

Keywords

Agri-aqua start-ups; Technology Business Incubator (TBI); Central Mindanao University; DOST-PCAARRD; agricultural entrepreneurship; business incubation; capacity building; product development; rural development; food security

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University Managed Technology Business Incubator: Mechanism for advancing Agri-Aqua Start-ups

Abstract

Agri-aqua start-ups play a vital role in promoting food security, sustainable enterprise development, and employment generation. However, their growth is constrained by limited access to resources, price volatility, supply chain disruptions, regulatory complexities, technological limitations, and inadequate managerial capabilities. Addressing these challenges requires coordinated support from multiple stakeholders. This paper presents the initiative of the Central Mindanao University Agri-Aqua Technology Business Incubator (CMU-ATBI), established through the support of the Department of Science and Technology–Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (DOST-PCAARRD), in fostering the growth and sustainability of agri-aqua start-ups. The CMU-ATBI provided incubation services to a diverse group of incubatees, including a cooperative, women's organizations, a farmers' association, and individual entrepreneurs. Through continuous capability-building programs, incubatees enhanced their entrepreneurial competencies, developed and submitted proposals for grant and loan funding, and gained recognition as resource persons in various technical and entrepreneurial forums. Product development assistance enabled incubatees to diversify their product offerings, resulting in increased revenue and improved market competitiveness. Furthermore, CMU-ATBI facilitated strategic partnerships between incubatees and higher education institutions across the region, strengthening collaboration through on-the-job training programs and knowledge exchange. The findings demonstrate that university-led technology business incubation can significantly enhance the capacity, innovation, and sustainability of agri-aqua enterprises, highlighting its role as an effective model for inclusive rural development and agricultural entrepreneurship.

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INTRODUCTION

Central Mindanao University (CMU) is recognized for its contributions to agriculture, forestry, and related fields, playing a crucial role in advancing research. However, a significant challenge lies in translating these research innovations into viable commercial endeavors. This report explores the role of business incubation as a solution for fostering economic growth and job creation. Business incubation, as defined by Stefanovic et al. (2008), is a systematic approach aimed at improving the success rates of new enterprises by establishing a nurturing and supportive ecosystem. The term "incubator" emphasizes providing a secure environment for the growth of emerging businesses. The primary goal is to expedite the commercialization of research outcomes while facilitating the adoption of state-of-the-art technologies, aligning with the Technology Transfer Act (RA 10055). CMU's initiative of technology business incubation aligns strategically with this mandate, catering to budding entrepreneurs and startups.

REVIEW OF LITERATURE

Business incubators have become important institutional mechanisms for promoting entrepreneurship, innovation commercialization, and enterprise development. Managed by professionals from industry, government agencies, and academic institutions, incubators provide emerging enterprises with access to resources, expertise, networks, and support services necessary to overcome early-stage business challenges. Unlike traditional business support programs that primarily provide physical facilities, contemporary technology business incubators (TBIs) operate as innovation ecosystems that integrate entrepreneurship training, mentoring, technology development assistance, market linkage, intellectual property support, and access to financing (Hausberg & Korreck, 2020; Leitão et al., 2022).

The concept of business incubation originated with the establishment of the first known business incubator in Batavia, New York, in 1959. Since then, incubation has evolved from a facility-based support model focused on providing affordable workspace into a comprehensive entrepreneurial development mechanism supporting innovation-driven enterprises. The global expansion of incubators reflects their increasing importance in strengthening entrepreneurial ecosystems, particularly in technology-intensive and knowledge-based sectors. Recent estimates indicate that thousands of incubators and accelerators operate worldwide, serving startups across developed and emerging economies by providing customized support services that enhance venture creation, survival, and growth (World Bank, 2020; Hausberg & Korreck, 2020).

*Modern technology business incubators provide a wide range of services designed to improve the capabilities and competitiveness of emerging enterprises. These services commonly include business mentoring, entrepreneurial training, technology development assistance, networking opportunities, investment facilitation, infrastructure support, and market access. According to Mian et al. (2016), TBIs play a critical role in bridging the gap between innovation generation and commercialization by

providing entrepreneurs with access to specialized resources and institutional support. More recent studies have further emphasized that incubators contribute to startup development by reducing resource constraints, improving managerial capabilities, and facilitating connections with investors, customers, and innovation networks (Leitão et al., 2022).

The evolution of business incubation has also resulted in the emergence of more flexible incubation models, including virtual incubation and hybrid support systems. These models enable incubators to support enterprises beyond physical facilities by providing digital mentoring, online business advisory services, and virtual networking opportunities. This transformation has become increasingly relevant due to advances in digital technologies and changing entrepreneurial environments. Nambisan et al. (2019) highlighted that digital transformation has reshaped entrepreneurship by creating new ways for startups to access knowledge, resources, and markets. Consequently, contemporary incubators are increasingly adopting technology-enabled approaches to extend their reach and improve service delivery.

Effective technology business incubation requires a carefully designed framework that considers enterprise selection, incubation duration, performance monitoring, and exit strategies. Recent research indicates that the effectiveness of incubation programs depends largely on the quality of entrepreneurs admitted into the program, the relevance of support services provided, and the ability of incubators to establish strong linkages with external stakeholders (Assenova, 2020; Lukeš et al., 2019). Clear selection and graduation mechanisms are particularly important because incubators aim to support high-potential ventures while maintaining a continuous pipeline of new enterprises. According to Pauwels et al. (2016), successful incubation models require structured processes that balance resource provision, entrepreneurial learning, mentoring, and venture growth objectives.

The sustainability and effectiveness of incubators are also influenced by their ability to operate as dynamic organizations embedded within broader entrepreneurial ecosystems. Rather than functioning as isolated support facilities, successful incubators develop partnerships with universities, research institutions, government agencies, investors, and industry organizations. Audretsch et al. (2022) emphasized that entrepreneurial ecosystems facilitate startup growth by enabling access to knowledge networks, institutional resources, and collaborative opportunities. In university-based incubation settings, these linkages are particularly important because they allow research outputs and innovations to be translated into commercially viable enterprises.

Recent literature identifies several factors contributing to successful incubation outcomes. First, incubators must maintain a strong commitment to enterprise development by providing continuous and customized support throughout different stages of venture growth. Second, incubators must develop sustainable operational models that ensure long-term service delivery and institutional stability. Third, incubation services should be adapted to the specific needs of enterprises, considering differences

in industry sector, technological maturity, and market requirements. Finally, incubators must maintain outward-looking approaches by strengthening external partnerships and participating actively in innovation ecosystems (Hausberg & Korreck, 2020; Theodoraki et al., 2022).

For agri-aqua and technology-based enterprises, business incubation provides a strategic platform for transforming innovations into market-oriented solutions. Through access to technical expertise, business development assistance, financing opportunities, and market networks, incubators help entrepreneurs overcome common barriers associated with commercialization. Secundo et al. (2020) emphasized that innovation ecosystems supported by knowledge-sharing institutions enhance entrepreneurial capabilities by facilitating collaboration, learning, and technology transfer. Therefore, TBIs serve not only as startup support mechanisms but also as catalysts for regional economic development, innovation diffusion, and employment generation.

METHODOLOGY

Research Design. This paper employed a descriptive case study design to examine the implementation and outcomes of the Central Mindanao University Agri-Aqua Technology Business Incubator (CMU-ATBI) in supporting the development and sustainability of agri-aqua start-ups. The case study approach was selected to provide an in-depth examination of the incubation program, its interventions, and its contributions to entrepreneurial capacity building, product development, resource mobilization, and institutional collaboration.

Study Site and Participants. The study was conducted at the Central Mindanao University Agri-Aqua Technology Business Incubator (CMU-ATBI), Bukidnon, Philippines. The participants consisted of incubatees enrolled in the incubation program during the project implementation period. These included a cooperative, women's organizations, a farmers' association, and individual agri-aqua entrepreneurs who received business incubation services through the program.

Data Sources and Collection. Data were obtained from multiple sources to ensure a comprehensive assessment of the incubation program. Documentary data were gathered from project accomplishment reports, training attendance records, business development plans, grant and loan proposals, monitoring and evaluation reports, partnership agreements, and product development records maintained by CMU-ATBI. These documents were supplemented by program monitoring reports and administrative records that documented the incubatees' participation in capability-building activities, funding applications, product commercialization initiatives, and institutional partnerships. Where available, validation interviews or consultations with incubatees and project implementers were conducted to verify documented accomplishments and provide contextual information regarding the outcomes of the incubation services.

Data Analysis

Documentary records were subjected to content analysis to identify major themes related to entrepreneurial capability development, access to financial resources,

product innovation, market expansion, and collaborative partnerships.

Ethical Considerations

The study utilized institutional records and program documentation with permission from the CMU-ATBI. Any information obtained from interviews or consultations was treated confidentially, and the identities of participants were anonymized where appropriate. The study adhered to the ethical principles of voluntary participation, confidentiality, and responsible

RESULTS AND DISCUSSIONS

Incubatee Recruitment and Enterprise Development

The Central Mindanao University Agri-Aqua Technology Business Incubator (CMU-ATBI) implemented a comprehensive incubatee recruitment and development process designed to accommodate entrepreneurs at different stages of enterprise readiness. Incubatees were classified into three categories: pre-incubatees, basic incubatees, and advanced incubatees. This classification enabled the incubator to provide development interventions that were responsive to the varying levels of entrepreneurial capability, technological readiness, and business maturity of participating enterprises. Such assistance may include entrepreneurial training, business planning, technical guidance, mentoring, access to networks, market support, and resource mobilization (World Bank, 2011).

Agri-Aqua start-ups or incubatees were accommodated under the program. These enterprises represented diverse agri-aqua and technology-based ventures, including mushroom production and processing, meat processing, organic fertilizer production, plant nursery operations, coffee production and processing, cacao processing, leather crafts, and other agricultural innovations. Some enterprises had already completed the incubation process, while others remained in the basic or advanced incubation stages. The diversity of enterprise activities further shows the capacity of CMU-ATBI to support a broad range of agricultural and technology-based business initiatives.

The recruitment and classification system provided a structured pathway through which entrepreneurs could progressively develop their enterprises. By recognizing differences in the readiness and needs of incubatees, CMU-ATBI was able to provide more appropriate support in business planning, technical development, market preparation, financial management, and enterprise expansion. This approach is consistent with the role of university-based business incubators in providing targeted assistance that strengthens the capacity and competitiveness of emerging enterprises. To support this, Mian et al. (2016) emphasized that technology business incubation involves a range of support mechanisms intended to assist new and emerging ventures in overcoming resource constraints, developing business capabilities, and improving their prospects for growth and sustainability. Through access to university expertise, research resources, technical knowledge, and institutional networks, university-based incubators can help reduce some of the barriers commonly encountered by early-stage enterprises.

Capacity-Building and Entrepreneurial Development

Entrepreneurial capacity building was a major component of the CMU-ATBI incubation program. Capability building and benchmarking activities were conducted to enhance the knowledge, skills, and managerial competencies of incubatees. These activities covered important areas such as entrepreneurial mindset development, organizational and operations management, financial management, business plan preparation, proposal writing, agricultural production technologies, and enterprise benchmarking. Mian et al. (2016) explained that technology business incubation has developed into a comprehensive support system that facilitates access to entrepreneurial knowledge, business development services, mentoring, networks, and strategic resources needed by startup enterprises.

The training activities were designed to address both the technical and business-related requirements of startup enterprises. Technical training programs, such as those related to the business enterprise's technologies, supported the improvement of production knowledge and operational practices. On the other hand, entrepreneurship and management training strengthened the ability of incubatees to plan, organize, manage, and sustain their enterprises. Financial management and business plan development were also emphasized because these competencies are essential for effective decision-making, efficient resource allocation, and access to external financing. The preparation of business plans enabled incubatees to clarify their enterprise goals, identify market opportunities, assess financial requirements, and formulate strategies for business growth. Proposal writing training further improved their capacity to communicate business and project ideas to potential funding institutions and development partners. The inclusion of benchmarking activities provided incubatees with opportunities to observe existing enterprises, learn from successful business practices, and identify approaches that could be adapted to their own operations. Vincent et al. (2021) highlighted the importance of absorptive capacity in technology business incubation, emphasizing that startups benefit when they are able to acquire, understand, integrate, and apply knowledge obtained from external sources. The ability to use external knowledge can strengthen entrepreneurial orientation and improve enterprise performance. These activities promoted experiential learning and encouraged the exchange of knowledge among entrepreneurs, industry practitioners, and other stakeholders. The importance of combining technical assistance with entrepreneurial and managerial development is further supported by Li et al. (2020), who found that business incubator services, particularly training programs, networking support, and access to financial resources, contribute to the development and performance of entrepreneurial ventures.

The capacity-building interventions are expected to contribute to the development of entrepreneurial competencies that extend beyond technical production. The training programs strengthened the ability of incubatees to manage business operations, prepare strategic plans, access resources, and respond to changing market conditions. The importance of combining technical assistance with entrepreneurial and managerial

development is further supported by Lukeš et al. (2019), who examined the contribution of business incubators to the growth of innovative startup enterprises. These outcomes demonstrate the importance of combining technical assistance with entrepreneurship and management development in technology business incubation. Further, Nikitina et al. (2020) emphasized the importance of developing entrepreneurial competencies that correspond to market requirements and support the creation and growth of new enterprises. The development of these competencies enables entrepreneurs to identify opportunities, mobilize resources, and adapt their business strategies to changing economic and market conditions. The value of learning through direct exposure, coaching, and interaction with experienced entrepreneurs is supported by Assenova (2020), who found that early-stage venture incubation and mentoring can improve entrepreneurial learning and business performance. Similarly, Haneberg et al. (2020) emphasized the value of coaching and structured support in the development of technology-based ventures. Their study showed that incubation activities can support entrepreneurs throughout the venture creation process by providing guidance, knowledge, and access to relevant resources.

Development of Information, Education, and Communication Materials

CMU-ATBI developed information, education, communication, and marketing materials to support the promotion and market development of incubatees. These materials included brochures, leaflets, pamphlets, business cards, presentation materials, pitching presentations, business signages, product packaging, and labels. The development of these materials assisted incubatees in improving the visibility and professional presentation of their products and services. Marketing materials enabled enterprises to communicate product information more effectively to potential customers, investors, business partners, and other stakeholders. The preparation of presentation and pitching materials also enhanced the capacity of incubatees to communicate their business models, market opportunities, and investment requirements during business forums, investor meetings, and public engagements. Krukowski et al. (2023) explained that entrepreneurial pitches involve the use of storytelling and sensemaking to communicate the value proposition and future potential of a startup. A well-developed pitch may help entrepreneurs explain the business problem being addressed, describe the proposed solution, demonstrate market opportunities, and communicate the feasibility and growth potential of the enterprise. Thus, the assistance provided by CMU-ATBI in developing pitching presentations may have improved the investment readiness and communication capabilities of incubatees. Support for packaging and labeling was particularly important because product presentation influences consumer perception, market acceptance, and business competitiveness. Schifferstein et al. (2021) emphasized that food packaging serves as an important communication medium by conveying information regarding the product, producer, brand, origin, quantity, ingredients, and other product attributes. Further, Shukla et al. (2022) found that creative packaging design can

affect consumer responses by increasing attention, improving product recognition, and influencing purchase-related behavior. Their findings suggest that packaging can function as a strategic marketing tool rather than merely as a protective container. In the context of CMU-ATBI, packaging support may have contributed to the development of stronger product identities and improved the ability of incubatees to differentiate their products from competing market offerings. Therefore, well-designed packaging can improve product visibility and assist consumers in evaluating and differentiating products in the marketplace. CMU-ATBI assisted incubatees in developing packaging and labeling that complied with relevant consumer protection and product standards. This support contributed to improved product identity, enhanced consumer confidence, and greater readiness for market expansion. In support of this, Bou-Mitri et al. (2021) found that food packaging design may influence consumer perceptions of product quality, safety, healthiness, and preference. These findings are relevant to agri-aqua enterprises because consumer perceptions may be influenced by the quality, clarity, attractiveness, and credibility of product packaging. The development of professional packaging and accurate labels may therefore contribute to enhanced consumer confidence and greater market acceptance. Similarly, Chatterjee et al. (2020) emphasized that the strategic use of marketing communication technologies can improve the business outcomes of small and medium-sized enterprises by strengthening customer engagement, increasing market visibility, and facilitating communication with different stakeholders.

The development of communication and marketing materials therefore served not only as a promotional intervention but also as a strategy for strengthening enterprise identity and market positioning. By providing these resources, CMU-ATBI helped incubatees improve their capacity to present their products professionally and establish stronger relationships with customers and potential business partners.

Promotional and Digital Marketing Support

CMU-ATBI extended its enterprise development services through the production of promotional videos for selected incubatees. Promotional materials were developed to document and communicate their entrepreneurial journeys, business activities, and enterprise achievements. These promotional videos were presented during orientation activities, trade fairs, exhibitions, and other public events. The use of audiovisual materials enabled incubatees to reach wider audiences and communicate their enterprise stories in a more engaging manner. The videos also provided opportunities to showcase the technologies, products, production processes, and development experiences of the enterprises. The development of promotional content contributed to increased business visibility and supported the marketing efforts of participating enterprises. It also demonstrated the role of digital and multimedia tools in strengthening enterprise promotion and market engagement. Supporting this, Chatterjee et al. (2020) found that the adoption of social media marketing can contribute to improved business outcomes among small

and medium-sized enterprises. Social media platforms enable businesses to communicate directly with customers, share product information, promote business activities, and establish stronger market visibility. These findings support the use of promotional and digital content as part of enterprise development strategies. Similarly, Xiao et al. (2023) found that the characteristics of short-form video advertisements can influence consumer engagement. Yang et al. (2023) also found that high-quality short-form branded videos can attract consumer attention, strengthen consumer engagement, and increase product and brand awareness, while Sharabati et al. (2024) found that digital marketing strategies, including online advertising, social media marketing, search engine optimization, and digital customer engagement, can contribute to the performance of small and medium-sized enterprises. Through these initiatives, CMU-ATBI supported incubatees not only in improving their products but also in communicating their value propositions to potential customers, investors, and institutional partners.

Intellectual Property Protection

The importance of IP protection among incubatees' enterprises has been increasingly recognized in innovation and entrepreneurship literature. Intellectual property rights provide mechanisms for transforming knowledge-based outputs into valuable economic assets by granting innovators exclusive rights over their creations and reducing uncertainties associated with imitation and market competition. For technology-based enterprises, trademarks contribute to brand differentiation and consumer recognition, while copyrights protect creative and communication-based outputs that support market positioning. According to the World Intellectual Property Organization (2020), effective IP management is not limited to legal protection but also serves as a strategic business tool that supports commercialization, investment attraction, and enterprise growth.

Recent studies emphasize that business incubators increasingly play an important role in improving the IP capabilities of startups and small enterprises. Secundo et al. (2020) highlighted that innovation ecosystems, including incubators and technology transfer institutions, provide essential support services that help enterprises convert knowledge resources into market-oriented innovations. These services include intellectual property guidance, technology assessment, commercialization assistance, and networking with innovation stakeholders. Similarly, Hausberg and Korreck (2020) noted that incubators contribute to startup development by reducing knowledge gaps and providing specialized support that individual entrepreneurs often lack, particularly in areas related to intellectual property management and business strategy.

The registration of trademarks among CMU-ATBI incubatees reflects the strategic importance of brand protection in developing competitive enterprises. Trademarks create intangible assets that contribute to enterprise reputation, customer trust, and long-term market differentiation. Research by Mendonça et al. (2021) demonstrated that intellectual property assets, particularly trademarks and patents, are associated with

stronger innovation performance because they enhance firms' ability to capture value from their products and services. For emerging enterprises, securing trademarks at an early stage reduces vulnerability to brand imitation and provides a foundation for expanding market presence.

Furthermore, copyright protection for promotional videos, brochures, and marketing materials developed through the incubation program highlights the growing significance of creative assets in contemporary entrepreneurship. Digital communication materials have become essential tools for startups and small enterprises in reaching customers, building brand awareness, and communicating value propositions. As noted by Nambisan et al. (2019), digital technologies have transformed entrepreneurial processes by increasing the importance of digital content, online visibility, and knowledge-based resources as sources of competitive advantage. Protecting these creative outputs ensures that enterprises retain ownership of their communication assets and can utilize them strategically for business development.

The IP assistance provided by CMU-ATBI also shows the broader role of university-based incubators in bridging academic innovation and entrepreneurial commercialization. Universities increasingly function as innovation hubs where research outputs, technologies, and creative ideas are translated into market applications through incubation and technology transfer mechanisms. According to Audretsch et al. (2022), university-based entrepreneurship support structures facilitate knowledge transfer by providing institutional resources, mentoring, and commercialization pathways that enable researchers and entrepreneurs to transform innovations into economic and societal value. In this context, CMU-ATBI's collaboration

Business Plan Development and Strategic Enterprise Support

Business plan development is a fundamental component of technology business incubation as it provides entrepreneurs with a structured mechanism for transforming innovative ideas into viable and sustainable enterprises. In the case of CMU-ATBI, individualized business planning assistance was provided to incubatees by considering their unique entrepreneurial contexts, including their vision, objectives, available resources, product offerings, target markets, and enterprise development needs. This customized approach recognizes that incubatees' enterprises vary in terms of technological maturity, business models, resource availability, and commercialization pathways. Rather than applying a uniform business development strategy, CMU-ATBI facilitated enterprise-specific planning interventions that enabled incubatees to develop strategies aligned with their operational realities and growth aspirations.

Recent literature highlights the importance of business planning as a strategic capability that supports entrepreneurial decision-making, resource allocation, and long-term sustainability. Business plans serve as dynamic management tools that allow entrepreneurs to define strategic objectives, evaluate market opportunities, assess operational requirements, and anticipate financial needs. According to Global Entrepreneurship Monitor (2023),

entrepreneurial success is strongly influenced by the ability of business owners to engage in strategic planning, opportunity assessment, and effective resource management. In technology-driven ventures, where uncertainty and innovation risks are relatively high, structured business planning helps entrepreneurs develop clearer commercialization pathways and improve their capacity to respond to changing market conditions.

The role of incubators in strengthening business planning capabilities has been widely recognized in recent entrepreneurship literature. Business incubators provide not only physical infrastructure but also managerial, technical, and strategic support services that enhance the capabilities of emerging enterprises. Hausberg and Korreck (2020) emphasized that incubators contribute to startup development by providing mentoring, business advisory services, networking opportunities, and access to entrepreneurial knowledge. These services are particularly valuable for early-stage enterprises that often possess technical expertise or innovative ideas but lack experience in market analysis, financial planning, and organizational management.

The individualized business planning support provided by CMU-ATBI reflects the evolving role of incubators from simple enterprise support facilities toward comprehensive innovation development platforms. Modern incubation programs emphasize capability building, where entrepreneurs are assisted in developing strategic competencies necessary for growth and competitiveness. According to Audretsch et al. (2022), university-based entrepreneurship support mechanisms facilitate knowledge transfer by combining academic resources, entrepreneurial training, mentoring, and commercialization assistance. Through these mechanisms, incubators help entrepreneurs bridge the gap between innovation generation and market application.

Business plans also play a significant role in enhancing investment readiness among incubatees. Access to financing remains one of the major challenges faced by startups and micro, small, and medium enterprises, particularly those commercializing innovative products. Financial institutions, investors, and development organizations often require clear evidence of market potential, operational feasibility, and financial sustainability before providing support. A well-developed business plan communicates the enterprise's value proposition, competitive advantages, revenue model, and growth potential. According to Mason and Brown (2018), entrepreneurial support systems that improve business capabilities and investment preparedness can significantly increase the likelihood of enterprises accessing external resources and expanding their operations.

Furthermore, business planning contributes to the professionalization of emerging enterprises by encouraging entrepreneurs to adopt systematic approaches to management. Many early-stage enterprises operate informally and rely primarily on entrepreneurial intuition rather than structured decision-making processes. Through business planning activities, incubatees are encouraged to establish measurable objectives, define operational strategies, identify risks, and develop monitoring mechanisms. This transition from opportunity-driven entrepreneurship toward strategic

enterprise management is essential for improving enterprise resilience and competitiveness. As noted by the Organisation for Economic Co-operation and Development (2019), the competitiveness of innovation-based enterprises increasingly depends on organizational capabilities, knowledge management, and the effective utilization of intangible resources.

The strategic orientation developed through business planning is particularly important for technology-based enterprises because commercialization requires more than technical innovation. Entrepreneurs must understand customer needs, market positioning, production requirements, regulatory considerations, intellectual property concerns, and financial sustainability. Nambisan et al. (2019) emphasized that digital and technology-driven entrepreneurship requires entrepreneurs to integrate technological capabilities with market strategies, organizational processes, and ecosystem engagement. In this context, CMU-ATBI's business planning support complemented other incubation services, such as intellectual property assistance, marketing development, and enterprise mentoring, by providing an integrated framework for enterprise growth. Moreover, customized business development support strengthens the ability of incubatees to identify appropriate growth pathways. Enterprises at different stages of development require different strategic interventions. Early-stage ventures may need assistance in validating their business concepts and identifying target markets, while more mature enterprises may require support in scaling operations, improving competitiveness, and accessing investment opportunities. Customized incubation approaches have been identified as more effective because they respond to the specific challenges and maturity levels of individual enterprises (Pauwels et al., 2016). This supports the rationale behind CMU-ATBI's individualized approach in assisting incubatees to develop business plans suited to their respective enterprise conditions.

CMU-ATBI stressed that business plan development is not merely a documentation activity but an important enterprise-building intervention. Through structured planning, incubatees were able to translate entrepreneurial ideas into organized business models, identify strategic priorities, and establish clearer directions for commercialization and growth. These outcomes align with recent studies emphasizing that successful incubation requires integrated support services combining entrepreneurship education, strategic planning, mentoring, market development, and innovation management (Hausberg & Korreck, 2020; Secundo et al., 2020). Therefore, business plan development should be considered a core component of technology incubation because it strengthens managerial capacity, improves investment readiness, and enhances the competitiveness and sustainability of innovation-driven enterprises.

Access to Loans, Grants, and Financial Support

Access to finance is a critical determinant of startup survival, innovation commercialization, and enterprise growth. For technology-based and innovation-driven enterprises, financial resources are essential not only for business establishment but also for technology

acquisition, product development, production expansion, market penetration, and organizational strengthening. In the case of CMU-ATBI, financial facilitation was integrated into the incubation support system through assistance in identifying funding opportunities, preparing documentary requirements, developing funding applications, and coordinating with government financing institutions. This intervention strengthened the capacity of incubatees to mobilize external resources and overcome one of the most common constraints faced by early-stage ventures—the limited availability of capital.

The financial support facilitated by CMU-ATBI resulted in several incubatees successfully accessing government-funded programs. Incubatees obtained financial assistance from the Department of Agriculture's Kapital Access for Young Agripreneurs Program, the Department of Science and Technology's Small Enterprise Technology Upgrading Program (SETUP), and the DOST–Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development Startup Grant Fund Program. These achievements demonstrate the role of incubation support in improving enterprise readiness and increasing the likelihood of accessing external financial resources.

Recent literature emphasizes that financial constraints remain among the most significant barriers affecting startup development, particularly for small and technology-oriented enterprises. Early-stage businesses often experience difficulties obtaining conventional financing due to limited operating history, insufficient collateral, uncertain market prospects, and inadequate financial documentation. According to the Organisation for Economic Co-operation and Development (2019), access to finance is a major enabling condition for innovation-driven entrepreneurship because it determines firms' ability to invest in research and development, acquire technologies, and scale business operations. Therefore, mechanisms that improve entrepreneurs' access to grants, loans, and other financing instruments are essential components of effective entrepreneurial ecosystems.

Business incubators serve an important intermediary role in addressing financing gaps by improving the investment readiness of startups and connecting them with appropriate funding sources. Hausberg and Korreck (2020) emphasized that incubators provide value not only through infrastructure and mentoring but also by facilitating access to networks, investors, and institutional resources. Through financial advisory services, incubators help enterprises improve business documentation, develop funding proposals, prepare financial projections, and demonstrate the feasibility of their ventures. The experience of CMU-ATBI reflects this role, as the incubator acted as a bridge between emerging enterprises and government financing agencies.

The importance of incubation support in improving access to government assistance is particularly relevant in developing economies where public financing programs serve as important mechanisms for promoting entrepreneurship and innovation. According to Audretsch et al. (2022), entrepreneurial ecosystems rely on coordinated interactions among universities, government agencies, financial institutions, and private organizations

to provide resources necessary for venture development. University-based incubators, such as CMU-ATBI, contribute to these ecosystems by translating policy-based support programs into accessible opportunities for entrepreneurs. By assisting enterprises in navigating application processes and compliance requirements, incubators reduce administrative barriers that often prevent small enterprises from accessing available resources.

The successful acquisition of grants shows how incubation support can accelerate technology commercialization and enterprise scaling. Grant-based financing is particularly important for innovation-oriented enterprises because it provides resources for experimentation, technology improvement, product validation, and market testing without immediately creating repayment obligations. Research by Block et al. (2018) showed that public financial support can positively influence entrepreneurial innovation activities by reducing investment risks and enabling firms to pursue growth opportunities that may otherwise be constrained by limited internal resources. In this context, government grants facilitated through incubation programs function as catalysts for innovation development and commercialization. As highlighted by Nambisan et al. (2019), digital transformation and technological capability development have become increasingly important sources of competitive advantage for modern enterprises. Access to technology-oriented financing therefore enables startups and small businesses to move beyond survival-oriented operations toward innovation-driven growth.

Beyond providing direct financial access, CMU-ATBI's assistance also contributed to improving the financial readiness and institutional credibility of incubatees. The preparation of business documents, project proposals, and funding requirements encouraged enterprises to develop stronger organizational systems and strategic plans. These capabilities are essential because funding agencies typically evaluate not only the proposed innovation but also the enterprise's capacity to implement, sustain, and expand the project. According to Secundo et al. (2020), entrepreneurial support organizations enhance innovation performance by developing knowledge-based capabilities, improving managerial competencies, and strengthening connections within innovation networks.

The experience of incubatees seeking additional support through programs such as DOST-SETUP, the Agricultural Training Institute Training Site Program, and the Department of Agriculture's Agricultural Competitiveness Enhancement Fund further demonstrates the continuing role of incubation beyond the initial enterprise development stage. Incubation programs create pathways for sustained enterprise growth by helping entrepreneurs progressively access increasingly complex support mechanisms. Pauwels et al. (2016) emphasized that effective incubation models provide continuous support throughout different stages of venture development, including idea validation, commercialization, and scaling.

Participation in Business Pitching, Networking, and Market Development Activities

CMU-ATBI and its incubatees actively participated in business pitching events, investment conferences, innovation activities, trade fairs, exhibitions, and networking functions. These activities included technology pitching workshops, investment conferences, National Innovation Day activities, the Agri-Aqua Innovation Pitch Fest, the Madagaya Trade Fair, and the CMU-ATBI Incubatees Summit.

Participation in these events provided incubatees with opportunities to present their products, technologies, and business models to potential investors, customers, government agencies, industry partners, and other entrepreneurs. Business pitching activities enhanced the ability of incubatees to communicate their enterprise value propositions and identify potential sources of investment and collaboration. Trade fairs and product exhibitions also supported market development by providing venues for product promotion, customer engagement, and direct selling. These activities enabled incubatees to obtain market feedback and improve their understanding of consumer preferences and market requirements. Networking activities strengthened relationships among incubatees, government agencies, academic institutions, private organizations, and industry stakeholders. These connections created opportunities for collaboration, knowledge exchange, technology transfer, and market expansion. The participation of incubatees in business and innovation events therefore contributed to the development of broader enterprise support networks.

Infrastructure Development and Enterprise Expansion

Infrastructure development is a critical dimension of technology business incubation because it provides enterprises with the physical and operational capacity required to transform innovative ideas into commercially viable products and services. In the context of CMU-ATBI, incubation support contributed to the establishment and improvement of enterprise infrastructure among participating ventures through the development of production facilities, processing areas, storage facilities, and other operational requirements. These infrastructure investments enabled incubatees' enterprises to improve production efficiency, strengthen product quality, undertake value-adding activities, and increase their capacity to respond to market opportunities. For agri-aqua enterprises, where production consistency, processing capability, and quality assurance are essential for competitiveness, access to appropriate infrastructure represents an important foundation for enterprise growth and commercialization.

The importance of infrastructure support in incubation programs has been increasingly emphasized in recent entrepreneurship and innovation literature. Business incubators have evolved from providing basic workspace facilities into comprehensive enterprise development platforms that combine physical resources, technical services, mentoring, networking, and commercialization support. According to Hausberg and Korreck (2020), modern incubators contribute to startup performance by reducing resource constraints and providing access to essential capabilities that young enterprises often cannot develop independently. Physical infrastructure, including

laboratories, production spaces, shared facilities, and equipment, allows startups to overcome early-stage limitations and accelerate the transition from prototype development toward market-oriented production.

The infrastructure improvements observed among CMU-ATBI incubatees clearly shows the role of incubation in enhancing enterprise operational capacity. Production and processing facilities allowed enterprises to increase their ability to manufacture, process, and package products more efficiently while maintaining quality standards. This is particularly relevant for agriculture- and food-based enterprises, where inadequate processing facilities, limited storage capacity, and inefficient production systems often constrain market expansion. As noted by Food and Agriculture Organization of the United Nations (2022), strengthening post-production infrastructure, processing capacity, and value-chain facilities is essential for improving agricultural competitiveness and reducing losses across food systems.

Infrastructure development also supports value addition, which is increasingly recognized as a major strategy for improving the competitiveness of agri-based enterprises. Through improved processing areas and production facilities, incubatees can move beyond primary production toward higher-value products with improved market potential. According to OECD and FAO (2021), investments in agricultural innovation systems and value-chain infrastructure contribute to productivity improvement, market integration, and the creation of higher economic value from agricultural resources. In this regard, the infrastructure assistance provided through CMU-ATBI supported enterprises in enhancing not only production capacity but also their ability to participate in more competitive markets.

Beyond physical expansion, enterprise infrastructure contributes to the development of organizational capabilities necessary for sustainable business growth. Adequate facilities enable enterprises to establish standardized production procedures, improve workflow efficiency, and implement quality management practices. These capabilities are particularly important for technology-based enterprises because commercialization requires consistent production performance and the ability to meet customer expectations. Nambisan et al. (2019) emphasized that innovation-driven entrepreneurship requires the integration of technological resources, organizational capabilities, and market-oriented strategies. Infrastructure therefore functions not merely as a physical asset but as an enabling resource that supports innovation adoption and commercialization.

The development of storage facilities among CMU-ATBI enterprises also highlights the importance of post-production infrastructure in reducing operational risks. Inadequate storage and handling facilities can result in product deterioration, increased production losses, and reduced profitability, particularly among agricultural enterprises dealing with perishable commodities. Improved storage systems enhance inventory management, maintain product quality, and provide enterprises with greater flexibility in responding to market demand. These improvements contribute to enterprise resilience by reducing vulnerabilities associated with supply chain and production constraints.

Infrastructure investments generated broader economic benefits beyond individual enterprises. The establishment and expansion of production facilities stimulate local economic activities by creating employment opportunities, increasing demand for raw materials and support services, and strengthening enterprise linkages within local communities. This aligns with the concept of entrepreneurial ecosystems, where enterprise growth is influenced by interactions among firms, institutions, suppliers, markets, and community stakeholders. Audretsch et al. (2022) emphasized that entrepreneurial ecosystems facilitate economic development by creating environments where knowledge, resources, and opportunities circulate among interconnected actors. In this perspective, incubatees' enterprises supported by improved infrastructure become contributors to regional innovation and economic activity.

The experience of CMU-ATBI also demonstrates the importance of infrastructure support in improving enterprise readiness for scaling and commercialization. Startups frequently encounter challenges when transitioning from small-scale production to larger market operations because existing facilities may not accommodate increased demand or higher quality requirements. Shared infrastructure, technology centers, and specialized facilities provided through incubation programs can reduce these scaling barriers. According to Secundo et al. (2020), innovation ecosystems supported by universities and knowledge institutions enhance enterprise growth by providing access to resources, technologies, and collaborative platforms that individual firms may not possess.

However, sustaining enterprise expansion requires continuous investment beyond initial infrastructure development. Emerging agri-aqua enterprises require access to modern equipment, shared processing facilities, testing laboratories, certification support, and other commercialization-related infrastructure to remain competitive. The availability of such facilities is particularly important as enterprises move toward larger markets that require compliance with quality, safety, and regulatory standards. The OECD (2019) emphasized that long-term competitiveness in innovation-based economies depends on continuous investment in knowledge, technology, infrastructure, and organizational capabilities.

Furthermore, infrastructure development should be complemented by appropriate technical assistance, capacity building, and market support. Physical facilities alone do not guarantee enterprise success unless entrepreneurs possess the managerial, technical, and marketing capabilities needed to utilize these resources effectively. Pauwels et al. (2016) highlighted that successful incubation models integrate multiple forms of support, including infrastructure provision, mentoring, training, and business development assistance, to maximize enterprise outcomes. This reinforces the importance of CMU-ATBI's integrated incubation approach, where infrastructure development is combined with intellectual property support, business planning, financial facilitation, and market development.

Contribution to Student Learning and Experiential Education

University-based technology incubation programs serve not only as mechanisms for enterprise development and commercialization but also as platforms for experiential learning, human capital formation, and industry–academe collaboration. In the case of CMU-ATBI, incubatees' agri-aqua enterprises functioned as experiential learning environments by accommodating college and senior high school students for on-the-job training (OJT). Through their engagement with incubatee enterprises, students were provided opportunities to apply classroom-based knowledge to actual production, processing, marketing, and business management activities. This integration of academic learning with enterprise practice strengthened students' technical competencies, entrepreneurial awareness, and understanding of the operational realities of agri-aqua ventures.

Experiential education has increasingly been recognized as an effective approach for developing competencies that cannot be fully acquired through classroom instruction alone. Kolb's experiential learning framework emphasizes that meaningful learning occurs through the interaction of concrete experiences, reflective observation, conceptual understanding, and active experimentation. In entrepreneurship and innovation education, exposure to real business environments enables students to develop problem-solving abilities, decision-making skills, and entrepreneurial competencies through direct participation in enterprise activities. Recent studies have shown that experiential learning opportunities improve students' confidence, employability, and ability to translate theoretical knowledge into practical solutions (Nabi et al., 2017; Pittaway et al., 2020).

The participation of students in CMU-ATBI incubatees' enterprises reflects the growing role of entrepreneurial ecosystems in higher education institutions. Universities are increasingly expected to move beyond traditional teaching functions by creating opportunities where students engage with industry, communities, and innovation-driven enterprises. According to Guerrero et al. (2019), entrepreneurial universities contribute to regional development by integrating education, research, innovation, and industry engagement. Through incubation programs, universities create environments where students, faculty members, entrepreneurs, and external stakeholders interact, enabling knowledge exchange and the development of entrepreneurial capabilities.

The involvement of incubatees as host organizations for student training also demonstrates the value of university–industry collaboration in enhancing workforce preparation. Industry-based learning allows students to experience workplace expectations, organizational processes, customer interactions, and production challenges that are difficult to replicate in academic settings. As highlighted by Jackson and Bridgstock (2021), meaningful industry engagement improves graduate employability by developing both technical skills and transferable competencies, including communication, teamwork, adaptability, and entrepreneurial thinking. In the context of agri-aqua enterprises, students gained exposure to diverse activities

such as agricultural production systems, food processing operations, enterprise management, market development, and financial decision-making.

The learning opportunities provided by incubatees' enterprises were particularly significant because agri-aqua entrepreneurship requires multidisciplinary knowledge and practical skills. Unlike conventional classroom activities, enterprise immersion exposes students to interconnected aspects of business operations, including resource management, quality control, customer relations, innovation adoption, and market competition. According to Nambisan et al. (2019), innovation-driven entrepreneurship requires the integration of technological knowledge with organizational and market capabilities. Experiential exposure within technology-based enterprises therefore enables students to better understand how innovations are transformed into products and services with economic and social value.

Beyond student learning outcomes, the collaboration between CMU-ATBI, incubatees, and academic programs contributed to reciprocal knowledge transfer. Students benefited from practical exposure, while enterprises gained access to emerging knowledge, technical assistance, and potential human resources from the university. This two-way exchange reflects the knowledge-transfer mission of entrepreneurial universities, where academic institutions contribute to innovation ecosystems through education, research, extension, and enterprise engagement. According to Secundo et al. (2020), knowledge exchange among universities, firms, and innovation support organizations strengthens entrepreneurial ecosystems by facilitating the movement of ideas, skills, and technologies among stakeholders.

The role of incubatees' enterprises as learning sites also supports the broader concept of living laboratories or real-world innovation environments. Such environments allow students to participate in authentic problem-solving processes while contributing to enterprise improvement. For example, students may apply academic knowledge in areas such as production optimization, marketing strategies, digital promotion, product development, and business documentation. These interactions create opportunities for experiential knowledge creation and reinforce the relevance of higher education programs to local economic development. As noted by Bruneel et al. (2017), university–industry interactions generate mutual benefits by enhancing innovation capabilities, strengthening networks, and improving the practical relevance of academic knowledge.

Furthermore, student engagement with agri-aqua startups contributes to the development of future entrepreneurs and innovation-oriented professionals. Exposure to entrepreneurial environments can influence students' attitudes toward entrepreneurship by reducing uncertainty about business ownership and increasing awareness of entrepreneurial opportunities. Nabi et al. (2017) found that entrepreneurship education combined with experiential activities produces stronger impacts on entrepreneurial intentions and competencies compared with purely theoretical approaches. Through direct participation in incubatees' enterprises, students develop

a deeper appreciation of entrepreneurship as a career pathway and as a mechanism for addressing agricultural and community development challenges.

The contribution of CMU-ATBI incubatees to student learning demonstrates the broader societal value of technology incubation programs. While incubators are traditionally evaluated based on enterprise survival, revenue generation, and commercialization outcomes, their educational contributions represent an equally important dimension of impact. By transforming incubatees' enterprises into practical learning environments, CMU-ATBI strengthened the relationship between academic instruction and real-world application. These activities supported the university's mission of integrating instruction, research, extension, and innovation while preparing students with competencies needed in increasingly dynamic agricultural and entrepreneurial environments.

Income Generation and Employment Creation

The economic impact of technology business incubation is reflected not only in enterprise survival and innovation development but also in the ability of incubatees' enterprises to generate income, create employment, and contribute to local economic transformation. In the case of CMU-ATBI, the incubatees' enterprises demonstrated measurable improvements in economic performance, as indicated by the 133% increase in overall sales and the 181% increase in employment generation relative to baseline conditions. These outcomes suggest that incubation interventions contributed to strengthening enterprise capacity, improving commercialization readiness, and enabling startups to transition from emerging ventures into operational businesses capable of generating economic value.

The increase in enterprise income may be attributed to the integrated package of incubation services provided by CMU-ATBI. These services included entrepreneurship training, business planning, technical mentoring, product development assistance, marketing support, financial facilitation, intellectual property protection, and networking opportunities. Contemporary studies emphasize that startup growth rarely results from isolated interventions but from coordinated support systems that address technological, managerial, financial, and market-related challenges. According to Wurth et al. (2022), entrepreneurial ecosystems that provide interconnected resources and institutional support enhance the capacity of new ventures to overcome growth barriers and improve performance outcomes. In this context, CMU-ATBI functioned as an enabling platform that helped enterprises develop the capabilities necessary for business expansion. The growth in sales among incubatees' enterprises demonstrates the importance of incubation programs in improving commercialization outcomes. Many startups, particularly those based on agricultural innovations, experience difficulties translating technical ideas into marketable products due to limited business expertise, weak market networks, and insufficient resources. Business incubation helps address these limitations by providing entrepreneurs with access to mentoring, market intelligence, technical assistance, and strategic guidance.

As noted by Hausberg and Korreck (2020), incubators have evolved into innovation support organizations that facilitate enterprise development by reducing resource constraints and strengthening entrepreneurial capabilities. The economic gains generated by CMU-ATBI incubatees are also consistent with findings on the role of innovation support organizations in improving firm performance. Audretsch et al. (2021) emphasized that entrepreneurial ecosystems contribute to regional economic development by creating conditions that enable new firms to access knowledge, capital, networks, and institutional support. University-based incubators are particularly important within these ecosystems because they connect research institutions, entrepreneurs, government programs, and markets. Through these linkages, incubators increase the likelihood that research-based innovations can be transformed into productive economic activities.

The substantial increase in employment generated by incubatees' enterprises further highlights the broader socioeconomic contribution of CMU-ATBI. Enterprise growth creates direct employment within production, processing, administration, and marketing activities while also stimulating indirect employment opportunities through increased demand for suppliers, service providers, and local resources. According to the International Labour Organization (2021), micro, small, and medium enterprises remain among the major contributors to employment generation, particularly in developing economies where local enterprises serve as important sources of livelihood and economic participation.

The employment outcomes of CMU-ATBI-supported enterprises demonstrate the role of incubation programs in promoting inclusive economic development. Unlike conventional technology commercialization models that focus primarily on financial returns, university-based incubation programs often generate broader social benefits by supporting local entrepreneurship and creating livelihood opportunities. Guerrero and Urbano (2021) emphasized that entrepreneurial universities contribute to regional development by integrating education, research, innovation, and entrepreneurship activities. Through incubation initiatives, universities become active contributors to economic transformation by supporting the emergence of enterprises that create jobs and stimulate community-based economic activities.

The contribution of incubation programs to employment creation is also associated with improved enterprise scalability. Startups often face challenges in expanding beyond small-scale operations due to limitations in production capacity, managerial systems, financing, and market access. Incubation support helps enterprises overcome these constraints by strengthening organizational capabilities and improving readiness for growth. According to Theodoraki et al. (2022), entrepreneurial support organizations enhance venture development by providing access to resources, knowledge networks, and collaborative opportunities that enable firms to scale their operations.

For agri-aqua enterprises, income generation and employment creation are particularly significant because these ventures contribute to agricultural modernization and rural economic development. By supporting

enterprises involved in agricultural production, food processing, and related services, incubation programs promote value addition and create opportunities for local communities. The Food and Agriculture Organization (FAO, 2022) emphasized that strengthening agrifood entrepreneurship and innovation systems is essential for improving rural livelihoods, increasing value-chain efficiency, and promoting sustainable food systems.

Furthermore, the economic outcomes of CMU-ATBI illustrate the importance of combining innovation support with market-oriented enterprise development. Innovation-driven enterprises require more than technical solutions; they must develop business models capable of generating sustainable revenue and responding to customer needs. As highlighted by Vial (2021), successful digital and innovation-driven enterprises increasingly depend on the integration of technological capabilities, organizational flexibility, and market responsiveness. The incubation services provided by CMU-ATBI supported this transition by helping entrepreneurs develop stronger business foundations and commercialization strategies.

Despite the positive economic outcomes, sustaining enterprise growth requires continuous support beyond the incubation period. As enterprises mature, their needs evolve toward market expansion, technology upgrading, investment attraction, and organizational scaling. Recent studies emphasize that entrepreneurial support systems must provide long-term ecosystem connections rather than short-term interventions to sustain venture development (Wurth et al., 2022). Therefore, continued institutional support, access to financing, technology upgrading programs, and market linkages remain important for maintaining the growth trajectory of incubatees' enterprises.

CONCLUSION

The Central Mindanao University Agri-Aqua Technology Business Incubator (CMU-ATBI) has demonstrated its significant contribution to strengthening agripreneurship and technology-based enterprise development among its incubatees. Through comprehensive incubation services—including entrepreneurial training, mentoring, business plan development, product enhancement, intellectual property protection, marketing support, networking opportunities, infrastructure development, and assistance in securing funding—the incubator has successfully enhanced the entrepreneurial capabilities and business competitiveness of participating enterprises.

The findings indicate that the incubation program generated substantial economic and social impacts. Several incubatees successfully obtained government grants and loan assistance, registered trademarks and copyrights, expanded their market presence through promotional initiatives, and participated in business pitching events and trade exhibitions. Moreover, the establishment of production facilities, increased employment opportunities, and remarkable improvements in business income demonstrate the effectiveness of the incubation strategies implemented by CMU-ATBI.

Beyond economic outcomes, the incubator has contributed to human capital development by providing practical learning opportunities for university and senior

high school students through on-the-job training placements. These collaborations strengthened the linkage among the university, industry, government agencies, and local communities while promoting innovation and knowledge transfer.

Overall, the CMU-ATBI serves as an effective model for technology business incubation that supports enterprise growth, employment generation, and regional economic development. The experiences gained from the implementation of the program provide valuable insights for higher education institutions, policymakers, and development organizations seeking to establish or strengthen business incubation initiatives that promote innovation-driven entrepreneurship and sustainable community development.

RECOMMENDATIONS

Based on the findings of the study, the following recommendations are proposed:

1. CMU-ATBI should continue strengthening its incubation services by providing advanced entrepreneurial training, business mentoring, and technology commercialization support tailored to the evolving needs of incubatees.
2. Greater collaboration with government agencies, financial institutions, private industries, and international organizations should be established to expand funding opportunities, market access, and investment support for startup enterprises.
3. The incubator should enhance its intellectual property assistance by encouraging more incubatees to register patents, trademarks, copyrights, and utility models to improve business competitiveness and protect innovations.
4. Additional digital marketing initiatives, e-commerce training, and international market linkage programs should be introduced to increase product visibility and market expansion.
5. Future incubation programs should strengthen post-incubation monitoring to assess the long-term sustainability, profitability, and growth of graduated enterprises.
6. The university should continue integrating incubation activities into instruction, research, and extension programs to maximize student engagement, technology transfer, and community development.
7. Future assessments should incorporate more comprehensive performance indicators such as return on investment, survival rate of incubatees, innovation outputs, and socioeconomic impact on surrounding communities.

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