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Status, Integration, and Social Entrepreneurship of Technology Business Incubation in the Academe

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1. Introduction

Background of the Study

Technology Business Incubators (TBIs) have emerged as pivotal platforms bridging academia, industry, and society, serving as key drivers of regional entrepreneurial ecosystems. They sustain innovation growth through mentorship, infrastructure access, and knowledge transfer. Research has shown that TBIs function as connectors among entrepreneurship education, experiential learning, and sustainable regional development (Lamine et al., 2018). Building on this, Yuan, Hao, Guan, and Pentland (2021) identified four critical components—people, technology, capital, and infrastructure—that significantly influence incubator performance, based on panel data from 857 national technology incubators in China. More recently, incubation models have increasingly integrated social and inclusive development. Baskaran, Chandran, and Ng (2019) emphasized the role of business incubators, academia, and social enterprises in fostering inclusive entrepreneurship and sustainable growth in Asia. Similarly, Karambakuwa and Bayat (2022) demonstrated how incubation hubs support marginalized groups by offering tailored training, market access, and networking opportunities. Extending this perspective, Coscarello (2025) found that university social innovation incubators in Latin America and Italy can act as catalysts for territorial development and social inclusion, particularly when guided by participatory governance models aligned with the Quadruple and Quintuple Helix frameworks.

Rationale of the Study

While numerous studies demonstrate the potential of TBIs to catalyze innovation, inclusion, and economic development, there remains a research gap in context-specific analyses of how TBIs integrate within academic ecosystems, particularly in under-researched regions. Exploring the status of TBI integration and its role in fostering social entrepreneurship within academic institutions can inform tailored strategies for enhancing innovation-driven inclusive growth.

This study aims to address the gap by offering insights into how academic TBIs integrate organizationally and socially to support inclusive, technology-driven entrepreneurship—providing value for policymakers, academic leaders, and incubator practitioners.

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Aim of the Study

This study aimed to determine the status, integration, and social entrepreneurship of technology business incubation in the academe in Panay Island and Guimaras, Philippines, for the academic year 2024–2025. It sought to provide empirical insights into how Technology Business Incubators (TBIs) in State Universities and Colleges (SUCs) contribute to innovation, entrepreneurship, and community development within the academic ecosystem.

Research Questions

The study sought to answer the following questions:

1. What is the profile of the respondents in terms of:
   a. Type of TBI
   b. Name of TBI
   c. Programs offered
   d. Number of jobs created
   e. Approved TBI policy/manual
2. What is the status of technology business incubation in the academe in Panay Island and Guimaras as assessed by the respondents, taken as a whole?
3. What is the extent of integration of technology business incubation in the academe in Panay Island and Guimaras as assessed by the respondents, taken as a whole?
4. What is the level of social entrepreneurship of technology business incubation in the academe i Panay Island and Guimaras as assessed by the respondents, taken as a whole?
5. Are there significant relationships among the status, integration, and social entrepreneurship of technology business incubation in the academe in Panay Island and Guimaras?

Hypotheses

This study was guided by the following null hypotheses:

- H_{01}: There are no significant differences in the status of technology business incubation in the academe in Panay Island and Guimaras when respondents are classified according to type of TBI, name of TBI, programs offered, number of jobs created, and approved TBI policy/manual.
- H_{02}: There are no significant differences in the extent of integration of technology business incubation in the academe in Panay Island and Guimaras when respondents are classified according to type of TBI, name of TBI, programs offered, number of jobs created, and approved TBI policy/manual.
- H_{03}: There are no significant differences in the level of social entrepreneurship of technology business incubation in the academe in Panay Island and Guimaras when respondents are classified according to type of TBI, name of TBI, programs offered, number of jobs created, and approved TBI policy/manual.
- H_{04}: There are no significant relationships among the status, integration, and social entrepreneurship of technology business incubation in the academe in Panay Island and Guimaras.
- H_{05}: Technology business incubation does not significantly influence social entrepreneurship in the academe in Panay Island and Guimaras.

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Theoretical Framework

This study was anchored on three interrelated theories: the Resource-Based View (RBV) Theory, the Triple Helix Model (THM), and the Social Capital Theory. These theories collectively explain the interaction of institutional resources, multi-sector collaboration, and social networks in driving innovation and entrepreneurship within academic settings.

The Resource-Based View (RBV) emphasizes that valuable, rare, inimitable, and non-substitutable resources provide organizations with a competitive advantage (Barney, 1991). In the case of Technology Business Incubators (TBIs), institutional resources such as funding, facilities, knowledge, and mentorship are essential for fostering start-up success (Salsabila et al., 2022; Subramanian et al., 2022). Complementing this, the Triple Helix Model (Etzkowitz & Leydesdorff, 2000) underscores the collaboration of universities, industry, and government in strengthening innovation ecosystems, with academic institutions serving as key actors in knowledge creation and commercialization (Bonilla-Jurado et al., 2023; Wang, 2023). Finally, Social Capital Theory highlights the importance of networks, trust, and social norms in enabling collaboration and resource sharing (Coleman, 1990; Rouxel et al., 2015). Together, these frameworks explain how State Universities and Colleges (SUCs) in Panay Island and Guimaras can leverage resources, partnerships, and social relationships to enhance the performance of TBIs and support socially responsible entrepreneurial initiatives.

Integrating these three theories, this framework provides a multidimensional lens to understand how resources, institutional collaboration, and networks interact to influence the status, integration, and social entrepreneurship outcomes of TBIs in academic environments.

Conceptual Framework

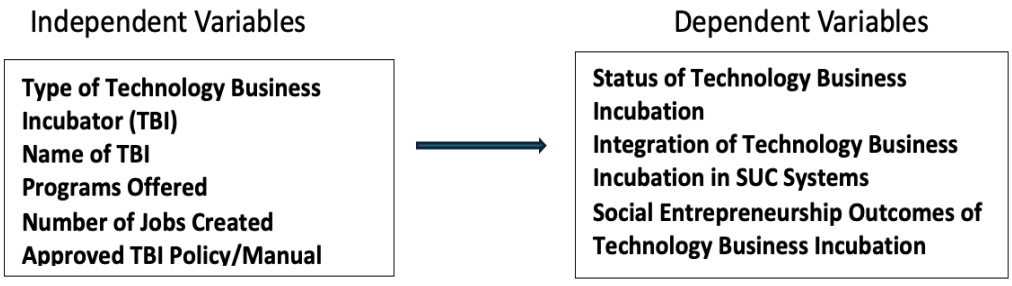

Figure 1. Schematic Diagram of Conceptual Framework

Figure 1 presents the conceptual framework guiding this study. The framework illustrates the hypothesized influence of institutional and operational components of Technology Business Incubators (TBIs) in State Universities and Colleges (SUCs) on three key outcome areas: the status of TBI implementation, its integration within institutional systems, and its contributions to social entrepreneurship. The **independent variables** include the type of TBI, its name or identity, the programs offered, the number of jobs created, and the presence of an

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approved TBI policy or manual. These variables represent the internal characteristics and administrative readiness of the TBI units. The **dependent variables—**status of TBI, integration into SUC systems, and social entrepreneurship outcomes—reflect the institutional and societal impact of TBI operations. The directional arrow between the two sets of variables indicates the study's core assumption: that institutional TBI characteristics significantly influence the extent of integration and the degree to which TBIs promote social entrepreneurship within the SUC context.

2. Literature Review

Technology Business Incubation (TBI) has emerged as a strategic mechanism for accelerating the growth of start-ups and fostering innovation ecosystems in higher education institutions. Studies emphasize that university-based incubators contribute significantly to local economic development through resource sharing, mentoring, and knowledge transfer (Lose et al., 2022). In Southeast Asia, TBIs have been instrumental in addressing developmental gaps by supporting student-led enterprises and facilitating academia-industry collaboration (Wonglimpiyarat, 2021). However, challenges persist in the form of institutional fragmentation, policy ambiguity, and limited funding, especially within public universities.

State Universities and Colleges (SUCs) in the Philippines play a crucial role in democratizing access to innovation-driven entrepreneurship. Recent initiatives by the Commission on Higher Education (CHED) and the Department of Science and Technology (DOST) have encouraged SUCs to integrate innovation hubs and incubators aligned with the Philippine Development Plan and the Innovation Act (CHED, 2020; DOST, 2021). Yet, the degree of integration varies across regions, and many SUCs still lack the structural readiness to effectively implement incubator-based entrepreneurship programs (Oracion & Delas Armas, 2023). This variation underscores the need for a localized understanding of institutional models and policy instruments that support sustainable incubation.

Social entrepreneurship—defined as the pursuit of innovative solutions to social problems through market-based strategies—has become an increasingly important outcome of incubation efforts in academic settings. TBIs in SUCs are now expected not only to produce economically viable enterprises but also to contribute to social impact, community development, and inclusive growth (Roy et al., 2022). The intersection between TBI integration and social entrepreneurship within SUCs remains underexplored, particularly regarding how institutional policies, incubation models, and support systems align to foster both innovation and social value creation. This gap provides the rationale for the present study.

3. Methodology

This study employed a descriptive-correlational research design to assess the status, integration, and outcomes of Technology Business Incubators (TBIs) in Philippine State Universities and Colleges (SUCs), particularly their contributions to social entrepreneurship. Data were gathered through a researcher-developed structured survey questionnaire administered to TBI managers or designated focal persons across selected SUCs with existing or pilot TBI programs. The instrument was validated by experts in entrepreneurship and innovation management and pilot-tested for reliability using Cronbach's alpha. Quantitative data were analyzed using descriptive statistics (mean, frequency, and standard deviation) and inferential statistics, particularly Pearson's r, to test the relationships between institutional incubation attributes including type, policy presence, program support and key

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outcome variables. Ethical considerations such as informed consent, voluntary participation, and data confidentiality were strictly observed throughout the study.

4. Results and Discussion

Table 1. Profile of Respondents (n = 25)

Profile Variable	Frequency	Percentage (%)
Type of TBI		
Academic-based	16	64.00
Government-linked	9	36.00
Name of TBI		
Identifiable TBI name	25	100.00
Programs Offered		
Yes	20	80.00
No	5	20.00
Number of Jobs Created		
Yes	15	60.00
No	10	40.00
Approved TBI Policy/Manual		
Yes	20	80.00
No	5	20.00

Table 1 illustrates the demographic and operational profile of TBIs. A substantial 64% are academic-based, with all respondents able to name their TBI. Most reported the presence of programs (80%) and approved policies (80%), but job creation was evident in only 60%, indicating possible operational constraints in translating programs into employment.

Table 2. Status of Technology Business Incubation (n = 25)

Indicator	Mean	Interpretation
Infrastructure	4.32	Very High
Mentorship	4.21	Very High
Networking	4.10	High
Funding Support	3.85	High
Governance	3.78	High
Overall Mean	4.05	High

Table 2 demonstrates that the status of Technology Business Incubators (TBIs) in Panay Island and Guimaras is strong, particularly in terms of *infrastructure* (M = 4.32) and *mentorship* (M = 4.21), both rated "very high." Indicators such as *networking* (M = 4.10), *funding support* (M = 3.85), and *governance* (M = 3.78) also score "high,"

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bringing the overall mean to 4.05. These results suggest that TBIs in this region have solid physical and human resource foundations, with somewhat lesser but still meaningful strengths in governance and financial support.

These findings align with several empirical studies. For example, Pattanasak et al. (2022) conclude that business incubators' success depends largely on the provision of both physical facilities and intangible supports such as mentorship and networking. Similarly, in Uttarakhand, incubators that offered strong infrastructure, mentorship, market linkages, and funding access had significantly higher success rates among startups compared to non-incubated cases. On the other hand, governance and funding have been identified as more challenging domains; Matthee (2025) finds that funding, especially public funding, often comes with mismatched objectives or strict KPIs that constrain incubator flexibility. Li, Liang, and Yan (2022) also highlight that too much dependence on government subsidies can cause incubators to focus on basic services at the expense of value-added ones, suggesting that optimal financing and governance structures matter.

In sum, the results—very high infrastructure and mentorship, slightly lower scores in funding and governance, and a high overall status—mirror patterns in the literature: strong physical/mentorship resources are key drivers, while governance and financial structures often present bottlenecks.

Table 3. Extent of Integration of TBI in the Academe (n = 25)

Integration Indicator	Mean	Interpretation
Curriculum Integration	4.20	Very High
Faculty Participation	4.15	Very High
Student Engagement	3.95	High
Research Alignment	3.88	High
Administrative Support	3.75	High
Overall Mean	3.99	High

Table 3 shows that the integration of Technology Business Incubators (TBIs) into higher education institutions is generally strong, with an overall mean of 3.99, interpreted as *high*. Among the indicators, *curriculum integration* (M = 4.20) and *faculty participation* (M = 4.15) were rated *very high*, reflecting that incubation concepts and practices are increasingly embedded in academic programs and actively supported by faculty. This is consistent with Guerrero and Urbano (2019), who observed that embedding entrepreneurship education and incubation processes into curricula enhances institutional entrepreneurial orientation and graduate preparedness. Similarly, Hayter and Cahoy (2018) stressed the importance of faculty involvement in creating an entrepreneurial culture that bridges classroom learning with incubation practices.

Meanwhile, *student engagement* (M = 3.95), *research alignment* (M = 3.88), and *administrative support* (M = 3.75) were rated *high*, suggesting that while participation and alignment exist, there remain opportunities for stronger institutional collaboration. Previous studies affirm that student participation is a key determinant of incubation effectiveness, as engagement fosters experiential learning and the translation of ideas into viable ventures (Maritz & Donovan, 2015). At the same time, research alignment and administrative backing are essential for sustaining innovation; however, these often face challenges in resource allocation and strategic prioritization (Mian, Lamine, & Fayolle, 2016).

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Overall, the findings highlight that the integration of TBIs in Panay Island and Guimaras is progressing well, particularly in curriculum and faculty domains, though additional efforts to strengthen administrative support and student engagement could further enhance academic–incubation synergies.

Table 4. Level of Social Entrepreneurship in TBIs (n = 25)

Social Entrepreneurship Dimension	Mean	Interpretation
Community Involvement	4.25	Very High
Ethical Leadership	4.10	Very High
Inclusivity and Innovation	3.85	High
Social Impact Orientation	3.75	High
Sustainability Practices	3.68	High
Overall Mean	3.93	High

Table 4 presents the assessment of the social entrepreneurship dimension of Technology Business Incubators (TBIs) in Panay Island and Guimaras. The overall mean of 3.93 indicates a *high* level, with particular strengths in *community involvement* (M = 4.25) and *ethical leadership* (M = 4.10), both rated *very high*. These findings suggest that TBIs in the academe are strongly oriented toward community engagement and ethical responsibility, which aligns with the assertion of Zahra et al. (2009) that social entrepreneurship thrives when organizations prioritize social value creation alongside economic goals. Similarly, Bacq and Alt (2018) emphasized that ethical leadership fosters trust and legitimacy, both of which are crucial for sustaining socially oriented ventures.

Other indicators such as *inclusivity and innovation* (M = 3.85), *social impact orientation* (M = 3.75), and *sustainability practices* (M = 3.68) were interpreted as *high*, but with room for improvement. These results echo the findings of Saebi, Foss, and Linder (2019), who noted that while social enterprises often demonstrate strong community focus, challenges remain in scaling innovation and embedding sustainable practices into long-term strategies. Moreover, research by Nicholls (2010) highlighted that many academic and institutional incubators face limitations in developing sustainable impact models due to resource constraints and limited integration of environmental considerations.

In summary, TBIs in the academe demonstrate solid foundations in social entrepreneurship, particularly in community involvement and ethical leadership, while inclusivity, innovation, and sustainability practices represent areas with developmental potential for broader societal impact.

Table 5. Differences in TBI Status by Profile Variables (n = 25)

Profile Variable	p-value	Interpretation
Type of TBI	0.035	Significant
Programs Offered	0.021	Significant
Number of Jobs Created	0.004	Highly Significant
TBI Policy/Manual Presence	0.027	Significant

Table 5 shows statistically significant variations in the status of Technology Business Incubators (TBIs) when classified according to institutional profile variables. Results reveal that *type of TBI* (p = .035), *programs offered* (p

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= .021), and *policy/manual presence* (p = .027) all yielded significant differences, while *number of jobs created* (p = .004) was highly significant. The strongest influence of job creation underscores that measurable employment outcomes remain a critical indicator of incubation performance. This finding supports the argument of Mian, Lamine, and Fayolle (2016) that the effectiveness of incubation is often judged by its tangible socio-economic contributions, particularly job generation. Similarly, Amezcua et al. (2013) found that incubators that contribute to regional employment growth are more likely to be perceived as impactful by stakeholders.

The significance of *program offerings* and the *presence of formalized policies/manuals* aligns with Bruneel, Ratinho, Clarysse, and Groen (2012), who emphasized that structured programs and clear governance frameworks increase the credibility and operational efficiency of incubators. Furthermore, the relevance of *TBI type* resonates with Hackett and Dilts (2004), who noted that differences in incubation models—such as university-based versus independent incubators—produce varied outcomes depending on institutional mission and resource availability.

Overall, the results highlight that while all profile variables matter, employment outcomes serve as the most influential driver of how stakeholders evaluate the success and status of TBIs in the academe.

Table 6. Differences in Integration of TBI by Profile Variables (n = 25)

Profile Variable	p-value	Interpretation
Type of TBI	0.048	Significant
Programs Offered	0.038	Significant
Number of Jobs Created	0.052	Not Significant
TBI Policy/Manual Presence	0.026	Significant

Table 6 shows that the level of integration of Technology Business Incubators (TBIs) into higher education varied significantly according to *type of TBI* (p = .048), *programs offered* (p = .038), and *policy/manual presence* (p = .026). These results highlight that institutional structures and formalized guidelines exert strong influence on how deeply TBIs are embedded within academic frameworks. This supports the findings of Bruneel, Ratinho, Clarysse, and Groen (2012), who emphasized that structured programming and well-defined governance mechanisms enhance the legitimacy and effectiveness of incubator integration. Likewise, Guerrero and Urbano (2019) argued that institutional design and policy frameworks are critical drivers in shaping how entrepreneurial initiatives are aligned with academic missions.

In contrast, *number of jobs created* (p = .052) was not significant, indicating that integration is less dependent on employment outcomes and more strongly influenced by academic structures. This observation resonates with Hayter and Cahoy (2018), who noted that integration within universities is guided primarily by pedagogical and institutional priorities rather than immediate economic impact. Similarly, Mian, Lamine, and Fayolle (2016) observed that while job creation is a valued outcome, it is not always the central measure of integration in academic incubation models, where emphasis is often placed on education, research, and innovation linkages.

Overall, the findings suggest that in the academe, the depth of TBI integration is determined more by structural and policy-driven factors than by direct employment performance.

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Table 7. Differences in Social Entrepreneurship by Profile Variables (n = 25)

Profile Variable	p-value	Interpretation
Type of TBI	0.030	Significant
Programs Offered	0.025	Significant
Number of Jobs Created	0.018	Significant
TBI Policy/Manual Presence	0.011	Highly Significant

Table 7 indicates that the level of social entrepreneurship within Technology Business Incubators (TBIs) is significantly influenced by all institutional profile factors examined. Specifically, *type of TBI* (p = .030), *programs offered* (p = .025), and *number of jobs created* (p = .018) were found to be significant, while *policy/manual presence* (p = .011) was highly significant. These results suggest that TBIs with clear structures, diversified program offerings, and strong policy frameworks are more likely to foster socially oriented entrepreneurial practices. This aligns with Zahra, Gedajlovic, Neubaum, and Shulman (2009), who emphasized that organizational structures and resource configurations shape the capacity of enterprises to balance economic and social objectives.

The strong influence of *programs offered* and *policy/manual presence* supports the findings of Bruneel, Ratinho, Clarysse, and Groen (2012), who argued that structured incubation programs and formal governance mechanisms are essential for developing entrepreneurial capabilities and ensuring long-term sustainability. Furthermore, the significance of *job creation* underscores the socio-economic role of TBIs, resonating with Amezcua, Grimes, Bradley, and Wiklund (2013), who found that incubators that generate employment tend to reinforce legitimacy and strengthen social outcomes. Finally, the role of *TBI type* reflects Hackett and Dilts' (2004) observation that variations in incubator models can lead to different pathways for achieving both commercial and social entrepreneurship goals.

Overall, the findings demonstrate that TBIs with well-defined programs and policies are better positioned to embed social entrepreneurship, combining community engagement, ethical practices, and sustainable development objectives with entrepreneurial growth.

Table 8. Correlations among Status, Integration, and Social Entrepreneurship (n = 25)

Variable Pair	r-value	Interpretation
Status vs Integration	0.72	Strong Positive
Integration vs Social Entrepreneurship	0.68	Strong Positive
Status vs Social Entrepreneurship	0.65	Moderate Positive

Table 8 presents the correlations among the status, integration, and social entrepreneurship dimensions of Technology Business Incubators (TBIs). A *strong positive* relationship was found between *status and integration* (r = .72), suggesting that TBIs with strong infrastructure, mentorship, and governance are more effectively embedded within academic programs. This finding is consistent with Mian, Lamine, and Fayolle (2016), who emphasized that well-resourced incubators are more likely to align with institutional missions and expand their academic influence. Similarly, a *strong positive* correlation between *integration and social entrepreneurship* (r = .68) indicates that deeper curricular and faculty engagement fosters socially responsible entrepreneurial practices. This supports

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Guerrero and Urbano's (2019) view that entrepreneurial universities generate wider social value when incubation is embedded in education and research.

A *moderate positive* correlation was also observed between *status and social entrepreneurship* (r = .65). This suggests that while resources and operational strength enhance social outcomes, these are mediated by integration processes. Zahra et al. (2009) likewise noted that social entrepreneurship outcomes are not only resource-driven but also dependent on institutional practices and stakeholder engagement. Overall, the results highlight a co-evolutionary relationship: strong TBI operations enhance integration into higher education, which in turn strengthens social entrepreneurship, creating a reinforcing cycle of academic and societal impact.

Implications of the Study

The findings of this study have several important implications for stakeholders in the academe, government, and entrepreneurial ecosystems.

First, the strong correlation among TBI status, integration, and social entrepreneurship underscores the importance of a well-established and well-supported incubation environment in academic institutions. This implies that universities and colleges should not treat technology business incubation as an isolated activity but as an integral component of their teaching, research, and extension functions. Institutions with structured programs, clear governance, and active faculty and student engagement are more likely to produce socially relevant innovations.

Second, the significant differences across TBI types, job creation, and policy implementation indicate that not all TBIs are performing equally. This variation suggests the need for targeted capacity-building interventions, such as standardized TBI policies, mentorship schemes, and performance tracking frameworks that align with national innovation goals. Policymakers in the Commission on Higher Education (CHED) and the Department of Science and Technology (DOST) may use these results to refine funding allocation, monitoring systems, and accreditation guidelines for academic TBIs.

Third, the high level of social entrepreneurship observed reflects the potential of TBIs to become vehicles for inclusive and sustainable development. However, the study also reveals areas needing improvement, particularly in inclusive innovation and long-term sustainability. This highlights the importance of designing incubation programs that incorporate ethical leadership, community orientation, and responsible innovation.

Lastly, the study affirms that integrating TBIs within academic ecosystems can foster job creation, foster entrepreneurial mindsets among students, and stimulate regional innovation hubs. Therefore, institutional leaders are encouraged to institutionalize TBI initiatives through formal policy, curriculum integration, and resource allocation to maximize both educational and socio-economic outcomes.

5. Conclusion and Recommendations

Conclusion

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The present study examined the profile, status, integration, and social entrepreneurship performance of Technology Business Incubators (TBIs) in the academe within Panay Island and Guimaras. Results indicated that while TBIs varied in type, programs offered, and job creation output, the general status of TBI operations was assessed as functional and relevant, though not without limitations. The integration of TBI into academic structures was evident, particularly in curriculum alignment and institutional support, albeit uneven across institutions. Social entrepreneurship, a key performance indicator of TBIs, was found to be evident and promising, reflecting the TBIs' alignment with both market responsiveness and social value creation.

Significant differences were observed when results were classified by institutional variables such as TBI type and job creation levels, indicating disparities in resource access, policy implementation, and operational maturity. Furthermore, strong correlations between status, integration, and social entrepreneurship dimensions emphasized the importance of holistic, coordinated approaches to incubation programs.

Overall, the study supports the premise that a well-integrated, policy-guided, and socially anchored TBI framework within academic institutions can enhance the development of innovation ecosystems at the regional level.

Recommendations

Based on the findings and implications of this study, the following recommendations are offered:

1. Institutionalize TBI policies and manuals across all HEIs operating TBIs to ensure coherence, accountability, and long-term sustainability.
2. Enhance faculty and student involvement in incubation programs by embedding TBI concepts into curricular and research activities.
3. Strengthen social entrepreneurship orientation of TBIs by incorporating community development, sustainability, and ethical innovation into TBI mentoring and training programs.
4. Develop standardized monitoring and evaluation tools for assessing TBI status, integration, and social impact, guided by CHED and DOST frameworks.
5. Support regional partnerships among TBIs, LGUs, and industry to foster shared resources, co-incubation projects, and innovation clusters.
6. Allocate more funding and training to TBIs with low job creation records or limited integration to build their capacity and relevance.
7. Encourage documentation and publication of best practices from successful TBIs to serve as models for other institutions.

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