

Applying Business Incubation to Foster Scalable Innovation in Emerging Technologies

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Abstract: This paper discusses applying business incubation models to developing and scaling innovative ventures, with particular reference to a case study of a hypothetical health diagnostic platform using Artificial Intelligence, MediScan. Business incubators are structured environments facilitating startup development through guidance, access to resources, technical assistance, and market access strategies. This study provides theoretical underpinnings of incubation, dissects its pre-incubation, incubation, and post-incubation phases and illustrates exactly how these are executed in practice. With process mapping, benefits measurement, and implementation strategies analyzed in detail, the paper shows the critical role played by incubators in converting early-stage ideas into meaningful, sustainable ventures. It further addresses the challenges encountered by startups after incubation and prescribes recommendations for future enhancements in incubation models. It puts focus on the role of customized incubation schemes in fostering innovation, considerably in high-impact industries such as healthcare technology.

Keywords: Business incubation; HealthTech; AI Diagnostics; Entrepreneurial support; Incubator stages.

1. Introduction

Startups today are confronted with a complicated and competitive environment marred by high rates of technological innovation, volatile consumer tastes, and intensified global competition. From winning seed finance and compliance with regulatory needs to hire a capable team and expanding operations, transforming an idea into market-ready product is a challenge in itself (Clayton, 2024) [1]. The transition from ideation to commercialization is often fraught with uncertainty, resource shortages, and knowledge deficiencies. In such a difficult context, business incubators have taken center stage as critical centers of support for early-stage ventures and entrepreneurs (Mbunge et al., 2021; McFarland et al., 2023) [2-3]. Business incubators are like constructed ecosystems aimed at facilitating the development and success of startups through diverse support tools. They encompass offering physical facilities such as office space and laboratories, access to talent pool of entrepreneurs and industry experts, partnership and networking opportunities, and support to secure finance (Balthazar et al., 2022) [4]. By addressing some of the most critical challenges facing new ventures, incubators raise the chances of survival for startups and long-term viability. More than that, they provide space for innovation to thrive where entrepreneurs have space to challenge assumptions, test business ideas, and iterate value propositions before venturing into the competitive market (Leung et al., 2022; Srivastava et al., 2022) [5-6].

This study aims to explore how entrepreneurial incubation models can be used to promote the success and scale of high-potential innovation projects, particularly in the field of medical technology. Taking the artificial intelligence health diagnosis platform MediScan as an example, this study analyzes how incubation theory is transformed into practice and helps understand the role of incubation in developing, testing, and scaling innovative enterprises. The study results provide feasible practical examples and theoretical support for future innovations and entrepreneurship in the medical

field.

2. Literature Review

The idea of business incubation has changed over time since the period in the 1950s when it was mostly linked to low-cost office space and minimal business services. Spanning decades, incubation has been directed toward innovation promotion, development of entrepreneurial skills, and facilitation of commercialization of new technologies. For Bodolica and Spraggon (2021) [7], business incubators are "mechanisms designed to accelerate the development of entrepreneurial companies through an array of business support resources and services." Contemporary importance is placed on value-added services such as mentorship, access to finance, training initiatives, and association with industries. Various authors have highlighted the contribution of incubators to increased success in startup ventures. For instance, Sohail et al. (2023) [8] posit that effective incubation has much to do with the quality of services offered and the alignment of the incubator's strategic orientation with the needs of its client ventures. They also pointed to the significance of tailored support with the conclusion that success in incubation is largely based on individualized coaching and resource alignment. Other authors, like Indiran et al. (2021) [9], have offered frameworks to conceptualize the process of incubation with such stages as selection, support, and graduation being critical. In the tech sector, incubation is uniquely important given the level of uncertainty and capital intensity involved in innovation. Healthcare is uniquely challenging due to regulatory barriers, the ethical implications, and stringent clinical testing and verification requirements. In such an environment, business incubators have the potential to offer specialized assistance, such as access to clinical trials, compliance and intellectual property guidance, and introductions to healthcare investors and policymaking communities. Trends now include sector-specific incubators and accelerators in healthtech, medtech,

and biotech indicating the demand for domain-specific expertise in incubation models is growing.

3. Theoretical Framework of Business Incubation

Incubators typically operate under a structured timeline, guiding startups through three primary phases: Pre-incubation, incubation, and post-incubation. Each one tackles specific requirements: ideation, development, and scaling, respectively. Moreover, incubators tend to provide soft support services like training in business ethics, legal support, and access to testing facilities or computing facilities. These services mean the difference between the success and failure of a startup. Business incubation is a support process facilitating the rapid development of successful startups and entrepreneurial ventures. Core incubator functions usually encompass mentorship, access to finance, networking, administration support, and shared infrastructure. There are various types of incubators, as presented in the Table 1 below:

Table 1. Different types of Incubator

Type of Incubator	Description	Examples
Academic	University-affiliated incubators supporting student or faculty startups.	MIT Martin Trust Center
Private	Run by private firms or VCs for profit or equity.	Y Combinator, Techstars
Public	Government-supported to promote regional development.	Startup India, EU Startup Incubator
Virtual	Provide services remotely without physical space.	Founder Institute, Antler

4. Overview of an Innovative Project

To illustrate the use of incubation, we take the example of an imaginary innovative project: an AI-powered health diagnostic platform 'MediScan'. It employs deep learning algorithms to scan medical images to detect diseases like cancer and tuberculosis at early stages. This high-impact concept marries healthcare and AI but needs significant technical, regulatory, and economic support to achieve market readiness—thus making it a good candidate for incubation. MediScan is imagined as scalable digital health software to bring early detection to underserved communities. Its central innovation is using convolutional neural networks (CNNs) to identify anomalies from large datasets of medical imaging with high accuracy. MediScan further encompasses a telemedicine component where healthcare providers may remotely consult with patients. By addressing both diagnostic accuracy and accessibility, MediScan has the potential to revolutionize conventional healthcare approaches.

5. Application of Incubation Stages to The Project

Table 2 is an outline of how MediScan would move through the three primary incubation phases: Pre-incubation entails MediScan's founders getting involved in thorough stakeholder analysis to identify potential end-users, regulatory bodies, and prospective partners. It is during this phase that they fine-tune their unique selling proposition through surveys and focus groups. In the period of incubation, the startup produces a prototype utilizing agile practices, incorporates cybersecurity measures, and undertakes beta testing in collaboration with medical clinics. Post-incubation is about expanding to international markets, compliance with international healthcare regulations, and attending international pitch events.

Table 2. Stages of incubation

Stage	Activities	Incubator Support	Outcomes
Pre-incubation	Idea validation, market research, feasibility studies	Business model coaching, market mentors	Validated idea and business canvas
Incubation	Prototype development, regulatory research, clinical partnerships	Technical mentorship, funding access, workspace	Working MVP and partnership MoUs
Post-incubation	Scaling, commercialization, funding rounds	Investor networking, pitch training, demo days	Revenue generation, seed/Series A funding

Table 3 is an example of a simplified pseudocode for MediScan's image analysis process:

Table 3. Pseudocode for MediS

Algorithm 1. Pseudocode for MediS
<pre> def diagnose_image(image): preprocessed = preprocess(image) model = load_model('mediscan_ai.h5') result = model.predict(preprocessed) if result > threshold: return 'Positive Detection' else: return 'Negative' </pre>

6. Outcomes and Benefits of Incubation

The successful incubation of the MediScan project brings

forth a range of strategic advantages that extend beyond mere survival (Table 4). Business incubation offers a structured pathway to reduce uncertainty, accelerate product development, and strengthen a startup's position in the market. Incubators act as catalytic environments where innovative ideas are not only nurtured but also validated, refined, and prepared for market entry. A growing body of research highlights the positive correlation between incubation and startup performance. For instance, studies by Alaassar et al. (2021) and Gao et al. (2021) [10-11] demonstrate that incubated startups consistently outperform their non-incubated counterparts in terms of survival rates, funding access, and scalability, particularly within the first five years of operation. In the case of MediScan, these benefits are not only theoretical they are operationally significant.

Table 4. The key outcomes and benefits for MediScan are summarized

Benefit	Description	Strategic Impact on MediScan
Risk Reduction	Incubators provide structured guidance during early-stage validation, business modeling, and product prototyping, helping to identify technical and market-related risks early.	MediScan benefits from a more robust go-to-market strategy, with minimized risk of product misfit or regulatory failure. Early feedback loops enhance the platform's alignment with real-world clinical needs.
Expert Network	Startups gain direct access to seasoned mentors, domain experts, legal advisors, and venture capitalists who offer specialized knowledge across various business functions.	Through expert input, MediScan can optimize its AI algorithms for medical diagnostics, ensure regulatory compliance (e.g., HIPAA or CE certification), and shape its business model for investor appeal.
Resource Access	Physical infrastructure, advanced software tools, testing environments, and co-working spaces are made available at reduced or no cost during incubation.	With access to critical facilities, MediScan can reduce its capital expenditures, develop a minimum viable product (MVP) faster, and iterate more efficiently based on prototype testing and user feedback.
Strategic Partnerships	Incubators often facilitate connections to potential industry partners, healthcare institutions, investors, and pilot users.	MediScan gains early access to pilot programs, clinical collaborators, and strategic investors, positioning the startup for smoother market entry and enhanced credibility within the healthcare ecosystem.
Learning & Iteration	Incubators promote a culture of experimentation and agile development, encouraging frequent pivoting based on performance metrics and user feedback.	MediScan can refine its diagnostic models and user interface based on real-time insights, improving product-market fit and patient usability before full-scale launch.
Funding Support	Many incubators offer seed funding or connect startups with angel investors and early-stage VCs.	MediScan may secure early-stage funding through incubator networks, allowing for sustained growth beyond the MVP stage without premature dilution.

These results underscore the fact that incubation is not merely a support system but rather a strategic development framework with direct implications for a startup's ability to grow, evolve, and thrive in high-risk markets like healthcare technology. For MediScan, the implications are extensive: with reduced barriers to operation, enhanced expertise, and condensed development cycles, the platform is well positioned to penetrate the market with validated technology, a compliant model of operation, and potential early adopters in hand. In addition, the collaborative culture developed within incubators gives the benefit of protection against the isolation and resource deficiency traditionally plaguing early-stage initiatives. This feeling of ecosystem integration breeds confidence, stimulates innovation, and allows teams to prioritize long-term strategic goals instead of short-term survival. Overall, the incubation process enhances the internal strength of the MediScan project while concurrently broadening its access to the outside world. These synergistic benefits not only raise the likelihood of initial market entry but lay the foundation for long-term viability and growth within a competitive and regulatory environment.

7. Challenges and limitations

Other outcomes include higher investor confidence, enhanced time-to-market, and better alignment with sustainable development goals (SDGs), mainly health and innovation. All the above benefits are not unique to MediScan but are common to similar med-tech startups nurtured by incubation. Incubators have challenges, even with all the benefits they bring. Some of the challenges include equity stakes imposed by incubators, restricted access to later-stage finance, and possible overreliance on incubator services. MediScan, for example, might have challenges with fundraising following incubation or intellectual property conflicts.

8. Conclusion and Recommendations

Business incubation offers a formal process for innovative ventures such as MediScan to transition from ideas to commercialization. Although incubation provides early-stage

critical support, long-term success still depends on strategic vision, strong execution, as well as market fit. Policy-makers and managers at incubators must emphasize flexible program approaches, support after incubation, and accessible funding channels to have maximum impact. Another challenge is the sustainability of momentum after incubation. Most startups, having depended on structured guidance, struggle with strategic decisions after leaving the incubator. Further, entry to top-tier incubators is competitive, with potentially valuable ideas getting overlooked by less well-connected or under-resourced entrepreneurs.

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