International Journal of Management, Public Policy and Research
International, Peer Reviewed journal
E-ISSN: 2583-3014

UNLEASHING INNOVATION: THE TRANSFORMATIVE ROLE OF TECHNOLOGY IN ENTREPRENEURSHIP START-UPS A SYSTEMATIC LITERATURE REVIEW

Balvir Kumar*, Dr. S.S Sodha

Ph.D. Research Scholar, S.D School of Commerce, Gujarat University

Professor, S.D School of Commerce, Gujarat University

ABSTRACT
Technology plays an indispensable role in the field of entrepreneurship, holding significant value in the modern business environment. It serves as a catalyst for transformation, driving innovation, fostering growth, and providing a competitive edge for entrepreneurial ventures. Understanding the critical role of technology in entrepreneurship is essential for entrepreneurs, policymakers, and other key stakeholders. A systematic literature review serves as an effective method to highlight this importance. The goal of such a review is to present a comprehensive synthesis of existing knowledge about the impact of technology on entrepreneurial activities.
This methodology involves a thorough examination of a wide range of academic sources to identify major themes, emerging patterns, and research gaps within the field. The review investigates the influence of technology on various aspects of entrepreneurship, including the start-up process, business model development, market dynamics, and innovation. It also examines factors that affect decisions related to technology adoption and explores the challenges entrepreneurs face in leveraging technology.
Additionally, the review delves into the specific roles and contributions of various technologies such as artificial intelligence, blockchain, the Internet of Things, cloud computing, and social media within the entrepreneurial context. The insights derived from this systematic analysis not only expand the existing body of knowledge but also highlight areas requiring further exploration. Moreover, the findings offer practical and policy-oriented recommendations for entrepreneurs, educators, and policymakers to better navigate the intersection of technology and entrepreneurship.

Keywords: Start-ups Policy, Technology Disruption, Blockchain, AI, Remote work.

JEL Classification : L29, D23,D53

***Corresponding Author:** Mr. Balvir Kumar, School of Commerce, Gujarat University,Navrangpura, Ahmedabad, Gujarat, India, Pin-380009 Mob No: 9910602005,
email:balvirkumar@gujaratuniversity.ac.in,balvirdelhi@gmail.com

INTRODUCTION

In today's rapidly evolving and interconnected world, technology has become a pivotal driver of transformation, influencing nearly every aspect of life, including entrepreneurship. As the digital era advances, technology emerges as a dynamic catalyst, enabling entrepreneurial ventures to explore new frontiers and develop innovative solutions to complex challenges. Its profound influence on start-ups is evident in the redefinition of business models, market structures, and the very nature of innovation. The intersection of technology and entrepreneurship has ushered in groundbreaking changes, challenging traditional paradigms and creating unprecedented opportunities for growth and creativity. Effectively utilizing technology has become a key determinant of success and sustainability for entrepreneurial endeavors.
In the 21st century, entrepreneurs are navigating a digital revolution where access to advanced technologies is critical for achieving competitive advantages on a global scale. The integration of emerging technologies streamlines operational processes, empowers entrepreneurs to address complex problems, and drives disruptive innovation. Technology has transitioned from a supporting role to a strategic enabler, positioning businesses at the forefront of

innovation, accelerating growth, and uncovering untapped opportunities (Sharma et al., 2021). Cutting-edge technologies such as artificial intelligence, blockchain, cloud computing, and the Internet of Things have not only transformed industries but also disrupted conventional business models (Smith & Johnson, 2021). By democratizing entrepreneurship, the widespread availability of advanced technologies has provided opportunities for individuals from diverse backgrounds to develop groundbreaking solutions with global reach.

As technological advancements continue to reshape industries, they blur traditional sector boundaries, redefine market dynamics, and encourage entrepreneurs to embrace disruption as a pathway to success. The synergy between technology and entrepreneurship creates fertile ground for innovation and growth. Entrepreneurship, characterized by vision, adaptability, and the relentless pursuit of solutions, finds a powerful ally in technology (Suthar et al., 2024). This partnership has led to the emergence of tech-driven start-ups capable of disrupting established markets, introducing innovative business models, and addressing societal challenges with digital precision. Technology enables entrepreneurs to test, refine, and iterate their ideas at an unprecedented pace, creating products and services that align with rapidly changing consumer needs. The flexibility provided by technology fosters a culture of experimentation, where failure is embraced as an essential component of the learning process, ultimately driving transformative breakthroughs (Sharma & Suthar, 2020).

To comprehensively explore the multifaceted impact of technology on entrepreneurship, a systematic literature review (SLR) offers methodological depth and rigor. By synthesizing a broad range of academic studies, such a review highlights the nuances, opportunities, and challenges associated with technology's role in entrepreneurial ventures. This systematic approach moves beyond fragmented examples and anecdotal narratives to provide a cohesive understanding of technology's influence across various phases of entrepreneurship, from ideation to scaling successful enterprises (Abera et al., 2024). The review serves as a guide through the dynamic landscape of technological entrepreneurship, identifying emerging trends and research gaps that require further attention (Suthar, Negussie, & Vaghela, 2024).

This study establishes a foundational resource for policymakers, educators, and entrepreneurs to navigate the transformative landscape of technology-driven entrepreneurship. It explores technology's role as a disruptive force, reshaping industries and redefining norms. Additionally, it examines how technology influences different stages of the start-up process, including growth, innovation, and market entry. The adoption of technology-driven business models is analyzed to reveal their strategic advantages for entrepreneurial ventures (Suthar & Sharma, 2022). Furthermore, the dynamic interplay between technology and market dynamics is investigated, illustrating how technology disrupts traditional markets and reshapes consumer behaviour. Although existing literature reviews have examined aspects of technology in the context of start-ups, there remains a gap in studies specifically focused on the relationship between technology and new ventures. This research aims to bridge that gap by conducting an SLR that systematically examines the extensive body of prior research on the role of technology in new ventures. The review seeks to address two primary research questions (RQs):

RQ1: What is the research profile of prior literature examining technology in new ventures?
RQ2: What are the prevalent research themes in the existing literature on the role of technology in new ventures?

Guided by a systematic content analysis, this study delves into the diverse body of work on technological entrepreneurship. Through this analysis, it aims to uncover valuable insights and perspectives that deepen our understanding of the transformative impact of technology on entrepreneurial ventures.

2. METHODOLOGY

Systematic reviews have become widely accepted across various disciplines, particularly in management, due to their ability to enhance research rigor (Dorn et al., 2016) and provide evidence-based insights (Tranfield et al., 2003; Suthar, Negussie, & Vaghela, 2024). The systematic literature review (SLR) servesas a valuable method for gaining a comprehensive understanding of the research landscape in a specific field, offering an overview of existing studies (Snyder, 2019). Unlike traditional reviews, SLRs employ a predefined protocol for searching and analyzing literature, ensuring transparency and replicability (Battisti et al., 2021; Crous et al., 2022; Siddaway et al., 2019).They are highly effective in identifying and analyzing prior research within a particular domain,providing a reliable and transparent methodology for conducting reviews (Behera et al., 2019).Moreover, SLRs summarize the current evidence on a given topic, identify research gaps, andpropose conceptual frameworks (Dilipkumar Suthar, 2023).

Despite conducting an initial literature review, no existing review focusing on the relationshipbetween technology and start-ups was identified. Therefore, our study aims to achieve the following objectives: perform a descriptive

analysis of existing research on technology in the context of start-ups and identify and categorize key themes in literature.

To ensure objectivity and consistency, we followed a systematic process inspired by previoussystematic reviews (Tranfield et al., 2003) to investigate the literature on technology and start-ups. The steps involved in our review were as follows:

a) Planning the Review: We carefully planned and defined the scope of the review, includingthe research questions, inclusion and exclusion criteria, and search strategy.

b) Performing Data Extraction: We systematically extracted relevant data from the selectedstudies, including author information, publication details, research objectives, methodologies,and key findings.

c) Applying Screening Criteria: The selected studies were assessed against predefined screening criteria to ensure their relevance and quality.

d) Descriptive Analysis: Through a descriptive analysis, we summarized the findings and themes identified in the literature related to technology's impact on start-ups.

By following this methodological approach, we aim to provide a robust and comprehensive review of the literature on how technology influences start-ups. The systematic analysis will yield valuable insights into the current state of research in this area, highlight key themes and trends, and pinpoint areas that require further investigation. Ultimately, our study will contribute to the understanding of how technology shapes the landscape of start-ups and will serve as a valuable resource for entrepreneurs, policymakers, educators, and researchers alike.

Planning the Review:

In the planning stage of our systematic literature review, we carefully selected keywords that are relevant to the literature on technology and start-ups. To initiate our search, we performeda preliminary exploration on Scopus, using terms such as "technology," "start-ups," "new ventures," and "entrepreneurship." From the initial 250 results, we compiled an initial list of keywords that align with our research objectives.

Screening Criteria:

We then screened the titles and abstracts, eliminating duplicates and excluding publications that did not directly or indirectly address the relationship between technology and start-ups. While we acknowledge that microlending, microfinance, and entrepreneurial finance studies have explored technology-driven funding, they often encompass other funding sources as well.Hence, we focused solely on studies directly related to technology in the context of start-ups, excluding those that used terms like microfinance or entrepreneurial finance. This refined screening process (articles – 78) ensured that our search results exclusively pertained to technology's impact on start-ups.

3. THEMATIC ANALYSIS

To illuminate the current landscape of technology and start-up research, we employed a thematic analysis, a widely used qualitative research method. Thematic analysis is particularlyvaluable in systematic literature reviews as it helps in extracting key themes and identifying research gaps (Gaur and Kumar, 2018). We carefully examined the selected studies, considering their stated aims, propositions or hypotheses, results, discussions, and conclusions. Using a two-step process, we conducted open coding on all 58 articles, meticulously recording
the identified themes using Nvivo. To ensure transparency and replicability, we followed the systematic procedure outlined by Gioia et al. (2013) in identifying the themes, further enhancing the rigor and validity of our analysis. Thematic analysis allowed us to uncover common patterns and trends in the extant literature, shedding light on the various facets of technology and start-up research, and providing valuable insights into the transformative impact of technology in entrepreneurial ventures.

Through thematic analysis, we identified five predominant themes in the literature on technology and start-ups:(a) The Transformative Role of Technology in Entrepreneurial Ventures, (b) Technology and the Startup Process, (c) Factors Influencing Technology Adoption in Entrepreneurship, (d) Market Dynamics and Technology Disruption. These themesprovide valuable insights into how technology profoundly impacts and shapes the landscape ofstart-ups, driving innovation, growth, and competitive advantage.

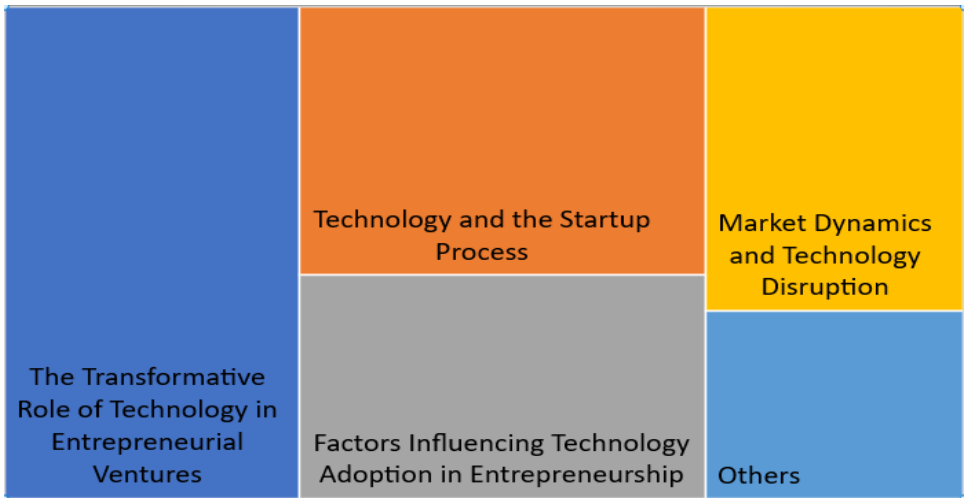

Figure 1 Major Themes identified in articles

3.1 The Transformative Role of Technology in Entrepreneurial Ventures

After an extensive literature review on the transformative role of technology in entrepreneurialventures, we have carefully selected 24 articles that offer invaluable insights about transformative role of technology in entrepreneurial ventures. The adoption of cutting-edge technologies in entrepreneurial ventures has demonstrated a transformative impact on variousaspects of their operations (Garrido-moreno, 2022). By embracing technologies like artificial intelligence, data analytics, and blockchain, start-ups have unlocked opportunities for increased innovation, leading to the development of novel business models and innovative products/services(Muhyudi et al., 2021). Such technological advancements have also facilitated the streamlining of operations, resulting in improved efficiency within these ventures(Tobon-Valencia et al., 2022). This tech-driven transformation extends beyond innovation, as research shows that technology-focused start-ups possess the potential to disrupt traditional industries(Zhou et al., 2022). By leveraging technology to offer innovative solutions, they can challenge established players and carve out new market spaces. Consequently, investors are drawn to these technology-driven start-ups, viewing them as attractive investment opportunities. This interest translates into higher levels of funding and capital infusion, enabling these ventures to grow and scale more rapidly. Furthermore, technology plays a pivotal role in enhancing customer engagement and outreach(Masi et al., 2022). Leveraging digital marketing channels, social media, and online platforms, entrepreneurial ventures can connect with a broader audience and cultivate increased brand loyalty. Moreover, technology-driven strategies have been associated with higher customer retention rates, solidifying their market position. The transformative role of technology extends to facilitating collaboration and interaction within entrepreneurial ecosystems. Technology hubs, incubators, and accelerators provide critical resources, mentorship, and networking opportunities, fostering a supportive environment for tech-driven entrepreneurship. However, amidst these benefits, there are challenges and risks associated with technology adoption(Yaqub & Alsabban, 2023). Concerns over cybersecurity, data privacy, regulatory compliance, and the need for skilled talent to manage advanced technologies pose potential obstacles for these ventures. Despite these challenges, technology-driven entrepreneurship shows promise in addressing industry-specific challenges and pain points. For instance,technology has enabled the introduction of telemedicine platforms, wearable devices, and health monitoring apps in the healthcare sector, improving accessibility and healthcare delivery. Moreover, the positive impact of technology-driven ventures transcends financial success(Tajpour & Razavi, 2023). Start-ups focused on technology-driven sustainable solutions have garnered attention from investors and customers alike. These ventures have thepotential to create lasting impacts on society and the environment, aligning with the growing emphasis on sustainable business practices. In light of the COVID-19 pandemic, the importance of digital transformation and technology integration has become evident(Yaqub &Alsabban, 2023). Studies reveal that start-ups embracing digital transformation are more resilient during challenging economic conditions, enabling them to navigate uncertainties and adapt to new market realities. Overall, the transformative role of technology in entrepreneurialventures offers immense potential for innovation, disruption, and growth. However, it requiresa strategic approach to address challenges while embracing sustainable and resilient practices to make a lasting impact

on society and the market.

3.2 Technology and the Start-ups Process

In our thorough examination of the literature concerning the transformative role of technologyin entrepreneurial ventures, we have meticulously identified 20 articles that offer invaluable insights about technology and the start-ups process. Start-ups that embrace and effectively utilize advanced technologies are more likely to achieve success and long-term sustainability(Andra-teodora, 2023). The adoption of innovative technologies enables these ventures to innovate, streamline operations, and respond to market demands with greater efficiency. Moreover, technology-driven start-ups possess a higher potential to disrupt traditional industries by introducing novel market niches and challenging established players, thus gaining a competitive edge(Kaur & Chhibber, 2022). The facilitation of easier market access for start-ups is another advantage offered by technology. With online platforms, e- commerce, and digital marketing lowering entry barriers, entrepreneurs can now reach a globalcustomer base without requiring significant physical infrastructure(Pukala, 2019). Consequently, technology-focused start-ups tend to attract more funding and investment, as investors recognize the potential of scalable technology solutions, making such ventures moreappealing to venture capitalists and angel investors. In addition to market access and funding advantages, technology plays a pivotal role in driving product and service innovation among
start-ups. Advanced technologies like artificial intelligence, blockchain, and the Internet of Things enable the creation of unique and novel offerings tailored to specific customer needs. Technology's impact extends further into marketing strategies, where start-ups can implementtargeted digital marketing approaches to engage customers more effectively(Paul et al., 2021).Leveraging social media, content marketing, and data analytics allows start-ups to understandcustomer preferences better and enhance customer engagement. Internally, technology helps start-ups optimize their operations and reduce costs by employing automation, cloud computing, and software solutions, enabling them to focus on core business activities(Ghobakhloo & Iranmanesh, 2021). Moreover, technology facilitates the establishment of collaborative ecosystems, where co-working spaces, start-up incubators, and accelerators leverage technology to foster collaboration, networking, and knowledge sharing among entrepreneurs. Scalability is a key advantage of technology-driven start-ups, as they canrapidly expand their operations without being hindered by traditional physical infrastructure constraints. However, technology adoption also brings cybersecurity challenges and risks to start-ups(Sreenivasan et al., 2023). Addressing data privacy, protecting against cyber threats, and ensuring regulatory compliance become crucial considerations for tech-focused ventures. Lastly, technology has transformed human resource management in start-ups(Kaur & Chhibber, 2022). Remote work, digital collaboration tools, and online recruitment platforms have become integral components in building and managing startup teams. The cohesive integration of technology across various aspects of the start-up process underscores its transformative role in empowering entrepreneurial ventures to thrive and succeed in the dynamic and competitive business landscape.

3.3 Factors Influencing Technology Adoption in Entrepreneurship

Having conducted an extensive review of the literature on the transformative role of technologyin entrepreneurial ventures, we have identified 16 articles that provide invaluable insights intothe factors influencing technology adoption in entrepreneurship. Entrepreneurs' decisions regarding technology adoption are influenced by a multitude of factors, and among them, oneconsistent finding from research is the significance of perceiving tangible benefits and value indoing so(Horani et al., 2023). These benefits encompass increased efficiency, cost savings, improved product/service quality, and enhanced competitiveness, thus serving as a primary driver for their investment in new technologies(Muhyudi et al., 2021). Furthermore, entrepreneurs carefully consider the ease of use and compatibility of technology with their existing processes and systems, as technologies perceived as complex or incompatible may face resistance in adoption. Additionally, individual entrepreneurial characteristics, such as innovativeness, risk-taking propensity, and technology expertise, play a substantial role in shaping adoption decisions(Di Maria et al., 2022). Entrepreneurs characterized by a higher risk appetite and an inclination for innovation are more likely to become early adopters oftechnology(Pukala, 2019). Access to external support and resources, including financial incentives, government initiatives, mentorship programs, and technology training, significantlyencourages technology adoption in entrepreneurial ventures(Kaur & Chhibber, 2022). Moreover, the industry and market context, particularly in competitive and technologically advanced sectors, fosters a favourable environment for technology adoption(de Faria et al., 2021; Ghobakhloo & Iranmanesh, 2021; Kim et al., 2023). The influence of social networks and peer experiences cannot be underestimated, as positive stories within the

entrepreneurial community have a domino effect, motivating others to embrace similar technologies(Miah et al., 2023; Song et al., 2023). However, it is essential to recognize that financial constraints andcosts may pose barriers, especially for start-ups with limited resources. Additionally, the existing organizational culture and mindset play a vital role in shaping technology adoption, with ventures that value innovation and embrace change being more inclined to adopt new technologies(Sultana, 2021). Finally, the regulatory environment, encompassing data privacy and security regulations, can significantly impact technology adoption decisions, particularly in sectors that face stringent compliance requirements(Dehghani et al., 2022). In some instances, entrepreneurs may also be prompted to adopt technology in response to competitivepressures, as they fear falling behind competitors or aim to gain a competitive advantage. Collectively, these factors interact to influence technology adoption in the dynamic landscapeof entrepreneurial ventures.

3.4 Market Dynamics and Technology Disruption

Through an extensive examination of the literature on the transformative role of technology inentrepreneurial ventures, we have identified 18 articles that offer valuable insights into the market dynamics and technology disruption. The rapid advancement and widespread adoptionof technology have fundamentally reshaped industries and markets, leading to increased marketinstability and disruption(Yaqub & Alsabban, 2023). Traditional market leaders now find themselves facing formidable challenges from innovative start-ups that leverage cutting-edge technology to offer more efficient, customer-centric, and disruptive solutions. These start-upsare agile, nimble, and capable of swiftly adapting to changing market conditions, making themformidable competitors for established players(Bale 2023). As a consequence of technology disruption, the lifecycles of products and services have significantly shortened across numerousindustries. Research findings indicate that companies must now operate in a perpetual state ofinnovation and adaptation to keep pace with rapid technological advancements. Failure to embrace change and continuously evolve could leave businesses vulnerable to becoming obsolete in a dynamic and ever-evolving market landscape(Shi et al., 2022). One of the most profound effects of technology-driven disruption is the emergence of new and innovative business models that challenge traditional industry structures. Novel concepts, such as sharingeconomy platforms, subscription-based services, and platform-based businesses, have altered the dynamics of various sectors. These disruptive models have unlocked new value propositions, transformed consumer behaviour, and shifted the competitive landscape, blurringthe lines between traditional industries and sparking a convergence of sectors. In this fast-paced and technology-centric environment, competition has become fiercer than ever. Companies must navigate through the complexities of the technological landscape, constantly innovating and differentiating their offerings to retain market share and remain relevant. The ability to embrace change, adapt swiftly, and respond effectively to technological advancements is critical for survival and success in this highly dynamic market environment. Consumer behaviour has undergone a significant transformation due to technology disruption(Miah et al.,2023; Sudirjo & Tjahyadi, 2023). There is now a greater emphasis on digital interactions and personalized experiences. Consumers expect seamless, convenient, and tailored experiences across all touchpoints with a company. As a result, businesses must meticulously align their marketing strategies with these evolving consumer preferences to maintain relevance and buildlasting customer relationships. Moreover, technology disruption often leads to the convergence of industries. Technologies like artificial intelligence (AI), the Internet of Things (IoT), and blockchain have found applications in multiple sectors, effectively dissolving traditional
boundaries between industries(Cotrino et al., 2021; Frederico, 2023; Silva & Sehnem, 2022; Singh & Singh, 2023; Yaqub & Alsabban, 2023). This convergence presents both challenges and opportunities for businesses, as it requires them to explore new collaborative partnershipsand leverage cross-industry innovations to remain competitive. While technology disruption opens up new job opportunities in technology-related fields, it can also lead to job displacementin certain industries(Suthar, 2023). This phenomenon necessitates a focused effort on upskilling and reskillingthe workforce to address these challenges and ensure a smooth transition to a tech-driven economy. Additionally, the fast pace of technological advancements often outpaces regulatory frameworks, resulting in regulatory challenges for both established companies and innovative start-ups(Tobon-Valencia et al., 2022). Researchers have highlighted the need for agile and adaptable regulatory approaches that strike a balance between accommodating technological progress and safeguarding consumer interests while fostering fair competition. The combination of market dynamics and technology disruption has made digital transformation astrategic imperative for businesses(Muhyudi et al., 2021). Embracing digital technologies hasbecome paramount for companies to stay competitive, enhance operational efficiency, and caterto the evolving needs and preferences of customers in a

digital-first era. Finally, studies have demonstrated that collaboration and partnerships between established companies and start-ups play a crucial role in driving innovation and effectively responding to technology disruption(Suthar & Sharma, 2022). By leveraging each other's strengths, established firms and start-ups can collectively navigate the challenges of technology disruption, fostering a culture of open innovation and co-creation to thrive in an ever-changing market landscape.

4. CONCLUSION

In this systematic literature review, we set out to explore the profound impact of technology onentrepreneurship start-ups. Through a meticulous examination of prior research, we have gained valuable insights into the research profile and prevalent themes in the existing literature on the role of technology in new ventures. Firstly, our investigation revealed a rich and diverseresearch profile, characterized by a growing interest in understanding the intersection betweentechnology and entrepreneurship. Scholars from various disciplines have contributed to this body of knowledge, highlighting the interdisciplinary nature of the topic and its significance intoday's dynamic business landscape. Secondly, we identified four prominent themes that emerged from the existing literature. The first theme, "The Transformative Role of Technologyin Entrepreneurial Ventures," underscores how technology acts as a catalyst for innovation, market disruption, and business model transformation, enabling start-ups to create novel products and services that revolutionize traditional industries. The second theme, "Technologyand the Startup Process," delves into the crucial role technology plays in different stages of thestart-up journey. From ideation and product development to market entry and scaling, technology serves as an essential enabler that accelerates growth and enhances operational efficiency. The third theme, "Factors Influencing Technology Adoption in Entrepreneurship," examines the determinants and barriers affecting the adoption of technology by start-ups. Understanding these factors is crucial for entrepreneurs and policymakers alike, as it helps foster an ecosystem conducive to technology adoption and entrepreneurial success. Lastly, thefourth theme, "Market Dynamics and Technology Disruption," sheds light on how technology-driven disruptions reshape markets and industries. Start-ups leveraging technological advancements challenge traditional players, altering consumer behaviour and creating new market opportunities. In conclusion, this systematic literature review underscores the transformative power of technology in entrepreneurship start-ups. The identified themes provide a comprehensive framework for comprehending the complex interplay between technology and new ventures. As technology continues to evolve, understanding its role in entrepreneurship becomes increasingly essential for fostering innovation, sustainable growth, and competitiveness in the ever-changing business landscape. Future research in this field should continue to explore emerging technologies, evolving market dynamics, and the interconnections between technology adoption and entrepreneurial success. Armed with this knowledge, entrepreneurs, policymakers, and stakeholders can navigate the challenges and seize the opportunities presented by technology, paving the way for a vibrant and thriving entrepreneurial ecosystem.

5. REFERENCES

[1] Aggarwal, M., Nayak, K. M., & Bhatt, V. (2023). Examining the factors influencing fintechadoption behaviour of gen Y in India. Cogent Economics and Finance, 11(1). https://doi.org/10.1080/23322039.2023.2197699
[2] Abera, M., Marvadi, C., & Suthar, D. (2024). Digitization strategy and innovation performance of microfinance institutions: mediating role of innovation capability. Journal of Accounting and Organizational Change, June. https://doi.org/10.1108/JAOC-12-2023-0241
[3] Ahmed, H., & Ahmed, M. (2023). Influencing Factors on Adoption of Modern Agricultural Technology in Developing Economy Countries. Developing Country Studies, March. https://doi.org/10.7176/dcs/13-2-01
[4] Al-Edenat, M. (2023). Organizational competencies toward digital transformation at theevents of disruptive changes: an operational process innovation perspective.
[5] Competitiveness Review, 33(4), 690–710. https://doi.org/10.1108/CR-05-2021-0081
[6] Al-Hadrawi, B. K., & . A. R. J. (2022). The Relationship Between Vitality and Flourishing inthe workplace in the Industry 4.0. Journal of Contemporary Issues in Business and Government, 28(3), 890–909. https://doi.org/10.47750/cibg.2022.28.03.072
[7] Alqoud, A., Schaefer, D., & Milisavljevic-Syed, J. (2022). Industry 4.0: Challenges and Opportunities of Digitalisation Manufacturing Systems. Advances in Transdisciplinary Engineering, 25, 25–30. https://doi.org/10.3233/ATDE220560
[8] Andra-teodora, G. (2023). OF DIGITAL TRANSFORMATION IN THE LABOUR MARKET :UPSKILLING.

XXIX(3), 23–29. https://doi.org/10.2478/kbo-2023-0071
[9] Anggraini, F., Puttri, D., Novianti, N., & Helmi, S. (2023). Effect of Women's Entrepreneurship Practices on Information Communication Technology (ICT) AdoptionDuring the Covid-19 Pandemic: A Case Study in West Sumatra, Indonesia. Journal of Economics, Finance and Management Studies, 06(06). https://doi.org/10.47191/jefms/v6-i6-65
[10] Bajic, B., Rikalovic, A., Suzic, N., & Piuri, V. (2021). Industry 4.0 Implementation
[11] Challenges and Opportunities: A Managerial Perspective. IEEE Systems Journal, 15(1), 546–559. https://doi.org/10.1109/JSYST.2020.3023041
[12] Bale, V., & State-maharashtra, D.-P. (2023). " FROM STARTUPS TO SCALE-UPS : THE GROWTH OF SUSTAINABLE FINTECH VENTURES ". April.
[13] Basly, S., & Hammouda, A. (2020). Family Businesses and Digital EntrepreneurshipAdoption: A Conceptual Model. Journal of Entrepreneurship, 29(2), 326–364. https://doi.org/10.1177/0971355720930573
[14] Benitez, G. B., Ghezzi, A., & Frank, A. G. (2023). When technologies become Industry 4.0platforms: Defining the role of digital technologies through a boundary-spanning perspective. International Journal of Production Economics, 260(June), 1–7. https://doi.org/10.1016/j.ijpe.2023.108858
[15] Bou Hatoum, M., Nassereddine, H., & Dadi, G. (2023). Factors Influencing the Adoption ofConstruction 4.0 Technologies by Departments of Transportation. June, 371–382. https://doi.org/10.1061/9780784484883.033
[16] Cotrino, A., Sebastián, M. A., & González-Gaya, C. (2021). Industry 4.0 HUB: A
[17] collaborative knowledge transfer platform for small and medium-sized enterprises.
[18] Applied Sciences (Switzerland), 11(12). https://doi.org/10.3390/app11125548
[19] Cruzara, G., Junior, I. C., Sandri, E., Quandt, C. O., Innovation, S., & Capabilities, D. (2020).INDUSTRY 4 . 0 -A BIBLIOMETRIC ANALYSIS OF THE SCIENTIFIC OVERVIEW IN INDUSTRY 4 . 0 - A BIBLIOMETRIC ANALYSIS OF THE SCIENTIFIC OVERVIEW
[20] IN. October.
[21] Cucu, M., Panduru, D. A., & Preda, A. (n.d.). Exploring Business Leadership in a Start-up Active in the Construction Materials Industry. https://doi.org/10.2478/picbe-2023-0148
[22] Cukurova, M., Miao, X., & Brooker, R. (2023). Adoption of Artificial Intelligence in Schools: Unveiling Factors Influencing Teachers' Engagement. April, 151–163. https://doi.org/10.1007/978-3-031-36272-9_13
[23] Dilipkumar Suthar. (2023). Unveiling the Dynamics of Segment Reporting: a Systematic Literature Review. EPRA International Journal of Economic and Business Review, September, 38–46. https://doi.org/10.36713/epra14461
[24] de Faria, V. F., Santos, V. P., & Zaidan, F. H. (2021). The business model innovation andlean startup process supporting startup sustainability. Procedia Computer Science, 181(February 2023), 93–101. https://doi.org/10.1016/j.procs.2021.01.106
[25] De, G. (2023). POLYTECHNIQUE MONTRÉAL affiliée à l ' Université de Montréal Gestionde la transformation 4 . 0 au sein des PME manufacturières Département de mathématiques et de génie industriel Thèse présentée en vue de l ' obtention du diplôme de Philosophiæ Doctor Génie Industriel Décembre 2022. June. https://doi.org/10.13140/RG.2.2.12580.65928
[26] Dehghani, M., William Kennedy, R., Mashatan, A., Rese, A., & Karavidas, D. (2022). Highinterest, low adoption. A mixed-method investigation into the factors influencing organisational adoption of blockchain technology. Journal of Business Research, 149(May), 393–411. https://doi.org/10.1016/j.jbusres.2022.05.015
[27] Di Maria, E., De Marchi, V., & Galeazzo, A. (2022). Industry 4.0 technologies and circular economy: The mediating role of supply chain integration. Business Strategy and the Environment, 31(2), 619–632. https://doi.org/10.1002/bse.2940
[28] Dilanchiev, A., Chikvaidze, T., & Mercan, M. (2023). Factors Influencing Cryptocurrency Adoption in Georgia. Journal of Business, 11(2), 22–43. https://doi.org/10.31578/job.v11i2.211
[29] Education, E., Intention, E., Environment, F., Environment, S., & Support, B. D. (2023).
[30] FACTORS INFLUENCING ENTREPRENEURIAL INTENTIONS AND THE ROLE OF ENTREPRENEURSHIP EDUCATION IN INDIAN UNIVERSITIES : A STAKEHOLDER
[31] PERSPECTIVE Adil Ellikkal A , Sunderraj Rajamohan B Article history : Keywords : Entrepreneurship Education ; Entrepreneurial Intention ; Family Environment ; Business Development Support ; Factors Influencing Entrepreneurial Intentions and theRole of Entrepreneurship Education in Indian Universities : A Stakeholder Perspective. 1–20.

[32] Eliganur, B. (2023). A DESCRIPTIVE STUDY ON GOVERNMENT SCHEMES FORSTARTUP. June.
[33] Elnaggar, L. (2023). Readiness Factors of Organization for Industry 4 . 0 Bachelor ThesisAuthor : Lina Elnaggar. June. https://doi.org/10.13140/RG.2.2.36085.14568
[34] Figueiredo, R., Soares, R., & Ferreira, J. J. de M. (2020). Key Strategic Drivers for Business Digital Transformation. January 2020, 137–153. https://doi.org/10.4018/978-1-7998-
[35] 4552-2.ch006
[36] Frederico, G. F. (2023). ChatGPT in Supply Chains: Initial Evidence of Applications and Potential Research Agenda. Logistics, 7(2), 26. https://doi.org/10.3390/logistics7020026
[37] Garrido-moreno, A. (2022). ENTREPRENEURSHIP AND DIGITAL TRANSFORMATION : MANAGING DISRUPTIVE INNOVATION IN A (Issue August).
[38] https://doi.org/10.3389/978-2-88971-439-1
[39] Ghobakhloo, M., & Iranmanesh, M. (2021). Digital transformation success under Industry 4.0: a strategic guideline for manufacturing SMEs. Journal of Manufacturing Technology Management, 32(8), 1533–1556. https://doi.org/10.1108/JMTM-11-2020-
[40] 0455
[41] Halmosi, P. (2019). The role of the technology-oriented startups under Industry 4 . 0.
[42] December, 13–14.
[43] Heubeck, T. (2023). Managerial capabilities as facilitators of digital transformation?
[44] Dynamic managerial capabilities as antecedents to digital business model transformation and firm performance. Digital Business, 3(1), 100053. https://doi.org/10.1016/j.digbus.2023.100053
[45] Horani, O. M., Khatibi, A., AL-Soud, A. R., Tham, J., & Al-Adwan, A. S. (2023).
[46] Determining the Factors Influencing Business Analytics Adoption at Organizational Level: A Systematic Literature Review. Big Data and Cognitive Computing, 7(3), 125.https://doi.org/10.3390/bdcc7030125
[47] Hussin, H. H., Jemari, M. A., Kasuma, J., Yacob, Y., & Panie, R. (2018). Factors InfluencingE-Commerce Adoption Among Malay Women Entrepreneurs in Kuching Sarawak. Journal of Borneo-Kalimantan, 3(1). https://doi.org/10.33736/jbk.614.2017
[48] Jain, S., Sharma, P. P., Suthar, D., Maheria, S., & Vaghela, J. (2022). the Analogy of Sustainable Competitiveness of Saarc and G-Seven Nations. Towards Excellence, May, 185–203. https://doi.org/10.37867/te140118
[49] Kaur, K., & Chhibber, P. (2022). Conceptual Framework of Digital Transformation in HigherEducation an Emerging Trend. Edutech Enabled Teaching, July, 93–110. https://doi.org/10.1201/9781003254942-7
[50] Kewsuwun, N. (2023). Factors Influencing Information Technology Adoption of the Educational Opportunity Expansion Schools ' Teachers in Pattani Primary EducationalService Area in Pattani Province. April. https://doi.org/10.14456/jil.2023.8
[51] Kim, J., Jeong, H. R., & Park, H. (2023). Key Drivers and Performances of Smart Manufacturing Adoption: A Meta-Analysis. Sustainability (Switzerland), 15(8).https://doi.org/10.3390/su15086496
[52] Korie, N., Njeru, L., Mburu, J., & Gitau, G. (2023). Assessment of factors influencing adoption of tomato post-harvest loss-reduction technologies in Kaduna state, Nigeria.East African Journal of Science, Technology and Innovation, 4(2), 1–23. https://doi.org/10.37425/eajsti.v4i2.599
[53] Lobozynska, S., Vladychyn, U., & Skomorovych, I. (2023). Fi N a N Se Digital BankingTransformation Through. 85–101.
[54] Marcucci, G., Antomarioni, S., Ciarapica, F. E., & Bevilacqua, M. (2022). The impact of Operations and IT-related Industry 4.0 key technologies on organizational resilience.Production Planning and Control, 33(15), 1417–1431. https://doi.org/10.1080/09537287.2021.1874702
[55] Marengo, A. (2023). Investigating the Factors Influencing the Adoption of Blockchain Technology across Different Countries and Industries : A Systematic Literature Review. July. https://doi.org/10.3390/electronics12143006
[56] Masi, A., Carnevale, E., Brega, F., & Pero, M. (2022). The Impact of Industry 4.0 on SupplyChain Coordination in Engineer-To-Order Companies. Proceedings of the Summer School Francesco Turco, April 2023.
[57] Miah, M. S., Singh, J. S. K., & Rahman, M. A. (2023). Factors Influencing Technology Adoption in Online Learning among Private University Students in Bangladesh Post COVID-19 Pandemic. Sustainability (Switzerland), 15(4). https://doi.org/10.3390/su15043543
[58] Mohammadi, A., Saeedikondori, A., Ali, & Bin, N. A. (2017). Factors Influencing CloudComputing Adoption in.

Journal of ICT, 1(1), 21–41.
[59] Muhyudi, M., Maulida, M., ASEAN, K. A.-C. T., & 2021, undefined. (2021). The Strategic Role of Top Management Team (TMT) Digital Orientation in Digital Transformation ofManufacturing Industry. Atlantis-Press.Com, 198(January), 103–113. https://doi.org/10.2991/aebmr.k.211207.016
[60] Nagarcoil, T. (2023). Overview of industry 4.0. July.
[61] Nedelko, Z., & Mustafa, G. (2023). Contribution of industry 4.0 to sustainable development.
[62] May. https://doi.org/10.18690/um.epf.3.2023.75
[63] Nikou, S., Mezei, J., Brush, C., & Wraae, B. (2022). Factors Influencing EntrepreneurshipEducators' Pedagogical Choices—A Configurational Approach. Sustainability (Switzerland), 14(19), 1–15. https://doi.org/10.3390/su141912248
[64] Nordin, N. M., Koe, W.-L., Mohamed, N. A., & Rahman, S. A. A. (2023). Factors Influencing the Adoption of Online Marketing among Malaysian SMEs. Business Management and Strategy, 14(1), 93. https://doi.org/10.5296/bms.v14i1.20954
[65] Panda, S., & Sharma, A. (2023). Analyzing the Factors Influencing the Adoption of Integrated Pest Management (IPM) Technology in Cotton in Rajasthan. Indian Journal Of Agricultural Research, Of. https://doi.org/10.18805/ijare.a-5924
[66] Pang, C., & Wang, Q. (2023). How Digital Transformation Promotes Disruptive Innovation?Evidence from Chinese Entrepreneurial Firms. In Journal of the Knowledge Economy (Issue 0123456789). Springer US. https://doi.org/10.1007/s13132-023-01413-7
[67] Paul, S., Riffat, M., Yasir, A., Mahim, M. N., Sharnali, B. Y., Naheen, I. T., Rahman, A., &Kulkarni, A. (2021). Industry 4.0 applications for medical/healthcare services. Journalof Sensor and Actuator Networks, 10(3), 0–32. https://doi.org/10.3390/jsan10030043
[68] Pukala, R. (2019). Start-Ups as One of the Elements Triggering the Development of Industry
[69] 4.0. MATEC Web of Conferences, 297, 08002. https://doi.org/10.1051/matecconf/201929708002
[70] Reyes Zárate, G., & Lizette Garay Rondero, C. (2023). Experiential Learning for Industry 4.0 in Higher Education: a Challenge-based learning case study. Proceedings of the 6th International Conference on Intelligent Human Systems Integration (IHSI 2023) Integrating People and Intelligent Systems, February 22–24, 2023, Venice, Italy, 69(February). https://doi.org/10.54941/ahfe1002913
[71] Rossi, A. H. G., Marcondes, G. B., Pontes, J., Leitão, P., Treinta, F. T., De Resende, L. M.M., Mosconi, E., & Yoshino, R. T. (2022). Lean Tools in the Context of Industry 4.0:Literature Review, Implementation and Trends. Sustainability (Switzerland), 14(19). https://doi.org/10.3390/su141912295
[72] Saxena, A., Jain, R., & Mandal, A. (2022). Fintech in India: Current Status,Trends & Prospects. Journal of Business Management and Information Systems, 9(2), 21–28.https://doi.org/10.48001/jbmis.2022.0902004
[73] Sharma, P. P., & Suthar, D. (2020). Indian Global Leadership in Enforced Lockdown : Blossoming Industrial & Agricultural Opportunities Would Make India a Superpower Introduction : 7(February), 36–41.
[74] Sharma, P., Suthar, D., & Maheria, S. (2021). Artificial Intelligence Accounting Technology -Perception and Acceptance. Impact of Smart Technologies and Artificial Intelligence (AI) Paving Path towards Interdisciplinary Research in the Fields of Engineering, Arts, Humanities, Commerce, Economics, Social Sciences, Law and Management - Challenges and Opportunities, July.
[75] Shi, L., Mai, Y., & Wu, Y. J. (2022). Digital Transformation: A Bibliometric Analysis.
[76] Journal of Organizational and End User Computing, 34(7).https://doi.org/10.4018/JOEUC.302637
[77] Silva, T. H. H., & Sehnem, S. (2022). Industry 4.0 and the Circular Economy: Integration Opportunities Generated by Startups. Logistics, 6(1). https://doi.org/10.3390/logistics6010014
[78] Singh, H., & Singh, A. (2023). ChatGPT: Systematic Review, Applications, and Agenda for Multidisciplinary Research. Journal of Chinese Economic and Business Studies, 21(2), 193–212. https://doi.org/10.1080/14765284.2023.2210482
[79] Siswanto, V. K., Ulfa Aulia, B., Dadiara, A. R., Adlina, Y. Y. N., & Dzaki, H. M. (2020).
[80] Best practice of start up in Indonesia. IOP Conference Series: Earth and EnvironmentalScience, 562(1). https://doi.org/10.1088/1755-1315/562/1/012026
[81] Sohail, A., & Amin Ul Haq, M. (2022). Why Industry 4.0 Adoption is Unavoidable forSustainable Performance of Organizations? Pakistan Business Review, 23(3). https://doi.org/10.22555/pbr.v23i3.612
[82] Song, Y., Li, L., Sindakis, S., Aggarwal, S., Chen, C., & Showkat, S. (2023). Examining E- Commerce Adoption in Farmer Entrepreneurship and the Role of Social Networks: Datafrom China. In Journal of the Knowledge

Economy (Issue 0123456789). https://doi.org/10.1007/s13132-023-01379-6
[83] Sreenivasan, A., Ma, S., Rehman, A. U., & Muthuswamy, S. (2023). Assessment of Factors Influencing Agility in Start-Ups Industry 4.0. Sustainability (Switzerland), 15(9), 1–22.https://doi.org/10.3390/su15097564
[84] Sreenivasan, A., & Suresh, M. (2023). Factors influencing sustainability in start-ups operations 4.0. Sustainable Operations and Computers, 4(March), 105–118. https://doi.org/10.1016/j.susoc.2023.03.002
[85] Sudirjo, F., & Tjahyadi, I. (2023). Assessing Factors Influencing Online Shopping AdoptionAmong Indonesian Consumers: A Quantitative Study. West Science Interdisciplinary Studies, 1(05), 51–57. https://doi.org/10.58812/wsis.v1i05.73
[86] Sultana, N. (2021). An Assessment of Global Entrepreneurial Culture and Developing Entrepreneurship in India Through Business Incubation. August.
[87] Suntsova, O. (2022). Econometric and Digital Business Transformation in Industry 4.0 and
[88] 5.0 Concepts. Financial and Credit Systems: Prospects for Development, 2, 36–47. https://doi.org/10.26565/2786-4995-2022-2-04
[89] Suthar, D. (2023). SHINING A LIGHT ON FINANCIAL TRANSPARENCY: BIBLIOMETRIC INSIGHTS INTO SEGMENT REPORTING. EPRA International Journal of Multidisciplinary Research (IJMR)-Peer Reviewed Journal, 2, 198–210. https://doi.org/10.36713/epra2013
[90] Suthar, D., Negussie, D., Vaghela, J., Parmar, N., & Rahevar, M. (2024). Unveiling Multifaceted Impacts of Crowdfunding in Finance , Innovation , and Sustainability – Systematic Literature Review.
[91] Suthar, D., & Sharma, P. P. (2022). Perception of the Key Stakeholders of Education on the Acceptance of Edutech Platforms in Teaching-Learning Process Dilip. February, 1–6. https://doi.org/10.5281/zenodo.10906348
[92] Tineke Wehartaty, & Lena Ellitan. (2023). Building a digital workplace in the era of industry
[93] 4.0 and the digital economy. World Journal of Advanced Research and Reviews, 18(2), 207–217. https://doi.org/10.30574/wjarr.2023.18.2.0787
[94] Tobon-Valencia, E., Lamouri, S., Pellerin, R., & Moeuf, A. (2022). Modeling of the Master Production Schedule for the Digital Transition of Manufacturing SMEs in the Context of Industry 4.0. Sustainability (Switzerland), 14(19). https://doi.org/10.3390/su141912562
[95] Topal, M. H. (2017). The Journal of International Scientific Researches. The Journal of International Scientific Researches, 2(5), 9–23. https://orcid.org/0000-0003-2474-8913
[96] Utomo, A. A., Maulida, M., & Musa, S. (2023). Organizational Inertia, Digital Capabilities, Digital Transformation, and Firm Competencies. The South East Asian Journal of Management, 17(1), 130–144. https://doi.org/10.21002/seam.v17i1.1283
[97] Veres, C., & Moica, S. (2020). Industry 4 . 0 Implementation Model : Taking Steps TowardsIndustry 4 . 0 Implementation Model : Taking Steps Towards Digitization. September.
[98] Wang, D., Song, J., Sun, X., & Wang, X. (2022). A Study on the Impact of Boundary- Spanning Search on the Sustainable Development Performance of Technology Start- Ups. Sustainability (Switzerland), 14(15). https://doi.org/10.3390/su14159182
[99] Winarno, K. (2023). The Factors Influencing Technology Adoption Process of Farmers in Term of Agricultural Extension Policy Case in Central Java Indonesia. June. https://doi.org/10.14710/agrisocionomics.v7i2.16147
[100] Yaqub, M. Z., & Alsabban, A. (2023). Industry-4.0-Enabled Digital Transformation:Prospects, Instruments, Challenges, and Implications for Business Strategies.
[101] Sustainability (Switzerland), 15(11). https://doi.org/10.3390/su15118553
[102] Yesugade, A., Gupta, K., & Chopade, P. (2023). IMPETUS TO THE FINTECH IN INDIA -ATREND ANALYSIS. June.
[103] Zhao, Z., & Yan, Y. (2023). The Role of Organizational Unlearning in Manufacturing Firms'Sustainable Digital Innovation: The Mechanism of Strategic Flexibility and Organizational Slack. Sustainability, 15(13), 10371. https://doi.org/10.3390/su151310371
[104] Zhou, Y., Ma, J., Cao, D., & Wu, L. (2022). Startup Process Optimization of HydropowerUnit Based on Stress Measurement of Francis Turbine Runner. Frontiers in Energy Research, 10(May), 1–11. https://doi.org/10.3389/fenrg.2022.8856