



# The Relationship Between Social Innovation and Return on Investment (ROI) in Polytechnic and Community Collages Commercialization Activities

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**Abstract:** Research, development, innovation, commercialization and economy (RDICE) are the main focuses of Technical and Vocational Education and Training (TVET), an educational system that prioritizes obtaining Return on Investment (ROI). As essential parts of the TVET system, polytechnics and community colleges are always looking to improve income generation through ROI-driven projects. However, a number of contributing factors, such as product value, product exposure, return on Investment (ROI) and social innovation (SI) are necessary for ROI to be successful in polytechnics and community colleges. The purpose of this study is to examine need for return on investment and social Innovation in commercialization activities of Polytechnics and Community Colleges. A quantitative research technique was used, with 145 respondents including Heads of Research, Innovation, and Commercialization from polytechnics and community colleges. Partial Least Squares (PLS) analysis is used to analyze data. This study's findings show that Return on Investment (ROI) and Social Innovation (SI) are key predictors of successful commercialization activities. This study provides strategic insights for educational institutions to boost their commercialization activities while remaining aligned with the commercialization agendas of polytechnics and community colleges.

**Keywords:** Return on Investment, Commercialization Activities, Social Innovation, Polytechnic, community collage

## 1. Introduction

Higher education institutions, such as polytechnics and community colleges, play an important role as economic drivers in the age of globalization and technological growth through activities such as research, development, innovation, commercialization and economy (RDICE). Technical and Vocational Education and Training (TVET) is an educational and training system that focuses on developing talent with knowledge and skills that are relevant to industry and technology (UNESCO 2022). TVET is critical to human capital development, particularly in creating a highly skilled and competitive workforce (Ismail, Zahari & Chik, 2024). Within the polytechnics and community colleges ecosystem, the TVET system encourages the commercialisation of goods and services (Hassan & Ibrahim, 2023).

Polytechnics and community colleges, as TVET-based institutions, provide formal education and lifetime training that meets current demands. In terms of economic and social a development, Malaysia has benefited from the founding of polytechnics in 1969 and community colleges in 2001. In addition to offering pertinent programs and skills, polytechnics and community colleges also boost productivity, promote lifelong learning, boost competitiveness and aid in socioeconomic development. Nevertheless, it is imperative that polytechnics and community colleges concentrate on the commercialization of goods and services with return on investment (ROI) value. ROI is a crucial metric for evaluating how well commercialization initiatives accomplish institutional goals and advance society. polytechnics and community

colleges commercialisation frequently puts financial profits ahead of the benefits of social innovation. This misalignment undervalues RDICE projects and results in incomplete ROI reporting. As a result, TVET products and services continue to under-represent their actual communal contribution (Ismail, 2025). The objective of this study is to examine need for return on investment and social Innovation in commercialization activities of Polytechnics and Community Colleges.

## **2. Literature Review**

### **2.1 Malaysia MADANI**

The concept of Malaysia MADANI is proposed as a strategy for creating a society that is inclusive, progressive and prosperous in all aspects of life. MADANI, which stands for Knowledgeable, Cultural, Progressive, Innovative and Caring community, is a vision that highlights the necessity of building a community that is united, competitive and values integrity. To effect positive change in a MADANI society, the government, educational institutions, the private sector and the community must collaborate (Nor Azira et al. 2025). In this setting, educational institutions like polytechnics and community colleges play an important role in delivering education and training to build competitive human capital and meet industrial demands. Commercialization efforts in polytechnics and community colleges help to improve the MADANI society by doing research and innovation that has both social and economic benefits. Through commercialization efforts, these educational institutions' products and services not only benefit the nation economically, but also enrich society with relevant skills and knowledge. According to Ahmad et al. (2021), successful commercialization of educational innovations can boost economic growth while increasing social value. In order to evaluate the long-term effects on the creation of a MADANI society, it is imperative to measure the Return on Investment (ROI) in commercialization inside polytechnics and community colleges. These organizations may boost the local economy, create jobs and enhance the quality of life by enhancing their commercialization skills (Khademi et al., 2022).

### **2.2 Polytechnic and Community Colleges**

The Malaysian TVET system, comprising 36 polytechnics and 105 community colleges, is currently being strengthened through the RDICE (Research, Development, Innovation, Commercialization, and Economy) framework to systematically drive the commercialization of technical products and services. To guarantee that innovations not only produce financial gains but also incorporate social value for institutional sustainability and wider community effect, this initiative is crucial. Additionally, encouraging research and innovation enables polytechnics and community colleges employees and students to generate innovative solutions pertinent to contemporary industrial demands. Commercialisation results may be evaluated comprehensively using the RDICE technique, demonstrating the vital role technical institutions play in promoting equitable and long-term national economic growth (Rahman, 2025).

### **2.3 Return on Investment**

Return on Investment (ROI) in commercialization activities refers to the profits made from investments in the commercialization of products and services. ROI also includes calculating the benefits and value gained from commercialization efforts, as well as evaluating the efficiency and efficacy of various investment alternatives in order to generate the best returns (Lysaridis et al., 2024). ROI in educational institutions includes not only financial profit but also social value generated. According to Smith (2018), the ROI of commercialization is dependent on strategic partnership between universities and local populations. Brown and Taylor (2021) corroborate this assertion, arguing that collaboration with industry can increase the market potential of commercial products and services. For educational institutions, especially polytechnics and community colleges, which provide goods and services in a variety of industries like engineering, artificial intelligence, education, multimedia, agrotechnology, health and food, calculating return on investment (ROI) based on research, development, innovation, commercialization and economy (RDICE) is essential.

Furthermore, in the context of commercialization, visibility describes how a product might be perceived, identified and draw interest in order to reach the intended market. Products and services are made more visible through print and social media (Norizan, Ishak & Mat Ali, 2024). This is a crucial component of marketing and promotion since it guarantees that products and services are seen on social media sites like Facebook, Instagram, WhatsApp, Telegram, and TikTok (Chowdhury et al., 2024). Visibility serves to highlight the aptitude and experience of community college and polytechnic in commercialization initiatives. Thus, in order to maximize the return on investment, commercialization visibility in polytechnics and community colleges is essential. The prominence of polytechnics and community colleges can continue to drive innovation in accordance with TVET requirements with the help of persistent support and efficient marketing tactics.

### **2.4 Innovation Social**

Social innovation is an approach aimed at solving stakeholder problems, whether from the industry or the community, through the expertise of institutions and the creators of new ideas, processes, products and services (Steidle et al., 2024). In the context of commercialization, social innovation refers to efforts to transform idea-based or problem-solving

projects into the development of commercially valuable products and services. According to Rahman (2023), community development through education, particularly through the RDICE approach, is a strategy that can provide added value, welfare and justice in efforts to develop both the economy and society in alignment with the values of MADANI. Therefore, social innovation in polytechnics and community colleges through RDICE should be integrated into teaching and learning processes and collaboration to encourage lecturers and students to apply their expertise in contributing to industry and the community. This approach is part of the efforts by polytechnics and community colleges to empower lecturers and students to generate innovations for commercialization, which not only address social challenges but also contribute to economic growth.

## 2.4 Commercialization Conceptual Framework and Hypothesis Testing

The Technology-Organization-Environment (TOE) Framework examines how technology, the environment, and organizational variables influence an organization's decision to accept or integrate new technology (Ding et al., 2021). The TOE framework is used in study on the use of technology in businesses, notably in the areas of information technology, technology and innovation. The TOE framework serves as the foundation for the commercialization conceptual framework (Shuang et al., 2025). Research focused on organizational views can benefit from the TOE framework (Al-Debei et al., 2019). Thus, community college and polytechnic organizations are used in this study. Additionally, TOE places a strong emphasis on technology, as social innovation and commercialization initiatives are predicated on technological goods and services. One of the main goals of the TOE framework is innovation, which directs researchers to produce novel findings. The final version of the conceptual framework for visibility, social innovation, return on investment and commercialization that

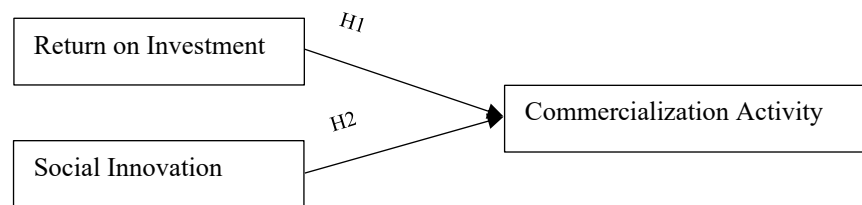


Fig. 1. Conceptual framework

### The Hypotheses

H1: Return on investment has a positively significant relationship with commercialization activity.

H2: Social innovation has a positively significant relationship with commercialization activity.

### 3. Method

The research methodology is the systematic process used to plan, implement, gather data, analyze it, and report the findings in accordance with the study objectives. This study uses a quantitative technique, which is deemed appropriate for the issue under investigation (Kittur & Javeed, 2023). The principal instrument used in this study is a questionnaire with a Likert scale of 1 to 5 to assess respondents' perceptions and feedback. The study's participants were 145 Research, Innovation, and Commercialization Heads from Polytechnics and Community Colleges. Partial Least Squares (PLS) analysis is used to analyze data, which is an excellent statistical tool for examining the correlations between variables within the research framework.

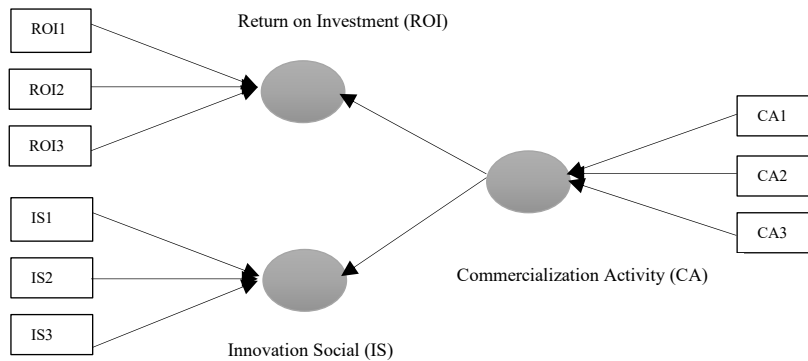
This study takes a quantitative approach since it is more suited to analyzing and describing phenomena (Creswell & Poth, 2020). The aim for using the quantitative technique is to study the correlations between variables and get insights into technology transfer operations in TVET institutions. The research instrument utilized is a questionnaire created using the Lazarsfeld Scheme technique (Katz & Lazarsfeld, 1955), including a pilot study to ensure its validity. The questionnaire includes both closed and open-ended questions. Part A contains demographic information, whereas Part B discusses the study's factors. All items were rated on a Likert scale of 1 (strongly disagree) to 5 (strongly agree). Smart Partial Least Squares (PLS) was used for data analysis, and hypotheses were tested by structural equation modeling (SEM) based on PLS (Hair et al., 2021).

### 4. Finding

#### 4.1 Assessment of the Measurement Model

SmartPLS version 2.0 was used for data analysis, which was based on partial least squares (PLS)-based structural equation modeling (SEM). The measurement model is assessed by examining its reliability, validity and overall fit to ensure that it accurately measures the constructs it is intended to represent. The measuring model showed good convergent and discriminant validity. First, the measuring model for each construct was examined for convergent validity. Convergent validity is defined as the degree to which several items measuring the same idea are consistent (Ramayah &

Rahbar, 2020). Convergent validity is often evaluated by looking at the loadings, average variance extracted (AVE) and composite reliability (Hair et al., 2021). The research model for this study is shown in Figure 1.2. According to Table 1.2, all loadings above the 0.50 criterion, as proposed by Hair et al. (2021). The AVE of all constructs above 0.50 (Bagozzi & Yi, 2020), and the composite reliability scores (CR) were all greater than 0.70 (Hair et al., 2021). Thus, convergent validity is verified.



**Fig. 2. Research Mode**

**Table 1. Result of the Measurement Model**

Construct	Item	Loadings	Average Variance Extracted (AVE)	Composite Reliability (CR)
Return on Investment (ROI)	ROI1	0.81	0.71	0.71
	ROI2	0.71		
	ROI3	0.72		
Innovation Social (IS)	IS1	0.82	0.85	0.73
	IS2	0.73		
	IS3	0.78		
Commercialization Activity (CA)	CA1	0.79	0.81	0.81
	CA2	0.82		
	CA3	0.79		

To assess the measurement model's discriminant validity, the square root of the average variance extracted (AVE) for each construct was compared to the correlations between that construct and other components (Bahari & Mohamed, 2020). As demonstrated in Table 1.3, the square root of the AVE for each construct was greater than its connection with other items, showing appropriate discriminant validity. This strategy is in line with the Fornell-Larcker criterion, which stipulates that in order to prove discriminant validity, the square root of the AVE must be higher than the correlation between the construct and any other construct (Hair et al., 2021). Furthermore, discriminant validity was determined by comparing the squared correlations of constructs to AVE values. As shown in Table 1.3, the AVE for each construct exceeded the squared correlations with other constructs, showing appropriate discriminant validity. This approach adheres to the standards established by Fornell and Larcker (1981). However, new research indicates that the Fornell-Larcker criterion may not always reveal a lack of discriminant validity. As a result, Henseler et al. (2015) suggest utilizing the Heterotrait-Monotrait (HTMT) ratio as a more trustworthy option for determining discriminant validity.

**Table 2. Discriminant Validity**

	CA	IS	ROI
Commercialization Activity (CA)	0.83		
Innovation Social (IS)	0.70	0.79	
Return on Investment (ROI)	0.70	0.66	0.9

#### 4.2 Assessment of The Structural Model

Following the examination of the measurement model, we turned our attention to the structural model, which defines the hypothesized relationships between exogenous and endogenous variables. This analysis evaluates causal relationships among constructs using route coefficients and coefficient of determination ( $R^2$ ). The  $R^2$  value and path coefficients (with their significance levels) indicate how well the data supports the proposed model (Kamranfar, Mohammad, Mahdavi, & Ghaderi, 2023). According to Hair et al. (2022), assessing the structural model in Partial Least Squares Structural Equation Modeling (PLS-SEM) entails determining the significance and relevance of path coefficients, among other criteria. In this work, a bootstrapping approach with 5,000 resamples was used to generate path coefficients and accompanying t-values, making it easier to determine the statistical significance of each hypothesized path. All hypotheses were supported, with t-values greater than 2.33 and significance levels at  $p < 0.01$ . Table 1.4 shows the outcomes of the hypotheses tests. The hypotheses suggest a substantial association between return on investment (ROI) and Commercialization Activity (CA) ( $\beta = 0.721$ ,  $p < 0.01$ ). Second, the hypothesis Innovation Social (IS) show a substantial link with Commercialization Activity (CA) ( $\beta = 0.792$ ,  $p < 0.01$ ). The conclusion is that H1 and H2 are supported.

**Table 3: Results of Hypotheses Testing**

Hypothesis	Relationship	Beta	Standard Error	T-Value	Result
		H1	Return on Investment (ROI) -> Commercialization Activity (CA)	0.721	0.03
H2	Innovation Social (IS) -> Commercialization Activity (CA)	0.792	0.03	6.05	Supported

#### 5. Discussion and Conclusion

To sustain the development of research and innovation, polytechnics and community colleges must improve commercialization operations that produce a return on investment. Commercialization activities should be planned and implemented in accordance with existing expertise, industry needs, and community requirements. This study's findings show a substantial association between return on investment and social innovation in commercialization operations at polytechnics and community colleges. The analytical results demonstrate a substantial link between return on investment and commercialization activity ( $\beta = 0.721$ ,  $p < 0.01$ ). It is recommended that polytechnics and community colleges strengthen industry collaborations to ensure that the products and services produced meet market demands, thereby driving sustainable national economic growth.

This study demonstrated a substantial association between innovation social and commercialization activity ( $\beta = 0.792$ ,  $p < 0.01$ ). These findings suggest that higher education institutions (HEIs) should prioritize innovation. Overall, commercialization initiatives at polytechnics and community colleges help to establish communities with industrial backing through return on investment. The return on investment gained by commercialization efforts is vital in acknowledging the knowledge of polytechnic and community college staff through the development of products and services based on the solution provider model. Polytechnic and community colleges must establish an inclusive commercialisation ecosystem through strategic industry partnerships to ensure that local innovation yields comprehensive rewards. This phase is crucial to maintain the sustainability of commercialisation operations, which not only enhance economic competitiveness, but also preserve social and environmental benefits for the sake of sustainable national growth. Furthermore, the government's attempts to develop MADANI values can be achieved by empowering commercialization operations, which are a crucial competitive factor in the MADANI approach. The visibility of Polytechnic and community colleges commercialization products is critical to ensuring that the innovative outcomes are recognized and used by society. Polytechnics and community colleges can promote themselves as a relevant and high-impact innovation hub by implementing well-planned marketing initiatives, enlisting industry partners and establishing excellent branding. This strategy can provide benefit to stakeholders.

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#### Conflict of Interest

The authors declare no conflicts of interest.

## Appendix A: An Example

Authors including an appendix section should do so before the References section. Multiple appendices should all have headings in the style used above. They will automatically be ordered A, B, C etc.

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