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The Role of Technology in Fostering Innovation and Growth in Start-up Businesses

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ABSTRACT

The integration of technology within the context of start-up enterprises has emerged as a transformative force driving innovation and growth. This paper presents a bibliometric analysis of the literature on the role of technology in propelling business innovation and growth in start-ups. Through a systematic review of scholarly articles, this study aims to uncover key trends, themes, and influential contributions in the field. The analysis employs co-citation networks, author and institution mapping, journal analysis, and keyword clustering to map the intellectual landscape of this dynamic research domain. The findings highlight the centrality of concepts such as open innovation, digital transformation, and disruptive innovation, underscoring the multidimensional interplay between technology and start-up success. Prolific authors and influential institutions are identified, showcasing the collaborative nature of research in this area. The prominence of specific journals underscores the dissemination of knowledge within the academic community. The comprehensive keyword analysis reveals prevalent themes such as business models, performance, and open innovation, as well as emerging considerations including sustainability and barriers. The insights derived from this bibliometric analysis contribute to a deeper understanding of the complex dynamics that shape the symbiotic relationship between technology, innovation, and growth in start-ups.

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1. INTRODUCTION

In recent years, the business and entrepreneurial landscape has been reshaped by the rapid evolution of technology. The emergence of startups as key drivers of innovation and economic growth has been inextricably intertwined with technological advances. This intersection of technology, innovation, and growth has become a focal point for researchers, practitioners, and policymakers seeking to understand and harness the potential of startups in the modern business ecosystem. Startups, characterized by their agility, propensity to take risks, and pursuit of disruptive ideas, have gained prominence as engines of economic transformation [1], [2]. These companies, which often operate in industries ranging from e-commerce to biotechnology, have demonstrated a remarkable capacity to challenge traditional business norms and introduce new solutions to existing problems.

Central to their success is the strategic utilization of technology, which not only improves operational efficiency but also serves as a catalyst for innovation and expansion [3], [4]. Technology, which includes digital tools, platforms, software, hardware, and innovative processes, has permeated various aspects of startups' operations. From streamlining supply chains to enabling personalized customer experiences, technology acts as a multifaceted enabler that drives creativity, accelerates growth, and ensures competitiveness. As startups navigate the complexities of an interconnected global economy, technology becomes an indispensable asset to achieve sustainable success [5]–[9].

Start-up companies are often associated with technology and innovation. This is because small companies can act as agents of change and creators of innovation, ensuring a source of new ideas and experiments. They can also adopt new technologies faster than larger companies [10]. Technological developments, especially in the digital field, have led to an increase in the complexity and spectrum of different products. This provides opportunities for small companies and startups to exploit specific needs and challenge market leaders in their respective market niches [10].

One example of a technology-related industry with a high number of start-ups is the blockchain industry. The early success of blockchain-based start-ups is related to a supportive entrepreneurial environment, regulatory clarity, strategic associations, active engagement in expertise sharing, deep business models, and experienced management [10]. Start-ups in the technology sector can expand rapidly due to their potential and ability to address problems for which solutions are not obvious, and success is not guaranteed [11]. Rapid expansion of startups is a major goal, so it is crucial for them to establish a strategy to efficiently promote their brand and drive growth [11].

Technology Business Incubators (TBIs) also play an important role in sustaining startups by providing support and guidance for business growth and development. They help mobilize seed funding, angel investors, and offer marketing expertise for product commercialization and marketing research [12]. In short, start-up companies thrive and are often synonymous with technology because of their ability to innovate, adapt to new technologies, and exploit specific market needs. Supportive environments, strategic associations and technology business incubators further contribute to their growth and success.

The symbiotic relationship between technology and startups is evident in the numerous examples of disruptive products and services that have transformed industries. Companies like Airbnb, Uber, and SpaceX have revolutionized the hospitality, transportation, and space exploration sectors, respectively, through innovative technology solutions. These examples underscore the critical role that technology plays in shaping the trajectory of startups, catapulting them from startups to market leaders.

Previous research on technology driving innovation and business growth in startups has focused on various aspects, including the role of virtual business incubators, cooperating startups, and the impact of innovation on sustainable business development. Bibliometric analysis has been used in several studies to understand the existing literature and identify research gaps. A study by [13] conducted a systematic literature review and bibliometric analysis on virtual business incubator models. The study found that academic production in this area is relatively new and fragmented, with different research paths and perspectives. Another study by [14] conducted a bibliometric network analysis to understand the business challenges of cooperative start-ups. The analysis aimed to identify the specific characteristics, opportunities and challenges that cooperative start-ups must understand to achieve business success.

In a study focused on the electric vehicle sector, [14] used bibliometric analysis to understand the impact of innovation in ensuring sustainable business development.

The study compared various models of conducting innovative research, such as the diffusion model, business model innovation, and Lewin's change management model. A study conducted by [15] examined the dynamic relationship between knowledge base, performance, and innovation in knowledge-intensive business services (KIBS). The study aimed to understand how KIBS companies implement their new service development process.

The synergistic innovation management model proposed by [16] suggests that firms simultaneously explore market, technological, and management innovations for sustainable business. The model is based on the theory of dynamic capabilities and core competencies. A study by [17] discussed the relevance of using digital and cognitive technologies in small businesses during the global pandemic. The study highlights the importance of innovation and cognitive thinking in the development of effective small and medium-sized enterprises. In a study by [18] the role of support on start-up success was investigated using a PLS-SEM approach. The study found that technology-related support, finance, and software-related support had a significant relationship with start-up success, whereas market-related support did not.

These studies provide valuable insights into the role of technology and innovation in driving business growth in start-ups. These studies also highlight the importance of support systems, such as virtual business incubators, start-up cooperatives, and government funding, in fostering innovation and ensuring start-up success.

However, the complex interplay between technology, innovation and startup growth requires a comprehensive understanding of the underlying mechanisms. While anecdotal evidence highlights the importance of technology in driving business success, a careful analysis of the existing scholarly literature is essential to provide a systematic and thorough perspective. This study aims to bridge this gap by conducting a bibliometric analysis of the literature pertaining to the role of technology in driving business innovation and growth in the context of startups.

2. LITERATURE REVIEW

2.1 Technology as a Driver of Innovation

Many researchers have emphasized the important role of technology in driving innovation in start-up companies. It is widely recognized that technological advances create opportunities for the development of new products, services, and business models. Start-ups are uniquely positioned to capitalize on emerging technologies due to their agile nature and willingness to experiment. The adoption of technologies such as artificial intelligence, blockchain, and the Internet of Things (IoT) has facilitated the creation of disruptive solutions that address unmet market needs [19]–[22].

The literature underscores how technology accelerates the innovation process by enhancing information exchange, collaboration, and rapid prototyping. Digital platforms and tools have enabled startups to gather customer feedback, iterate products and pivot strategies more effectively. This iterative approach to innovation, coupled with the capabilities offered by technology, has become the hallmark of successful start-ups, allowing them to create value and stay ahead of competitors [12], [23].

2.2 Technology-Driven Growth Strategy

The relationship between technology and growth in start-ups goes beyond innovation, but also includes strategies for scalability and market expansion. Digitalization has revolutionized the way startups acquire customers, manage operations, and access global markets. E-commerce, digital marketing, and cloud computing platforms have empowered startups to reach a wider audience and establish a global presence without the constraints of traditional brick-and-mortar companies [24]–[26].

In addition, technology has enabled startups to optimize internal processes, streamline supply chains, and manage resources more efficiently. These operational efficiencies are often critical factors in achieving sustainable growth and maintaining competitiveness. As startups navigate the complexities of scaling up, technology serves as an enabler that supports their transition from small-scale operations to industry disruptors [23], [27].

2.3 Challenges and Considerations

While the potential benefits of technology in driving innovation and growth are widely recognized, the literature also acknowledges the challenges that startups may face. Managing technology adoption, integration and cybersecurity issues can be complex, especially for companies with limited resources. The "technology paradox", where rapid technological advancement requires constant adaptation, poses challenges in terms of skill acquisition and keeping up with emerging trends [28]–[30].

In addition, the literature highlights the need for startups to strike a balance between technology-driven innovation and a customer-centric approach. While technology can enable new solutions, it is important to ensure that these solutions are aligned with the needs and preferences of target customers. Startups that prioritize customer engagement and feedback as an integral component of their technology-driven strategy are more likely to achieve sustainable growth.

2.4 The Role of the Entrepreneurial Ecosystem

An emerging theme in the literature centers on the role of the entrepreneurial ecosystem in driving technology-driven innovation and growth. This ecosystem encompasses a range of stakeholders, including incubators, accelerators, investors and research institutions, that contribute to the growth of startups. Technology clusters, such as Silicon Valley, have been studied as environments that facilitate knowledge spillover, resource sharing and collaboration among startups and established firms [31]–[34].

The literature emphasizes the importance of networks and connections in entrepreneurial ecosystems. Startups embedded in vibrant ecosystems are better positioned to access resources, knowledge, and funding that can accelerate their growth trajectory. The presence of mentorship, access to capital, and opportunities for collaboration across disciplines all contribute to the synergistic relationship between technology, innovation, and growth in these ecosystems [35], [36].

3. METHODS

The research methodology employed in this study encompasses a systematic approach to conducting a bibliometric analysis of the existing literature on the role of technology in driving business innovation and growth in start-up enterprises. By employing bibliometric techniques, this research aims to provide a comprehensive overview of the scholarly landscape, identify key trends and patterns, and synthesize insights that contribute to a deeper understanding of the interplay between technology, innovation, and growth in the context of start-ups.

The first step in the research methodology involves systematically collecting relevant literature from established academic databases. Databases such as Web of Science and Scopus will be utilized to ensure comprehensive coverage of peer-reviewed journal articles related to the research topic. A predefined set of keywords, including "technology," "innovation," "start-ups," "growth," "entrepreneurship," and related terms, will be used to conduct the search in Publish or Perish (PoP).

The collected literature will undergo a two-step screening process to ensure its relevance to the research objectives. In the initial stage, titles and abstracts will be screened to identify articles that align with the research focus. Articles that pass this initial screening will then undergo a full-text assessment to determine their suitability for inclusion. Inclusion criteria include relevance to the research topic, focus on technology-

driven innovation and growth in start-ups, and the empirical or theoretical contributions made by the article.

For each selected article, relevant data will be extracted and organized into a structured database. The extracted information includes publication year, authors' names and affiliations, journal details, research methods employed, key findings, theoretical frameworks, and keywords. This organized dataset will serve as the foundation for subsequent bibliometric analyses.

VOSviewer, a widely used software for visualizing bibliometric networks, will be employed to create visual representations of co-citation networks, author networks, institution networks, and keyword clusters. These visualizations will enhance the interpretation of complex relationships and trends within the literature.

Table 1. Metrics Data

Publication years:	1976-2023
Citation years:	47 (1976-2023)
Papers:	980
Citations:	202216
Cites/year:	4302.47
Cites/paper:	206.34
Cites/author	131775.78
Papers/author	566.95
Authors/paper:	2.24
h-index:	203
g-index:	440
hI,norm:	148
hi,annual:	3.15
hA-index:	54
Papers with ACC >= 1,2,5,10,20: 822,706,529,359,201	

4. RESULTS AND DISCUSSION

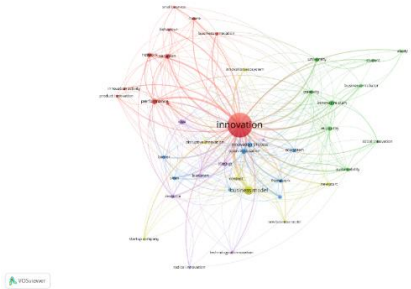

Figure 1. Mapping Results

The identification of productive themes and influential institutions demonstrates the multidisciplinary nature of the field, drawing expertise from academia, business, and technology. This collaborative effort reflects the holistic approach required to understand the complex dynamics of startup growth and innovation.

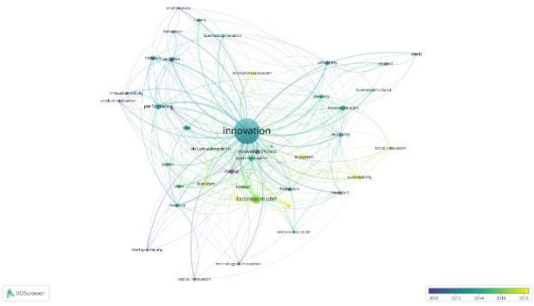

Figure 2. Trend Research

An analysis of research trends found that leading journals highlight the main outlets where research on technology and startup growth is disseminated. Prominent journals include the Journal of Business Venturing, Research Policy, and Strategic Management Journal. These journals have served as platforms to discuss theoretical frameworks, empirical studies, and practical insights related to the impact of technology on start-up success.

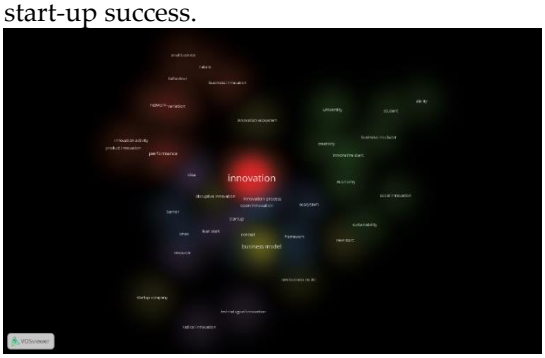

Figure 3. Mapping Cluster

The analysis revealed clusters of highly cited articles that represented core themes in the literature. In particular, five main groups emerged:

Table 2. Detail Cluster

Cluster	Total Items	Most frequent keywords (occurrences)	Keyword
1	(9)	Business Innovation (20)	Behaviour, business innovation, innovation

			activity, large company, nature, nerwork, performance, product innovation, small business, variation
2	(7)	Business Incubator (10)	Ability, business incubator, creativity, economy, innovative start,social innovation, student, sustainability, university
3	(5)	Digital Innovation (20)	Barrier, digital innovation, digital transformation, ecosystem, framework, innovation process, open innovation, SMEs
4	(4)	Start-up company (30)	Business model, concept, disruptive innovation, innovation ecosystem, new business model, new start, start-up company
5	(4)	Lean start (15)	Idea, innovation management, lean start, radical innovation, resource, start-up, technological innovation

Table 2's detailed clusters offer a comprehensive view of the various facets and dimensions explored within the literature on technology-driven innovation and growth in start-ups. Each cluster provides insights into specific aspects of innovation, incubation, digitalization, start-up dynamics, and lean methodologies. Collectively, these clusters contribute to a holistic understanding of the role of technology in shaping the landscape of start-up enterprises, underscoring the multifaceted interplay between technology, innovation, and growth.

Table 4. 12 High Citations

Citation	Author & Years	Tittle
27627	[37]	Open innovation: The new imperative for creating and profiting from technology
13429	[38]	Managing innovation: integrating technological, market and organizational change
6801	[39]	Patterns of industrial innovation
3752	[40]	The ambidextrous organization
3321	[41]	Towards the fifth-generation innovation process
23267	[42]	Internal capabilities, external networks, and performance: a study on technology-based ventures
3247	[43]	Why sustainability is now the key driver of innovation
2948	[44]	Why the lean start-up changes everything
4	[45]	Analisis Pengaruh Pembelajaran Di Smk Dan Keahlian Kewirausahaan Terhadap Niat Dan Sikap Kewirausahaan Siswa Smk Pelita Bandung
4	[46]	Pengaruh Dukungan Orang Tua, Harga Diri, Pengakuan Peluang, dan Jejaring terhadap Niat Berwirausaha di Kalangan Mahasiswa Manajemen di Kota Bandung
2	[47]	During The Covid-19 Pandemic, South Garut Developed A

		Marketing Plan For Sansevieria Ornamental Plants
1	[48]	Optimizing the Role of Business Incubators in Higher Education: A Review of Supporting Factors and Barriers

Table 4 presents a list of highly cited references from the literature on the role of technology in driving business innovation and growth in start-up enterprises. These references have garnered significant attention within the scholarly community, highlighting their influential contributions to the field. The discussion of these highly cited works provides insights into the foundational concepts and theories that have shaped the discourse on technology-driven innovation and growth in start-ups. These highly cited references collectively reflect the evolution of thought and theory within the field of technology-driven innovation and growth in start-ups. They have shaped key concepts such as open innovation, ambidexterity, lean methodologies, and the role of sustainability, providing a solid foundation for further research and discussions. The influence of these works underscores their significance in guiding both academic inquiry and practical approaches to leveraging technology for innovation and growth in start-up enterprises.

Table 5. Keywords Results

Most occurrences		Fewer occurrences	
Occurrences	**Term**	**Occurrences**	**Term**
942	Innovation	20	Digital transformation
126	Business Model	19	Creativity
109	Performance	19	Sustainable
56	Open innovation	19	Disruptive innovation
47	Idea	18	Barrier
45	Innovative start	16	Business incubator
43	Variation	15	Large company
39	Innovation process	14	Innovation ecosystem
38	Network	14	Behaviour
32	Start-up	13	Product iinovation
31	University	13	Radical innovation
29	Economy	11	Social innovation
27	Resource	11	Start-up company
26	Framework	10	Small business
25	Lean Start	10	New business model

Table 5 presents a compilation of keywords extracted from the analyzed literature on the role of technology in driving business innovation and growth in start-ups. The keywords are categorized into two columns based on their frequency of occurrence: "Most occurrences" and "Fewer occurrences." This discussion provides insights into the significance of the most frequently occurring keywords and highlights the contextual nuances represented by keywords with fewer occurrences.

4.1 Most Occurrences:

Innovation (942 occurrences): The prevalence of the term "innovation" underscores its central role in the discourse. It represents the core focus of the research, indicating the overarching theme of technology-driven innovation within start-ups.

Business Model (126 occurrences): The emphasis on "business model" suggests a recognition of the fundamental importance of aligning technology strategies with innovative business models to drive growth and competitiveness.

Performance (109 occurrences): The high occurrence of "performance" signifies the significance of assessing the outcomes and impact of technology-driven innovation on start-up success and growth.

Open Innovation (56 occurrences): The presence of "open innovation" highlights the acknowledgment of collaborative and boundary-spanning innovation processes that leverage external knowledge sources.

Idea (47 occurrences): The term "idea" suggests a focus on the ideation phase of innovation, reflecting the importance of creative thinking and idea generation in the start-up ecosystem.

4.2 Fewer Occurrences:

Digital Transformation (20 occurrences): The term "digital transformation" is indicative of the growing recognition of the profound impact of technology on reshaping entire industries and business models.

Creativity (19 occurrences): The emphasis on "creativity" highlights the essential role of creative thinking and originality in driving technology-driven innovation within start-ups

Sustainable (19 occurrences): The presence of "sustainable" underscores the increasing consideration of environmentally and socially responsible innovation practices within the start-up landscape.

Disruptive Innovation (19 occurrences): The focus on "disruptive innovation" signifies an understanding of how technological advancements can disrupt traditional markets and create new opportunities.

Barrier (18 occurrences): The term "barrier" suggests an exploration of challenges and obstacles that start-ups may face when integrating technology-driven innovations.

The varying occurrences of keywords reflect the multidimensional nature of the topic and the diverse perspectives within the literature. While some terms represent overarching concepts such as "innovation" and "business model," others highlight specific dimensions like "digital transformation" and "disruptive innovation." The presence of terms related to creativity, sustainability, and barriers indicates a recognition of the complexities and considerations involved in driving technology-driven innovation and growth within start-ups.

In conclusion, Table 5's keywords results provide a snapshot of the thematic landscape within the literature. The prevalence of certain terms underscores the fundamental concepts that underpin the field, while the occurrence of less frequent terms reveals emerging and contextualized aspects of technology-driven innovation and growth in start-up enterprises. These keywords collectively contribute to a comprehensive understanding of the multifaceted relationship between technology, innovation, and growth within the dynamic start-up ecosystem.

CONCLUSION

The exploration of technology's role in driving business innovation and growth within start-ups has yielded valuable insights into the mechanisms that underpin their success. Through the lens of bibliometric analysis, this study has illuminated key dimensions of this relationship, highlighting influential authors, institutional hubs, and prominent journals within the field. The thematic clusters unveiled through co-citation and keyword analysis showcase the diversity of perspectives and trends that have shaped scholarly discourse.

It is evident from the analysis that technology acts as a catalyst for innovation, serving as both a driver and enabler of growth in start-ups. The evolving nature of innovation processes, influenced by digital transformation and open collaboration, has redefined the strategies and approaches start-ups employ to disrupt markets and create value. The emergence of sustainability, barriers, and novel business models as focal points within the literature reflects the adaptive nature of start-ups as they navigate complex business landscapes.

This study's findings hold implications for researchers, practitioners, and policymakers alike. By highlighting the seminal works and influential thought leaders, this analysis guides future research directions and encourages cross-disciplinary collaboration. Moreover, the insights into prevalent themes and emerging considerations provide entrepreneurs and start-up leaders with a roadmap to leverage technology strategically for innovation and growth. Ultimately, as the start-up ecosystem continues to evolve, the symbiotic relationship between technology and innovation remains a cornerstone for shaping the future of business.

REFERENCES

[1] M. Klačmer Čalopa, J. Horvat, and M. Lalić, "Analysis of financing sources for start-up companies," *Manag. J. Contemp. Manag. issues*, vol. 19, no. 2, pp. 19–44, 2014.

[2] S. Sharma and D. P. Goyal, "Entrepreneurial marketing strategies for small businesses: An exploratory study of start-up companies in India," *Indian J. Mark.*, vol. 50, no. 8–9, pp. 48–65, 2020.
[3] I. Linina, D. Arbidans, and V. Vevere, "Identification of business management improvement factors for start-up companies in Latvia in the conditions of globalization," in *SHS Web of Conferences*, 2021, vol. 129, p. 8011.
[4] A. Azmy and A. Priyono, "Leadership Roles For Improving Employee Productivity at Digital Start-Up Company," *J. Manaj. Bisnis*, vol. 13, no. 1, pp. 16–27, 2022.
[5] W. Liu, Y. Liang, X. Bao, J. Qin, and M. K. Lim, "China's logistics development trends in the post COVID-19 era," *Int. J. …*, 2022, doi: 10.1080/13675567.2020.1837760.
[6] W. Jing, "Construction of an E-commerce system based on 5G and Internet of Things technology," *… Inf. Syst. Supply Chain Manag. …*, 2022.
[7] S. Fatonah and A. Haryanto, "Exploring market orientation, product innovation and competitive advantage to enhance the performance of SMEs under uncertain evens," *Uncertain Supply Chain Manag.*, vol. 10, no. 1, pp. 161–168, 2022.
[8] S. Supriandi, "PENGARUH MODAL SOSIAL, KAPABILITAS FINANSIAL, ORIENTASI KEWIRAUSAHAAN TERHADAP DAYA SAING BISNIS BERKELANJUTAN SERTA IMPLIKASINYA PADA KINERJA UMKM INDUSTRI KULINER DI KOTA SUKABUMI." Nusa Putra, 2022.
[9] - Kurniawan, A. Maulana, and Y. Iskandar, "The Effect of Technology Adaptation and Government Financial Support on Sustainable Performance of MSMEs during the COVID-19 Pandemic," *Cogent Bus. Manag.*, vol. 10, no. 1, p. 2177400, 2023.
[10] V. Semenova, "Entry Dynamics of Startup Companies and the Drivers of Their Growth in the Nascent Blockchain Industry," 2021.
[11] S. Li, "Promotional strategies of media startup companies," 2016.
[12] R. Verma, J. Verma, and R. Kumari, "Role of Technology Business Incubator (TBI) in Sustaining Start-Ups: The Case of Startup Incubation and Business Innovation Lab (SIBIL)," *Manag. Disruptions Bus. Causes, Conflicts, Control*, pp. 421–432, 2022.
[13] R. Vaz, J. V. de Carvalho, and S. F. Teixeira, "Towards a Unified Virtual Business Incubator Model: A Systematic Literature Review and Bibliometric Analysis," *Sustainability*, vol. 14, no. 20, p. 13205, 2022.
[14] M. Sánchez-Robles, J. R. Saura, and D. Ribeiro-Soriano, "Overcoming the challenges of cooperative startups businesses: insights from a bibliometric network analysis," *Rev. Manag. Sci.*, pp. 1–32, 2023.
[15] A. Krupskaya, "New service development in knowledge intensive business services: dynamic links between knowledge base, performance and innovation," 2018.
[16] L. Tchuta and F. Xie, "Towards a synergic innovation management model: the interplay of market, technology, and management innovations," *Int. J. Bus. Econ. Dev.*, vol. 5, no. 1, 2017.
[17] L. Khikhadze, "The relevance of using digital and cognitive technologies in small businesses in the conditions of a global pandemic.," *Econ. Bus.*, no. 3, 2022.
[18] D. M. H. Kee, Y. M. Yusoff, and S. Khin, "The role of support on start-up success: a PLS-SEM approach," *Asian Acad. Manag. J.*, vol. 24, pp. 43–59, 2019.
[19] L. Xia and S. Liu, "Intelligent IoT-based cross-border e-commerce supply chain performance optimization," *Wireless Communications and Mobile Computing*. hindawi.com, 2021.
[20] I. P. Chochliouros, M. A. Kourtis, A. S. Spiliopoulou, and ..., "Energy efficiency concerns and trends in future 5G network infrastructures," *Energies*, 2021.
[21] D. Basu, R. Datta, and U. Ghosh, "Softwarized network function virtualization for 5g: Challenges and opportunities," *Internet Things Secur. Smart …*, 2020.
[22] R. Singh, A. Gehlot, S. V Akram, L. R. Gupta, M. K. Jena, and ..., "Cloud manufacturing, internet of things-assisted manufacturing and 3D printing technology: reliable tools for sustainable construction," *Sustainability*, 2021.
[23] N. Somsuk, T. Laosirihongthong, and M. W. McLean, "Strategic management of university business incubators (UBIs): Resource-based view (RBV) theory," in *2012 IEEE 6th International Conference on Management of Innovation and Technology, ICMIT 2012*, 2012, pp. 611–618. doi: 10.1109/ICMIT.2012.6225876.
[24] M. Phiri, "Exploring digital marketing resources, capabilities and market performance of small to medium agro-processors. A conceptual model," *J. Bus. Retail Manag. Res.*, vol. 14, no. 2, 2020.
[25] F. D. Modau, N. Dhanpat, P. Lugisani, R. Mabojane, and M. Phiri, "Exploring employee retention and intention to leave within a call centre," *SA J. Hum. Resour. Manag.*, vol. 16, no. 1, pp. 1–13, 2018.

[26] Y. Iskandar, "Strategic Business Development of Polosan Mas Ibing with the Business Model Canvas Approach," in *International Conference on Economics, Management and Accounting (ICEMAC 2021)*, 2022, pp. 164–179.
[27] H. M. Al-Mubaraki and M. Busler, "Business incubators: Findings from a worldwide survey, and guidance for the GCC states," *Glob. Bus. Rev.*, vol. 11, no. 1, pp. 1–20, 2010, doi: 10.1177/097215090901100101.
[28] A. Haidine, F. Z. Salmam, A. Aqqal, and ..., "Artificial intelligence and machine learning in 5G and beyond: a survey and perspectives," *… Technol. 5G …*, 2021.
[29] A. N. Toosi, R. Mahmud, Q. Chi, and ..., "Management and orchestration of network slices in 5G, fog, edge and clouds," *Fog Edge Comput. …*, 2019.
[30] S. A. A. Shah, E. Ahmed, M. Imran, and ..., "5G for vehicular communications," *IEEE Commun. …*, 2018.
[31] T. Qoriawan and I. D. Apriliyanti, "Exploring connections within the technology-based entrepreneurial ecosystem (EE) in emerging economies: understanding the entrepreneurship struggle in the Indonesian EE," *J. Entrep. Emerg. Econ.*, no. ahead-of-print, 2022.
[32] A. Cavallo, A. Ghezzi, and R. Balocco, "Entrepreneurial ecosystem research: Present debates and future directions," *Int. Entrep. Manag. J.*, vol. 15, pp. 1291–1321, 2019.
[33] R. Purbasari, H. A. Muhyi, and I. Sukoco, "Actors and their roles in entrepreneurial ecosystem: a network theory perspective: cooperative study in Sukabumi, West Java," *Rev. Integr. Bus. Econ. Res.*, vol. 9, pp. 240–253, 2020.
[34] P. Ratih, W. Chandra, and R. Ning, "The impact of the entrepreneurial ecosystem on regional competitive advantage: A network theory perspective," *Russ. J. Agric. Socio-Economic Sci.*, vol. 83, no. 11, pp. 49–63, 2018.
[35] S. Kraus, C. Palmer, N. Kailer, F. L. Kallinger, and J. Spitzer, "Digital entrepreneurship: A research agenda on new business models for the twenty-first century," *Int. J. Entrep. Behav. Res.*, vol. 25, no. 2, pp. 353–375, 2019, doi: 10.1108/IJEBR-06-2018-0425.
[36] D. M. Hechavarria and A. Ingram, "A review of the entrepreneurial ecosystem and the entrepreneurial society in the United States: An exploration with the global entrepreneurship monitor dataset," *J. Bus. Entrep.*, vol. 26, no. 1, pp. 1–35, 2014.
[37] H. W. Chesbrough, *Open innovation: The new imperative for creating and profiting from technology*. Harvard Business Press, 2003.
[38] J. Tidd and J. R. Bessant, *Managing innovation: integrating technological, market and organizational change*. John Wiley & Sons, 2020.
[39] W. J. Abernathy and J. M. Utterback, "Patterns of industrial innovation," *Technol. Rev.*, vol. 80, no. 7, pp. 40–47, 1978.
[40] C. A. O Reilly and M. L. Tushman, "The ambidextrous organization," *Harv. Bus. Rev.*, vol. 82, no. 4, pp. 74–83, 2004.
[41] R. Rothwell, "Towards the fifth-generation innovation process," *Int. Mark. Rev.*, vol. 11, no. 1, pp. 7–31, 1994.
[42] C. Lee, K. Lee, and J. M. Pennings, "Internal capabilities, external networks, and performance: a study on technology-based ventures," *Strateg. Manag. J.*, vol. 22, no. 6-7, pp. 615–640, 2001.
[43] R. Nidumolu, C. K. Prahalad, and M. R. Rangaswami, "Why sustainability is now the key driver of innovation," *Harv. Bus. Rev.*, vol. 87, no. 9, pp. 56–64, 2009.
[44] S. Blank, "Why the lean start-up changes everything." Harvard Business Review, 2018.
[47] A. Y. Rukmana, R. Meltareza, B. Harto, O. Komalasari, and N. Harnani, "Optimizing the Role of Business Incubators in Higher Education: A Review of Supporting Factors and Barriers," *West Sci. Bus. Manag.*, vol. 1, no. 03, pp. 169–175, 2023.
[48] A. Y. Rukmana, "ANALISIS PENGARUH PEMBELAJARAN DI SMK DAN KEAHLIAN KEWIRAUSAHAAN TERHADAP NIAT DAN SIKAP KEWIRAUSAHAAN SISWA SMK PELITA BANDUNG." Tesis Program Magister Management Universitas Widyatama Bandung, 2017.
[49] A. Y. Rukmana, R. Bakti, H. Ma'sum, and L. U. Sholihannnisa, "Pengaruh Dukungan Orang Tua, Harga Diri, Pengakuan Peluang, dan Jejaring terhadap Niat Berwirausaha di Kalangan Mahasiswa Manajemen di Kota Bandung," *J. Ekon. Dan Kewirausahaan West Sci.*, vol. 1, no. 02, pp. 89–101, 2023.
[50] F. Sudirjo, P. A. A. N. Putri, A. Y. Rukmana, and E. S. Hertini, "DURING THE COVID-19 PANDEMIC, SOUTH GARUT DEVELOPED A MARKETING PLAN FOR SANSEVIERIA ORNAMENTAL PLANTS," *J. Ekon.*, vol. 12, no. 02, pp. 1066–1075, 2023.