



**THE BIBLIOMETRIC STUDY ON STARTUPS AND
BUSINESS INCUBATORS AS A SURVIVOR OF
STARTUPS IN THE POST-PANDEMIC PERIOD.**

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Ph.D. THESIS
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THESIS APPROVAL PAGE

I certify that in my opinion the thesis submitted by Ali SOLTANI SHIRAZI titled “THE BIBLIOMETRIC STUDY ON STARTUPS AND BUSINESS INCUBATORS AS A SURVIVOR OF STARTUPS IN THE POST-PANDEMIC PERIOD. ” is fully adequate in scope and quality as a thesis for the degree of PhD.

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This thesis is accepted by the examining committee with a unanimous vote in the Department of Business as a Ph.D. thesis. January 17, 2024

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The degree of PhD by the thesis submitted is approved by the Administrative Board of the Institute of Graduate Programs, Karabuk University.

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DECLARATION

I hereby declare that this thesis is the result of my own work and all information included has been obtained and expounded in accordance with the academic rules and ethical policy specified by the institute. Besides, I declare that all the statements, results, materials, not original to this thesis have been cited and referenced literally.

Without being bound by a particular time, I accept all moral and legal consequences of any detection contrary to the aforementioned statement.

Name Surname: Ali SOLTANI SHIRAZI

Signature :

FOREWORD

It is with great pleasure and pride that I present this Ph.D. thesis, which represents the culmination of years of research, dedication, and hard work. This thesis is the result of countless hours spent in the pursuit of knowledge and the desire to contribute to the field of startups and Incubators. I want to extend my heartfelt thanks to my advisor, Prof. Dr. Fatma Zehra SAVI, for her patience, unwavering support, and mentorship throughout my thesis. Her guidance has been instrumental in shaping my research and academic journey. I would like to dedicate this thesis to my amazing parents who have always been there for me during challenging times and supported me unconditionally. I hope that this thesis will serve as a valuable contribution to the academic community and inspire future research in this field.

ABSTRACT

In the aftermath of the unparalleled global pandemic, start-ups have encountered a multitude of obstacles and uncertainties. The period following the pandemic has marked the beginning of a new era for these innovative ventures, demanding adaptability, and resilience in order to navigate through uncharted territory as economies strive to recover from the repercussions of COVID-19. These start-ups have embraced inventive marketing strategies, product development, and customer analytics to deliver optimal value to consumers, even in times of crisis. With the emergence of the COVID-19 pandemic, the business landscape underwent a significant metamorphosis. Start-ups had to swiftly adjust to the novel challenges and opportunities presented by the pandemic. The post-lockdown phase has witnessed a rapid surge in the demand for business incubators, as companies grapple with the ever-changing economic landscape. Business incubators offer guidance and support to aspiring entrepreneurs who seek to establish or expand their businesses. Their services encompass a wide range of offerings, including access to capital and resources.

Business incubators play a crucial role in supporting start-ups by providing a diverse array of resources and support services that are customized to meet their unique requirements. Acting as a central hub for entrepreneurial activities, these incubators offer invaluable mentorship, coaching, and facilitate connections with a network of seasoned professionals. This network of experienced individuals not only offers guidance but also extends support in effectively navigating the ever-evolving business landscape post-lockdown.

Keywords: Start-ups, Covid-19, Post-Pandemic Period, Business Incubators.

ÖZ (ABSTRACT IN TURKISH)

Eşi benzeri görülmemiş küresel salgının ardından, startup'lar çok sayıda zorluk ve belirsizlikle karşı karşıya kaldı. Pandemi sonrası dönem, bu yenilikçi girişimler için yeni bir çağın başlangıcı oldu; ekonomiler COVID-19'un etkisinden kurtulmaya çalışırken, bilinmeyen arazide yol almak için uyum yeteneği ve dayanıklılık gerektiriyor. Bu start-up'lar, kriz sırasında bile tüketicilere maksimum değer sunmak için yenilikçi pazarlama stratejilerini, ürün geliştirmeyi ve müşteri analitiğini benimsedi. COVID-19 salgınının ortaya çıkışıyla birlikte iş dünyası önemli bir dönüşüm geçirdi. Yeni kurulan şirketler, salgının sunduğu yeni zorluklara ve fırsatlara hızla uyum sağlamak zorunda kaldı. Karantina sonrası dönemde, şirketler değişen ekonomik manzaraya ayak uydurmak için çabalarırken, iş kulučka merkezlerine olan ihtiyaçta hızlı bir artış görüldü. İş kulučka merkezleri, işlerini başlatmak veya büyütmek isteyen girişimcilere rehberlik ve destek sağlar. Hizmetleri sermaye ve kaynaklara erişim sağlamaktan ibarettir.

İş kulučka merkezleri, bu start-up'ların özel ihtiyaçlarına göre uyarlanmış çeşitli kaynaklar ve destek hizmetleri sunarak onlara bir yaşam çizgisi sağlıyor. Bu kulučka merkezleri, girişimcilik için bir merkez görevi görüyor; mentorluk, koçluk ve karantina sonrası iş ortamında rehberlik ve destek sağlayabilecek deneyimli profesyonellerden oluşan bir ağa erişim sunuyor.

Anahtar Kelimeler (Keywords in Turkish): Start-up'lar, COVID-19, Pandemi Sonrası Dönem, İş İnkübatörleri.

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ARŞİV KAYIT BİLGİLERİ (in Turkish)

Tezin Adı	Pandemi Sonrası Dönemde Girişimlerin Kurtaran Kuruluşu Olarak Girişimler Ve İş Küvatörleri Üzerine Bibliyometrik Çalışma
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ABBREVIATIONS

AI	: Artificial Intelligence
RG	: Research Goal
RQ	: Research Question
WOS	: Word Of Science
EU	: European Union
MSMEs	: Micro, Small and Medium Enterprises
SMEs	: Small and Medium Enterprises

SUBJECT OF THE RESEARCH

A startup refers to a recently established business, usually of small size, to introduce inventive products, services, or solutions to the market. Startups are commonly recognized for their emphasis on growth, scalability, and the disruption of existing industries. These enterprises are typically founded by entrepreneurs who identify a distinctive business opportunity or gap in the market and strive to address it through their innovative concepts. Startups have played a significant role in propelling technological advancements and shaping various sectors. Several renowned startups, such as Airbnb, Uber, SpaceX, and Slack, have achieved remarkable success. Nevertheless, it is crucial to acknowledge that the journey of a startup can be arduous, with numerous obstacles and uncertainties along the way. Achieving success often necessitates a combination of a sound business idea, effective implementation, adaptability, and a touch of serendipity.

In the wake of the unprecedented global pandemic, startups have faced numerous challenges and uncertainties. The post-pandemic period has ushered in a new era for these innovative ventures, necessitating adaptability, and resilience to navigate through the unknown terrain as economies strive to recover from the impact of COVID-19. These start-ups have embraced innovative marketing strategies, product development, and customer analytics to deliver maximum value to consumers, even during crises. With the advent of the COVID-19 pandemic, the business landscape underwent a significant transformation. Start-ups had to adapt quickly to the new challenges and opportunities presented by the pandemic.

The COVID-19 pandemic has been a trying time for businesses, with many startups forced to close their doors. However, there is hope on the horizon. The introduction of vaccines and the gradual easing of restrictions are giving startups a chance to conduct business once again. Furthermore, the pandemic has also created new opportunities for start-ups (Chili & Madzimore, 2022). International businesses are now exploring innovative ways to build resilience in this uncertain time (Chili & Madzimore, 2022).

Agility and speed have become crucial qualities for start-ups in the post-pandemic era, enabling them to navigate obstacles and capitalize on emerging trends (Chili & Madzimore, 2022). This entails their ability to swiftly adapt to changing

circumstances and seize opportunities that arise from the shifting epicenter of the pandemic. Moreover, the post-pandemic period has sparked a surge of creativity and innovation within start-ups. These enterprises have been at the forefront of developing digital business models, expediting the creation of COVID-19 vaccines, and harnessing technologies like robots and AI to tackle the challenges posed by the pandemic. Alongside these technological advancements, start-ups have also introduced inventive solutions and products for COVID-19. These innovations encompass novel personal protective equipment, contact tracing technology, and digital platforms for remote communication and collaboration.

The COVID-19 pandemic has underscored the significance of start-ups in propelling innovation and tackling the obstacles encountered by companies and society. Following the pandemic, start-ups have not only managed to endure but also flourish in the tumultuous market. The pandemic has presented substantial challenges for businesses of all sizes, resulting in closures, layoffs, and financial hardships. However, emerging enterprises and start-ups have been particularly susceptible during this period due to their limited resources and the absence of established networks to navigate through such disruptions. The post-lockdown era has witnessed a rapid surge in the demand for business incubators, as companies grapple with the ever-changing economic landscape. Business incubators play a crucial role in offering guidance and support to aspiring entrepreneurs who aspire to establish or expand their ventures. Their services encompass a wide range of assistance, including access to capital and resources.

Business incubators provide a lifeline for these start-ups by offering a range of resources and support services tailored to their specific needs. These incubators serve as a hub for entrepreneurship, offering mentorship, coaching, and access to a network of experienced professionals who can provide guidance and support in navigating the post-lockdown business landscape.

PURPOSE AND IMPORTANCE OF THE RESEARCH

The motivation behind this research is to expand knowledge about startups in the post-pandemic period, especially focusing on business incubators. The Coronavirus loathes huge ramifications for capital business areas, and the overall economy; its effects are evaluated to be significantly more than the past overall slumps. In this break, due to

this pandemic's impacts, new organizations are more disposed to fail or succeed speedier than in late memory. Likewise, business incubators used to expect a section in new organization's legitimacy before the pandemic so; since this investigation will be done in 2023 and the pandemic is done, we endeavor to explore; in the first place, the impacts of the pandemic on new organizations and their courses of action to restart their business after lockdown. Furthermore, we research the occupation of business incubation facilities on new organization's perseverance. The challenges encountered by individuals have not been thoroughly examined due to the rapid onset of the pandemic. In the subsequent sections, I will outline the research objectives, research inquiries, and research methodologies for each chapter of the dissertation.

METHOD OF THE RESEARCH

This study is a bibliometric inquiry that centers on the body of literature concerning start-ups in the post-pandemic period. It represents a graphical representation of the interconnectedness among a specific area of research, its specialization, and the numerous related articles or authors associated with it. The construction and visualization of the bibliometric map were carried out in this research utilizing VOSviewer 1.6.19.0. Bibliometric analyses have been commonly utilized to determine the extent of acknowledgment scientific articles receive among the scholarly community, predominantly by analyzing citations. Moreover, these investigations have played a crucial role in distinguishing authors, journals, and countries that demonstrate exceptional productivity in their respective fields. In this particular case, VOSviewer was utilized to create and illustrate a bibliometric map, identify clusters, and uncover networks within the articles.

HYPOTHESIS OF THE RESEARCH / RESEARCH PROBLEM

The primary objective of this dissertation is to provide a comprehensive understanding of startups and incubators in the post-pandemic era. However, the initial chapter focuses on the methodology employed. The intention behind commencing the dissertation with an extensive bibliometric evaluation of the theoretical foundations of startups and incubators was to establish a solid foundation. Nevertheless, during the

review of the literature on conducting bibliometric analyses, it became apparent that the recommendations were scattered throughout various sources, lacking a single authoritative reference for conducting such assessments. This realization led me to the research goal of the first chapter.

RG1: To create a framework for conducting bibliometric evaluations of scholarly literature.

Accomplishing this objective included two stages. At first, I needed to consider how bibliometric strategies had previously been managed in business research and how the techniques were utilized by scientists. Then, at that point, I expected to utilize the accessible data to foster rules epitomized in a fitting technique. The two research questions tied to the first research goal as below:

RQ1a: How are bibliometric methods used for scientific literature reviews?

RQ1b: What is an appropriate procedure for using bibliometrics in literature reviews?

Small enterprises and emerging businesses have commenced their resurgence after the imposition of lockdowns due to the Coronavirus 2019 (COVID-19) pandemic. However, they are encountering various challenges primarily due to altered consumer preferences and the imperative to adapt their operational strategies. Nevertheless, there is a dearth of discourse and, regrettably, limited empirical evidence regarding the actual implementation of theories in post-pandemic startup investigations.

RG2: To quantitatively establish the theoretical foundations of startups in post-pandemic literature.

The two research questions linked to the second research goal:

RQ2a: what are the theoretical foundations of the generic impacts of COVID-19 on startups?

RQ2b: what is the literature on startups' plans to restart their business in post-lockdown due to COVID-19?

The second chapter of this study was built upon the methodological framework established in the first chapter, which consisted of bibliometric review guidelines. Through the utilization of citation analysis, the key theories about post-pandemic startups were identified. This approach allows for the evaluation of the influence of citations, thereby facilitating the identification of the most impactful documents in the field of current research. Additionally, the structure of five research studies was thoroughly examined using co-reference analysis and visually represented through network analysis. Business incubators have a vital function in cultivating and promoting the development of fledgling enterprises. These incubators create a nurturing atmosphere for companies in their early stages, allowing them not only to endure but also to flourish. Through the provision of various services and facilitating access to valuable expertise, incubators aid in the establishment of a robust groundwork for sustainable expansion.

RG3: To quantitatively establish the role of business incubators in startup survival.

The field has become intricate and extensive owing to its substantial practical significance, resulting in a surge of interest among researchers and a noteworthy volume of scholarly publications. Nevertheless, we aim to investigate whether business incubators, as institutions that foster entrepreneurship, have exerted a crucial influence in ascertaining the feasibility of startups.

RQ3: what is the theoretical literature of business incubators on startup survival?

To effectively arrange the investigation into incubators and offer a well-organized perspective on the subject, we carried out bibliometric performance analyses and science mappings. These performance analyses illustrate the chronological development of the number of publications and citations related to incubators, as well as the journals, countries, authors, and articles that receive the highest number of citations. By examining the co-occurrence of keywords among authors and utilizing the bibliographic coupling technique, we can identify distinct research themes. Through a comprehensive analysis of the content in the science mappings, we propose a research framework that can serve as a valuable tool for future studies on business incubators.

POPULATION AND SAMPLE

Data collection was conducted in three stages. First, this study created a list of documents using TITLE-ABS-KEY (“startup” OR “start-up” OR “fintech” OR “fin-tech” OR “edutech” OR “edu-tech” OR “healthtech” OR “health-tech” OR “agritech” OR “agri-tech” OR “agro-tech” OR “agrotech”) AND (“Business Incubator” OR “Incubator” OR “Incubation”) AND (“post-pandemic” OR “post covid-19” OR “post covid 19”). To guarantee the inclusion of appropriate articles, this study integrated the keywords "fintech," "edutech," "healthtech," "agritech," and "agrotech." These specific terms were employed as they were referenced in certain papers discussing start-ups in different domains. By omitting these terms, there is a potential danger of disregarding articles that hold relevance to the research. The research generated 638 documents. The second stage was screening. The selection process for the articles involved the application of three specific criteria. Firstly, the articles had to be published in a scholarly journal. Secondly, they needed to be written in the English language. Lastly, the articles had to be released within the timeframe of the post-COVID-19 pandemic, between the years 2021 and 2023. During this process, a total of 194 articles were eliminated. The remaining articles, 444, went into the third stage. The third phase encompassed the remaining 444 articles. In the last step, articles were screened further based on their relevance to the study theme using titles, abstracts, and keywords. After the previous stage, this study selected 297 papers. In this conclusive stage, the articles were subjected to further scrutiny to ascertain their pertinence to the theme of the study. This meticulous screening procedure entailed an assessment of the articles' titles, abstracts, and keywords. The same process was done for the articles covering business incubators. The result was 75 articles.

SCOPE AND LIMITATIONS / DIFFICULTIES

The scope of the research is as below:

- Researchers have demonstrated a notable fascination with the realm of business incubators, resulting in a considerable volume of scholarly literature being generated.
- There is a considerable body of academic literature available on the incubation process, which includes studies on interventions, outcomes, and various conceptual frameworks.
- The analysis of business incubators provides valuable perspectives on the rise in publication figures, the extensively studied sub-domains, the nations with high productivity, and the leading journals within this domain.

The limitations are as below:

- The domain of business incubators is complex and fragmented, presenting challenges in terms of structuring and offering a holistic perspective.
- The lack of articles on business incubators and the fragmented nature of the topics covered contribute to the limitations in comprehending the field.
- The transmission of knowledge from academic literature to the startup community is limited, indicating the existence of gaps that hinder the dissemination of knowledge.

CHAPTER ONE

1. BIBLIOMETRIC METHODS IN BUSINESS AND MANAGEMENT RESEARCH

Bibliometric examination has acquired monstrous ubiquity in business research as of late (Donthu, Kumar, and Pattnaik, 2020b; Donthu, Kumar, Pattnaik, and Lim, 2021; Khan et al., 2021) and the justification for its strength can be credited (1) the movement, accessibility, and responsiveness of bibliometric programming like Gephi, programming Leximancer, VOSviewer, and logical data sets like Scopus and Web of Science (2) The cross-disciplinary trade of thoughts between bibliometrics, a field of information science, and business research is gainful for both. It's anything but a prevailing fashion, yet rather an impression of its value, that bibliometric examination is turning out to be progressively significant in business research for (1) Overseeing huge measures of mind-boggling information and (2) Having a critical effect on the investigation.

Bibliometric analysis is a valuable tool utilized by researchers to uncover emerging trends in article and journal performance, collaboration patterns, and research impact. It also aids in exploring the insightful plan of a specific field within the enduring composition. Notably, the information that garners the most attention in bibliometric examinations is often extensive, encompassing hundreds or even thousands of data points. This information is primarily objective, focusing on metrics such as the number of citations, publications, and occurrences of keywords and subjects. However, the interpretation of this data relies on a combination of objective assessments, such as performance analysis, and subjective evaluations, such as topical analysis, which are guided by informed strategies and techniques (Donthu, Kumar, Pandey, & Lim, 2021a; Verma & Gustafsson, 2020; Donthu et al., 2020c). That is, bibliometric methodology is valuable for unraveling and planning the combined scientific data and transformative subtleties of deep-rooted fields by thoroughly handling enormous volumes of unstructured information. Hence, bibliometrics concentrates on individuals who possess the ability to establish a strong foundation for advancing a particular field in innovative and critical ways. It empowers scholars by enabling them to (1) acquire a comprehensive overview of the subject matter in one centralized location, (2) identify gaps in the available data, (3) generate novel and innovative concepts for exploration, and (4)

elucidate the role and impact of their contributions within the field. Despite its numerous merits, bibliometric analysis is still a relatively new concept in business research and is often not fully utilized to its potential. This occurs when bibliometric studies rely on a limited range of data and techniques, resulting in an incomplete understanding of the field being examined. For instance, conducting performance analysis without incorporating science mapping, as exemplified by the work of Brown, Park, and Pitt (2020). Figure one illustrates the growth of publications in the field of business and management utilizing bibliometric methods over ten years.

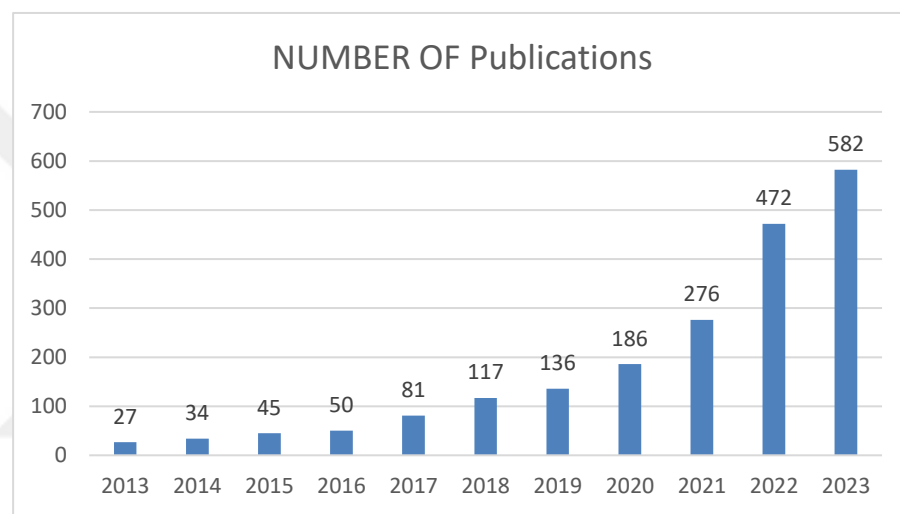


Figure 1. Trend Of Business And Management Publications

1.1. An Introduction To Bibliometric Analysis

Bibliometric methodology involves the application of quantitative methods, which include bibliometric analysis like citation analysis, on bibliometric data such as publication and citation units. (Broadus, 1987; Pritchard, 1969). The discourse surrounding bibliometrics can be traced back to the 1950s (Wallin, 2005), indicating that this methodology has been in existence for a significant duration. Recently, bibliometrics has experienced significant growth in business and management, as shown by its increased usage in Scopus. In Figure 1, we showed an increase in bibliometric data usage in business research publications in ten years. The availability of vast bibliographic datasets has made traditional review methods difficult to manage and impractical to use (Ramos-Rodríguez & Ruíz-Navarro, 2004). The availability of

scientific databases like Scopus and Web of Science has made it easier to collect enormous amounts of bibliometric data.

Moreover, the practical analysis of this data has been greatly facilitated by the availability of bibliometric software tools such as Gephi, Leximancer, and VOSviewer. As a result, there has been a notable increase in scholarly interest in bibliometric analysis in recent years. This approach has found widespread application in various domains of business research, including business strategy (Kumar, Surekha, Lim, Mangla, & Goyal, 2021), electronic commerce (Kumar, Lim, Pandey, & Westland, 2021), finance (Durisin & Puzone, 2009; Linnenluecke, Chen, Ling, Smith, & Zhu, 2017; Xu et al., 2018), human resources (Andersen, 2019), management (Ellegaard & Wallin, 2015; Zupic & Cater, ~ 2015), and marketing (Backhaus, Lügger, & Koch, 2011; Donthu, Kumar, Pandey, & Soni, 2020d; Donthu, Kumar, & Pattnaik, 2020b; Donthu, Kumar, Pattnaik, & Lim, 2021; Hu, Song, & Guo, 2019; Samiee & Chabowski, 2012; Donthu et al., 2020c). Within these fields, bibliometrics is utilized to examine publication and collaboration patterns, as well as to delve into the intellectual structure of the research field.

It is of utmost importance to juxtapose bibliometric analysis with alternative review methods such as meta-analysis and systematic literature reviews. Meta-analysis, a statistical approach, endeavors to gauge the magnitude and direction of effects or relationships. In essence, it furnishes a comprehensive synopsis of the existing evidence about a specific subject, thereby facilitating a more holistic comprehension of the matter at hand. Furthermore, meta-analysis assumes a pivotal role in evaluating the diversity of effect-size estimates across multiple studies and discerning the factors that contribute to this diversity (Aguinis, Pierce, Boscocontent,n, & Dalton, 2011, p. 310). Conversely, systematic literature reviews encompass a methodical approach to obtaining, organizing, and evaluating existing literature, including domain-specific, methodological, and theoretical reviews (Palmatier et al., 2018; Tranfield, Denyer, & Smart, 2003). These reviews typically involve manual procedures, such as content and thematic analyses, conducted by scholars (Lahiri, Mukherjee, & Peng, 2020; Lim, Yap, & Makkar, 2021). Comparable to bibliometric analysis, meta-analysis can manage extensive volumes of literature and offers a comprehensive overview of a specific field. However, it is worth noting that the literature examined in meta-analysis tends to be less varied, and the presence of heterogeneity among existing studies as well as the potential for publication

bias can undermine the reliability and accuracy of the findings derived from meta-analysis (Aguinis, Gottfredson, & Wright, 2011; Junni, Sarala, Taras, & Tarba, 2013).

However, traditional methods frequently lead to systematic literature reviews that have a limited scope of investigation, resulting in a reduced number of papers being considered for review (e.g., ranging from around 40 to 100-300) (Snyder, 2019). This indicates that systematic literature reviews are particularly suitable for specific research areas (e.g., customer engagement on social media) or specialized fields of study (e.g., social media influencer marketing). This assertion emphasizes that while systematic literature reviews often rely on qualitative techniques, which may be susceptible to interpretation bias from scholars with diverse academic backgrounds (MacCoun, 1998), bibliometric analysis and meta-analysis rely on quantitative techniques. Consequently, these approaches can mitigate or eliminate such bias. Given that both meta-analysis and bibliometric analysis are quantitative, it can be challenging for some scholars to differentiate between the two methods.

To clarify, while business scholars' quantitative methods can both handle enormous amounts of literature, they differ in their usage. Meta-analysis is a research approach that focuses on summarizing empirical evidence by examining the direction and strength of effects and relationships among variables. It is particularly useful in investigating open research questions with data that are more definitive than those reported in individual primary studies (Carney, Gedajlovic, Heugens, Van Essen, & Van Oosterhout, 2011, p 438). This task provides clarity on empirical results and their limitations. Meta-analyses are frequently utilized to extend theories (Combs, Ketchen, Crook, & Roth, 2011). However, bibliometric analysis offers a thorough understanding of the bibliometric and intellectual structure of a specific discipline by investigating the social and structural relationships between different research components, including authors, countries, institutions, and topics. The choice of a review approach ultimately depends on the specific goals of the study and the scope and nature of the literature under examination. Nonetheless, these review methods complement each other and offer unique advantages to researchers who utilize them. The comparison of bibliometric analysis, meta-analysis, and systematic literature reviews is presented in the table below. This methodological comparison aims to assist authors in making well-informed decisions regarding the most suitable review method based on various criteria.

Table 1: A Comparative Analysis of Prominent Review Techniques

Review Type	Goal	When to use	When not to use	Scope	Dataset	Analysis
Bibliometric Analysis	Summarizes large quantities of bibliometric data to present the state of the intellectual structure and emerging trends of a research topic or field	- When the scope of review is broad. - When the dataset is too large for manual review.	- When the scope of review is specific. - When the dataset is small and manageable enough that its content can be manually reviewed	Broad	Large	- Quantitative (evaluation and interpretation) - Qualitative (interpretation only)
Meta - Analysis	Summarizes the empirical evidence of relationship between variables while uncovering relationships not studied in existing studies.	- When the focus of review is to summarize results rather than to engage with content, which may be broad or specific - When studies in the field are homogenous. - When the number of homogenous studies available is sufficiently high. - When the number of homogenous studies remaining after removing low quality studies is sufficiently high.	- When studies in the field are heterogeneous. - When the number of homogenous studies is relatively low. - When the number of highquality homogenous studies is relatively low.	Broad	Large	- Quantitative (evaluation and interpretation) - Small but adequate
Systematic Literature Review	Summarizes and synthesizes the findings of existing literature on a research topic or field	- When the scope of review is specific - When the dataset is small and manageable enough that its content can be manually reviewed	- When the scope of review is broad - When the dataset is too large for manual review.	Specific	Small	Qualitative (evaluation and interpretation)

Source: Journal of Business Research 133 (2021) 285–296

1.2. The Bibliometric Analysis Technique Toolbox

Around fifty years ago, Derek J. de Solla Cost (1965) proposed intelligent procedures for focusing on science (Boyack, Klavans, and Börner, 2005). Co-reference examination and bibliographic coupling are examples of bibliographic strategies that make use of distribution data sets to build primary images of logical fields. They can be utilized to distinguish casual examination organizations, otherwise called "invisible colleges," that exist underneath the surface yet are not officially associated (Crane, 1972; Garfield, 1979, Price, 1965).

These collectives possess common research interests and have established connections through personal communication, conferences, and exclusive summer schools. The citation images of research fields, accumulated over time, reflect the choices made by authors regarding the subject matter, methodology, and significance of other writers' works (White & McCain, 1998). Bibliometric analysis employs two distinct categories of techniques: (1) performance analysis, which evaluates the

contributions of research participants, and (2) science mapping, which examines the interconnections among research participants.

1.3. Performance analysis

Performance analysis is a commonly employed method in research evaluations, even in cases where science mapping techniques are not utilized. This analysis serves to showcase the performance of different research elements, including authors, institutions, countries, and journals, within a specific field. It can be likened to the background or profile of participants typically presented in empirical research, albeit with a more analytical perspective (Cobo, Lopez-Herrera, ' Herrera-Viedma, & Herrera, 2011; Ramos-Rodríguez & Ruiz-Navarro, 2004). Bibliometric studies, on the other hand, are characterized by their descriptive analysis, which serves as their defining feature (Donthu, Reinartz, Kumar, & Pattnaik, 2020).

Table 2: The Bibliometric Analysis Toolbox

Bibliometric analysis		
Main techniques		Enrichment techniques
Performance analysis	Science mapping	Network analysis
Publication-related metrics - Total publications (TP) - Number of contributing authors (NCA) - Sole-authored publications (SA) - Co-authored publications (CA) - Number of active years of publication (NAY) - Productivity per active year of publication (PAY)	Citation analysis - Relationships among publications - Most influential publications	Network metrics - Degree of centrality - Betweenness centrality - Eigenvector centrality - Closeness centrality - PageRank
Citation-related metrics - Total citations (TC) - Average citations (AC)	Co-citation analysis - Relationships among cited publications - Foundational themes	Clustering - Exploratory factor analysis - Hierarchical clustering - Island algorithm - Louvain method - Multidimensional scaling - Simple centers algorithm
Citation-and-publication-related metrics - Collaboration index (CI) - Collaboration coefficient (CC) - Number of cited publications (NCP) - Proportion of cited publications (PCP) - Citations per cited publication (CCP) <i>h</i>-index (<i>h</i>) <i>g</i>-index (<i>g</i>) <i>i</i>-index (<i>i</i>-10, <i>i</i>-100, <i>i</i>-200)	Bibliographic coupling - Relationships among citing publications - Periodical or present themes	Visualization - Bibliometrix R - Bibexcel - Gephi - Pajek - UCINET - VOSviewer
	Co-word analysis - Existing or future relationships among topics - Written content (words)	- SciMat - Sci2
	Co-authorship analysis - Social interactions or relationships among authors - Authors and author affiliations (institutions, countries)	

Source: Journal of Business Research 133 (2021) 285–296

The most significant metrics for evaluating research constituents are the number of publications and citations per year. Publication serves as a proxy for productivity,

while citation reflects the impact and influence of the research. There are several methods available to measure the performance of research constituents, including citation per publication and h-index. These methods take into account both the quantity of publications and the number of citations. The analysis recognizes the importance of different components within a research field, although it is primarily descriptive.

1.4. Science Mapping

Science mapping is a method that explores the connections between various aspects of research (Baker, Kumar, & Pandey, 2021; Cobo et al., 2011; RamosRodríguez & Ruíz-Navarro, 2004). The examination concentrates on the intellectual interactions and structural connections among research participants. The methodologies utilized for mapping scientific knowledge encompass citation analysis, co-citation analysis, bibliographic coupling, co-word analysis, and co-authorship analysis. The integration of these techniques with network analysis is essential to effectively illustrate the bibliometric and intellectual frameworks within a particular research domain (Baker, Pandey, Kumar, & Haldar, 2020; Tunger & Eulerich, 2018).

1.4.1. Citation Analysis

Citation analysis is a crucial technique in science mapping. It operates on the premise that citations signify intellectual links between publications, where one publication references another (Appio, Cesaroni, & Di Minin, 2014). In this analysis, the impact of a publication is assessed based on its number of citations. Through analysis, it becomes possible to determine the most significant publications within a particular research field. Various techniques, such as network metrics, can be employed to ascertain the significance of publications in a research domain. However, the most impartial and uncomplicated approach to gauge its influence is through its citation count (Pieters & Baumgartner, 2002; Stremersch, Verniers, & Verhoef, 2007). By utilizing citations, it is possible to examine the most impactful publications within a particular research domain, thereby facilitating a comprehensive comprehension of the intellectual trends and developments within that field.

1.4.2. Co-citation Analysis

Co-citation analysis, a scientific mapping technique, is based on the premise that publications that are frequently cited together share thematic similarities (Hjørland, 2013). By employing this analysis, researchers can effectively uncover the intellectual framework of a specific research field (Rossetto, Bernardes, Borini, & Gattaz, 2018), including its core themes (Liu, Yin, Liu, & Dunford, 2015). Within a co-citation network, the relationship between two publications is established through their co-occurrence within the reference list of a third publication. Co-citation analysis provides a notable benefit to researchers in the field of business, as it allows them not only to pinpoint the most influential publications but also to uncover thematic clusters. These clusters are identified by examining the publications that are referenced. However, it is important to note that co-citation analysis primarily focuses on publications that have garnered a high number of citations, which means that recent or niche publications may be excluded from the thematic clusters. Co-citation analysis proves to be a suitable technique for business researchers who intend to uncover essential publications and knowledge sources. This methodology empowers scholars to recognize the most impactful works in a specific domain by examining the frequency at which they are referenced collectively in other scholarly articles. Consequently, researchers can acquire a more profound comprehension of the intellectual bedrock of their research area and the primary contributors to its advancement. Hence, co-citation analysis serves as a valuable instrument for individuals aiming to delve into the historical and conceptual foundations of their field of study.

1.4.3. Bibliographic Coupling

Bibliographic coupling, a technique employed in the field of science mapping, posits that publications that share references also share similarities in their content (Kessler, 1963; Weinberg, 1974). This method primarily focuses on categorizing publications into thematic clusters by considering the references they have in common. It is most effectively utilized within a specific timeframe (Zupic & Cater, 2015). Thematic clusters are established by examining the publications that cite each other, allowing recent and specialized publications to increase their visibility through the mechanism of bibliographic coupling, unlike co-citation analysis. Business scholars

who aim to explore a wide range of themes and the latest advancements in their field find bibliographic coupling to be an appropriate approach. By conducting an analysis using this method, researchers can obtain a representation of the current state of research in their area of interest.

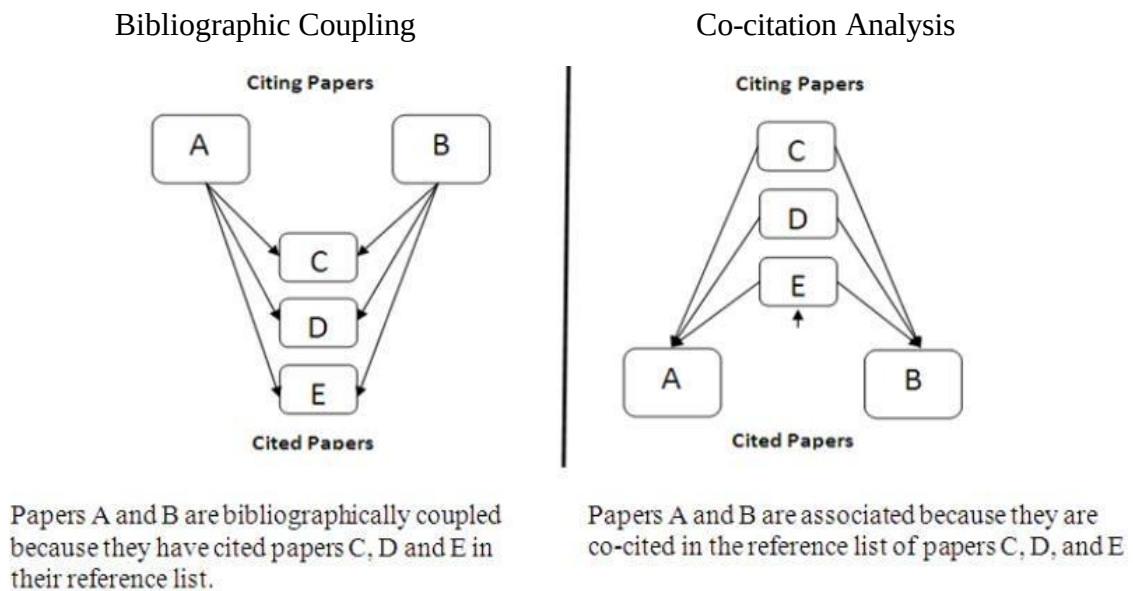


Figure 2: Co-Citation Analysis And Bibliographic Coupling

(BEYOND LIBRARIANSHIP: Creativity, Innovation and Discovery, 2011)

1.4.4. Co-Word Analysis

The previous three methodologies employed in science mapping primarily focus on publications. However, in the case of co-word analysis, the central unit of analysis shifts to "words." Unlike citation analysis, co-citation analysis, and bibliographic coupling, which rely on cited or citing publications as a focal point or a proxy, the co-word analysis technique diverges by directly examining the actual content of the publication itself. The identification of words in a co-word analysis is typically based on "author keywords." In cases where these keywords are absent, significant terms can also be extracted from "article titles," "abstracts," and "full texts" to facilitate the analysis field (e.g., Baker, Kumar, & Pandey, 2020; Burton, Kumar, & Pandey, 2020; Donthu, Gremler, Kumar, & Pattnaik, 2020; Emich, Kumar, Lu, Norder, & Pandey, 2020; Liu, Mai, & MacDonald, 2019). The co-word analysis bears similarities to co-citation analysis as it is based on the assumption that words that frequently co-occur have a

thematic connection. However, analyzing words as individual units does have its limitations. To comprehend the intricate relationships between words used in various contexts, it is imperative to re-read publications. This is particularly important as certain words may have different connotations and implications depending on the context in which they are used. Therefore, a thorough understanding of the intended meaning of the words can only be achieved through careful and deliberate re-reading of the relevant publications. In addition to the considerations, it is important to acknowledge the presence of certain modifiers that may impact the resolution of the query. Specifically, the text highlights the potential existence of words that possess a prominent level of generality, such as subject field names like advertising. Consequently, this characteristic poses a challenge in terms of assigning these words to a specific thematic cluster.

To mitigate the potential adverse outcomes of co-word analysis, business researchers should adopt a strategic approach when employing this analytical technique. In this regard, two suggestions are put forth. One approach to enhance understanding of the thematic clusters obtained from co-citation analysis or bibliographic coupling is by incorporating co-word analysis as a supplementary tool. This is because the themes derived from the shared characteristics in publications often exhibit a broad scope (Chang, Huang, & Lin, 2015). The application of co-word analysis presents a significant opportunity for scholars in the field of business to explore the essence of specific thematic clusters in greater detail. Second, the application of a co-word analysis methodology facilitates the anticipation of future research undertakings in the relevant domain. This predictive analysis is accomplished by integrating essential terminologies derived from the implications and future research directions explicated in the manuscript.

The utilization of co-word analysis is a suitable technique for business scholars who aim to improve their comprehension of co-citation analysis (past) or bibliographic coupling (present) and predict future trajectories. This method serves as a valuable tool for individuals seeking to augment their understanding of the subject matter, thus presenting a fitting approach in this regard. The co-word analysis can thus offer a glimpse into the prospective trajectory of the research domain.

1.4.5. Co-Authorship Analysis

Co-authorship analysis investigates the interplay among scholars within a specific research domain, with a focus on studying their collaborative endeavors. Understanding the way scholars interact with one another (Acedo, Barroso, Casanueva, & Galan, 2006; Cisneros, Ibanescu, Keen, Lobato-Calleros, & Niebla-Zatarain, 2018), encompassing factors such as affiliated institutions and countries of associated authors, holds significant importance due to the formal nature of co-authorship as a means of intellectual collaboration among scholars. With the growing intricacy of research methodologies and theories, it has become customary for scholars to engage in collaborative efforts (Acedo et al., 2006). Collaborative efforts among scholars possess the capability to augment research outcomes. The inclusion of a diverse range of scholars can lead to enhanced lucidity and profound insights, thereby contributing to the overall progression of knowledge (Tahamtan, Safipour Afshar, & Ahamdzadeh, 2016).

In this context, scholars engaging in collaborative efforts establish a network commonly referred to as "invisible collages," which can effectively facilitate the advancement of research pursuits (Crane, 1969). The examination can offer significant perspectives on the extent of scholarly research carried out by academics from a specific area. This information can be used to validate and encourage further research among scholars in regions not adequately represented. Analysis enables scholars to map collaborations across different periods, providing them with the opportunity to investigate the evolution of intellectual development in collaboration networks. Furthermore, it offers valuable insights to aspiring scholars, enabling them to establish connections and engage in collaborative endeavors with esteemed and influential researchers in their respective research domains.

Table 3: Summary of Bibliometric Methods

Method	Description	Units of analysis	Pros	Cons
Citation	Estimates influence of documents, authors or journals through citation rates.	document author journal	Can quickly find the important works in the field.	Newer publications had less time to be cited, therefore citation count as a measure of influence is biased towards older publications.
Co-citation	Connects documents, authors or journals on the basis of joint appearances in reference lists.	document author journal	It is the most used and validated bibliometric method. Connecting documents, authors or journals with co-citation has been shown to be reliable. Since citation is a measure of influence it offers a method to filter the most important works.	Co-citation is performed on cited articles so it is not optimal for mapping research fronts. Citations take time to accumulate so new publications cannot be connected directly but only through knowledge base clusters. Several citations are needed to map articles so it is impossible to map articles which are not cited much. When performing author co-citation analysis on SSCI (WOS) data, only first-author information is available.
Bib. Coupling	Connects documents, authors or journals on the basis of the number of shared references.	document author journal	Immediately available: does not require citations to accumulate. Can be used for new publications which are not cited yet, emerging fields and smaller subfields.	It can only be used for limited timeframe (up to a five-year interval). It does not inherently identify the most important works by citation counts as co-citation; it is difficult to know whether mapped publications are important or not.
Co-author	Connects authors when they co-author the paper.	author	Can provide evidence of collaboration and produce the social structure of the field.	Collaboration is not always acknowledged with co-authorship.
Co-word	Connects keywords when they appear in the same title, abstract or keyword list.	word	It uses the actual content of documents for analysis (other methods only use bibliographic meta-data).	Words can appear in different forms and can have different meanings.

Source: Ivan Zupic & Tomaz Cater, 2015.

1.5. The Bibliometric Analysis Procedure

1.5.1. Define The Aims And Scope Of The Study

The initial phase involves establishing the objectives and scope of the bibliometric investigation, a prerequisite preceding the adoption of bibliometric analysis methodologies and the collection of bibliometric data. It is imperative to undertake this preliminary step to guarantee that the study remains concentrated and by the intended

goals. Performing bibliometric analysis without proper planning and defining appropriate aims and scope can be a risky endeavor. This is because unsuitable objectives and scope can render the analysis useless, leading to a waste of valuable resources. Therefore, it is crucial to invest time and effort in careful planning before conducting bibliometric analysis. The objectives of a bibliometric inquiry should encompass an examination of the performance and scientific advancements within a particular research discipline. When considering performance, bibliometric studies frequently endeavor to unravel the influential research elements within a given research domain, encompassing authors, institutions, countries, and journals. In the realm of scientific inquiry, bibliometric studies are commonly designed to reveal the bibliometric structure that encompasses the interconnections among research constituents, thereby enhancing the intellectual framework established upon clusters of relevant themes within the research domain.

The investigation must demonstrate a satisfactory degree of comprehensiveness to justify the application of bibliometric analysis, as it is specifically tailored to handle substantial amounts of bibliometric data (Ramos-Rodríguez & Ruíz-Navarro, 2004). To assess the appropriateness of the study's scope, researchers can assess the abundance of scholarly papers accessible within the specific research domain being targeted. To ascertain the appropriateness of utilizing bibliometric analysis in a particular research field, it is imperative to evaluate the quantity of papers published within that field. If a substantial number of papers, ranging from hundreds to thousands, are present, it can be inferred that the field is of significant size and justifies the implementation of bibliometric analysis. If a research field consists of only a few tens or low hundreds of papers, it is categorized as a small field, and therefore, bibliometric analysis is deemed unnecessary. Employing bibliometric analysis on such a limited collection of papers would be excessive. In such instances, alternative review methods like meta-analysis and systematic literature reviews may be more appropriate.

1.5.2. Choose The Tecnique

In the next stage, the bibliometric inquiry is developed, which entails selecting suitable methods for bibliometric analysis that correspond with the objectives and scope of the study as determined in the preliminary phase. During this phase, academics often

encounter a notable obstacle that pertains to the contemplation of choosing a methodology that is in line with the intended bibliometric information or selecting a methodology beforehand and then adjusting the bibliometric data accordingly. Scholars often encounter bibliometric information in an unprocessed state, which requires them to undertake the task of cleansing and preparing the data to conform to the prescribed format for the chosen bibliometric analysis techniques. More importantly, the choice of bibliometric analysis techniques will depend on the aims of the study.

For instance, if the study seeks to provide a thorough investigation into the past, present, and future state of a research domain that includes a substantial collection of bibliometric data, a combination of co-citation analysis (about the past), bibliographic coupling (about the present), and co-word analysis (about the future) can be opted for. In the case of research aiming to reveal overarching themes across various periods, co-word analysis can be employed alongside author keywords to enhance the analysis of the facets (i.e., co-citation analysis and bibliographic coupling). The assessment of performance in bibliometric studies bears a resemblance to the evaluation of individuals in empirical studies. Consequently, it is crucial to meticulously choose and subsequently scrutinize the different aspects of performance analysis, such as the total count of publications and citations. These elements should be presented descriptively, offering a lucid explanation of their characteristics, and delving deeper into their analytical implications to shed light on their importance.

1.5.3. Data Collection

The required data for the selected bibliometric analysis techniques should be collected in the next step. During this phase, scholars must identify appropriate search terms that yield search outcomes of substantial magnitude to validate bibliometric analysis. Additionally, it is crucial to ensure that the search is confined within the designated research domain, or the specified scope of study as outlined in the preliminary stage. Scholars can opt for two methods to ascertain the most appropriate search terms. One approach is to consult the relevant literature to determine an appropriate combination of search terms. Another approach involves working with subject-matter experts or engaging in brainstorming sessions to curate relevant search terms. Subsequently, scholars need to determine the bibliometric data that should be

collected from the search results obtained. In this regard, scholars should refer to their chosen bibliometric analysis techniques to address the specific issue at hand.

If researchers choose to conduct co-word analysis as the next step, they should focus on obtaining the title, abstract, keywords, and full text of publications from the search results. In cases where the necessary data is unavailable, it is advisable to reevaluate the initial two steps. It is crucial to integrate bibliometric information from different databases, such as Scopus and Web of Science, into a uniform format. This is due to the differing formats of such data across databases and the likelihood of scholars utilizing multiple databases. However, the recommendation is to select a suitable database to reduce the need for consolidation. This can be achieved by minimizing unnecessary action items, which aids in mitigating potential human errors. Performing data cleaning is crucial when utilizing databases for bibliometric analysis, as these databases are not designed specifically for this task. Scholars are recommended to effectively address the matter by eliminating any occurrences of duplication and inaccurate entries. In specific cases, an author's affiliation in a database entry may encompass multiple institutions, even though the publication itself only mentions one. This phenomenon can be ascribed to the author profiling system employed by the database, rather than reflecting the author's true affiliation at the time of publication. Consequently, scholars are recommended to enhance the entry by selecting and preserving only one valid affiliation that aligns with the author's affiliation during the publication period. This practice is crucial to guarantee the precision and reliability of the ultimate dataset. Failing to rectify such errors could potentially result in an erroneous depiction of the research discipline.

1.5.4. Run The Analysis

The implementation of the bibliometric analysis and the delivery of the results mark the concluding phase of the procedure. Bibliometric analysis is commonly regarded as a distinct stage, accompanied by the creation of its corresponding summary and the formulation of the bibliometric review (Zupic & Cater, 2015). However, in practice, these action items often go hand in hand. The partitioning of the network into clusters and the creation of visual network summaries are essential components in informing the substance of the manuscript. These components directly contribute to the

writing procedure by offering valuable perspectives and bolstering the arguments put forth. Also, incorporating bibliometric summaries can be viewed as a strategy to augment the paper's content, reinforcing the information and findings discussed. The style of writing is also important in this step.

The writing style embraced by scholars is shaped by the academic journal they aspire to publish in and the field of study they are researching. Scholarly journals exhibit diverse requirements concerning the content and structure of research articles. Theoretical aspects of the study may be prioritized by some journals, with no specified page or word limitation, while others may necessitate a direct presentation of the study findings and impose strict page or word limitations. Consequently, scholars must scrutinize the submission guidelines of each journal to guarantee that their articles conform to the requirements and expectations of the intended journal.

1.5.5. Bibliometric Software

Different software tools can assist in the process of analyzing scientific literature using bibliometrics. Bibliometric tools utilize raw bibliographic data, which can be obtained from sources like the Web of Science, to conduct bibliometric calculations. These calculations are then used to determine the similarity matrices between various entities, including documents, authors, journals, and words. While these tools possess some analytical capabilities, they often require exporting the data to statistical and visualization software for more in-depth analysis. Olle Persson and his colleagues developed BibExcel, a software tool specifically designed for conducting bibliometric analysis in the management field (Persson et al., 2009). It is widely recognized as the foremost program in this domain, despite its user interface being less user-friendly. However, users can quickly become proficient in utilizing BibExcel due to its high effectiveness. The software offers a variety of bibliometric methods, including co-citation, bibliographical coupling, co-authorship, and co-word analysis. Moreover, it incorporates additional features such as a word stemmer, which greatly facilitates co-word analysis.

The official website of the software offers a plethora of tutorials to aid users in efficiently utilizing the software for diverse bibliometric analyses. Additionally, the website provides exporting options such as co-occurrence matrices, which can be

utilized in statistical software at a later stage, and network formats used in network analysis packages. BibExcel is a user-friendly software that is designed to facilitate quick learning and operation for users. However, it does have certain limitations, such as the absence of advanced preprocessing capabilities for data cleaning and a distinctive user interface. BibExcel presents itself as an ideal option for scholars who seek to swiftly generate bibliometric computations, carry out data cleansing, and perform intricate analyses using various software programs. Sitkis, a bibliometric data management tool, was created by Henri A. Schildt, a researcher affiliated with the Helsinki University of Technology (Schildt, 2005). This groundbreaking tool has proven to be an invaluable resource in the field of academic research, offering a comprehensive platform for conducting bibliometric calculations and streamlining the review process. Sitkis enables the implementation of crucial data preprocessing procedures and simplifies the examination of co-citation and co-authorship patterns. The data can be exported in the form of tab-delimited text files, which can be used with Excel and UCINET network analysis software. Sitkis stands out for its implementation of a compact network subgrouping algorithm, which is a clustering method specifically designed for bibliometric analysis (Schildt & Mattsson, 2006). The tool is easy to use, but it relies heavily on outdated technology (Access) for data storage and is not currently being further developed. The most recent version of the software was released in 2005. Therefore, we recommend that this software be primarily used by researchers who already have experience with Sitkis.

SciMAT (Cobo et al., 2012) represents a recent addition to the array of bibliometric software options available. The University of Granada's research team developed a software called SciMAT, which covers the complete science mapping process, beginning with data preprocessing, and concluding with visualization. The software presents an enhanced user interface, and sophisticated preprocessing capabilities for data cleansing, and is a contemporary open-source alternative. It provides a well-organized workflow that directs the user through the entire procedure, resulting in a less flexible approach compared to BibExcel. SciMAT software is an exceptional tool for carrying out extensive science mapping procedures. Nevertheless, conducting unplanned and hurried analyses using SciMAT can prove to be difficult. One significant limitation of this software is its absence of a user-friendly interface for exporting data matrices that can be utilized in statistical software. The only way to export

the data is either through (undocumented) scripts for further analysis or to confine it to the analyses conducted within SciMAT. However, there are at least two alternative software options that should be taken into account. Loet Leydesdorff's webpage provides a collection of user-friendly software programs that incorporate different bibliometric methodologies (Leydesdorff, 1999).

The command line interface is utilized to execute these fundamental programs. Their primary objective is to transform WOS data into matrices that can be employed in statistical and network analysis software. This tool's application is simple, although its preprocessing capabilities are limited. Another option to take into account is CiteSpace II (Chen, 2006), which provides comprehensive bibliometric functionalities. This software incorporates numerous advanced characteristics that surpass the basic needs of scientific mapping, but it does demand a substantial investment of time and effort to attain proficiency in its utilization. For a comprehensive analysis of the existing bibliometric software and its features, it is recommended to consult the study conducted by Cobo, Lopez-Herrera, Herrera-Viedma, and Herrera (2011). This research provides an in-depth examination of the functionalities offered by various bibliometric software tools.

1.5.6. Visualization

Bibliometric analysis is often complemented by network visualization tools, ranging from those that are entirely reliant on graphical user interfaces, such as VOSviewer (van Eck & Waltman, 2010), to those that operate through a command-based interface, such as the Bibliometrix package in R (Aria & Cuccurullo, 2017). Scholars could select from a diverse array of network visualization software alternatives, given that many of them are open-source and available at no cost. Each software has its own set of strengths and weaknesses. For example, Pajek and UCINET provide a plethora of features, but their pace of development is sluggish in comparison to Gephi and R. Furthermore, the flexibility of the network formed by these software applications poses another challenge. When utilizing VOSviewer to construct a network, the amalgamation of different forms of identical words is not feasible, unlike Gephi which allows for such a combination.

To address this issue, one potential strategy involves employing bibliometric

analysis and network visualization software. Numerous bibliometric studies adopt an additional approach to maximize the capabilities of the software and overcome its limitations (e.g., Baker et al., 2020a; Donthu, Kumar, Pandey, & Gupta, 2021; Xu et al., 2018). Hence, it is crucial to carefully consider the software's characteristics and the adaptability of the resulting network when making decisions regarding whether to exclusively utilize bibliometric software or combine different tools for analysis and visualization. Researchers encounter a challenge when attempting to visually represent changes in the research field across different periods. An effective technique for illustrating these changes is the utilization of a bar graph.

In this diagram, each row corresponds to a publication within the intellectual framework, and the width of the bars on both sides of the zero axis indicates whether the publication's influence has increased or decreased compared to the previous period. Shafique (2013; p. 74) provides a notable example of the application of this graph. Heat maps present an alternative method for visualizing co-word analysis. These graphs effectively depict the conceptual structure of a particular field by utilizing warmer colors and prominent fonts to highlight commonly used concepts, while less frequently used words are depicted in cooler tones and smaller, more subtle fonts.

1.5.7. Interpretation

The interpretation of the findings marks the concluding stage in bibliometric analysis. Bibliometrics should not be relied upon as a substitute for thorough reading in the field. It is imperative to conduct a comprehensive review of the documents incorporated in the analysis to ensure the attainment of accurate conclusions. Scholars who possess profound understanding and proficiency in the domain hold a significant advantage in this aspect. Individuals should be careful not to try to fit the analysis into their existing beliefs. Rather, they should take a different approach and use their knowledge to enhance their findings. The application of bibliometric methods often reveals the structure of a specific field in a unique way when compared to the categorization of traditional literature reviews. As a result, it is crucial to acknowledge and resolve these differences. Although science maps serve as a preliminary tool for analytical investigation, they should not be regarded as the goal. The interpretation methods utilized in bibliometric analysis are contingent upon the specific research topic

addressed in the authors' scholarly work. The argument is that three main types of bibliometric papers can have: a focus on structure, a focus on dynamics, and a focus on a particular research question. The first type of paper focuses on structure.

The objective is to analyze the connections between the various components of the framework (publications, authors, concepts), determine how they are related and impact one another, and evaluate their significance in addressing the core inquiries of the research field. Scholarly articles falling under the second category can make effective use of bibliometric techniques to focus on dynamics. The main aim of these papers is to observe and examine the progression of a specific research field over a given period. Researchers are advised to divide the bibliographic data into successive time intervals and document the field's structure for each period. This approach would then strive to clarify the modifications in the framework and the underlying causes for these changes. It would determine the elements that emerged within certain periods and those that underwent a decline.

Vogel (2012) presents a noteworthy example of this specific focus by investigating the development of the management field over several decades. Through the co-citation and network analysis methods, Vogel researched the dominant theoretical frameworks in each decade. A specialized form of paper is a targeted paper revolving around a specific research inquiry. Generally, such papers incorporate a concise empirical bibliometric section to substantiate or validate the author's assertions, along with a comprehensive analysis of how these assertions align with the current body of literature. An example of a specific inquiry could be, "To what extent does the theoretical perspective Y influence the research stream X?" Scholars can utilize citation analysis to prove that the research in the field of X is influenced by the theoretical perspective Y and that references to other useful theoretical perspectives are rare or non-existent. Other research goals can be included in this specific field of study. For instance, Volberda, Foss, & Lyles (2010) utilized bibliometric methods to investigate the contextual elements that impact absorptive capacity. Their research aimed to develop a comprehensive framework that identifies the several factors at various levels, the aspects of the process, and the outcomes of absorptive capacity.

CHAPTER TWO

2. INNOVATION

2.1. History

During the medieval period, the term "novation" denoted the lawful act of replacing the initial debtor with a new one, consequently refreshing the contractual duty (Godin, B. 2008). Before the 1900s, the utilization of this term was infrequent; however, it garnered substantial acknowledgment during the initial years of the 21st century. Godin suggests that the idea of innovation has experienced a shift in the 20th century, where the conflicting concepts of imitation and invention have been harmonized, and both have evolved since ancient Greek philosophy. Plato's scholarly endeavors primarily focused on the notion of replicating reality, a subject that has captivated intellectual discourse for countless generations. The deliberation has predominantly revolved around the question of whether artistic expression merely mimics the physical world or rather offers an insightful interpretation (Bannet, E. 2007, Force, P. 2005, Cole, B. 1995).

Throughout history, there have been numerous instances where imitation has been recognized as a form of innovation. In the specific context of England, particularly during the sixteenth and seventeenth centuries, patents were granted to importers of existing inventions as a means to stimulate economic progress, rather than solely rewarding inventors (Macleod, C. 1988, Popplow, M. 1998). Similarly, in the eighteenth century, the replication of goods intended for consumption was seen as a creative endeavor aimed at enhancing the overall quality, design, and visual appeal of these products (Berg, M. 1999, Berg, M. 2002, Clifford, H. 1999). The emergence of consumerism in the sixteenth century and the subsequent formulation of economic theories on wealth and material prosperity in the seventeenth century (Dumont, L. 1977) laid the foundation for the later advancements in industrialization. The fourteenth century witnessed the rise of the Renaissance in Europe, which instilled a profound longing for exploration that persisted for many years.

This longing fueled a relentless pursuit of advancement in numerous fields of knowledge, including the arts, sciences, literature, history, and economics (Godin, B. 2008). The alliance between scientific discovery, technological advances, and invention

played a pivotal role in shaping the industrialization process of the nineteenth century. (Branigan, A. 1981). This convergence of key components was primarily motivated by the pursuit of profit, which in turn led to profound societal transformations. During the nineteenth century, Marx was a trailblazer in utilizing economic theory to scrutinize social and technological progressions (Sweezy, P.M. 1968, Rosenberg, N. 1976). Marx observed the progress in industrial production as a driving force behind the expansion of capital and economic activity on a larger scope, while concurrently fostering transformative social changes (Godin, B. 2008).

The close correlation between the progress in technology, industrial development, and economic growth during the twentieth century can be attributed to the improvements in production efficiency, as illustrated by the transformation of economic theory (Godin, B. 2008). During the 20th century, some writers utilized the term "innovation" to clarify the progressions in technology, they explored the underlying mechanisms of this concept through an extensive collection of literary works (Stern, B.J. 1927). Initially, the research focused on the psychological factors associated with innovation. The importance of linear process models and the imaginative aspect of innovation were identified as crucial elements (Godin, B. 2008). By the mid-twentieth century, innovation had gained widespread recognition as a vital tool for fostering economic growth (Schon, D.A. 1967) and ensuring the sustainability of various institutions (Schumpeter, J.A. 1928, Schumpeter, J.A. 1934, Schumpeter, J.A. 1939, Schumpeter, J.A. 1942, Schumpeter, J.A. 1947). In the latter half of the 20th century, the notion of innovation became intricately linked with advancement, technological progress, societal shifts, and development across diverse domains of knowledge, encompassing the entirety of society and customized to cater to the unique requirements of every individual (Godin, B. 2008).

2.1.1. What Is Innovation?

Innovation in business management refers to the application of new ideas, processes, or technologies to improve the overall functioning and performance of an organization. It involves not only creating innovative products or services but also implementing new ways of organizing, leading, and operating the business. The term innovation is frequently mistaken for invention. Definitions of innovation can be found

in (Rowe & Boise, 1974), (Dewar & Dutton, 1986), (Rogers, 1983), (Utterback, 1994), (Afuah, 1998), (Fischer, 2001), (Garcia & Calantone, 2002), (McDermott & O'Connor, 2002), (Pedersen & Dalum, 2004), (Frascati Manual, 2004) as well. Innovation involves the creation of an original concept and its integration into a fresh product, service, or procedure, resulting in the progressive expansion of the country's economy, the rise in job opportunities, and the generation of substantial profits for the pioneering business entity. Innovation is an ongoing and iterative process that encompasses diverse organizational decision-making procedures, spanning from the initial inception of a novel idea to its subsequent implementation phase.

A novel idea refers to the identification of a new demand from consumers or an innovative method of production. It arises through the gradual accumulation of knowledge, coupled with a persistent and ambitious entrepreneurial mindset. During the execution stage, the innovative idea goes through a process of improvement and is converted into a product or process that can be sold in the market. This transformation leads to a decrease in costs and an increase in productivity (Urabe, 1988). Schumpeter, commonly recognized as the trailblazer of the innovation theory in the economy, perceived innovation as the economic outcome resulting from technological progress. He held the belief that innovation involved the application of fresh amalgamations of established productive resources to tackle business obstacles (Schumpeter, 1982). Twiss asserts that the concept of innovation involves a comprehensive and interdisciplinary methodology, which combines various fields such as science, technology, economics, and management, to attain novelty. This intricate process encompasses the entire journey of an idea, starting from its conception to its eventual commercialization through the stages of production, exchange, and consumption (Twiss, 1989).

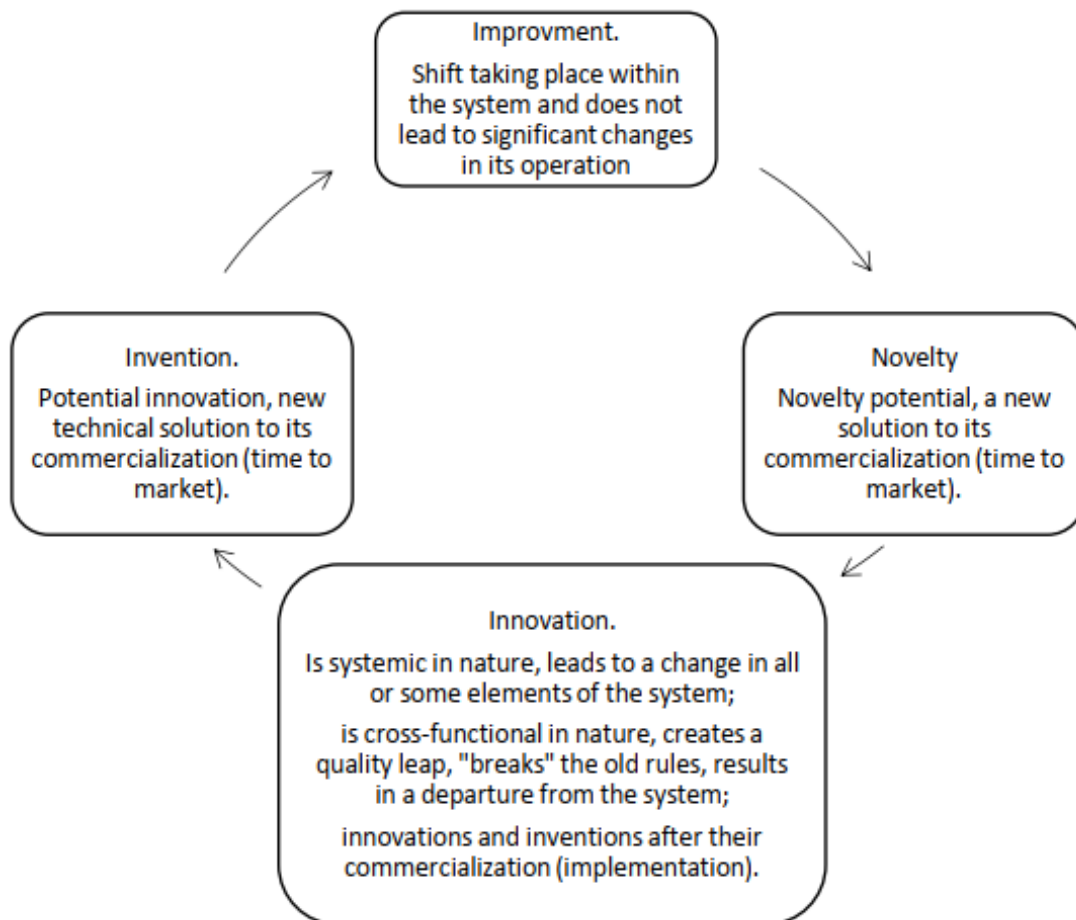
This is best summarized in the EU Green Paper on Innovation:

In brief, innovation is:

- the renewal and enlargement of the range of products and services and the associated markets;
- the establishment of new methods of production, supply, and distribution;
- the introduction of changes in management, work organization, and working conditions and skills of the workforce.

EC(1995:2)

Innovation can be seen as a form of improvement or progress, and to some extent, even as an invention. However, it is important to accurately understand the difference between these terms, especially in scientific and legislative contexts.



Source: Timur Kogabayev & Antanas Maziliauskas. HOLISTICA Vol 8, Issue 1, 2017, pp. 59-72

Figure 3: The concepts of "improvement", "novelty", "invention", "innovation"

2.2. What Is Start-Up?

Based on the findings of Nurcahyo et al. (2018) and Salamzadeh and Kesim (2015), a start-up is defined as a company that is in the initial phases of its growth and has recently initiated its business activities. Start-up companies are frequently distinguished by their restricted expertise and resources, along with their significant dependence on investors, customers, and competitors. Moreover, these nascent enterprises extensively employ cutting-edge technology to propel their activities

(Crowne, 2002; Tripathi et al., 2019). Start-ups can develop a diverse array of products, which can be classified into two primary categories: products that heavily rely on hardware and products that heavily rely on software. (Crowne, 2002). Startups are newly established enterprises that aim to develop a distinctive product or service, introduce it to the market, and ascertain its appeal and indispensability to customers. With a foundation in innovation, these emerging companies endeavor to tackle shortcomings in existing products or establish entirely novel categories of goods and services, thereby revolutionizing deeply ingrained beliefs and operational approaches across diverse industries.

As a result, numerous startups have garnered acclaim within their specific fields as "disruptors." Start-ups have experienced substantial expansion in various sectors, encompassing finance (fintech), education (edutech), agriculture (agritech), health (healthtech), logistics, e-commerce, and retail. Each field of business can be subdivided into smaller segments based on more specific criteria. In the field of finance, start-up enterprises can be classified into different categories based on their unique business models. These categories include trading platforms, payment apps, software solution providers, credit card companies, wallet providers, applications serving both business and individual customers, and payment apps specifically tailored for businesses (Beinke et al., 2018). Based on valuation, start-ups were classified into six categories: small start-ups, pony, Centaurus, unicorn, decacorn, and hectocorn (Malau et al., 2020; Yazici and Rüzgar, 2019). Their valuations were less than US\$10m, US\$10m, US\$ \$100m, US\$1bn, US\$10bn, and US\$100bn, respectively (Malau et al., 2020; Yazici and Rüzgar, 2019).

2.2.1. Start-ups and Covid 19

Few individuals could have anticipated the extensive impact that the novel infectious virus, COVID-19, originating in China, would have on global health and the worldwide economy when it was first documented at the end of 2019. The alarming repercussions of this global pandemic are apparent as more and more countries implement quarantine protocols, with a few even resorting to declaring a state of emergency, all the while witnessing an unrelenting rise in the number of COVID-19 cases. Like other worldwide concerns, especially those related to global health, this

unfortunate event will undoubtedly affect the global economy (Dana, Etemad, and Wright 1999; Ahani and Nilashi 2020; Dai, Hu, and Zhang 2020; Evans 2020).

During the pandemic, small businesses and startups encounter a particularly precarious predicament as a result of their restricted resources, amplified difficulties in maintaining their activities, and heightened vulnerability to customer and investor attrition (Vinberg & Danielsson, 2021). The transformations occurring in the market exert a substantial influence on startups, necessitating a reassessment of their business models (Salamzadeh & Dana, 2021). Startups encountered various obstacles amidst the pandemic, including disruptions in the supply chain (Reuschke et al., 2021; Vorobeva & Dana, 2021) and difficulties in recruiting proficient personnel (Pereira et al., 2021; Shahul Hameed et al., 2022). Throughout their life cycle, startups primarily encounter financial and bureaucratic hurdles (Ferreira et al., 2017; Mayr et al., 2021; Pareras, 2021). These challenges are closely followed by the difficulty of identifying marketable opportunities (Fini et al., 2020), issues related to human capital (Bendickson et al., 2017), and a lack of crisis management skills. The absence of experience in crisis management further compounds the difficulties faced by startup teams (Salamzadeh & Dana, 2021). As a result, the limitations experienced by startups underscore the array of obstacles they must confront in an uncertain and intricate environment as they strive to survive the ongoing pandemic and attain a competitive edge.

2.2.2. Challenges Faced By Start-Ups During The COVID-19

The future of all organizations has been significantly influenced by the COVID-19 crisis, particularly in terms of the established supply chain for specific markets. This exceptional circumstance has also led to uncertainties surrounding conventional business models (Humphries et al., 2020; Reuschke et al., 2021; Salamzadeh & Dana, 2021). Small enterprises are equally susceptible to the global health crisis, as they confront the potential threat of being compromised when a calamity jeopardizes the market, primarily owing to inadequate consumer demand. The small business market may require a revision of strategies due to the complete transformation that the market has undergone (Salamzadeh & Dana, 2021; Vinberg & Danielsson, 2021).

Resource availability and liquidity problems worsen the situation (Eggers, 2020; Guerrero et al., 2021; Liguori & Pittz, 2020). The capital market has experienced

significant volatility due to the pandemic, leading to heightened instability in funding. This phenomenon can be attributed to the risk-averse behavior of numerous investors who have adopted a cautious approach in response to the prevailing circumstances (Eggers, 2020; Salamzadeh & Dana, 2021). Furthermore, amidst this crisis, startups encounter supplementary financial obstacles, including constrained budgets, diminishing orders, and the imperative to proficiently handle cash flow. These elements intensify the already arduous endeavor of sustaining these nascent enterprises (Kuckertz et al., 2020; Salamzadeh & Dana, 2021).

The ongoing challenges faced by startups in recruiting and managing human resources have been further exacerbated by the pandemic. In this context, the task of attracting and retaining talented and skilled individuals has become increasingly difficult (Pereira et al., 2021; Shahul Hameed et al., 2022). The COVID-19 pandemic also brought profound negative emotional distress and social impacts (Cullen et al., 2020). The enforcement of lockdown policies and quarantine measures leads to a range of psychological effects, encompassing anxiety, depression, and burnout, among others (Cullen et al., 2020).

However, amid the COVID-19 pandemic, specific businesses faced challenges. In contrast, others, especially internet-based industries such as e-commerce, online entertainment, food delivery, and remote work solutions, thrived as a result of the increased demand brought about by the obligatory stay-at-home measures implemented during the lockdown and quarantine period (Donthu & Gustafsson, 2020). This situation has also opened up opportunities for small businesses to explore innovative operational methods, products, and distribution channels (Kang et al., 2021; Kuckertz et al., 2020; Reuschke et al., 2021; Vinberg & Danielsson, 2021).

2.2.3. Getting Start-Ups Back on Feet

Following the rapid spread of COVID-19, numerous countries that were impacted by the virus promptly adopted various measures to control its transmission. These measures included the implementation of movement restrictions, the enforcement of quarantine protocols, the temporary closure of public services like educational institutions, and the cancellation of large gatherings, alongside other preventive actions (Farooq et al., 2020). There is an increasing concern among people about the potential

risk of acquiring the disease while venturing into public areas. As a result, this anxiety has caused a decrease in the willingness of individuals to frequent places like restaurants, gyms, parks, sports events, movie theaters, and other comparable venues where they are likely to encounter a substantial gathering of people (Antipova, 2021). Governments and economic entities across the globe have embarked on economic recovery initiatives of unparalleled scale and scope (Markard & Rosenbloom, 2020). The COVID-19 pandemic has necessitated the imperative collaboration between businesses, government, and society, as is the case with any crisis. This collaboration is of utmost importance in effectively addressing the challenges posed by the pandemic (Banik et al., 2020).

The revitalization of both the economy and society is greatly influenced by the presence of entrepreneurship and start-ups (Fazio et al., 2021). During the COVID-19 outbreak, pioneering start-ups possess distinctive capabilities to conquer obstacles. Not only are they adept at adjusting and persevering, but they also serve as a model for other enterprises. Through charting unexplored territories and introducing inventive resolutions, these start-ups are molding the landscape of post-pandemic business (Kuckertz et al., 2020). Because of the COVID-19 pandemic, startups are encountering substantial disruptions in their fundamental operations and collaborations with other companies. Moreover, the alteration in customer preferences has exacerbated the difficulties they confront. Consequently, startups are compelled to reassess their business strategies across diverse industries to conform to the prevailing circumstances (Giones et al., 2020). Governments are proactively promoting the expansion of start-up ventures amidst the COVID-19 crisis by providing crucial monetary aid, resources, and guidance through various initiatives and policy adaptations.

2.2.4. Impact on Small Businesses

During the global economic downturn caused by the COVID-19 pandemic, governments and various economic entities worldwide implemented comprehensive and unparalleled measures to revive the economy (Markard and Rosenbloom, 2020). As with any crisis, it is crucial to establish a strong interdependence between businesses, government, and society to effectively address the challenges presented by the COVID-19 pandemic.

2.2.4.1 Government Initiatives Are Crucial For Small Business Growth.

The preservation of micro, small, and medium enterprises (MSMEs) is of utmost importance for governments, as their potential collapse could lead to severe repercussions such as enduring unemployment, a distressing surge in poverty rates, and heightened food insecurity (Mishra and Rampal, 2020). The government's assistance is particularly vital in two key areas for SMEs: (1) financial management and (2) addressing disruptions in the supply chain (Ratnasingam et al., 2020).

According to empirical evidence, it has been observed that governmental initiatives, irrespective of their financial nature, have the potential to impact and either diminish or magnify the consequences of entrepreneurial orientation factors on organizational performance. These factors encompass innovativeness, risk-taking, autonomy, and competitive aggressiveness, as highlighted by Nakku et al. (2020). The lack of proper financial decisions often leads to the failure of small businesses, underscoring the significance of government assistance in the form of financial aid. This aid can be extended through various methods, such as reducing interest rates, providing cash transfers, or facilitating more flexible conditions for loan repayment. By extending these forms of financial support, the government can effectively alleviate the financial strain experienced by small businesses and enhance their prospects for achieving prosperity. The government should additionally offer support to the complete supply and demand system, with a specific emphasis on improving the purchasing ability of consumers. Building upon this concept, if small and medium-sized enterprises (SMEs) are expected to gain benefits from the ease of access and affordability of bank loans, then the increased integration of banking markets should additionally foster the growth of SMEs by alleviating the negative impacts of financial limitations on their expansion (Moscalu et al., 2020).

2.2.4.2. Understand Customer Behavior

The global pandemic has caused significant changes in consumer behavior, leading to a noticeable shift in customer preferences. Farmers' markets have been particularly affected, experiencing a decline in their customer base. On the other hand, local small-scale independent retailers have shown impressive adaptability, successfully retaining a significant portion of their customers (Li et al., 2020a). Businesses must

remain vigilant and responsive to the sudden shifts in demand dynamics. For instance, the food service sector has witnessed a substantial rise in the trend of individuals cooking and eating meals at home (Hobbs, 2020).

2.2.4.3. Supply Disruptions And Margin Concerns.

Supply-side disruptions and margin concerns occur when there are issues with producing or supplying goods and services, which can affect profit margins. These disruptions can be caused by natural disasters, labor strikes, or changes in government regulations. When disruptions happen, businesses may struggle to get the materials they need for production, leading to higher costs and delays in delivering products. Margin concerns arise when businesses can't pass on increased costs to consumers, resulting in lower profit margins. Businesses need to manage and minimize these disruptions and concerns to maintain smooth operations and financial stability. Throughout the COVID-19 pandemic, supply chains have faced obstacles in meeting the demands of businesses of different types and sizes.

In the past, these chains effectively met the demands of different companies; however, they are currently facing challenges in meeting their requirements (Dadsena et al., 2021). Suppliers are currently experiencing heightened competitive pressure in terms of strategic elements, particularly the implementation of environmentally friendly transportation practices (Kumar and Anbanandam, 2020). Collaboration, collective efforts, and support from various departments are of utmost importance, as organizations with multiple stakeholders are expected to have a longer lifespan in the COVID-19 market scenario compared to those working independently (Zimon et al., 2020).

2.2.4.4. Internet And Support Are Vital For Digital Change

SMEs are encouraged to adopt a novel approach to managing their businesses through the integration of technological advancements. They must acquire and comprehend digital skills that are specifically relevant to their business operations (Winarsih et al., 2021). Additionally, it is recommended that digital transformation can be achieved by (1) maintaining competitiveness in the market, (2) enhancing operational

efficiencies, (3) improving customer satisfaction, and (4) facilitating strategic decision-making for business owners. The significance of data within the technological framework cannot be overstated in today's society, as it plays a central role in driving progress and fostering collaboration (Chau et al., 2021).

2.2.4.5. Advancing Civilization And Improving Ecology.

The decline in sales leads to conflicts within and among organizations, requiring a new strategy for managing business operations in companies (Mora Cortez and Johnston, 2020). Firms are required to integrate a broader objective into their business framework that surpasses the sole focus on financial gain, nurturing a symbiotic association between the organization, the community, and the natural surroundings (Sheth, 2020). Collaboration, collective efforts, and support from various departments are of utmost importance, as organizations with multiple stakeholders are expected to have a longer lifespan in the COVID-19 market scenario compared to those working independently (Ahuja et al., 2019; Zimon et al., 2020).

2.2.4.6. Embrace Change And Encourage Entrepreneurship

Businesses should view the pandemic as a catalyst for significant changes in consumer behavior and the advancement of digitalization in the market (Kim, 2020). Individuals, on the other hand, should adopt an entrepreneurial mindset to foster creativity and effectively address the anxiety and uncertainty brought about by the COVID-19 crisis. This approach facilitates the creation of entrepreneurial ecosystems that promote innovation (Ratten, 2020). Emotional intelligence plays a vital role in achieving success, accounting for 30% of it. Its influence is particularly evident in terms of self-awareness and the ability to adapt and introduce new ideas in small and medium-sized enterprises (SMEs) (Karia, 2021). Therefore, entrepreneurs should not only focus on the negative impacts of COVID-19 but also recognize the potential hidden opportunities and maintain a positive outlook.

2.3. What Is a Business Incubator?

Business incubators have a vital function in cultivating and promoting the development of fledgling enterprises. These incubators create a nurturing atmosphere for companies in their early stages, allowing them not only to survive but also to flourish. Through the provision of various services and facilitating access to valuable expertise, incubators aid start-ups in building a solid groundwork for sustainable expansion. These incubators provide a variety of services and facilitate the acquisition of valuable knowledge, empowering emerging enterprises to flourish in a highly competitive market landscape. Incubators have a significant impact on reducing the likelihood of start-up failure in their early years (Soetanto and Jack 2016). Through the provision of vital knowledge and services (Bruneel et al. 2012; Hausberg and Korreck 2020), incubators effectively aid these nascent ventures in successfully navigating the demanding start-up phase and enhancing their prospects of survival (Aernoudt 2004; Soetanto and Jack 2016). This support encompasses a range of services including financial consultation, managerial guidance, comprehensive business support, specialized business assistance, and tangible resources (Allen and Rahman 1985). Additionally, it offers fully furnished workspaces and networking prospects with fellow entrepreneurs and managers (Peters et al. 2004). Incubators play a crucial role in generating employment opportunities, local economic growth (Markley and McNamara 1995, p. 14), and fostering technological advancements (Colombo and Delmastro 2002).

Business incubators are distinct from various other organizations that provide support to start-ups. Coworking spaces share similarities with business incubators in that they offer office and social environments that encourage interpersonal interactions. These spaces also promote innovative behavior and cater to the needs of emerging enterprises. (Appel-Meulenbroek et al., 2020; Bouncken and Reuschl, 2018; Bouncken et al., 2021; Rese et al., 2021; Hughes et al., 2018; Bouncken et al., 2020; Barwinski et al., 2020).

However, co-working spaces are also visited by individuals who may not have direct affiliations with start-ups, such as freelancers or employees from well-established companies (Bouncken et al. 2018). Among other advantages, sharing space contributes to sustainable entrepreneurship (Fennhofer et al. 2014; Oswald and Zhao 2020). Moreover, science and technology parks share certain resemblances as they are often

described as "a center designed to promote creativity, facilitate the sharing of information, and often driven by the existence of a university, which catalyzes this mutually advantageous partnership." (Hobbs et al. 2017).

However, their range of services extends beyond start-ups, as they also cater to well-established companies (Bergek and Norrman 2008; Hausberg and Korreck 2020; Mian 1996). The concept of an incubator encompasses networking as a crucial element (Soetanto and Jack 2016). Hackett and Dilts (2004) contend that a business incubator is not merely a collective of individuals; rather, it represents an intricate network of relationships involving mentors, tenants, advisory boards, and other key stakeholders. In this regard, a business incubator plays a pivotal role in fostering connections both internally and externally to its organization (Mian 1996). Peters et al. (2004) highlight the significance of a business incubator in providing an extensive network of professionals in various fields such as finance, business planning, marketing, legal advisory, manufacturing, and more.

2.3.1. Business Incubators Support And Strengthen Start-Ups.

Business incubators have played a crucial role in supporting startups during the COVID-19 pandemic. Despite the challenging circumstances, many business incubators have adapted their services and provided additional support to help startups survive and thrive. Given a profound shift similar to the transformation observed throughout the COVID-19 pandemic, the need to adopt change becomes evident. The outbreak of the pandemic has created a sense of uncertainty, which in turn has stimulated entrepreneurial initiatives. As a result, there has been a greater acknowledgment of the significant impact that innovation and forward-thinking can have. This newfound understanding has allowed individuals to perceive the challenges brought about by the pandemic as opportunities for progress and advancement (Chang, 2021).

The role of business incubators in fostering entrepreneurship is emphasized because they serve as both physical and supportive infrastructures for entrepreneurs. By leveraging their resources and expertise, business incubators have helped startups navigate the uncertainties caused by COVID-19 and mitigate some of the risks associated with this unprecedented situation. By providing financial benefits, knowledge exchange, and access to resources, business incubators have supported startups in

overcoming the challenges posed by the COVID-19 pandemic and have contributed to their survival and success during these difficult times. Most business incubators have adopted similar approaches, such as offering entrepreneurs exclusive workspaces for their extensive projects, prolonging their stay duration, improving training programs to minimize potential risks, aiding in social media marketing, and offering valuable guidance in most cases. All these services are offered free of charge. In brief, the primary objective of these organizations is to offer support to entrepreneurs. Nevertheless, given the prevailing conditions, they have exhibited their ability to serve as valuable assets in times of emergency as well. An entrepreneur could have potentially faced more substantial losses that could have been minimized if they had not received assistance from a business incubator.



3. INTERPRETATION

3.1. Initial Data Statistics

Publication trend: The diagrams presented below depict the trend in publications and the corresponding annual publication count. The evolution of a study field can be observed through the publication trend over time (Garfield, 1994). The enthusiasm displayed towards exploring start-ups in the post-pandemic era was of significant magnitude. In 2021, there were 74 articles. It increased to 149 in 2022, and 194 in 2023, and 5 in 2024.

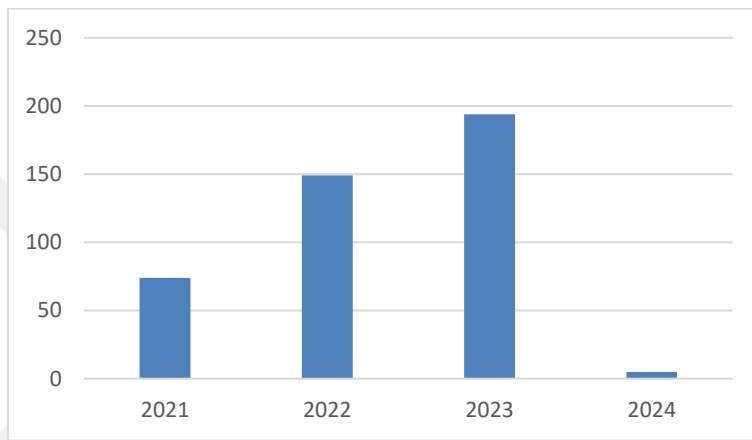


Figure 4: Post-pandemic startup publication trend

Regarding business incubators, it was 20 in 2021. It increased to 34 in 2022, and 57 in 2023. In 2024 it became 4.

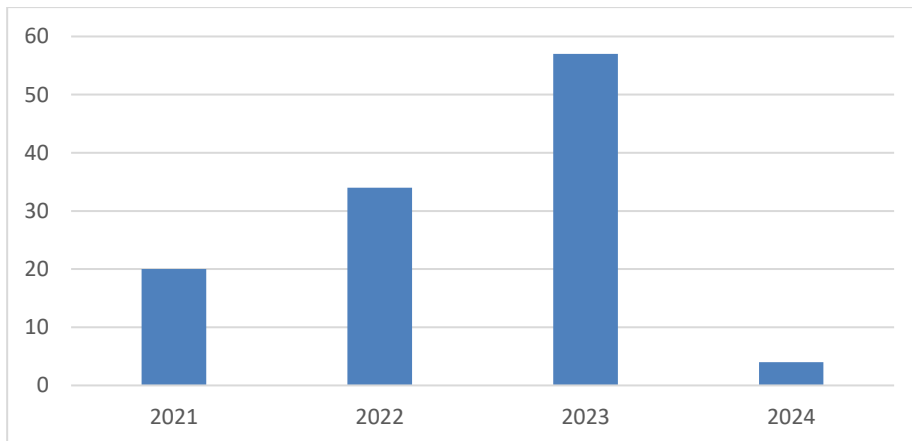


Figure 5: Post-pandemic business incubator publication trend

3.2. Most Preferred Journals

Table 4 illustrates a graphical representation of the journals that have published multiple articles, specifically focusing on those that have published two or more. According to the data presented in the table, the Journal of Business Research emerged as the most preferred journal, having published a total of eight articles. The Journal of Business Research is an esteemed academic journal that upholds a stringent peer-review process to ensure the excellence of its published research articles. It encompasses a broad spectrum of subjects within the domain of business and management, encompassing areas such as marketing, finance, accounting, organizational behavior, and strategic management. By providing a platform for scholars and practitioners to exchange their ideas and insights, the journal aims to facilitate the advancement and enrichment of knowledge in the field of business.

The International Journal of Consumer Studies emerged as the second most favored journal, boasting a total of six articles. This esteemed publication, affiliated with the International Society for Consumer Studies, holds a prominent position in the global academic community. Its primary objective revolves around the exploration of consumer research, encompassing a wide range of subjects such as consumer behavior, consumer culture, consumer policy, and consumer education. Following closely behind, the Journal of Business and Industrial Marketing secured the third spot with three publications. Distinguished as an academic journal, it adheres to a stringent peer-review process. The journal's main focus lies in conducting research within the realm of business-to-business marketing and industrial marketing. It delves into various facets of this domain, including marketing strategy, customer relationship management, supply chain management, and marketing communications. These topics are meticulously examined within the context of industrial and business markets.

Table 4: Post-pandemic startup's most preferred journals

No.	Journal	No. of Articles
1	Journal of Business Research	8
2	International Journal of Consumer Studies	6
3	Journal of Business and Industrial Marketing	3
4	Cogent Business and Management	3
5	Current Issues in Tourism	2
6	Technology in Society	5
7	International Journal of Logistics Research and Applications	2
8	Managing Sport and Leisure	5
9	International Journal of Contemporary Hospitality Management	3
10	Academy of Management Learning and Education	2
11	Cities	4

Table 5 presents a comprehensive overview of the top 20 journals focused on business incubators. As indicated in the table, the Journal of Small Business Economics takes the lead with a remarkable count of eight articles. Following closely, the Journal of Business Venturing secures the second position with six articles. The Journal of Small Business Economics is a highly esteemed academic publication that undergoes a meticulous peer-review process. Its primary focus lies in the realm of entrepreneurship, small business management, and the economic implications associated with these ventures. The journal publishes scholarly articles that delve into various facets of small and medium-sized enterprises (SMEs), encompassing topics such as firm performance, innovation, financing, and policy matters. Lastly, the Journal of Business Research claims the third spot with a total of seven articles.

Table 5: post-pandemic business incubators' most preferred journals

No.	Journal	No. of Articles
1	Small Business Economics	8
2	Journal of Business Venturing	6
3	Journal of Business Research	7
4	Journal of Cleaner Production	3
5	Journal of Small Business Management	2
6	Entrepreneurship and Regional Development	2
7	Human Relations	2
8	International Entrepreneurship and Management Journal	5
9	Journal of Business Venturing	6
10	Technovation	4
11	Journal of Small Business and Enterprise Development	2

3.3. Most Productive Authors

Table 6 shows authors with more than one article regarding startups. According to Table 6, the most productive author was Guerrero, M. with five articles. Belitski and Kraus were in the third and fourth places with three articles respectively. It goes on till Bag which comes with two articles.

Table 6: Post-pandemic startup's highly efficient authors.

No.	Author's Name	No. of Articles
1	Guerrero, M.	5
2	Belitski, M.	3
3	Kraus, S.	3
4	Kumar, A.	3
5	Newman, A.	3
6	Parayitam, S.	3
7	Bag, S.	2
8	Barros-Celume, S	2
9	Behl, A.	2
10	Bertoldi, B.	2
11	Bhattacharyya, S.S.	2

Table seven presents the most productive authors in business incubators with more than one article. Aas comes to first place with four articles. Alaassar, Guerrero, and Mention come in the following places. Brown and Owen are in the fifth and sixth places with three articles.

Table 7: Post-pandemic business incubators highly efficient authors

No.	Author's Name	No. of Articles
1	Aas, T.H.	4
2	Alaassar, A.	4
3	Guerrero, M.	4
4	Mention, A.L.	4
5	Brown, R.	3
6	Owen, R.	3
7	Banalieva, E.R.	2
8	Dvouletý, O.	2
9	Gond, J.P.	2
10	Kshetri, N.	2
11	Mason, C.	2

3.4. Geographic Distribution And Multinational Collaboration

Table eight offers the first eleven countries with more than ten articles. The United Kingdom has the first place with eighty-five articles. India, the United States, and China come with eighty-three, sixty-five, and thirty-five respectively.

Table 8: Post-pandemic startup geographical distribution

No.	Country	No. of Articles
1	United Kingdom	85
2	India	83
3	United States	65
4	China	34
5	Italy	33
6	Australia	32
7	Germany	27
8	South Africa	27
9	France	24
10	Spain	22
11	Malaysia	18

Table nine represents the geographical distribution of business incubators in post post-pandemic period. In this table, the United States takes the first place with thirty-nine articles. United Kingdom, India, and Spain take the following places with thirty-six, seventeen, and sixteen articles respectively. As we see here China has the eighth place with twelve articles, in comparison to table seven which has the fourth place.

Table 9: post-pandemic business incubators' geographical distribution

No.	Country	No. of Articles
1	United States	39
2	United Kingdom	36
3	India	17
4	Spain	16
5	Germany	14
6	France	13
7	Italy	13
8	China	12
9	Australia	10
10	Portugal	7
11	Sweden	7

Figure six visualizes the co-authorship mapping for startups. The figure depicts countries with at least one publication. As is shown United Kingdom plays the central role with big nodes.

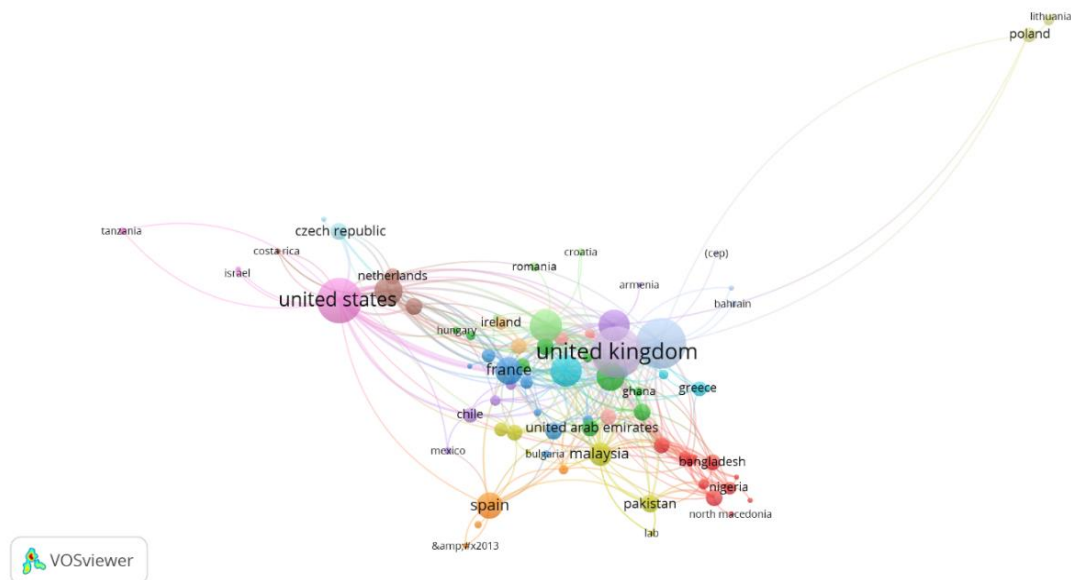


Figure 6: Startups co-authorship map

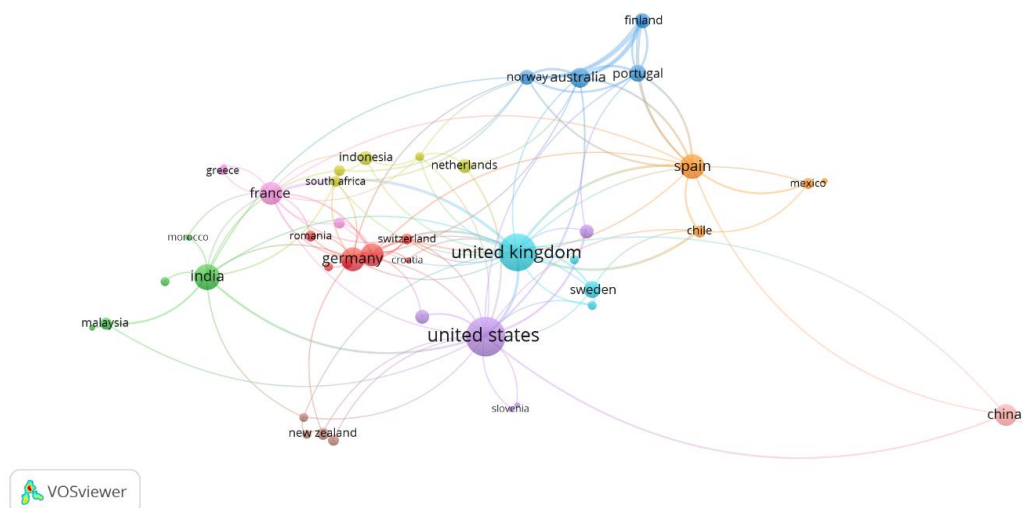


Figure 7: Business incubators co-authorship map

3.5. Citation Analysis

Table 10 presents a comprehensive overview of the scholarly journals that have garnered more than twenty citations about start-ups during the post-pandemic era. Notably, the Journal of Business Research emerges as the most frequently cited journal, amassing a remarkable 129 citations from 2021 to 2023. Following closely behind, the International Journal of Consumer Studies and Society and Business Review secure the second and third positions, garnering 111 and 109 citations respectively.

Table 10: Startup articles citation analysis

No.	Journal	No. of Articles	No. of Citations
1	Journal of Business Research	8	129
2	International Journal of Consumer Studies	6	111
3	Society and Business Review	1	109
4	Service Industries Journal	1	98
5	Current Issues in Tourism	2	96
6	Technology in Society	5	61
7	International Journal of Logistics Research and Applications	2	60
8	Managing Sport and Leisure	5	58
9	International Journal of Contemporary Hospitality Management	3	55
10	Work, Aging, and Retirement	1	53
11	Cities	4	48

Table 11 represents journals that have been cited more than twenty times regarding business incubators in the post-pandemic period. The first place belongs to *Small Business Economics* with 408 citations and the second place goes to *Journal of Business Venturing*.

Table 11: Business incubators article citation analysis

No.	Journal	No. of Articles	No. of Citations
1	Small Business Economics	8	408
2	Journal of Business Venturing	6	382
3	Journal of Business Research	7	261
4	Journal of Cleaner Production	3	133
5	Industry and Innovation	1	110
6	Entrepreneurship and Regional Development	2	107
7	Human Relations	2	95
8	International Entrepreneurship and Management Journal	5	84
9	Journal of Business Venturing	6	68
10	Technovation	4	67
11	Journal of Small Business and Enterprise Development	2	64

Based on Figure 8, there are a total of eight clusters observed within 26 links. To determine the importance of the Journal of Business Research within its field, it is necessary to analyze the citations exchanged between different journals. In this regard, the journal is found to be connected to other journals within the same cluster, including the Baltic Journal of Management, Society and Business Review, and Small Business Economics. The size of the nodes in the figure corresponds to the number of citations, while the lines indicate the connections between articles. Both the node size and the number of lines are directly proportional to the citations and linkages of the respective articles. The node color signifies clusters. The same color in the network shows that those journals belong to the same cluster (Guindalini et al., 2021; Niñerola et al., 2021).

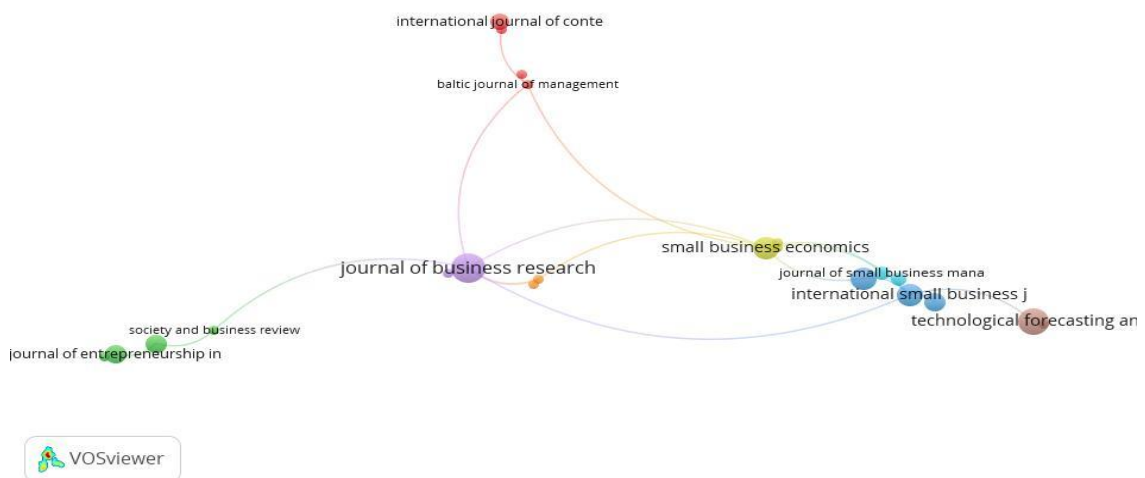


Figure 8: Visualized network of startup citation analysis

As illustrated, Figure Nine displays three distinct clusters comprising six links. The Journal of Small Business Economics holds significant influence in shaping the subject matter, evident by its clustering with other esteemed journals like Innovation Organization and Management, as well as the Journal of Administrative Sciences.

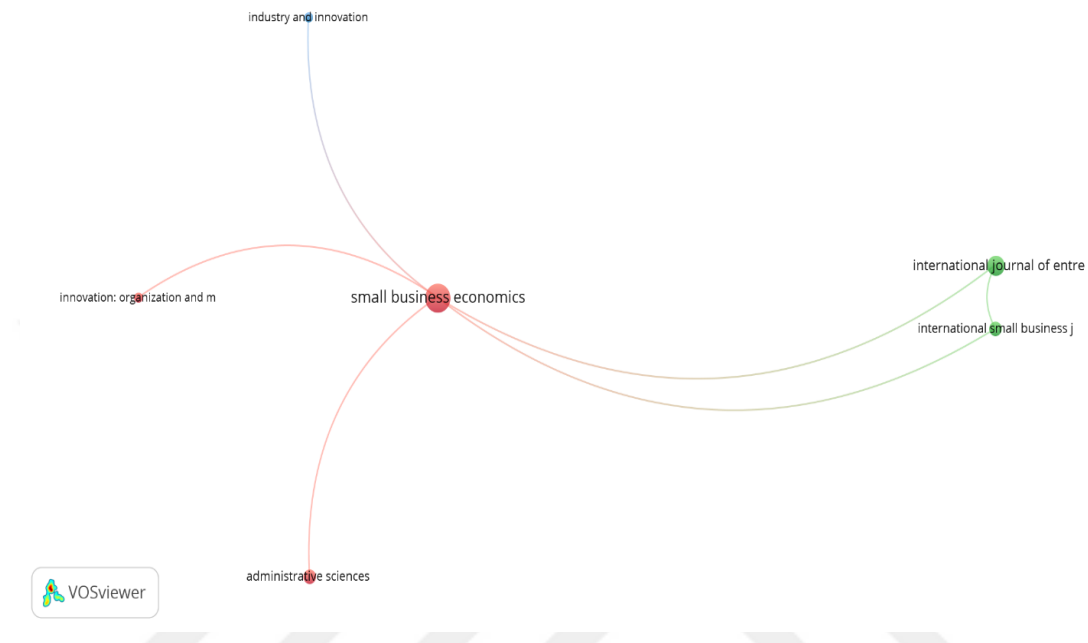


Figure 9: Visualized network of business incubators citation analysis

3.6. Co-citation Analysis

The co-citation network of post-pandemic start-up data contains eleven clusters, forty-two thousand eight hundred sixty-nine links, and the total strength is equal to forty-four thousand one hundred and sixty. Based on the network five out of eleven clusters are isolated, so the remaining six are much focused. The first cluster contains four hundred sixty-two, the second cluster two hundred twenty, the third cluster one hundred eleven, the fourth cluster one hundred and eight, and the fifth cluster sixty-eight and the sixth one twenty-one items. According to the network Fornell C., Larcker d.f., eval in red node plays a central role here which is linked to several ones. The co-citations and linkage of the article exhibit a direct correlation with the magnitude of the node and the number of lines.

The network below refers to the role of incubators survival which involves six clusters, sixty-two thousand and eleven links. The total strength is sixty-seven thousand five hundred sixty-five. Two out of six clusters are isolated, so the centrality is much more focused on the other four. As it is shown, the first cluster contains four hundred-three, the second cluster two hundred thirty-five, the third cluster two hundred seventy, and the fourth one hundred one.



Figure 12: Business incubators co-citation analysis

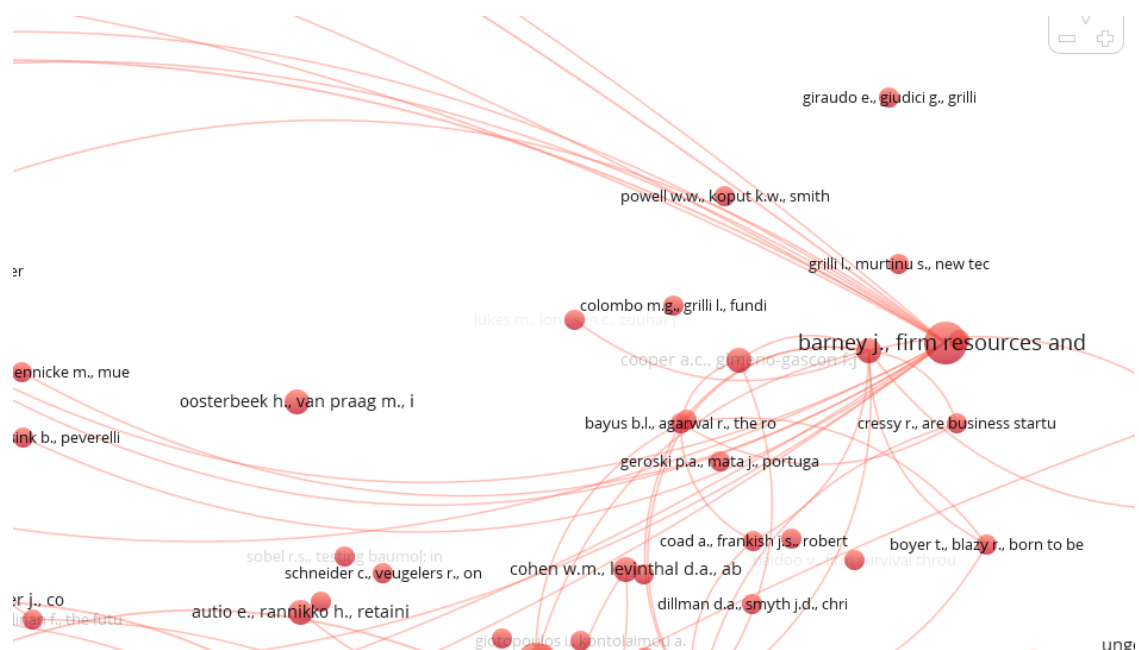


Figure 13: Detailed business incubators visualized map

3.7. Bibliographic Coupling

The bibliographic coupling network of the post-pandemic start-up contains forty-two clusters, six thousand seven hundred twenty-eight links within ten thousand hundred nineteen total strengths. Nine out of forty-two clusters have more than 20 items. The first cluster is sixty-six, and the ninth one involves twenty-two items. Other clusters contain fifty-nine to thirty items.

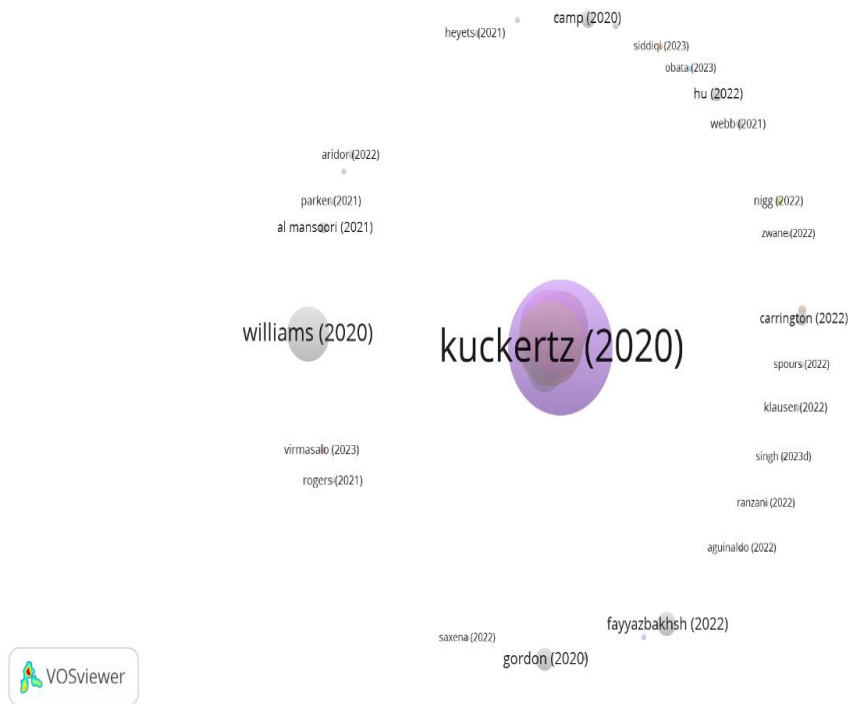


Figure 14: Startups bibliographic coupling map

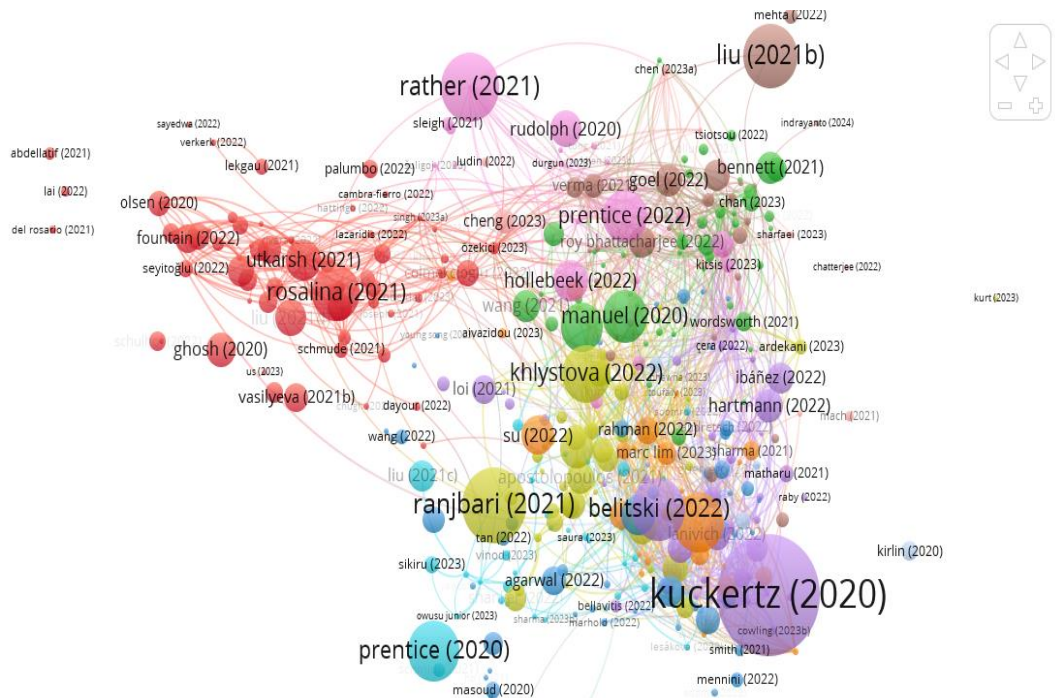


Figure 15: Detailed startups bibliographic coupling map

The size of the nodes represents the proportion of bibliographic coupling while the line shows linkages. The bibliographic coupling network of business incubators contains twenty clusters of which nine clusters are isolated. The other eleven clusters are centered of which the first one involves twenty-seven, the second one twenty-six, and the eleventh one which contains two items. By zooming in we can have the nodes and linkages which is equal to one thousand nine hundred thirty-seven.



Bibliometric techniques provide a quantitative approach to conducting literature reviews, facilitating various types of reviews, and assessing scientific research. These techniques support researchers in exploring topics, identifying publication patterns, and evaluating scholarly contributions. Bibliometric methods are used for scientific literature reviews in several ways:

1- Quantitative analysis: Bibliometric analysis is a systematic approach that utilizes quantitative methods to examine topics in academic literature and acquire an extensive understanding of them. It involves examining bibliographic data to identify patterns and trends in publishing within specific areas of knowledge.

2- Supporting literature reviews: Bibliometrics can aid in diverse types of literature reviews, encompassing those that seek to depict, comprehend, elucidate, or validate objectives. The effectiveness of literature reviews can be improved by employing bibliometric techniques, such as co-citation analysis and bibliographic coupling.

3- Evaluation and assessment: Bibliometric methods are utilized within evaluation frameworks to assess scholarly contributions, research groups, and individuals in scientific research. Furthermore, these techniques are employed to establish rankings of institutions and universities worldwide

The concept map of the above analysis is as below:

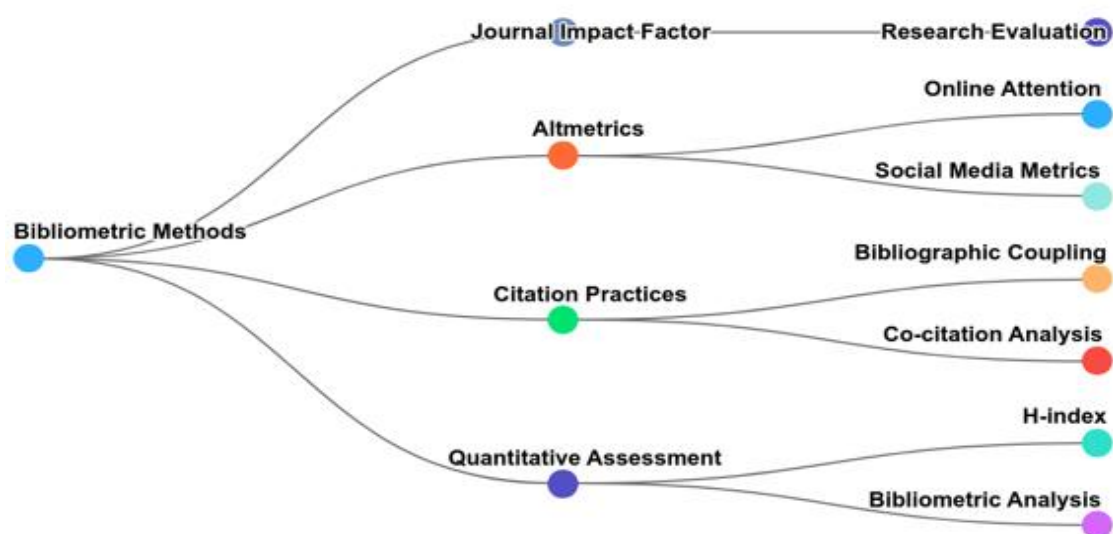


Figure 18: Bibliometric methods

To use bibliometrics in literature reviews, researchers can follow these steps:

1- Choose a theoretical positioning: Explain the purpose of the review, whether it is intended to describe, understand, clarify, or assess.

2- Apply appropriate bibliometric techniques: The effectiveness of the literature review can be enhanced by combining co-citation analysis of references and bibliographic coupling of documents.

3- Interpret the results: While bibliometric analysis is predominantly quantitative, it requires interpretation to derive meaningful insights. To accomplish this, researchers can employ a sensemaking approach, which involves engaging in activities such as scanning, sensing, and validating the bibliometric findings.

By effectively employing bibliometrics in literature reviews, researchers can acquire valuable insights into the patterns of knowledge production and accumulation. By following the prescribed steps, researchers can effectively utilize bibliometrics to analyze and comprehend the trends and patterns within the scholarly domain.

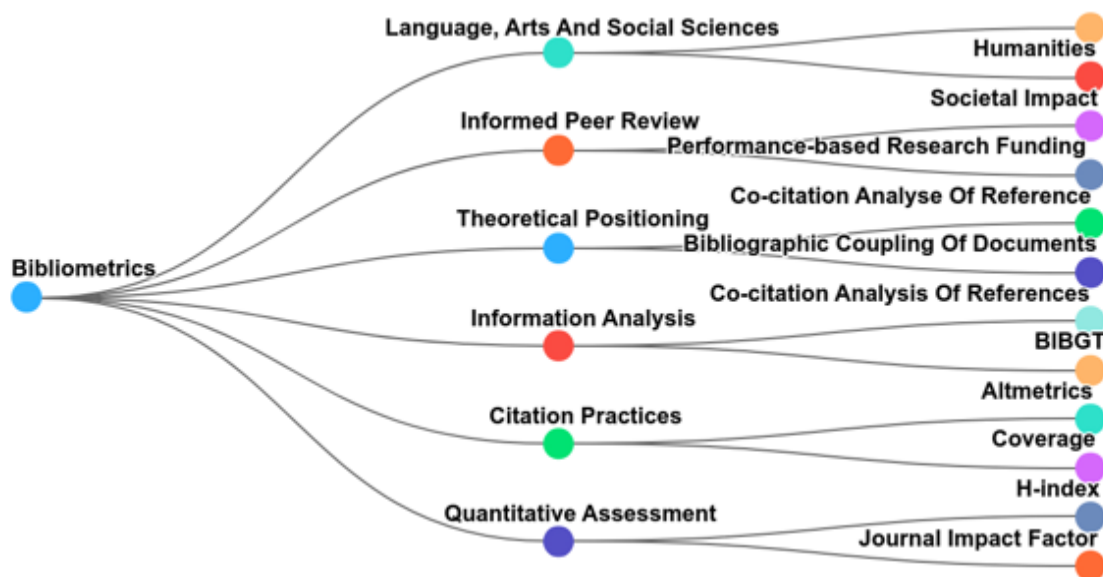


Figure 19: Bibliometrics in the literature review

The theoretical foundations provide a comprehensive understanding of the generic impacts of COVID-19 on startups. By analyzing the following aspects, we can gain insights into these impacts.

1- COVID-19's impact on businesses: The global business landscape has been greatly affected by the COVID-19 pandemic, leaving no sector untouched. This unprecedented crisis has resulted in economic downturns, widespread joblessness, and disruptions in business operations. Startups, in particular, have encountered a multitude of obstacles as they grapple with shifting consumer preferences and the imperative to modify their business strategies to endure.

2- Long-lasting effects: The long-term effects of the disruptions caused by the pandemic are anticipated to have an enduring impact on both startup activity and employment. Even temporary declines in startup activity have the potential to trigger significant job losses that may persist for more than ten years. Furthermore, the pandemic has impeded the potential expansion of startups, resulting in a reduced number of high-growth companies emerging during this period.

3- Key factors for startup success: To effectively overcome the obstacles presented by the COVID-19 pandemic, startups must place utmost importance on various essential components. These encompass safeguarding the safety and welfare of their workforce and clientele, implementing prudent financial strategies, establishing a strong online presence, and offering convenient doorstep services. These factors have been widely recognized as pivotal for the triumph of startups amidst this challenging period.

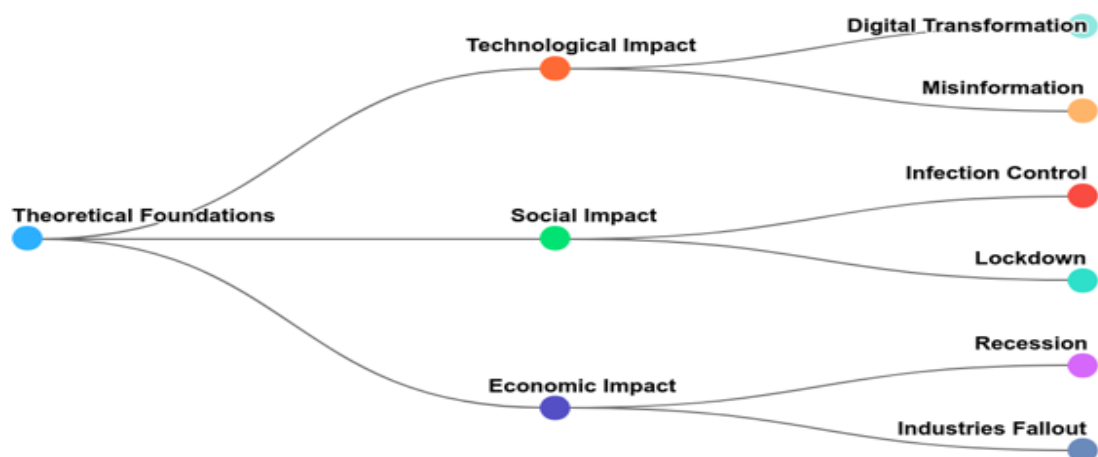


Figure 20: The generic impacts of COVID-19 on startups

Startups intending to recommence their activities in the aftermath of the COVID-19 lockdown must give precedence to several essential factors, as highlighted in prevailing academic literature.

1- Adapting to changed customer preferences: Amid the worldwide pandemic, startups have found themselves obligated to adopt and adapt their business models to cater to the constantly evolving needs and desires of their clientele.

2- Ensuring safety: The prosperity of startups in the contemporary business landscape heavily relies on prioritizing the safety of both employees and customers.

3- Embracing technology: Amidst the global pandemic, the viability and triumph of startups are heavily contingent upon their adeptness in adopting technology, specifically in terms of establishing a virtual existence and harnessing digital platforms.

By considering these factors, emerging enterprises can enhance their likelihood of achieving success and effectively maneuver through the difficulties presented by the COVID-19 pandemic. Startups must demonstrate flexibility, agility, and adaptability, while also prioritizing cost management and providing convenient services. Additionally, establishing a well-defined organizational structure, cultivating a robust organizational culture, and maintaining effective communication are vital in ensuring uninterrupted business operations.

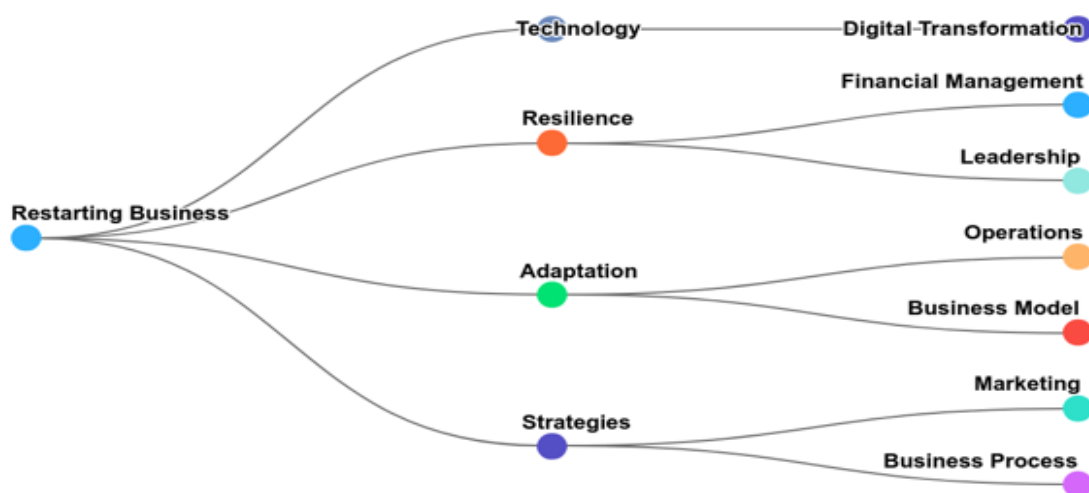


Figure 21: Restarting businesses

To enhance their likelihood of triumph and effectively surmount the challenges presented by the COVID-19 outbreak, startups should consider the following elements. Demonstrating flexibility, agility, and adaptability is crucial for startups, alongside prioritizing cost management and providing convenient services. Furthermore, the establishment of a well-organized organizational structure and a robust business incubator are imperative for the endurance of startups, as substantiated by prevailing theoretical studies. Startups that initiate their business within incubators demonstrate a higher probability of staying afloat compared to companies that do not take advantage of incubator services. The efficacy of business incubators can be attributed to a range of factors, encompassing the provision of shared office spaces, supplementary support services, expert guidance in business operations, mentorship, and well-established networking opportunities. Among these factors, the presence of structured networking is deemed the most crucial element for the triumph of startups. Furthermore, the literature emphasizes the significance of incubators in assimilating startups into networks, thereby contributing to their overall prosperity. In conclusion, the theoretical literature underscores the favorable influence that business incubators exert on the sustainability of startups, while also underscoring the importance of networking and support services rendered by these incubators. Additionally, it is imperative to establish a robust organizational culture and foster effective communication to ensure seamless business functioning.

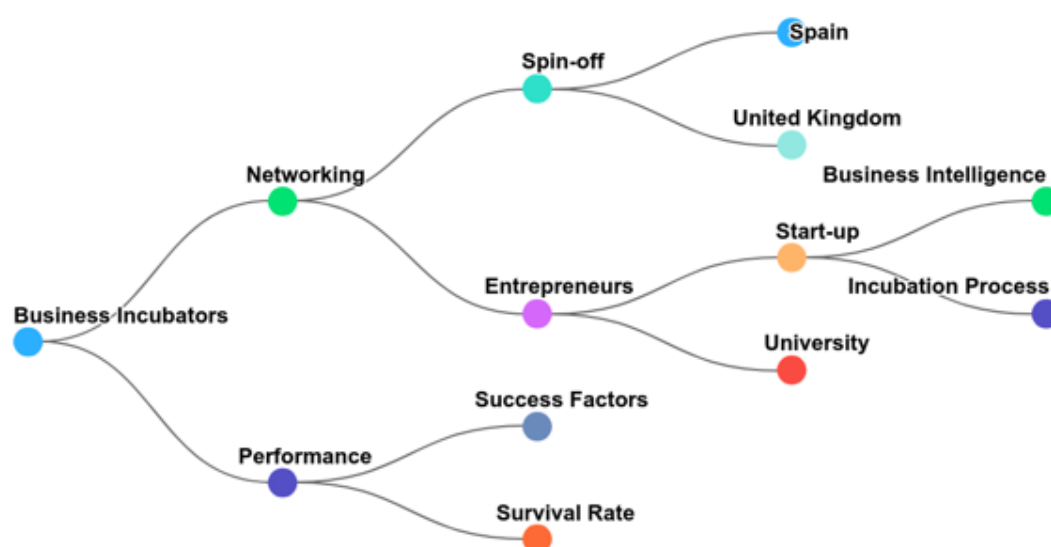


Figure 22: Business incubators

4. CONCLUSION

This chapter will conclude the study by summarizing the key research findings concerning the research goals and research questions as well as the value and contribution thereof. In the aftermath of the global pandemic, this bibliometric study delves into the dynamic interplay between startups and business incubators, examining their pivotal role as a survival strategy for startups in the post-pandemic era. Utilizing bibliometric analysis, we scrutinize a comprehensive array of scholarly publications to trace the evolution of research trends, key themes, and emerging patterns within the startup ecosystem.

Our investigation reveals the intricate relationship between startups and business incubators, shedding light on the various factors that contribute to startup resilience and success in the face of unprecedented challenges. Through quantitative and qualitative analyses, we identify critical themes such as innovation, strategic partnerships, and adaptive strategies that have emerged as key determinants of survival for startups navigating the complexities of the post-pandemic landscape.

Furthermore, this study explores the global landscape of business incubators, investigating their impact on regional startup ecosystems. By synthesizing existing literature, we offer insights into best practices, potential pitfalls, and areas for future research. As the entrepreneurial landscape undergoes transformative shifts, this bibliometric study provides a timely and comprehensive overview of the symbiotic relationship between startups and business incubators, offering valuable implications for policymakers, entrepreneurs, and researchers alike.

This study aimed to investigate the theoretical foundations of startups in the post-pandemic and also the role of business incubators in their survival. Three hundred seventy-two Scopus-indexed articles have been analyzed in this study. they focused on startups in the post-pandemic period and the role of business incubators in their survival. Overall, there was a consistent increase in the number of published articles between 2022 and 2023. This upward pattern is expected to continue due to the strong enthusiasm among scholars to explore the effects of the pandemic on the sustainability of start-ups in the long run, the strategies they adopt to overcome obstacles, and their subsequent recuperation. It is of utmost importance to highlight that the prevailing corpus of literature primarily focuses on the domain of business and management. The most

preferred and cited journals were the Journal of Business Research and Small Business Economics respectively. The most productive countries were the UK, India, and the US for startups and US, UK, and India for business incubators. The commonly employed phrases consisted of "COVID-19," "entrepreneurship," "pandemic," "startup," and "innovation." This suggests that start-ups operating in the financial sector, particularly fintech, gained comparatively more popularity than start-ups in other fields such as agriculture (agrotech), education (edutech), and even health (healthtech). Fintech plays a crucial role in tackling financial obstacles during times of social distancing measures and lockdowns.

The results indicate that following the global pandemic, startups can depend on various established theories in entrepreneurship, economics, and management to establish their theoretical basis. Nevertheless, these startups need to consider the unique challenges and opportunities that have arisen due to the worldwide pandemic. Based on the results of the science mapping analysis, it is evident that several areas have not been adequately investigated. The initial findings revealed a dearth of research on the subject of start-up customers in the current body of literature, despite the pivotal role customers play in shaping the success of a business during the pandemic, it is highly likely that there will be notable shifts in consumers' behavior. As a result, it becomes crucial to thoroughly examine topics such as consumer satisfaction, perceived service quality, and consumer buying behavior to obtain a comprehensive comprehension of the current situation.

Further findings show that the role of business incubators in the survival of startups in the post-pandemic period has been multifaceted and critical. Access to capital has been a significant concern for startups during the pandemic. Business incubators have played a role in guiding startups through available financial support programs, assisting in fundraising efforts, and helping startups navigate economic relief initiatives. Quality management plays a pivotal role in augmenting marketing and financial performance in the domain of business and management studies. However, the scholarly exploration of quality management has been insufficiently addressed and lacks the attention it deserves. It is crucial to prioritize the examination of the contrast in quality performance pre and post-pandemic, along with its influence on sustainability. Thorough discussions on start-ups from various standpoints, encompassing consumers, employees, organizations, and management, both during and after the pandemic, can

provide valuable insights for practitioners, academics, and the government. These deliberations can assist in developing efficient strategies to bolster the resilience of start-ups during crises and empower them to capitalize on unexplored prospects amidst the pandemic.



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CURRICULUM VITAE

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