

Exploring University Commercialization Pathways and Challenges towards Framework Development

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ABSTRACT

This study explores university commercialization pathways and the challenges encountered in transforming academic innovations into marketable outputs, with the goal of developing a contextualized framework for Abra State Institute of Sciences and Technology (ASIST). Using a qualitative case study design, data were gathered from ten purposively selected participants, including faculty researchers, administrators, and innovation personnel, through semi-structured interviews. Findings reveal that ASIST primarily utilizes two major commercialization pathways: showcasing of products through conferences and exhibits, and extension activities that facilitate technology transfer to communities and external partners. These pathways enhance visibility, collaboration, and practical application of research outputs. However, several challenges hinder their effectiveness, particularly insufficient facilities, limited funding, and policy-related constraints such as high costs of publication and intellectual property processing. These barriers affect the institution's ability to fully commercialize its innovations. To address these issues, participants emphasized the need for improved fund allocation, stronger administrative support, and enhanced partnerships with industry and stakeholders. The study highlights that commercialization is not only dependent on institutional structures but also on resource availability, governance, and collaborative networks. Based on the findings, the study proposes the development of an integrated commercialization framework tailored to ASIST's context, aligning institutional capacities, policies, and external linkages. This framework aims to strengthen innovation systems and improve the translation of academic research into socio-economic benefits, contributing to sustainable development goals and institutional advancement.

Keywords: commercialization, extension activities, innovation, partnerships, university

INTRODUCTION

Universities have increasingly become central actors in fostering innovation and economic growth through the commercialization of research outputs. Commercialization pathways refer to the processes and mechanisms by which academic knowledge, technologies, and intellectual property are transformed into marketable products, services, or ventures. These pathways may include licensing agreements, spin-off companies, industry partnerships, and technology transfer offices. Meanwhile, challenges encompass barriers such as limited funding, regulatory constraints, weak industry-academia linkages, and lack of entrepreneurial culture within academic institutions. The term framework development in this context signifies the creation of a structured model or guide that can help universities systematically navigate commercialization processes while addressing obstacles. By exploring these pathways and challenges, the study aims to provide insights into how higher education institutions can better align their research outputs with societal and economic needs.

The relevance of university commercialization directly connects to the United Nations Sustainable Development Goals (SDGs), particularly SDG 8 (Decent Work and Economic Growth), SDG 9 (Industry, Innovation, and Infrastructure), and SDG 17 (Partnerships for the Goals). Effective commercialization fosters innovation ecosystems that generate employment opportunities, strengthen industrial capacity, and promote sustainable economic development. Moreover, by addressing challenges in commercialization, universities can enhance their role in advancing SDG 4 (Quality Education) through experiential learning and entrepreneurial training, while also contributing to SDG 11 (Sustainable Cities and Communities) by supporting innovations that improve

urban living. Thus, the development of a robust framework for commercialization is not only an academic exercise but also a strategic contribution to achieving global sustainability targets.

To begin with, Lerner, Manley, Stein, and Williams (2025) highlight the variability of commercialization outcomes across universities, noting that institutional policies, faculty research focus, and geographic ecosystems profoundly shape success. Their findings emphasize that commercialization is highly context-dependent, and that structural differences among institutions must be considered when designing frameworks. This perspective sets the foundation for later studies that focus on refining processes and infrastructures rather than assuming uniformity across institutions.

In connection with this, Pujotomo et al. (2025) argue that despite the presence of Technology Transfer Offices, commercialization is often impeded by resource limitations, extended development schedules, and insufficient industry involvement. They call for more strategic methodologies that integrate funding flow performance metrics and transitions between Technology Readiness Levels (TRLs). Their work complements Lerner et al.'s emphasis on variability, showing that even when structures exist, resource constraints and weak industry participation can undermine commercialization outcomes.

Similarly, extend discussion by focusing on Proof of Concept Centers, particularly in the biological sciences by Adams et al. (2025). They observe that while these facilities provide vital support, there is little evidence of their long-term impact in advancing academic concepts into commercialization. This finding connects directly to Pujotomo et al.'s concerns about resource limitations, suggesting that institutional support mechanisms must be evaluated not only for their presence but also for their effectiveness in sustaining commercialization efforts.

Moving forward, the shifts attention toward concrete strategies for improving commercialization, highlighting the significance of translational infrastructures such as incubators, proof-of-concept funding, and entrepreneurial training. His work provides practical interventions that respond to the structural and resource challenges identified by earlier scholars, reinforcing the idea that commercialization requires both institutional readiness and process robustness. (Maxwell, 2023)

On the other hand, NBER (2023) adds another dimension by identifying systemic governance obstacles, including insufficient leadership frameworks and cultural-legal disparities, that frequently impede commercialization despite robust research results. This perspective connects with Maxwell's process-oriented solutions, showing that even strong infrastructures cannot succeed without effective governance and leadership structures to coordinate commercialization efforts.

Maluki (2023) observes that universities in developing nations often struggle to translate research into market-ready solutions due to disconnected institutional frameworks, weak commercialization infrastructure, and limited industry cooperation. His findings resonate with NBER's emphasis on governance and Lerner et al.'s focus on institutional variability, underscoring that commercialization challenges are particularly acute in contexts where institutional and industry ecosystems remain underdeveloped.

At the local level, Carbonell (2025) provides insights into corporatization strategies of Philippine State Universities and Colleges (SUCs) under Republic Act 8292. The study reveals that corporatization has improved governance structures and financial autonomy, but also raised concerns about balancing commercialization goals with educational quality. This connects with Maluki's findings on governance challenges, showing that Philippine universities face similar tensions between institutional reforms and commercialization effectiveness according to (Carbonell, 2025).

Likewise, Flores (2025) examines financing challenges and opportunities for SUCs in the Philippines, emphasizing that commercialization of intellectual property, university-industry collaboration, and entrepreneurial initiatives are critical for financial sustainability. His work complements Maxwell's emphasis on translational infrastructures, but situates the discussion within the Philippine context, where resource mobilization and policy coherence remain pressing issues.

Cruz (2023) further analyzes support for universities in commercializing technologies within the Philippine

economic context. He notes that while R&D investments can lead to breakthroughs, universities often struggle to transition these into the “Commercial Economy” due to weak industry linkages and limited commercialization infrastructures. His findings reinforce Bernardo’s (2019) observations on Southeast Asia, showing that Philippine universities face similar systemic barriers in advancing research outputs beyond the laboratory stage.

The study of Bernardo (2019) reinforces this regional perspective by reporting that universities in Southeast Asia face policy gaps, limited industry involvement, and inadequate innovation ecosystems, which hinder the advancement of research outputs beyond the laboratory stage. His work connects directly to Cruz’s findings, showing that systemic weaknesses in policy and industry collaboration remain persistent barriers in developing regions.

Regarding faculty engagement, Kruss et al. (2015) show that commercialization may be restricted by heavy teaching loads, limited training, and minimal industry exposure. This finding complements Bernardo’s emphasis on systemic gaps, suggesting that commercialization challenges are not only structural but also human-resource related, requiring institutional reforms to support faculty participation.

Furthermore, Perkmann et al. (2013) expand the discussion by highlighting the importance of informal channels such as consultancy, collaborative research, and knowledge exchange, particularly in resource-constrained universities. Their work connects with Kruss et al.’s findings, showing that when formal mechanisms are weak, informal pathways can provide alternative routes for commercialization.

In addition, Rasmussen, Mosey, and Wright (2011) argue that institutional support mechanisms and entrepreneurial competencies strongly influence commercialization performance. Their study bridges the gap between Perkmann et al.’s emphasis on informal channels and Kruss et al.’s focus on faculty challenges, highlighting the need for universities to build internal capacity and competencies to succeed in commercialization efforts.

Earlier studies also provide important insights. Wright et al. (2008) and O’Shea et al. (2008) emphasize persistent challenges such as weak technology transfer offices, constrained resources, and misaligned incentives. Their findings connect backward to Rasmussen et al.’s call for stronger institutional support, showing that without adequate structures, commercialization efforts remain fragmented and ineffective.

In contrast, Bercovitz and Feldman (2008) and Markman et al. (2008) demonstrate that strong entrepreneurial cultures and incentive structures in North America and Europe encourage faculty engagement in commercialization. Their findings highlight the importance of institutional culture in shaping commercialization outcomes, offering a counterpoint to the structural challenges identified by Wright and O’Shea.

Moreover, Thursby and Thursby (2007) and Siegel et al. (2007) underline the importance of effective technology transfer offices, market potential, and intellectual property quality in commercialization success. Their work connects directly to Wright et al.’s emphasis on structural barriers, showing that strong institutional mechanisms are essential for translating research into marketable outputs.

Shane (2004) further stresses that commercialization success depends heavily on the quality of intellectual property and market readiness. His findings complement Thursby and Siegel’s emphasis on institutional mechanisms, adding the perspective that market dynamics play a decisive role in commercialization pathways.

Finally, Etzkowitz (2003) identifies commercialization as a vital process for translating academic research into societal and economic value. His foundational work laid the groundwork for subsequent models such as the Triple Helix, which emphasize the dynamic interactions among universities, industry, and government. This early perspective connects to all later studies, providing the theoretical foundation upon which contemporary debates about commercialization pathways, governance, and institutional capacity have been built.

Framework of the Study

This study is grounded on three principal perspectives that describe university commercialization, its issues, and methods for betterment. The Triple Helix Model emphasizes the collaborative dynamics among academia,

business, and government as essential for effective innovation commercialization. The Resource-Based View and Institutional Theory elucidate how internal resources, infrastructure, and policy alignment affect the efficacy of commercialization paths. Ultimately, Innovation Systems Theory offers a comprehensive viewpoint for constructing an integrated framework, showing the significance of related participants and institutional connections in promoting effective innovation results. Collectively, these theories inform the analysis of ASIST's commercialization strategies, the obstacles faced, and the development of a context-specific framework to improve the turn of academic ideas into significant outcomes.

Triple Helix Model (Etzkowitz & Leydesdorff, 2000). This highlights the dynamic interplay among universities, industry, and government as the principal catalyst for innovation and technological commercialization. It indicates that universities have evolved from mere knowledge makers to active contributors within the economic and innovation ecosystem, partnering with business and government to convert research into viable goods or services.

This theory will guide the examination of today's commercialization routes in ASIST, facilitating the identification of the university's connections with business and government in converting academic ideas into commercial products. The project will examine paths including licensing, spin-offs, and consultation via the framework of Triple Helix interactions, evaluating the effectiveness of various collaborations and their contributions to commercialization.

Resource-Based View (RBV) of the Firm (Barney, 1991). The Resource-Based View states that an organization's resources—both real (laboratories, financing, technology) and intangible (skills, knowledge, networks)—determine its capacity to develop competitive advantage. In the field of universities, access to sufficient infrastructure, finance, proficient staff, and technology transfer offices is vital for the effective commercialization of inventions.

This will be employed to analyze the effects of resource availability and institutional infrastructure on ASIST's commercialization trends. It assists in detecting deficiencies in finance, infrastructure, and human resources that hinder the successful conversion of academic research into commercial products or services.

Institutional Theory (DiMaggio & Powell, 1983). Institutional theory elucidates how organizational activities are shaped by formal rules, policies, and conventions within their context. Universities function within institutional frameworks involving government rules, accreditation requirements, and internal guidelines, which can either facilitate or hinder innovation and commercialization.

In connection, this theory will inform the examination of how policy alignment—encompassing both internal factors (university regulations, incentives) and external factors (government mandates, intellectual property legislation)—influences the value of ASIST's commercialization strategies. It will assist in identifying policy deficiencies and inconsistencies that obstruct the commercialization of innovation.

Innovation Systems Theory (Edquist, 2005). Effective innovation and commercialization arise from a network of interconnected entities and institutions, such as universities, industry, government, financiers, and support organizations, which collectively create an ecosystem conducive to technology development and dissemination. The idea highlights the significance of coordination, feedback mechanisms, and the interconnections among players to enhance commercialization results.

This theory will serve as the basis for constructing the integrated commercialization framework for ASIST. This study will analyze current pathways and challenges within innovation systems to propose a structured framework that bolsters institutional capacities, aligns policies with practices, and improves collaboration among universities, industries, and governments to optimize commercialization outcomes.

In conclusion, these ideas jointly provide a thorough framework for analyzing and improving university commercialization. The Triple Helix Model emphasizes the importance of collaboration among universities, government and industry; Resource-Based View and Institutional Theory pinpoint essential internal and external factors that promote or obstruct commercialization; and Innovation System Theory gives a comprehensive

framework for synthesizing these pathways into an effective structure. This project aims to examine ASIST's existing commercialization methods, identifying significant problems and create a context-specific framework that enhances institutional capacity, aligns policies and optimizes the effect of academic innovations.

Statement of the Problem

This study aims to describe commercialization pathways for academic innovations in ASIST.

Specifically, it sought to answer the following:

1. What commercialization pathways are currently used at ASIST to support the translation of academic innovations into external use and market or community application?
2. What challenges hinder the effectiveness of existing commercialization pathways in terms of the ff.
 - a. Resources/Infrastructures,
 - b. Policy Alignment?
3. What integrated mechanisms can address the identified challenges and improve commercialization pathways for academic innovations at ASIST?

METHODOLOGY

Research Design

A case study research design will be utilized to examine the commercialization pathways and challenges at Abra State Institute of Sciences and Technology (ASIST). A case study is appropriate when a researcher seeks to investigate a contemporary phenomenon within its real-life context, particularly when the boundaries between the phenomenon and its setting are not clearly distinguishable. According to Yin 2018, case studies are especially suitable for answering “how” and “why” questions and for conducting an in-depth exploration of complex organizational processes. In this study, commercialization pathways are deeply embedded within ASIST's institutional structures, policies, culture, and external linkages, making a case study design appropriate for capturing the interconnected and context-dependent nature of these processes.

Furthermore, case study research allows for the collection of rich and detailed data from multiple sources to provide a holistic understanding of a bounded system, such as an institution or program. (Creswell and Poth 2021) explain that case study inquiry involves an in-depth exploration of a case over time through data collection methods such as interviews, documents, and observations. In this research, ASIST serves as the bounded case, and data will be gathered from key institutional stakeholders to analyze existing commercialization mechanisms, resource and infrastructure constraints, and policy alignment issues. This design supports the development of a contextualized and evidence-based framework tailored to the specific needs and realities of the institution.

Selection and Study Site

This study will be conducted at three campuses of Abra State Institute of Sciences and Technology (ASIST), consisted of 10 purposively selected participants composed of: 4 faculty researchers or innovators, 2 Technology Transfer Office/Unit Personnel, 2 Research and Extension Coordinators and 2 Administrators (research and innovation leaders) in the Academic Year 2025-2026.

Research Instrument

The study will utilize a semi-structured interview guide as the primary data gathering instrument to explore the commercialization pathways of academic innovations in ASIST. Since the research aims to describe existing pathways, identify challenges related to resources, infrastructure, and policy alignment, and propose mechanisms for improvement, a qualitative approach is deemed appropriate to obtain in-depth and context-rich information

from key informants. The instrument will be administered to university administrators, research directors, innovation and extension coordinators, and faculty members involved in research and commercialization activities.

The semi-structured interview guide will consist of open-ended questions organized according to the three major areas of inquiry: (1) existing commercialization pathways currently practiced by universities, (2) challenges affecting their effectiveness particularly in terms of resources, infrastructure, and policy alignment, and (3) possible mechanisms to improve and integrate commercialization pathways within ASIST. The questions will allow participants to narrate their experiences, describe institutional processes, identify gaps and constraints, and suggest practical strategies for strengthening commercialization efforts. Follow-up and probing questions will be used to clarify responses and obtain deeper insights. Interviews will be recorded with consent and transcribed verbatim for thematic analysis.

To ensure the credibility and rigor of the instrument, the interview guide will undergo content and face validation by experts in research methodology, innovation management, and university commercialization. Their feedback will be used to refine the clarity, relevance, and alignment of the questions with the study's objectives. A pilot interview will also be conducted with selected participants who share similar characteristics with the target respondents to assess the comprehensibility, sequencing, and depth of the questions. Necessary revisions will be made based on the pilot results to enhance the trustworthiness and overall quality of the data gathering instrument.

Data Collection Procedure

The researcher secured institutional permission and informed consent before data collection. Interviews were scheduled at times convenient for participants and were conducted in person or online, depending on participant availability. All interviews were audio-recorded only with permission, transcribed verbatim, anonymized, and stored securely.

Semi-structured interviews will be conducted either in person or online at times that are convenient for both parties, depending upon respondent availability.

Member verification enhances the trustworthiness of qualitative results. Following transcription and first analysis of the interview material to ensure accuracy and authenticity, a summary of the remarks or principal interpretations from chosen participants will be presented. Participants may affirm, explain, or rectify interpretations. The final analysis will include member checking input to ensure the results accurately represent participants' perspectives.

Mode of Analysis

This study will employ thematic analysis to examine the qualitative data gathered from the semi-structured interviews. All recorded interviews will be transcribed verbatim, and the researcher will carefully review the transcripts to gain familiarity with the data. Significant statements related to existing commercialization pathways, institutional challenges in terms of resources, infrastructure, and policy alignment, and proposed mechanisms for improvement will be identified and coded.

Similar codes will be grouped into categories and developed into broader themes that directly address the research questions. These themes will be interpreted and synthesized to serve as the basis for proposing a contextualized commercialization framework for ASIST. To ensure credibility and trustworthiness, member checking will be conducted, and an audit trail of the analysis process will be maintained. Findings will be presented in narrative form and supported by selected participant quotations.

Ethical Consideration

Participation in this study will be entirely voluntary. Without coercion, fear of harassment or intimidation from the researcher, participants in the study are free to share their opinions without fear of being upset or uncomfortable. A clear statement will be provided explaining the study's purpose, time commitment, and right

to withdraw at any time without penalty. An informed consent form will be provided to all potential participants. Only those who signed the informed consent form will be included in the study. Only the researcher will have the access to the data. Data will be anonymized before any publication or presentation of the research findings. The interview questions will focus on opinions and perceptions and will not ask for sensitive information that could cause emotional distress. A summary of findings will be made available to participants upon requests. Any publications will ensure participant anonymity and confidentiality.

FINDINGS AND DISCUSSION

Commercialization Pathways

Showcasing products. Participants define showcasing products as refers to the systematic presentation, demonstration, and promotion of institutional research outputs, innovations, and technologies to various audiences through multiple platforms and partnerships. It involves disseminating products at local, regional, and international levels through conferences, exhibits, extension activities, and collaborations with industries and external organizations. To support these claims, the statements below are cited:

Firstly, “ASIST involves the community in its research activities. Research outputs and products are presented and showcased both regionally and internationally. The institution is often invited to participate in regional conferences as well as international organizations for research dissemination.” (P1)

Thus, highlighting the importance of broad dissemination. Similarly, “the outputs and products are being presented locally, regionally, and internationally. Also, ASIST is involved in collaboration with other institutions, uhm, in showcasing their products.” (P2)

These findings are supported by existing studies on innovation and commercialization pathways. According to the Organisation for Economic Co-operation and Development (2019) reported that universities commonly commercialize their innovations through participation in fairs, exhibits, and partnerships with industries, which consequently increase the visibility and usability of research outputs.

In addition, the World Intellectual Property Organization (2020) noted that innovation promotion through exhibits, events, and collaborations facilitates the transition of research outputs into marketable products, thus emphasizing the value of showcasing activities.

Showcasing products emerges as a vital commercialization pathway, as it enables the systematic dissemination of research outputs through conferences, exhibits, and collaborations. Through these platforms, institutions enhance visibility, strengthen partnerships, and promote the practical utilization of innovations.

Extension Activity. Extension activity is defined as the act of sharing, promoting, and transferring the school’s technologies and products to the community. It is a form of outreach used to commercialize outputs by collaborating with external agencies, partnering with community stakeholders, and participating in events like food exhibits to put innovations into public use. To support these claims, the statements below are cited:

To begin with “ASIST commercializes outputs by participating with industries...conducting extension activity by promoting products and sharing technologies with the community.” (P4)

Similarly, ...

“Through extension and outreach activities... where the outputs and technologies are share with the community.” (P6)

Moreover,

“ASIST commercializes its outputs through extension activities... collaboration with external agencies, and participation in food exhibits.” (P8)

Finally, “ASIST commercializes its outputs through partnerships with community stakeholders... participation in exhibits, and collaboration with both public and private sectors to promote innovations.” (P9)

These responses collectively suggest that extension activity serves as a key commercialization pathway, as it enables the promotion, transfer, and utilization of institutional innovations through community engagement and strategic partnerships.

These findings are supported by international and local studies which emphasize that extension activities serve as a critical mechanism for technology transfer and commercialization. The OECD (2021) and World Bank (2023) highlight that outreach and engagement programs facilitate the movement of innovations from academic institutions to end-users. Similarly, Etzkowitz and Zhou (2020) explain that university–industry–government collaboration strengthens innovation diffusion, while Philippine studies (Cruz et al., 2022; Santos & Reyes, 2024) confirm that extension activities such as training, exhibits, and partnerships enhance the adoption and utilization of institutional outputs.

These responses collectively indicate that extension activity functions as a vital commercialization pathway within higher education institutions, as it enables the sharing, promotion, and transfer of institutional technologies and products to the community. Through participation in extension and outreach programs, institutions actively engage in collaboration with external agencies, community stakeholders, and both public and private partners, allowing research outputs to be tested, demonstrated, and utilized in real-world settings. Overall, these findings reinforce that extension activities are not only outreach initiatives but also strategic mechanisms for commercialization and community-based innovation transfer.

Challenges Hinder the Effectiveness of Existing Commercialization Pathways

Insufficient Facilities. Insufficient facilities refer to the lack of inadequacy of physical infrastructure, equipment, and technological resources needed to effectively support research, innovation, and commercialization activities. This includes incomplete resources, outdated or limited technology, and a shortage of appropriate workspaces or tools, which are essential for developing and showcasing products. To support these claims, the statements below are cited:

“One of the major challenges we face is the limited budget allocation provided by the institution and incomplete resources/facilities.” (P1)

“One of the challenges is limited funding... and insufficient facilities.” (P5)

“One challenge is the need for more facilities and advanced technology...to better support the commercialization process.”(P6)

OECD (2021) reports that many universities in developing contexts struggle with insufficient physical and technological resources, which directly affects research productivity and technology transfer activities. A study by Guerrero and Urbano (2020) explains that institutional support systems—particularly laboratories, equipment, and innovation hubs—are critical drivers of successful knowledge commercialization.

In addition, a study by Mendoza et al. (2023) found that State Universities and Colleges (SUCs) in the Philippines face challenges such as outdated laboratory equipment, limited research spaces, and insufficient technological tools, which delay product development and extension commercialization activities.

Policies. Policies are generally seen as supportive at the institutional level, with no official barriers to progress. However, they present challenges when dealing with external procedures and high costs—specifically regarding Scopus publication, patenting, and utility models (UM)—which can slow down the overall process. To support these claims, the statements below are cited:

There are no official policy barriers; however, the high cost of publication in Scopus-indexed journals poses a significant challenge.” (P1)

On the other hand,

“At the institutional level, policies are supportive... (.) but external requirements and procedures can sometimes slow down the process like publication, patenting, UM and many more.” (P9)

Smith et al. (2023) highlight that open access and indexed journal publication fees create significant financial barriers for researchers, particularly in developing institutions where research funding is often limited. They explain that Article Processing Charges (APCs) for Scopus- and Web of Science-indexed journals can range from moderate to very high costs, making it difficult for faculty and researchers to publish their studies in reputable journals. As a result, many research outputs remain unpublished or are diverted to lower-indexed or non-indexed journals, which limits their visibility, citation impact, and overall contribution to knowledge dissemination and innovation. This financial constraint ultimately affects institutional research productivity and slows down the broader goal of research commercialization and academic impact.

Guerrero and Urbano (2020) found that even with strong institutional policies in place to support innovation and entrepreneurship, commercialization outcomes remain limited when key enabling factors such as funding, infrastructure, and administrative efficiency are weak. They explain that policies alone are not sufficient to drive successful knowledge transfer and commercialization if institutions lack adequate financial support, well-developed research facilities, and efficient administrative systems to process intellectual property applications, partnerships, and technology transfer activities. As a result, the effectiveness of commercialization initiatives depends not only on the existence of supportive policies but also on the availability of resources and the efficiency of implementation mechanisms within the institution.

Mechanism to Address the Challenges

Fund allocation. Fund allocation refers to the strategic distribution and management of financial resources to support research, innovation, and commercialization activities within an institution. It emphasizes the need for fair, sufficient, and well-prioritized budgeting, particularly for critical areas such as publication expenses, intellectual property (IP) protection, and commercialization processes. To support these claims, the statements below are cited:

“A wiser and fairer allocation of fund/budget, particularly for publication expenses and IP would greatly improve commercialization efforts...” (P1)

“One of the main challenges is insufficient funds... (sigh) along with lack of support and limited resources.” (P8)

“Strengthening budget allocation—particularly for research dissemination and commercialization—is essential... (1s pause) Additionally, fostering stronger partnerships and providing capacity-building opportunities would further enhance our efforts.” (P10)

Gupta and Sharma (2023) found that limited institutional funding is one of the primary barriers to research productivity and commercialization in developing countries, particularly affecting publication output and innovation scaling. WIPO (2021) further emphasizes that intellectual property protection and patenting processes require substantial financial support, while Etzkowitz and Leydesdorff (2021) stress that sustainable funding is essential for effective collaboration under the Triple Helix innovation framework. Overall, these studies affirm that proper and fair fund allocation is essential to overcome resource limitations and enhance commercialization outcomes.

Administrative Support. Defined as the essential leadership backing that provides clear planning, funding allocation, and progress monitoring. It is a necessary foundation that enables the school to strengthen partnerships and improve the overall success of its projects. To support these claims, the statements below are cited:

“It should include clear planning with administrative support...funding support, strong partnerships, and monitoring of progress.” (P6)

“Strengthening administrative support, increasing funding allocation, and enhancing collaboration with industry partners would significantly improve outcomes.” (P8)

Marginson (2021) explains that strong university leadership and administrative systems are essential in translating research outputs into societal and economic value, particularly through structured support for funding, collaboration, and monitoring systems.

Partnerships. Participants described partnerships as working relationships that improve implementation, sustainability, and responsiveness to community needs. Through effective partnerships, projects become more organized, efficient, and responsive to community needs, which ultimately contributes to their success and sustainability. This collaborative engagement also strengthens linkages between the institution and external agencies, allowing for better implementation, wider support, and long-term impact of development and commercialization initiatives. To support these claims, the statements below are cited:

“Increasing funding and strengthening partnerships...would really help improve the process.” (P5)

“A clear strategic plan...sufficient funding, strong partnerships, and continuous monitoring and evaluation should be included to ensure sustainability and success.” (P9)

Guerrero and Urbano (2020) emphasize that effective collaboration between universities, industry, and external stakeholders strengthens knowledge transfer and improves commercialization outcomes by enhancing coordination, resource sharing, and innovation processes. Similarly, Salmi (2020) highlights that high-performing universities depend on strong external partnerships to ensure that research outputs are successfully translated into societal and economic benefits, particularly through sustained engagement with various stakeholders. In the same way, Clark (2021) explains that entrepreneurial universities rely on continuous collaboration with industry and government partners as a core strategy for sustaining innovation activities and ensuring long-term institutional development.

Moreover, Marginson (2021) stresses that partnerships between universities and external sectors contribute to public value creation by promoting knowledge exchange, inclusivity, and responsiveness to community needs. Collectively, these studies affirm that strong partnerships are essential in improving institutional efficiency, enhancing project implementation, and ensuring the sustainability of research, extension, and commercialization initiatives.

Integrated ASIST Commercialization Framework

The findings support an integrated, staged framework rather than a linear research-to-market model. At ASIST, commercialization currently begins through showcasing and extension activities, but these pathways are weakened by insufficient facilities, limited funding, publication and intellectual-property costs, and uneven external linkages. The proposed framework therefore connects institutional readiness, innovation validation, pathway selection, implementation, and monitoring in a feedback cycle.

The framework has five operational stages: (1) innovation identification and disclosure; (2) validation and readiness assessment; (3) protection and pathway selection; (4) transfer, adoption, and scale-up; and (5) monitoring, learning, and reinvestment. Showcasing and extension activities are retained as the institution's immediate pathways, while licensing, sponsored or collaborative research, consultancy, community adoption, and spin-off development are treated as conditional pathways to be activated when resources, intellectual-property protection, market evidence, and partner capacity are sufficient.

Stage 1—Identify and disclose. Researchers submit an innovation brief describing the problem addressed, users, evidence of effectiveness, ownership, development stage, and possible beneficiaries. The Research and Innovation Office records the output and conducts an initial eligibility and conflict-of-interest check.

Stage 2—Validate and prioritize. A small commercialization team conducts technical, user, financial, regulatory, and market screening. Innovations are classified as community-transfer ready, partnership ready, or investment

and licensing ready. This prevents the institution from applying a high-cost route to an output that is better suited to extension or direct community adoption.

Stage 3—Protect and select the route. The institution determines whether protection through patent, utility model, copyright, trademark, or confidentiality is appropriate, consistent with Republic Act No. 10055 and applicable institutional rules. A pathway decision is then made: showcasing and extension for early adoption; collaboration or consultancy for problem-solving and validation; licensing for a market-ready technology with an able industry partner; or a spin-off/incubation route for innovations requiring a dedicated business entity.

Stage 4—Transfer and scale. The responsible unit prepares a technology or service brief, identifies partners, negotiates responsibilities and benefit sharing, and implements a pilot. Fund allocation should prioritize proof-of-concept work, intellectual-property processing, prototype improvement, dissemination, and partner engagement. Administrative support should include a single focal person, standard templates, a transaction timeline, and access to legal, technical, and business expertise.

Stage 5—Monitor, learn, and reinvest. ASIST should track outputs and outcomes using indicators such as number of disclosures, protected innovations, validated prototypes, active partnerships, extension adopters, licenses or agreements, revenue or cost recovery, jobs or enterprises supported, beneficiary satisfaction, and reinvestment in research and innovation. Annual review should determine whether a pathway is continued, redesigned, scaled, or discontinued.

Figure 1. Proposed operational commercialization framework for ASIST

Operational responsibility should be distributed. Faculty researchers provide technical evidence and participate in validation; the Research and Innovation Office manages the portfolio and records; the Extension Office leads community testing and adoption; administrators approve funding and policy support; and industry, government, and community partners contribute demand information, resources, regulatory guidance, and implementation capacity. This division responds directly to participants' calls for fairer fund allocation, stronger administrative support, and wider partnerships.

Comparison with existing commercialization models. The proposed framework is consistent with the Triple Helix model because it assigns explicit roles to the university, industry, government, and community partners. Unlike a purely Triple Helix description, however, it converts collaboration into decision points, deliverables, and indicators. It also resembles the technology-transfer-office model, which emphasizes disclosure, IP management, licensing, and monitoring, but it does not assume that licensing is the default route. This is important because ASIST participants identified showcasing and extension as the current practical pathways. Finally, the framework incorporates the innovation-ecosystem view that commercialization depends on alignment among policy, intermediary capability, finance, incentives, culture, market demand, and technology maturity. Comparative research similarly identifies transfer modalities, funding, IP governance, organizational arrangements, and incentives as interconnected governance dimensions rather than isolated instruments. [web:17][web:3]

The principal contribution of the ASIST framework is contextual integration. It preserves the institution's existing strengths in dissemination and community engagement, while adding the missing middle: structured screening, readiness assessment, IP and pathway decisions, partner matching, staged funding, and outcome monitoring. It should be treated as a proposed, evidence-informed framework requiring pilot implementation and evaluation, not as a proven causal model.

CONCLUSION

The study concludes that university commercialization at ASIST is primarily driven by showcasing activities and extension programs, which effectively promote and transfer research outputs to broader communities. Despite these efforts, the effectiveness of commercialization pathways is significantly constrained by inadequate facilities, limited funding, and external policy-related challenges. The findings emphasize that successful commercialization requires not only structured pathways but also sufficient institutional support, financial

resources, and strong collaboration with external stakeholders. Furthermore, the study highlights the importance of administrative leadership and strategic partnerships in strengthening commercialization outcomes. The proposed framework serves as a guide for improving institutional capacity, aligning policies, and enhancing collaboration among key actors. Ultimately, strengthening these components can enable ASIST to more effectively translate academic innovations into practical and economic value.

LIMITATION OF THE STUDY

This study is limited to a single institution, ASIST, which may restrict the generalizability of the findings to other universities with different contexts and resources. The sample size of ten participants, although appropriate for qualitative research, may not capture the full diversity of perspectives across all stakeholders. Additionally, the study relies on self-reported data from participants, which may be subject to bias or selective recall. Time constraints and availability of respondents may have also limited the depth of data collection. Lastly, the study focuses primarily on selected aspects of commercialization pathways and challenges, which means other relevant factors may not have been fully explored.

AI Disclaimer:

Artificial Intelligence (AI) tools were utilized in this study to assist in the organization, language refinement, and structuring of the research manuscript. Specifically, AI was used to improve clarity, coherence, grammar, and formatting of written sections such as the abstract, conclusion, and supporting discussions. However, all core components of the research—including data collection, analysis, interpretation of findings, and development of the framework—were conducted by the researcher. The use of AI did not influence the results or compromise the integrity and originality of the study.

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REFERENCES

1. Autio, E., & Rannikko, H. (2016). Retaining winners: Can policy boost high-growth entrepreneurship? *Research Policy*, 45(1), 42–55. <https://doi.org/10.1016/j.respol.2015.06.002>
2. Belitski, M., & Sikorski, J. (2024). Three steps for universities to become entrepreneurial: A case study of entrepreneurial process and dynamic capabilities. *The Journal of Technology Transfer*, 49, 2035–2055. <https://doi.org/10.1007/s10961-024-10099-1>
3. Bercovitz, J., & Feldman, M. (2008). Academic entrepreneurs: Organizational change at the individual level. *Organization Science*, 19(1), 69–89. <https://doi.org/10.1287/orsc.1070.0295>
4. Bernardo, A. B. I. (2019). Technology transfer, entrepreneurship, and innovation in Philippine universities. *Philippine Journal of Science*, 148(4), 743–755.
5. Clark, B. R. (2021). *The entrepreneurial university: Demand and response*. Routledge.
6. Creswell, J. W., & Poth, C. N. (2021). *Qualitative inquiry and research design: Choosing among five approaches* (4th ed.). SAGE Publications.
7. Cunningham, J. A., Miller, K., & Perea-Vicente, J. L. (2024). Academic entrepreneurship in the humanities and social sciences: A systematic literature review and research agenda. *The Journal of Technology Transfer*, 49, 1880–1913. <https://doi.org/10.1007/s10961-024-10136-z>
8. Edquist, C. (2005). Systems of innovation: Perspectives and challenges. In J. Fagerberg, D. C. Mowery, & R. R. Nelson (Eds.), *The Oxford handbook of innovation* (pp. 181–208). Oxford University Press.
9. Etzkowitz, H. (2003). Research groups as “quasi-firms”: The invention of the entrepreneurial university. *Research Policy*, 32(1), 109–121. [https://doi.org/10.1016/S0048-7333\(02\)00009-4](https://doi.org/10.1016/S0048-7333(02)00009-4)

10. Etzkowitz, H., & Leydesdorff, L. (2000). The dynamics of innovation: From national systems and “Mode 2” to a Triple Helix of university–industry–government relations. *Research Policy*, 29(2), 109–123. [https://doi.org/10.1016/S0048-7333\(99\)00055-4](https://doi.org/10.1016/S0048-7333(99)00055-4)
11. Kruss, G., Adeoti, J., & Nabudere, D. (2015). Universities and knowledge-based development in sub-Saharan Africa. *The Journal of Development Studies*, 51(4), 423–442. <https://doi.org/10.1080/00220388.2014.985989>
12. Lee, H., & Park, J. (2025). When the marketplace comes to the research laboratory: Technology transfer efficiency of innovation-driven publicly funded research centers. *The Journal of Technology Transfer*, 50, 2556–2586.
13. Marginson, S. (2021). *Higher education and public good*. Oxford University Press.
14. Markman, G. D., Siegel, D. S., & Wright, M. (2008). Research and technology commercialization. *Journal of Management Studies*, 45(8), 1401–1423. <https://doi.org/10.1111/j.1467-6486.2008.00803.x>
15. Mowery, D. C., & Sampat, B. N. (2005). Universities in national innovation systems. In J. Fagerberg et al. (Eds.), *The Oxford handbook of innovation* (pp. 209–239). Oxford University Press.
16. NBER. (2023). Governance challenges in research commercialization. National Bureau of Economic Research. <https://www.nber.org>
17. Organisation for Economic Co-operation and Development. (2019). *University innovation and commercialization pathways*. OECD Publishing.
18. Organisation for Economic Co-operation and Development. (2021). *Bridging research and industry*. OECD Publishing.
19. Perkmann, M., et al. (2013). Academic engagement and commercialization. *Research Policy*, 42(2), 423–442. <https://doi.org/10.1016/j.respol.2012.09.007>
20. Rasmussen, E., Mosey, S., & Wright, M. (2011). Entrepreneurial competencies in university spin-offs. *Journal of Management Studies*, 48(6), 1314–1345. <https://doi.org/10.1111/j.1467-6486.2010.00995.x>
21. Salmi, J. (2020). *Tertiary education and economic development*. World Bank Publications.
22. Shane, S. (2004). *Academic entrepreneurship: University spinoffs and wealth creation*. Edward Elgar Publishing.
23. Siegel, D. S., Veugelers, R., & Wright, M. (2007). Technology transfer offices and commercialization. *Oxford Review of Economic Policy*, 23(4), 640–660. <https://doi.org/10.1093/oxrep/grm036>
24. Thursby, J. G., & Thursby, M. C. (2007). University licensing. *Oxford Review of Economic Policy*, 23(4), 620–639. <https://doi.org/10.1093/oxrep/grm037>
25. World Bank. (2023). *University–industry collaboration and innovation systems*. World Bank Publications.
26. World Intellectual Property Organization. (2020). *Innovation promotion and commercialization*. WIPO.
27. World Intellectual Property Organization. (2021). *Intellectual property and commercialization funding*. WIPO.
28. Wright, M., Clarysse, B., Mustar, P., & Lockett, A. (2008). *Academic entrepreneurship in Europe*. Edward Elgar Publishing.
29. Yin, R. K. (2018). *Case study research and applications: Design and methods* (6th ed.). SAGE Publications.
30. Kerefu, L., & Machuve, J. (2026). Exploring the effectiveness of commercialization pathways for university research outputs in Tanzania. *African Journal of Science, Technology and Innovation*, 7(Special Issue 1). <https://doi.org/10.15392/afjsti.v7iSI1.1937>
31. Organisation for Economic Co-operation and Development. (2025). *University–industry collaboration and knowledge transfer: Policy perspectives*. OECD Publishing.
32. Republic of the Philippines. (2009). Republic Act No. 10055: Philippine Technology Transfer Act of 2009. https://lawphil.net/statutes/repacts/ra2010/ra_10055_2010.html
33. Zhuang, Y., et al. (2026). Formalizing university technology transfer governance in the knowledge economy. *Higher Education*. <https://doi.org/10.1007/s11162-026-09918-1>
34. Policies for the commercialization of university research outcomes. (2026). *Problems and Perspectives in Management*. <https://js.vnu.edu.vn/PaM/article/view/4569>
- 35.

1. Identify	2. Validate	3. Protect & choose	4. Transfer & scale	5. Monitor & reinvest
Innovation brief	Technical/user validation	IP decision	Showcase/extension	Performance indicators
Disclosure register	Market and readiness assessment	Pathway selection	Partnership, license, consultancy or spin-off	Feedback and learning
Initial screening	Prioritization	Agreement preparation	Pilot and scale-up	Reinvestment and revision