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Unleashing entrepreneurial potential : The impact of innovation and technology

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Abstract

This article examines the impact of incubation on the advancement of innovation and entrepreneurship, utilising an extensive worldwide examination of published literature on research conducted on incubators. The paper commences by examining the role of incubators in cultivating start-up ecosystems. The study employed a case study approach to analyse government policies and processes in India, making it the first of its kind to provide a thorough analysis. The analysis of the study highlights the necessity of business incubation for promoting innovation, technology, and entrepreneurship in both developed and developing economies. However, their operational focus and performance standards differ from each other due to their distinct political and economic contexts.

Subject Classification: *62P25, 91B15, 91B55.*

Keywords: *Entrepreneurship, Technology, Innovation, Case study, Startup, Incubation centres.*

Introduction

The core objective of innovation, spanning from its conceptualization to the commercialization of a novel invention, whether it entails the development of a new product, process, or organizational framework,

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centres around enhancing the overall well-being of individuals by offering convenience [6]. Technology business incubation serves as a prime illustration of such a framework, wherein startups have the opportunity to translate their ideas into ambitious visions with the support and mentorship provided by an incubator [7].

The origins of this process can be traced back to the Batavia industrial center in New York around 1959, and today it can be observed worldwide. This incubation not only encourages the development of affordable and efficient innovations but also encompasses various other aspects such as job creation, advancement of technological capabilities, and fostering stronger collaboration in industry [11]. Many national governments see business incubators as adaptable instruments for supporting start-ups with the overarching goal of promoting employment and economic growth [31]. However, despite sharing a common structure, the concept of innovation varies significantly across different regions. In developing countries, it tends to be more radical in nature, emphasizing ground-breaking innovation, while in developed countries, it leans towards incremental improvements or import-based strategies. To bridge this gap, technology-based incubation programs serve as a hybrid approach, promoting cost-effective innovation in diverse areas such as healthcare, biotechnology, and robotics [23]. With robust government backing and an emphasis on innovation and technology, Japan and South Korea are the leaders in Asia. These nations' advanced incubation initiatives greatly increase their competitiveness on the world stage [8].

From a layperson's point of view, business incubation can be defined as a supportive process that helps and educates newly established companies, equipping them with the necessary tools and knowledge to navigate and succeed in the intensely competitive business environment of today [9]. The idea of an incubator can be compared to the care given to a premature baby placed in an incubator for a specific period to promote its growth and development. In a similar vein, this concept applies to startup businesses that need nurturing and support to overcome the challenges in the modern business landscape, ultimately guiding them towards success [2].

Incubation has emerged as a potent method for promoting economic advancement on a global scale, serving as a catalyst for initiating and nurturing companies [29]. A significant role in the success of the endeavours and promoting economic growth is accomplished by incubators by providing entrepreneurs with necessary expertise, networks, and resources [28]. Incubation is a vital driver of economic advancement

for a nation, contributing to various aspects such as the establishment of new businesses, job creation, industry development, technology transfer and commercialization from academic and research institutions, wealth generation, and the promotion of a techno-entrepreneurial culture [26]. Business incubation is a unique and flexible combination of processes, resources, and individuals designed to assist entrepreneurs and support the growth and development of new and small businesses, products, and innovations during their early stages [32].

In India, the process of incubation has been advancing with the introduction of the Atal Innovation Mission (AIM), an initiative of the government managed by Niti Aayog, which was established in 2016 [27]. Its core aim is to instill an innovative mindset in the entrepreneurial ecosystem and the MSME sectors throughout the country. Incubators have a vital role to play in this mission as they serve as catalysts for innovation and entrepreneurship. By promoting the exchange of ideas and facilitating the transformation of concepts into practical solutions, incubators make a valuable contribution to the economy [38]. The Atal Innovation Mission, a dynamic initiative backed by NITI Ayog, is designed to foster a culture of innovation by promoting collaboration between industries, and incubation centers. Its main objective is to enhance the linkages between corporations, and incubators in order to nurture innovation, startups, and scalable technologies across diverse sectors such as manufacturing, agriculture, energy, water, cyber security, health, education, and waste management [1].

Thus, in conclusion we have identified a research gap that there are differences in polices and guidelines for entrepreneurial development in developed and developing nations and India being the world's fastest-growing economy, this article focuses on India's incubation landscapes while also comparing and contrasting them with those of other industrialised nations [5],[3],[8],[37]. It specifically examines the funding sources and financial services provided by incubators to their client firms. Numerous nation-states perceive business incubators as potent instruments to cultivate new enterprises with the overarching goals of promoting economic growth and generating employment opportunities [5].

Review of Literature

The idea was first conceived in 1959 when Joseph Mancuso established the Batavia Industrial Centre in New York to offer low-cost office space and assistance to businesses. In the 1960s and 1970s, similar initiatives to

commercialize research began to appear in Europe and the United Kingdom; these projects were usually carried out in conjunction with academic institutions [8]. Particularly in the US, the 1980s were a time of expansion thanks to pro-business economic policies. Diversification increased in the 1990s, especially with the emergence of tech-focused incubators fueled by the internet boom. To support student entrepreneurs, universities have expanded their role by setting up incubators [35].

Business incubation in India has undergone tremendous development, mirroring the nation's increasing emphasis on promoting entrepreneurship and innovation. To institutionalise incubation, the National Science & Technology Entrepreneurship Development Board (NSTEDB) was founded in 1982 [38]. In the 2000s, technology business incubators (TBIs) and incubation centres at top universities like the Indian Institutes of Technology (IITs) and Indian Institutes of Management accelerated the evolution. In addition to infrastructure, these centres offered coaching, networking, and investment for businesses. In the decade of 2010, the incubation environment became more diverse as private sector efforts and foreign collaborations entered the scene [17]. The introduction of government initiatives like Atal Innovation Mission (AIM) and the Startup India initiative in 2016 significantly boosted support for incubators by providing funding, policy assistance, and infrastructure development [27].

In recent years, India has witnessed significant advancements in its entrepreneurial landscape. The country's growing economy, improved access to capital, and targeted government initiatives aimed at supporting SMEs have contributed to the thriving startup ecosystem. As a result, India has emerged as a prominent global hub for startups, characterized by a vibrant entrepreneurial environment [27]. The number of registered startups in India has surpassed 50,000 in the past decade alone, highlighting the remarkable growth of the sector [27].

WIPO, [40] concluded that innovation plays a crucial role in driving the growth of entrepreneurship, and its importance in the success of startups is widely recognized. A study conducted by the World Intellectual Property Organization (WIPO) revealed that India ranks third globally in terms of innovation. This ranking highlights the immense potential of India to become a leading global hub for innovation. Khokhawala & Iyer, [17] revealed that a positive connection between innovation and the success of startups in India. The findings emphasized that startups that prioritize innovation have a higher likelihood of securing venture capital funding and exhibiting a greater survival rate compared to startups that

do not prioritize innovation in their strategies. Lala & Sinha, [19] observed to underscore the significance of innovation and technology in promoting entrepreneurship in the agriculture sector, particularly among small and marginal farmers. The study's findings recommend that policymakers prioritize the promotion of innovation and technology adoption in Indian agriculture to foster entrepreneurship and support overall sectoral development. Analysis conducted by NASSCOM in 2023, it was projected that the valuation of the Indian technology startup ecosystem would reach $1 trillion by 2025 [25]. The study further predicts that the number of startups in India will exceed 100,000 during the same period. NITI Aayog, [27] provided the Indian government has implemented several initiatives to promote innovation and technology-driven entrepreneurship. One prominent program is Startup India, launched in 2016, aimed at providing financial aid, mentorship, and support to startups. Another significant initiative is the Atal Innovation Mission, which focuses on fostering innovation and entrepreneurship among peoples. The mission offers funding, mentorship, and valuable resources to nurture young innovators and entrepreneurs. Al-Mubaraki et al., [3] proposes that there will be several optimistic results with the successful execution of incubation programme, including: (1) a boost in economic development through the generation of employment opportunities; (2) a stronger entrepreneurial ecosystem; (3) a sustainable market presence and high survival rate companies; (4) accelerated innovation through the creation of smart products and services; and (5) economic diversification facilitated by the innovation and technology outcomes of companies. Al-Mubaraki et al., [4] specified that the effective implementation of innovation plans results in establishment of successful startup companies through expansion of networking opportunities, effective planning, enhanced financing, employment generation and also supports technological entrepreneurship and research commercialization. [18],[31] proposes that innovation programs should bolster the resources essential for a contemporary economy that is knowledge-based and encourages intelligent development. A conceptual framework (as shown below in figure 1) for the processes implemented in incubation centers for the advancement of entrepreneurial endeavors'. Hsu & Pivec, [14] examined the embracing a multi-stakeholder approach that emphasizes collaboration among entrepreneurs, non-profit organizations, consumers, government, and industry players. This approach is seen as vital for achieving sustainability goals in social, economic, and environmental aspects. By integrating sustainability and profitability, the aim is to preserve local heritage, boost exports, create

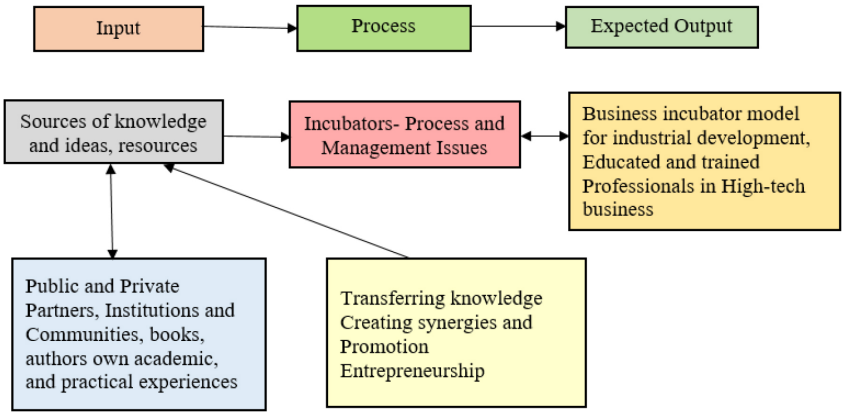

Figure 1

A theoretical framework for process followed at incubation Centers (in general) for development entrepreneurship.

jobs, and foster stakeholder engagement. Furthermore, the author highlights the significance of sustainable innovations in achieving successful ventures. Choudhary and Datta [10] aimed to the pivotal role of entrepreneurial activity in driving economic growth through innovation and job creation. They emphasize the importance of fostering innovation alongside supportive entrepreneurship and innovation policies to promote economic growth. It highlights the transformative role of entrepreneurial activity in converting existing knowledge into economic know[21].

Research Methodology

The data for this research paper will be collected using secondary sources such as academic journals, reports, and publications related to entrepreneurship development, innovation, and technology adoption. Qualitative research methodology places emphasis on developing a naturalistic approach to evaluate a problem or situation in its authentic environment, relying on the subjective understanding of the evaluators to present an interpretation. Patnaik & Pandey, [30] categorizes various approaches into narrative research, phenomenology, ethnography, grounded theory, and case studies in qualitative inquiry. The research methodology employed is qualitative data analysis using case study model. Case study method has a significant historical background as a systematic investigation, with its inception ascribed to early twentieth-

century studies conducted in the fields of anthropological research and social sciences [13],[17],[41].

Exploring Innovative Business Practices: A Case Study of India

Given India's position as one of the world's fastest-growing economies, it is imperative to establish a framework that promotes novelty, entrepreneurship and enables the effective implementation of profitable ideas through a supportive startup ecosystem. This responsibility falls not only on the government but also on the private sector and research institutions, all of whom should actively encourage the integration of innovative startups. Through this collaborative effort, India can position itself as a leading player in the field of innovation [36].

In a prior investigation carried out by [33], involving 11 entrepreneurs from India, it was noted that these business proprietors are actively embracing innovation as a strategy to maintain their market presence and explore new markets. While entrepreneurs express the need for policy reforms and governmental backing, the researchers also propose a restructuring of the higher education system to equip the workforce with the essential skills to incorporate into the market requirements. Improving performance is the main objective behind the adoption of innovative practices [41].

The NITI Aayog report emphasizes that India has a favourable position to establish a top-notch innovation and entrepreneurial ecosystem, enabling individuals to leverage technological advancements and build sustainable businesses [27]. Extensive utilization of technologies such as big data analytics, machine learning and artificial intelligence assists the nation making it path clear towards successful implementation of vision of Industry 4.0. In addition, a significant knowledge base with a huge youth population, makes India superior to any other nation. However, research on innovation and entrepreneurship in rural areas remains limited in scope. In a comprehensive study by Lala & Sinha, [19] involving multiple cases, highlights that tailored innovation for rural contexts not only addresses poverty but also contributes to overall community development.

According to the India Innovation Index 2023 report by NITI Aayog, in spite of the difficulties due to pandemic, India has demonstrated resilience in maintaining its progress. While the concept of innovation is often associated with enhancing company performance, at the country level, with broader objectives of poverty reduction, social mobility and

decrease in inequality [39]. A significant growth in the number of recognized start-ups is highlighted in the report, reaching a total of 61,400 among them in financial year 2021-22 alone more than 14000 start-ups got listed. This represents a substantial increase compared to only 733 start-ups registered in 2016-17. Additionally, India has consistently improved its global innovation index ranking, climbing from the 60th position in 2017 to the 40th position in 2021 [25].

India has become a thriving hub for entrepreneurial activity, witnessing a surge in startup numbers and the development of a robust ecosystem to support these ventures. Breakthroughs in areas such as cloud computing, artificial intelligence, and blockchain have revolutionized industries, enabling the creation of novel products and services [22]. Cloud computing, for example, has democratized access to computing resources, eliminating the need for heavy infrastructure investments. Online marketplaces have also provided small businesses with opportunities to reach a broader customer base and compete on a level playing field with larger corporation [24].

AICs act as a foundation for promotion of innovation and start-up ecosystem, particularly among SMEs and MSMEs. The key objective of AICs is to improve countries ranking in the Global Innovation Index by extending benefits to technology-driven ventures of Tier 2 and titer 3 cities. To cultivate this culture of innovation and entrepreneurship AIM provide a grant of Rs 20 lakh to establish incubation centers in various entities, including non-governmental organizations (NGOs) and trust societies [34]. Despite of these efforts Indian organizations need to focus on performance evaluation of the ventures, better professional ownership and adequate infrastructure. India's expenditure on innovation as a percentage of GDP is comparatively lower than that of other nations. **Evaluation of government programmes and policies that encourage technological innovation and entrepreneurship** [16],[22],[27],[41].

Government policies and initiatives play a vital role in fostering innovation and promoting technology-driven entrepreneurship in India. In recent years, the Indian government has implemented a range of measures to create a supportive environment for entrepreneurs, including the following initiatives:

Startup India: Launched in 2016, Startup India aims to nurture entrepreneurship and innovation by offering a host of benefits to startups, such as tax exemptions, simplified access to funding, and streamlined regulatory processes. The program has effectively raised awareness about entrepreneurship and inspired more individuals to establish their own

businesses. As per the Department for Promotion of Industry and Internal Trade (DPIIT), over 50,000 startups have been established in India through this program.

Digital India: The programme "Digital India" aims to develop a society which is self-sufficient and empowered and a society wherein there is a free flow of knowledge. It encompasses programs to promote the adoption of digital technology, including the development of broadband infrastructure and campaigns to enhance digital literacy. The programme has effectively promoted the adoption of digital technologies through various initiative such as the Bharat Net project, Common Service Centres (CSC) scheme, and e-Kranti. To promote digital access in rural areas high-speed net connectivity is provided through the Bharat Net project.

Make in India: Make in India is a flagship initiative that aims to boost manufacturing in India and attract foreign investments. It simplifies regulations, provides incentives, and facilitates the establishment of businesses to support entrepreneurs in setting up their ventures in the country. The initiative has led to increased FDI and manufacturing growth, boosting economic development and job creation.

Atal Innovation Mission: The mission was launched in 2016 for the promotion of innovation and entrepreneurship among youths, researchers, and entrepreneurs. It includes the establishment of incubation centres, tinkering labs, community innovation centres, innovation challenges and Mentor India campaign. The initiative has been successful in fostering a culture of innovation and entrepreneurship. Additionally, the program has established over 100 incubation centres across the country, providing support to over 2,500 startups in scaling their businesses.

Collectively, these initiatives have had a significant impact on nurturing innovation and technology-driven entrepreneurship in India. For instance, the Startup India initiative has resulted in the creation of more than 40,000 startups, while the Digital India initiative has increased internet penetration and the adoption of digital technologies across the nation. These government policies have fostered an ecosystem conducive to entrepreneurial growth, encouraging innovation and driving economic development in the country [33],[34].

Discussion & Conclusion

This review article delivers an overview on the concept of innovation, entrepreneurship and incubation and emphases on providing a knowledge of the global parallels and variations in incubation systems by describing

and contrasting important aspects of the incubation scenario in structured economies and developing economies [5],[3],[15]. The achievements across many industries clearly demonstrate the influence of these incubators, underscoring their significance in the global innovation ecosystem. Study reveals that many successful technological businesses may trace their roots back to American incubators like Y Combinator and Techstars. These incubators have helped launch and nurture businesses that are now worth billions of dollars, like Stripe, Dropbox, and Airbnb. Tel Aviv Cyber Labs and similar incubators play a crucial role in bolstering Israel's cybersecurity economy by capitalising on the country's inventive culture and military might. Both CyberArk and Check Point are now known as industry giants in cybersecurity. BioM in Munich is one of several biotech incubators in Germany that help entrepreneurs with their life science ventures. One of the first COVID-19 vaccines was successfully created by BioNTech, demonstrating the critical importance of incubation facilities [12],[20].

In comparison to developed nations, study shows incubators in India and other developing countries have a more centralized approach to business models, primarily because they heavily rely on government guidance and support. They prioritize businesses capable of delivering immediate social and economic advantages to local communities. However, the effectiveness and achievements of business incubators differ greatly because of variations in infrastructure, availability of funds, and support systems [9],[23]. Operating with limited resources, incubators in developing countries play a crucial role in tackling local socio-economic challenges.

Thus, to conclude both structured economies and developing economies need business incubation organizations to encourage entrepreneurship and innovation, but their operational focus and performance criteria differ [14],[32]. Developed nations use their resources and infrastructure to establish high-growth, scalable firms, whereas developing countries focus on sustainable businesses that solve local problems and boost socioeconomic development. Despite these distinctions, both aim to assist startup growth and economic growth. Since the study is limited to entrepreneurial initiatives in developing economies, further researches are suggested to compare both established and emerging economies using a financial cost-benefit analysis.

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