citation network pertaining to disruptive innovation offers insights into the interconnected web of authorship and influence.

Upon closer examination of the co-citation analysis, several significant observations emerge. The network discerns the emergence of two prominent clusters, primarily defined by the co-citation of two key articles in a third article. The first cluster revolves around the most co-cited articles, including Tushman ML's 1986 work titled "Technological Discontinuities and Organizational Environments," Henderson R's 2006 contribution "The Innovator's Dilemma as a Problem of Organizational Competence," and Christensen CM's pivotal 1997 piece "The Innovator's Dilemma: The Revolutionary Book that Will Change the Way You Do Business." Notably, these highly co-cited articles revolve around the common theme of disruptive innovation within organizational contexts. This observation aligns seamlessly with the conceptual structure map's findings, further substantiating the thematic connection between disruptive innovation and organizational environments.

The Seybold Report
ISSN 1533-9211
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The second cluster within the network features articles such as "Disruptive technologies: catching the wave" by Bower, JL and Christensen CM (1995), Christensen CM's "Making strategy: Learning by doing" (1997), as well as "Disruption, disintegration and the dissipation of differentiability" (2002) and Dannels E's 2004 work titled "Disruptive technology reconsidered: a critique and research agenda." Additionally, Govindarajan and Koppalle's 2006 article "Disruptiveness of innovations: measurement and an assessment of reliability and validity" contributes to this cluster. These articles collectively highlight the foundational theories that underpin the domain of disruptive innovation.

In essence, the author co-citation analysis delves into the intricate connections between seminal authors and their works within the realm of disruptive innovation, providing valuable insights into the thematic threads and scholarly influences that have shaped this dynamic field.

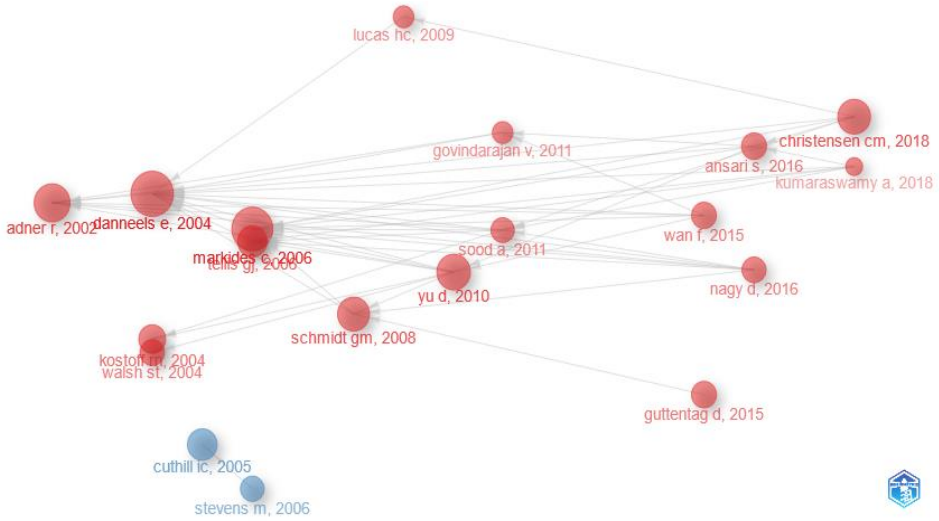

Figure 10: Historical direct citation map of disruptive innovation articles published in journals indexed in web of Science, 1992–2023

Historiographic mapping stands as a vital intellectual tool utilized by scholars to navigate and comprehend the scholarly terrain encompassing a specific subject. This thorough process entails the detailed analysis and synthesis of influential articles to construct a cognitive map depicting the evolution of ideas within a particular field. By identifying seminal works, particularly in the range of disruptive innovation research, one can effectively chart the course of these ideas and evaluate their impact on subsequent researchers.

One of the pivotal cornerstones that set the stage for the concept of disruptive innovation was Christensen's groundbreaking paper from the year 2000, titled "Will Disruptive Innovations Cure Health Care?" In this seminal work, Christensen introduced the term "disruptive innovation" and laid the essential groundwork for its exploration. This paper serves as an enduring cornerstone that has profoundly influenced the subsequent development and direction of disruptive innovation research.

ISSN 1533-9211

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Following Christensen's work, Adner's 2002 paper, "When Are Technologies Disruptive? A Demand-Based View of The Emergence of Competition," further enriched the discourse. Adner's perspective emphasized the pivotal role of demand in determining when technologies attain disruptive status. In 2004, Dannels' paper "Disruptive Technology Reconsidered: A Critique And Research Agenda" provided a critical examination of disruptive technology. This work prompted a much-needed reevaluation of the concept. This work paved the way for refining and expanding the theoretical foundations of disruptive innovation. The year 2006 witnessed Markides' insightful review article titled "Disruptive Innovation: In Need of Better Theory." Through this comprehensive review, Markides engaged in a constructive critique of the existing theories surrounding disruptive innovation. By highlighting areas for improvement and suggesting avenues for further research, Markides catalyzed further scholarly discourse, encouraging scholars to refine their understanding of this complex domain. In the segment of thematic review, Yu's 2010 paper, "A Reflective Review of Disruptive Innovation Theory," stands out. This review not only pointed out significant pitfalls within the disruptive innovation literature but also illuminated potential future directions for research. By doing so, Yu contributed to the ongoing development of the field and guided researchers toward unexplored avenues of investigation. These influential articles collectively form a historiographic map of disruptive innovation research. They represent pivotal milestones that have shaped the field's progression, from its inception through critical evaluations and thematic reflections. By acknowledging and analyzing the influences of these key works, scholars can navigate the intricate landscape of disruptive innovation, fostering a deeper understanding and continuous advancement of this dynamic domain.

Journal Co-Citation

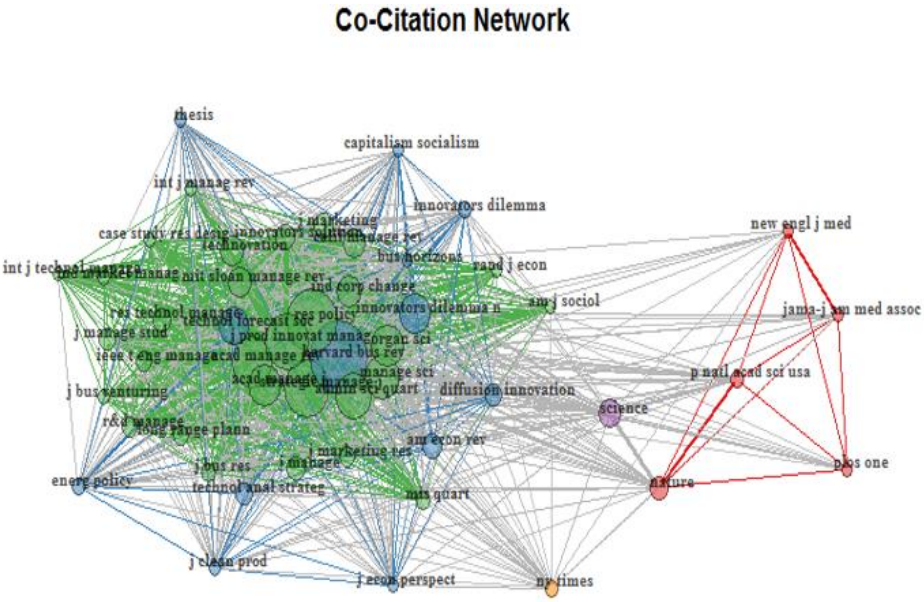

Figure 11: Co-citation network of journals in disruptive innovation articles published in journals indexed in web of science,1992–2018

The Seybold Report
ISSN 1533-9211
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To comprehend the diverse roles that scientific journals play in advancing the understanding of "Disruptive Innovation" (DI), a comprehensive analysis was conducted to pinpoint the most influential journals contributing to this thematic area.

This exploration revealed a staggering total of 727 journals that contribute to the DI literature. Subsequently, employing a journal co-citation analysis, these co-cited journals were categorized into five distinct clusters, with three of these clusters emerging as the most significant and extensive.

The primary cluster, which serves as the cornerstone of co-cited journals, is intrinsically linked to the realm of management. Journals such as the "Journal of Business Research," "Academy of Management Journal," "Organizational Science," and "Journal of Business Venturing" constitute this cluster. These journals foster articles that establish connections between entrepreneurship, innovation, and disruption, elucidating the intricate interplay of these elements within the business landscape.

The second prominent cluster revolves around the themes of sustainability, economics, and disruption. Noteworthy journals within this cluster include "The Journal of Economic Perspectives," "Harvard Business Review," and "American Journal of Sociology," among others. These journals collectively delve into the intersections of sustainability, economic dynamics, and disruptive forces, offering valuable insights into how these factors intertwine and impact various industries.

The third pivotal cluster is centered around healthcare discoveries and disruptive innovations. Esteemed journals like "The New England Journal of Medicine," "PLOS One," and "Nature" spearhead this cluster. This group of co-cited journals converges on healthcare-related breakthroughs and transformative innovations that have the potential to revolutionize the medical field and healthcare practices at large.

By identifying and scrutinizing these distinct clusters of co-cited journals, a comprehensive and nuanced understanding of the multifaceted nature of disruptive innovation research emerges. Each cluster encapsulates a specific facet of DI, spanning from its management implications to its influence on sustainability, economics, and even healthcare advancements. As scholars engage with these co-cited journals, they navigate a rich landscape of insights that collectively shape the evolving discourse on disruptive innovation. This comprehensive mapping not only guides researchers but also highlights the dynamic tapestry of knowledge that scientific journals weave within the context of disruptive innovation.

DISCUSSION

The present article undertook a comprehensive exploration of simulated driving research, employing a range of bibliometric analyses to glean valuable insights into research performance within this field. By analyzing a dataset comprising 4212 documents from the Web of Science Core Collection spanning the years 1992 to 2023, several notable trends and significant observations emerged.

The Seybold Report
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A remarkable trend observed is the exponential increase in articles within the simulated driving domain post-2014, indicating the relative novelty of this research area. The surge in publications in recent years serves as a testament to the burgeoning interest and potential for advancement within this domain. Notably, the United States emerges as the leading contributor both in terms of the sheer number of publications and international collaborations, with the United Kingdom following closely behind.

Navigating scientific change within complex domains is inherently challenging, and such is the case with disruptive innovation. The evolution of the disruptive innovation domain has witnessed paradigm shifts, albeit not always easily discernible, especially within the context of social science domains. Noteworthy shifts, however, have come to light during the 1992-2023 timeframe. This study adeptly captures the transformative journey of disruptive innovation by employing co-citation analysis, historiographic mapping, and an evolutionary perspective. The intricate interdisciplinary nature of disruptive innovation compounds the complexity of this endeavor due to the intricate interplay between various domains and concepts.

The analyses performed in this study illuminate several key aspects. Firstly, the observed exponential growth in publications signifies the nascent stage of the research domain, hinting at its promising potential for future exploration by scholars. The conceptual evolution of disruptive innovation, as evidenced, has predominantly centered around organizational, managerial, and technological dimensions, albeit its broader impacts on other domains remain salient. The article subtly alludes to a shifting paradigm within the disruptive innovation domain, yet acknowledges the need for further clarification and refinement of the associated theories. Moreover, the emergence of collaborative endeavors within the domain is a noteworthy development. Such collaborative works foster diverse perspectives on disruptive innovation, enriching the discourse and amplifying the contribution to the field.

In summary, this article provides a comprehensive and insightful analysis of simulated driving research through the lens of bibliometric methodologies. By unveiling trends, charting evolutionary trajectories, and acknowledging collaborative dynamics, the study lays a strong foundation for scholars to delve deeper into the disruptive innovation domain, ultimately fostering a more nuanced understanding and driving innovation across diverse domains.

SIGNIFICANT SCHOLARLY CONTRIBUTIONS

The outcomes of our study offer a profound unveiling of the intellectual framework inherent to the disruptive innovation field. By meticulously examining the most impactful works and elucidating connections amongst them, we expose the intricate layers of disruptive innovation research. This revelation unveils the manifold dimensions within the realm, effectively illustrating the interplay of intellectual, social, and collaborative endeavors that constitute the domain. This heightened comprehension serves as a conduit to unearth the pivotal theoretical, conceptual, and empirical landmarks that have propelled the disruptive innovation field forward. Consequently, our study substantiates the assertions made by fellow scholars,

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underscoring that disruptive innovation remains an evolving terrain. The conspicuous absence of journal dominance further underscores that disruptive innovation research traverses a wide spectrum of journals. The overarching inference drawn from our findings lies in the fact that, hitherto, there exists no singular method to define, quantify, and synthesize disruptive innovation. As such, policymakers need to grasp the intricate nature of disruptive innovation, possessing the acumen required to navigate the diverse and sometimes contradictory streams of disruptive innovation literature.

LIMITATIONS AND FUTURE AVENUES

Despite the methodological impartiality upheld in our work, certain limitations need acknowledgement. While Scientometric analysis gains acceptance and validation across a broader geographical scope, knowledge domains, and temporal extents, our study is not without constraints. The inclusion of references within articles carries certain limitations, given the myriad reasons authors reference specific works. A promising extension to our study lies in a more intricate review of the extensively cited articles in this domain, which could be undertaken through systematic review or meta-analysis. Another pronounced limitation lies in the restriction to articles indexed solely within the Web of Science database. Broadening our investigation to incorporate the Scopus database could unveil a more comprehensive understanding of the domain. To achieve a more nuanced grasp of the domain's evolution, the bibliometric data might be subdivided into distinct time periods, allowing for a deliberate exploration of the domain's developmental trajectory.

In summation, our study emerges as a pivotal milestone in comprehending the disruptive innovation landscape. Through meticulous analysis and the unveiling of connections, we lay bare the domain's complexity, thereby contributing to its theoretical enrichment. This research solidifies the notion of disruptive innovation as an evolving entity and emphasizes the imperative of navigating its intricate contours. While certain limitations persist, the path ahead is illuminated with opportunities to delve deeper, refine methodologies, and glean further insights into the domain's multifaceted evolution.

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