

**Transforming Higher Education Institutions into Entrepreneurial  
Hubs: The Evolving Role of Business Incubation in Public and  
Private higher education Sectors**

**Sarwar Khawaja,  
Chairman Business Development,  
Oxford Business College,  
UK**

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## **Abstract**

This article explores the strategic role of business incubation in transforming higher education institutions (HEIs) into entrepreneurial hubs, focusing on the evolution of incubation models and their impact on the higher education landscape. Business incubation has emerged as a crucial mechanism for fostering innovation, entrepreneurship, and economic growth across both public and private HE sectors.

Over time, incubators have evolved through five distinct generations, each responding to the shifting needs of start-ups and the broader economic environment. The first generation focused on providing basic infrastructure and affordable resources, while the second generation introduced vital business support services, such as mentoring, training, and access to financial networks. The third generation emphasised the creation of collaborative networks and value chain integration, enhancing the connectivity between start-ups, investors, and industry players. The fourth generation advanced further by integrating sustainability and social impact into incubation models, reflecting a broader societal shift towards responsible business practices.

The emerging fifth generation, driven by technological advancements and global connectivity, leverages digital platforms, virtual incubation models, and global networks to accelerate start-up growth and expand their reach across borders. Despite these advancements, start-ups face significant challenges, including access to capital, scaling business operations, navigating regulatory frameworks, and maintaining sustainable growth. Business incubators play a critical role in addressing these challenges by offering tailored support and resources, facilitating investor access, and providing platforms for international collaboration. This article aims to provide insights into how HEIs can harness the evolving incubation models to transform themselves into entrepreneurial hubs that address these challenges while also fostering socio-economic development and technological innovation across multiple sectors.

**Keywords:** Business Incubators/Incubation, Entrepreneurial Hubs Business Incubation Generations, Public and Private HEIs

**Introduction**

Higher education institutions (HEIs) have traditionally been viewed as centres of learning and research. Transforming higher education institutions (HEIs) into entrepreneurial hubs has become a key strategy in fostering innovation, economic development, and societal impact in the 21st century (Jones, et al, 2021, Quitaras & Abuso, 2021). As global economies shift towards knowledge-based industries, HEIs are increasingly recognised as learning centres and engines of entrepreneurship and innovation hubs (Sharma & Sharma, 2021). By integrating entrepreneurship into their core missions, these institutions can play a vital role in bridging the gap between academic research and commercial application, stimulating the creation of start-ups, and nurturing entrepreneurial mindsets among students and faculty (Syed et al.,2023). This transformation requires a comprehensive approach, including the establishment of business incubators, fostering partnerships with industry, providing entrepreneurship education, and creating an ecosystem that supports venture creation and growth. Such initiatives help position HEIs as catalysts for regional and national economic development while equipping graduates with the skills needed to navigate and thrive in a rapidly changing global market.

HEIs can be categorise into two Public Higher Education Institutions (PuHEIs) and Private Higher Education Institutions (PrHEIs) (Qureshi & Khawaja, 2021). The demand for Higher Education (HE) worldwide is growing phenomenally (Qureshi, Khawaja, 2021). The private sector plays a significant role in HE (Qureshi et al., 2024), such as a demand-absorbing role (Altbach, 1998; Levy, 2011; Buckner, 2017). Therefore, more than 30% of the global population of HE students is enrolled in private HE (Altbach et al., 2009; Levy, 2018). This sector is instrumental in addressing the growing demand for HE, the inability of public HE to rapidly expand its provision to meet demand (Qureshi, 2023), driving innovation, and diversifying the educational landscape. The more astonishing fact is that private HE has suddenly become the fastest growing HE segment worldwide (Altbach & Levy, 2005; Levy, 2011, 2012 and 2018).

However, with the rise of the knowledge economy, PuHEIs are increasingly being called upon to contribute to economic development by fostering entrepreneurship and innovation (Marginson, 2010). Business incubation within HEIs is one of the most effective means of achieving this goal. Through business incubators, HEIs can provide resources and infrastructure for startup ventures, offer mentoring and networking opportunities, and facilitate access to capital (Bikse et al, 016).

The establishment and growth of business incubation within HEIs have emerged as a significant and increasingly prevalent trend, particularly in Western countries (Carayannis & Von Zedtwitz, 2005; Shalaby, 2020; Vardhan, 2022). These incubators are increasingly recognised as powerful instruments for fostering entrepreneurship, driving innovation, and contributing to broader economic development (Millette et al, 2020). By providing a supportive environment for nascent enterprises, HEI-based business incubators serve as critical platforms where academic knowledge can be translated into practical, market-oriented solutions (Khieng et al, 2019).

This trend is not confined to public or state-funded institutions, as the PrHEIs have grown tremendously in the last few decades, especially because of liberalisation, privatisation and marketisation policies of many world countries (Qureshi & Khawaja, 2021). Consequently, it has also begun to permeate PrHEIs worldwide across Western countries (Hallam & DeVora, 2009).

Business incubation has become a key driver in transforming HEIs into entrepreneurial hubs, facilitating the translation of academic knowledge into practical solutions. This trend is evident in both public and private institutions, as they increasingly recognize the value of business incubation for enhancing reputation, diversifying revenue streams, and fostering socioeconomic development. The adoption of these models by PrHEIs underscores the growing recognition that entrepreneurial education and support are vital components of HE's mission, extending beyond traditional academic boundaries and contributing to the communities they serve (Leal, et al; 2023).

This shift underscores the growing recognition that entrepreneurial education and support systems are integral to the mission of Higher Education (HE), transcending traditional academic boundaries and positioning HEIs as pivotal players in the global innovation ecosystem (Suroso, et al; 2020).

As PrHEIs increasingly integrate business incubation into their institutional strategies, they not only foster the entrepreneurial capabilities of their students and faculty but also align themselves with global trends in HE that emphasise the importance of innovation, economic engagement, and societal impact (Theodorakopoulos, et al; 2014). This development marks a critical evolution in the role of HEIs, transforming them from mere educational entities into dynamic hubs of economic and entrepreneurial activity.

### **Brief Conceptual Overview of Business Incubation**

The concept of business incubation has evolved significantly over time. The traditional association with physical space has expanded to a broader understanding of incubation as an ongoing process, encompassing various facility types and virtual platforms. This process-oriented perspective highlights the importance of a supportive ecosystem that facilitates access to essential resources and expertise. Modern business incubation aims to foster innovation, enhance start-up sustainability, and contribute to economic development goals. Business incubation refers to a process through which emerging entrepreneurial ventures are provided with the necessary resources, services, and support to enhance their chances of survival, growth, and long-term success. The concept of business incubation has evolved since its inception in the 1950s, with early models focused primarily on offering physical infrastructure to start-ups (Lewis, 2001). Today, business incubation encompasses a broad range of services, including mentorship, access to funding, networking opportunities, and business development support (Hackett & Dilts, 2004).

According to the National Business Incubation Association (NBIA), a business incubator serves as a strategic economic development mechanism designed to accelerate the growth and success of nascent entrepreneurial ventures by providing a comprehensive range of business support resources and services.

Traditionally, the concept of a business incubator has been closely associated with a physical space or real estate, offering entrepreneurs a dedicated environment to develop and grow their businesses. However, this traditional view has evolved significantly over time.

The contemporary understanding of business incubation has expanded beyond the confines of physical space, shifting from an "incubator" as merely a facility to the broader concept of "incubation" as an ongoing and dynamic process. This process-oriented perspective recognises that the support offered to start-ups extends far beyond the provision of physical infrastructure. It encompasses a diverse array of facility types, including universities, research, science, business parks, and private sector-led centres. Additionally, it acknowledges the rise of virtual incubators, which provide critical business support services to entrepreneurs without needing a physical presence (Hytti, 2007).

This expanded definition of business incubation reflects a more holistic approach to nurturing entrepreneurship. It highlights the importance of a supportive ecosystem that offers space and facilitates access to essential resources such as mentorship, networking opportunities, funding, and specialised expertise. Whether through physical or virtual means, modern business incubation processes are designed to foster innovation, enhance the sustainability of start-ups, and contribute to broader economic development goals.

Incubators serve as critical intermediaries in entrepreneurial ecosystems by addressing market failures that typically hinder early-stage ventures. These market failures include insufficient access to capital, limited managerial expertise, and inadequate business networks (Bruneel et al., 2012). Business incubators thus mitigate these challenges by offering structured support programs aimed at enhancing the strategic capabilities of new ventures (Aernoudt, 2004). Moreover, they help to reduce the high risks typically associated with entrepreneurship, fostering innovation and economic growth at both local and national levels.

The conceptual framework of business incubation is grounded in its capacity to create an enabling environment for new businesses. According to Hackett and Dilts (2004), business incubation processes involve three core elements: selection, monitoring, and assistance. The **selection** phase refers to the careful vetting and admission of promising start-ups into the incubator. Once accepted, these ventures undergo **monitoring**, where incubator managers track their progress and identify challenges. Finally, **assistance** encompasses the diverse range of support services provided, from financial guidance to networking opportunities and technology access.

Incubation models can vary depending on their focus, with some incubators emphasizing social entrepreneurship, while others target specific industries such as biotechnology or information technology (Grimaldi & Grandi, 2005). Regardless of the model, the overarching goal remains the same: to nurture start-ups and prepare them for long-term success in competitive markets. Thus, despite the lack of a standard definition, most incubator scholars share a common understanding of an incubator as a supporting institution for nascent ventures (Hausberg and Korreck 2020).

### **Types of Business Incubators**

Business incubators can be distinguished by various criteria, such as their operators or functions, resulting in diverse classifications. Grimaldi and Grandi (2005) propose a widely recognised typology that classifies business incubators into four categories based on the entity managing the incubation process. These categories include: **Business Innovation Centres (BICs)**, which are often publicly funded and focus on fostering innovation and entrepreneurship in regional contexts; **University Business Incubators (UBIs)**, which are linked to academic institutions and primarily support ventures emerging from university research and student entrepreneurial initiatives; **Independent Private Incubators (IPIs)**, which operate without direct affiliation to academic or governmental institutions and rely on private capital to generate returns through investment in start-ups; and **Corporate Private Incubators (CPIs)**, which are run by large corporations to foster innovation that aligns with corporate strategies, often seeking to nurture disruptive technologies and products that could be integrated into the company's own operations.

In contrast, Aernoudt (2004) approaches the classification of incubators by focusing on their primary function, identifying five key types:

- **Mixed Incubators**, which offer a combination of services aimed at both technological and non-technological ventures, providing broad-based support to a variety of industries
- **Economic Development Incubators (EDIs)**, which are primarily focused on regional economic growth, often supported by government agencies, and geared towards job creation and the revitalisation of local economies
- **Technology Incubators (TIs)**, which are specialised in nurturing high-tech start-ups, particularly in industries such as information technology, biotechnology, and engineering, and are typically associated with research institutions
- **Social Incubators (SIs)**, which focus on supporting ventures with a strong social mission, such as non-profits or enterprises aimed at addressing social and environmental challenges, often aligning with the goals of social entrepreneurship
- **Basic Research Incubators (BRIs)**, which concentrate on the commercialisation of early-stage research, often emerging from academic or government-funded research programs, with an emphasis on transforming scientific discoveries into viable businesses

Each type of incubator plays a unique role in the broader entrepreneurial ecosystem, providing tailored resources, mentorship, and networks to meet the specific needs of their target ventures. For example, university business incubators leverage academic resources, including faculty expertise and research facilities, to support start-ups (Rothaermel & Thursby, 2005), while corporate incubators offer strategic advantages through direct access to corporate infrastructure and market channels (Graham, 2014). As such, the classification of incubators reflects the diverse objectives, stakeholders, and operational models that characterise the incubation landscape, allowing for a more nuanced understanding of how different incubator types contribute to entrepreneurship and innovation.



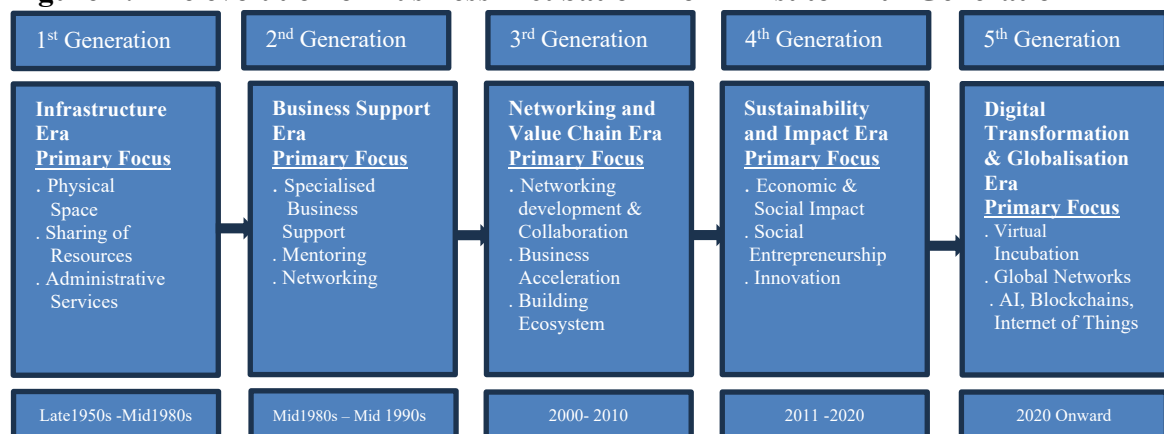
### The Evolving Concept of Business Incubation

Business incubation has evolved significantly over the past several decades, adapting to the changing needs of entrepreneurs and responding to global economic, technological, and social shifts. The progression of business incubation can be divided into five distinct generations, each characterised by its primary focus and core activities. Understanding this evolution provides insights into the role of incubators in fostering innovation, entrepreneurship, and economic growth.

The origins of the business incubation concept can be traced back to 1959 when the first formal business incubator was established in Batavia, New York (Lewis, 2001). This early initiative began a structured approach to supporting entrepreneurial ventures, offering start-ups affordable workspace, shared resources, and essential administrative services. Throughout the 1960s and 1970s, business incubation gained momentum. It began to disseminate across various regions, reflecting a growing recognition of its potential to reduce barriers to entry for new businesses and promote local economic development (Campbell et al., 1985; Hackett & Dilts, 2004). During this period, business incubators primarily focused on providing physical infrastructure and operational support to help new businesses survive the critical early stages of development. The model gradually evolved to incorporate more comprehensive business support services, laying the groundwork for the future expansion and diversification of incubation practices.

The first generation of business incubation emerged in the late 1950s when the primary challenge for entrepreneurs was the high cost of establishing new businesses. Incubators in this era focused on providing **physical infrastructure** and shared resources that could reduce start-ups' overhead expenses. For more information, please see the figure 1.

**Figure 1: The evolution of Business Incubation from First to Fifth Generation**



**Source:** Conceptualise from: Theodorakopoulos, et al. (2014), Mian, (2021).

While the 1st-generation incubators did not offer in-depth business support, they played a crucial role in reducing barriers to entry for entrepreneurs by providing affordable space and essential infrastructure. This model allowed new ventures to focus on product development without the burden of high operational costs.

By the mid-1980s, the focus of business incubation shifted from merely providing physical space to offering business development services. The introduction of mentorship, training programs, and access to networks became central features of this generation of incubators, reflecting a growing awareness of the need for holistic support to ensure the success of new ventures.

The 2nd-generation incubators significantly accelerated the growth of start-ups by offering more than just physical space. The focus on business development services, particularly in high-growth sectors, allowed entrepreneurs to overcome knowledge gaps, resource shortages, and market access challenges.

From the mid-1990s onward, the role of business incubators expanded further to include the development of networks and value chains. This era coincided with the rise of the globalised economy, in which collaboration between start-ups, research institutions, industry partners, and investors became increasingly important.

The 3rd-generation incubators positioned themselves as key players within broader innovation ecosystems. By facilitating collaboration and integration across value chains, these incubators enabled start-ups to access diverse resources and markets, leading to more rapid innovation and growth.

In the 2010s, business incubation entered a new phase, marked by a growing emphasis on sustainability, social responsibility, and impact measurement. This era reflects the increasing importance of not only economic growth but also social innovation, community development, and environmental responsibility.

The latest generation of business incubation, emerging in the 2020s, is characterised by the rapid adoption of **digital technologies** and the increasing importance of **globalisation**. This generation reflects the profound impact of digital transformation on the start-up ecosystem, particularly in light of advancements in technologies such as artificial intelligence (AI), blockchain, and the Internet of Things (IoT).

A pivotal factor driving the emergence of fifth-generation business incubation has been the accelerated shift towards digitalisation and the widespread adoption of online resources, catalysed by the global COVID-19 pandemic (Qureshi et al., 2024). The pandemic disrupted traditional business operations and forced many industries to rapidly transition to virtual communication, collaboration, and service delivery platforms (Qureshi et al., 2020). In the context of business incubation, this shift marked a significant turning point. Incubators increasingly embraced digital tools and virtual models to offer start-up support, mentoring, and networking opportunities despite physical restrictions (Soetanto and Jack 2016).

The pandemic highlighted the importance of flexible, technology-driven incubation frameworks as incubators pivoted towards virtual platforms to maintain operations and engagement with entrepreneurs.



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This shift ensured continuity and demonstrated the potential for reaching a broader, geographically dispersed audience through digital incubation models (Alaassar, et al, 2021). The use of emerging technologies such as artificial intelligence, cloud computing, and blockchain further reinforced the capabilities of virtual incubation, enabling start-ups to access global markets, talent, and investors without the constraints of location. As a result, the fifth generation of business incubation is increasingly characterised by integrating digital tools and global collaboration, creating more scalable and resilient models for fostering innovation in a rapidly changing world.

Fifth-generation incubators are redefining the boundaries of business incubation by leveraging technology to support a more global and interconnected start-up ecosystem. This generation is expected to drive innovation on a larger scale, promote the internationalization of start-ups, and foster cross-border partnerships that fuel both local and global economic growth.

### **Challenges Faced by Start-ups**

Start-up businesses often encounter a myriad of challenges during their formative years. Despite possessing substantial technical expertise or deep product knowledge, many start-ups frequently need more critical managerial, market, and administrative acumen to navigate the intricate landscape of modern business (UNECE,2021). The complexity of the competitive environment in which these nascent enterprises operate requires not only a solid foundation in their respective fields but also a robust capacity to acquire, assimilate, and apply a broad range of business knowledge (Hennessy, 2012). Their survival and growth hinge on their ability to effectively manage this complexity and leverage relevant knowledge to their advantage.

One strategic approach to mitigating the knowledge gaps and operational challenges faced by start-ups is through the support provided by HEI incubators. HEI-based incubation programmes offer a structured environment where start-ups can access essential resources, mentorship, and networks that are pivotal in overcoming the obstacles typically encountered in the early stages of business development (Mele, et al; 2022). These incubators serve as protective ecosystems, enabling start-ups to bridge the gap between technical expertise and the comprehensive business knowledge required for long-term success (Awonuga, et al; 2024). By fostering a culture of innovation and entrepreneurship, HEI incubators not only enhance the prospects of start-up survival but also contribute to the broader economic and societal impact of higher education institutions (Leal, 2023).

Over the past few decades, business incubators have gained significant traction as a pivotal strategy for fostering new enterprise development on a global scale across all industries (Zahra and Wright, 2016, Sansone et al, 2020). These incubators provide a nurturing environment that combines access to critical resources, such as funding, mentorship, and technical support, with opportunities for networking and collaboration. By mitigating the risks associated with early-stage business development, incubators play a crucial role in enhancing new ventures' survivability and growth potential.

The international acknowledgement of business incubators underscores their importance in economic development strategies, particularly in promoting innovation, entrepreneurship, and job creation (Zaidi, et al; 2023). As global economies become more interconnected and competitive, the role of business incubators in facilitating the successful launch and scaling of new enterprises has become increasingly vital, not only as a tool for local economic development but also as a catalyst for broader socio-economic progress (Gao, et al; 2021).

Start-ups encounter many challenges and are characterised by notably high failure rates. One of the main purposes of Business Incubation is to reduce the risk of failure

These obstacles stem from a complex interplay of factors, each contributing to the precarious nature of early-stage entrepreneurial ventures.

Firstly, start-ups often need more sufficient financial resources. Securing initial funding can be particularly challenging, and many ventures struggle to obtain the capital necessary for development, scaling operations, and sustaining growth. The scarcity of financial support can limit their ability to invest in critical areas such as product development, marketing, and talent acquisition.

Secondly, start-ups frequently face significant operational hurdles. Founders may possess strong technical skills or innovative ideas but often need more experience in crucial areas such as management, strategic planning, and business operations. This gap in managerial expertise can hinder their ability to effectively execute their business plans and adapt to evolving market demands.

Market-related challenges also pose substantial risks. Start-ups must navigate a highly competitive landscape with established players and rapidly changing consumer preferences. Identifying and capturing market opportunities while differentiating themselves from competitors requires adept market analysis and strategic positioning, which can be daunting for nascent businesses.

Additionally, start-ups are susceptible to external economic factors and market volatility. Economic downturns, shifts in industry trends, and changes in regulatory environments can disproportionately impact young companies, exacerbating their vulnerabilities and increasing the risk of failure (Soetanto and Jack, 2016).

Furthermore, start-ups often need help with scaling their operations (Lange, et al, 2023). Growth challenges, including managing increased demand, expanding infrastructure, and maintaining quality control, can strain limited resources and affect operational efficiency (Trautwein, 2021).

In light of these multifaceted challenges, it becomes evident that start-ups require robust support mechanisms to enhance their chances of success. Effective business incubation programs and support systems are crucial in mitigating these risks by providing essential resources, mentorship, and strategic guidance. By addressing the myriad obstacles faced by start-ups, these programmes can significantly improve their prospects for survival and growth, ultimately contributing to a more dynamic and resilient entrepreneurial ecosystem.

## **Conclusion**

The evolution of business incubation reflects the changing needs of entrepreneurs and the growing complexity of the global innovation ecosystem. From its early focus on providing physical infrastructure to its current emphasis on digital transformation and international collaboration, each generation of business incubation has built upon the previous one, adapting to new challenges and opportunities. As new technologies and trends emerge, business incubation will continue to evolve, playing a pivotal role in shaping the future of entrepreneurship and innovation globally.

Integrating business incubation into HEIs, public and private represents a strategic approach to transforming them into entrepreneurial hubs. By providing comprehensive support and resources to start-ups, these incubators play a crucial role in overcoming the multifaceted challenges faced by nascent ventures. They not only contribute to the success of individual start-ups but also drive broader economic and societal impact. As the global landscape becomes increasingly competitive, the strategic role of business incubation in fostering innovation, entrepreneurship, and economic growth within HEIs will continue to grow in importance.

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### **About the Author**

**Professor Sarwar Khawaja**

**Chairman, Business Development**

**Oxford Business College, UK**

Sarwar Khawaja is the founder of SK HUB, Chairman of the Executive Board at Oxford Business College and the Chairman and CEO of Ealing College Upper School. Sarwar holds an Oxford High-Performance Leadership Programme at the University of Oxford—Said Business School. Recently he is appointed as a distinguished Professor of Practice in Business Administration by Quaid-i-Azam University, Islamabad, Pakistan. With a robust skill set that includes Lesson Planning, Semiotics, Tutoring, Training, Educational Leadership, and more, he contributes valuable insights to the industry. Sarwar has written more than 50 research papers published in reputable peer-reviewed journals. He has over three decades of experience leading and transforming educational institutions in the UK and abroad. He is an accomplished British educationist, thought leader, sociopreneur, and philanthropist renowned for his significant contributions to social justice and financial inclusion. As an Honorary Professor of Business Management at the Małopolska J. Dietl University in Krakow, Poland, Khawaja adds another feather to his cap, bridging the worlds of academia and social entrepreneurship. As the Chairman of Akhuwat UK Trust, over four million underprivileged individuals in Pakistan have been empowered through interest-free microfinance initiatives. His pioneering model, based on respect and dignity, is a testament to his belief that financial inclusion should be a universal right. For more information, please visit his website:

<https://ksarwar.com>

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