

## **A Study on the Requirements of Private Sector on Research Investment Ratio and Intellectual Property Ownership for Collaborative Research**

Thanaporn Ngamprapasom, Chiang Mai University, Thailand  
Manissaward Jintapitak, Chiang Mai University, Thailand

The Asian Conference on Education & International Development 2025  
Official Conference Proceedings

### **Abstract**

This research aims to investigate the preferred research investment ratios and intellectual property ownership requirements of small and medium-sized enterprises (SMEs) involved in collaborative research with the College of Arts, Media, and Technology, Chiang Mai University. It also examines the research topics businesses are interested in pursuing collaboratively within Upper Northern Provincial Cluster 1, focusing on Chiang Mai Province. Data were collected through questionnaires and in-depth interviews with 29 SME owners in Chiang Mai who expressed interest in commercial research and development (R&D) collaboration with the college. The findings reveal that 58.6% of the surveyed SMEs operate as registered companies, 27.6% as community enterprises, and 13.8% are in the process of registering companies. The businesses are primarily engaged in manufacturing (75.9%), followed by services (13.8%) and trading (10.3%). Regarding collaborative research topics, most respondents expressed interest in content and media (44.8%), followed by tools and equipment (24.1%), platform systems (17.2%), new products (10.3%), and multiple topics (3.4%). With its collaborative nature, this research involves the active participation of SMEs, making them an integral part of the process. Concerning funding, 55.2% of the respondents were willing to contribute 25% of the total research costs. Regarding intellectual property (IP) ownership, 79.3% preferred negotiating ownership arrangements post-research, while 17.2% were willing to assign full IP ownership to Chiang Mai University. These findings provide valuable insights into SMEs' investment and IP ownership expectations, which can help inform the design and execution of collaborative research projects between academia and the private sector.

*Keywords:* collaborative research, research investment ratios, intellectual property ownership, academia-private sector collaboration

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

The Thailand 4.0 initiative, aimed at establishing a “stable, prosperous, and sustainable” nation, drives economic transformation through innovation-led growth (Tesarint, B, 2017). The 9th National Research Policy and Strategy (2017-2021) underscores this goal by supporting private-sector R&D, fostering investments, and enhancing internal capabilities to generate innovations and technologies that advance manufacturing, commerce, and services (National Research Council of Thailand, 2016). This vision seeks to position Thailand as a research-driven nation, leveraging outputs to benefit economic and social development. Chiang Mai University aligns with this national vision by emphasizing social responsibility and sustainable development through research and innovation. The College of Arts, Media, and Technology prioritizes collaboration with the private sector to transform industries using digital technologies. This research, focusing on investment ratios and intellectual property ownership in commercial collaborative R&D between SMEs in Chiang Mai Province's Upper Northern Provincial Cluster 1 and the College of Arts, Media, and Technology, Chiang Mai University, seeks to inform and refine the college's R&D planning and budget allocation strategies (Budget Allocation) by broader national policy objectives.

## Research Objectives

1. To investigate the desired investment ratios and intellectual property (IP) ownership preferences of businesses engaging in collaborative research and development (R&D) with Chiang Mai University's College of Arts, Media, and Technology. The study focuses on small and medium-sized enterprises (SMEs) within Upper Northern Provincial Cluster 1, with a case study focusing on Chiang Mai Province.
2. To identify the research topics SMEs prefer in Upper Northern Provincial Cluster 1 for collaborative R&D projects with Chiang Mai University's College of Arts, Media, and Technology. The study utilizes a case study approach focused on Chiang Mai Province.

## Literature Review and Related Research

### Conceptual Framework of Chiang Mai University's College of Arts, Media, and Technology

In 2022, the College of Arts, Media, and Technology (CAMT) at Chiang Mai University offered the following undergraduate programs:

1. Software Engineering
2. Modern Management and Information Technology
3. Animation and Visual Effects
4. Digital Games
5. Digital Industry Integration

The following postgraduate (Master's and Doctoral) programs were also available:

1. Software Engineering (Master's)
2. Knowledge and Innovation Management (Master's)
3. Digital Technology Management (Master's)
4. Knowledge and Innovation Management (Doctoral)

Research areas within CAMT encompass the following:

1. Animation Production
2. Game Design and Development
3. Augmented Reality
4. Modern Management Practices
5. Information Technology for Tourism
6. Tourism Experience Design
7. Logistics Management
8. Knowledge Management
9. Digital Marketing
10. Data Mining
11. Data Analytics
12. Artificial Intelligence
13. Internet of Things (IoT)
14. Software System Design
15. Programming
16. Application Development
17. Educational Innovation
18. Learning Models
19. Business Analytics
20. Digital Content Creation
21. Digital Transformation
22. Software Analytics
23. Machine Learning
24. Sensor Technology
25. Uncrewed Aerial Vehicles (UAVs) and Remote Sensing

### **Conceptual Framework of Small and Medium-Sized Enterprises (SMEs)**

The Ministry of Industry (2002) defines Small and Medium-sized Enterprises (SMEs) as outlined in the Promotion of Small and Medium-sized Enterprises Act, B.E. 2543 (1993), Article 4. This definition encompasses four main business categories: 1) Manufacturing, 2) Wholesale, 3) Retail, and 4) Services, along with other businesses designated by the Minister.

The Ministry of Industry further delineates SME size based on the following criteria:

- a) Small Enterprises: These are characterized by:
  - Manufacturing and service businesses: Employing no more than 50 people or possessing fixed assets valued at no more than 50 million baht.
  - Wholesale businesses: Employing no more than 25 people or possessing fixed assets valued at no more than 50 million baht.
  - Retail businesses: Employing no more than 15 people or possessing fixed assets valued at 30 million baht.
- b) Medium Enterprises: These are characterized by:
  - Manufacturing and service businesses: Employing more than 50 but no more than 200 people or possessing fixed assets valued at more than 50 million baht but no more than 200 million baht.
  - Wholesale businesses: Employing more than 25 but no more than 50 people or possessing fixed assets valued at more than 50 million baht but no more than 100 million baht.

- Retail businesses: Employing more than 15 but no more than 30 people or possessing fixed assets valued at more than 30 million baht but no more than 60 million baht.

### **Review of Relevant Literature**

Lee (2000) investigated the sustainability of inter-organizational collaborations, focusing on the reciprocal benefits between university and industry partners. The sample included university faculty and technology managers from companies. The study found mutual benefit is crucial for sustainable collaboration, with industry partners seeking novel research findings and increased research output. At the same time, universities require funding, knowledge-creation opportunities, and graduate students' research spaces.

Sáez et al. (2002) examined the characteristics of collaborations between universities and various research centers. Their study, based on a sample of 747 research collaborations in Spain, revealed that most funding was directed towards fundamental research related to central and regional research management. Formal agreements were prevalent in collaborations between diverse organizations (e.g., competitors, suppliers, clients), each with distinct research goals and success metrics.

Laosirihongthong (2008) explored university-industry partnerships in innovation development, identifying factors contributing to successful collaborative R&D projects. The research highlighted the critical role of mutual understanding in project participation. Successful collaborations require mutually beneficial outcomes and clearly defined objectives. While such partnerships offer significant mutual benefits, government support and policy facilitation (e.g., legal frameworks and investment incentives) are essential drivers.

Viboolsakchai (2012) studied models for collaborative research between universities and industry, surveying 52 university administrators, industry executives, and relevant stakeholders involved in such collaborations in Thailand. The study categorized collaborative R&D activities into four aspects: principles of collaboration, collaborative structure and mechanisms, supporting resources, and operational processes. Significant challenges included the lack of perceived importance, insufficient motivation for cooperation between some university and industry partners, and a lack of clear operational frameworks.

Sukasiriwat and Kerdsi (2014). Investigated challenges and limitations driving innovation within Thai SMEs. Their research, which included a literature review, analysis of research papers and databases, and interviews with top executives of SMEs who had received research funding from the National Innovation Agency (NIA), identified key obstacles to SME innovation: 1) Insufficient government support, 2) high R&D and innovation development costs, and 3) difficulty in securing funding.

Amnuaypravit (2016) examined funding access strategies for SMEs in Bangkok. The study indicated that SMEs must enhance their accounting and financial systems, aligning with standard financial practices, improving relationships with financial institutions, and facilitating future collaboration.

Sinsomboon and Disthanon (2019) investigated the commercialization process of research outputs using a single case study of a Thai research university. This qualitative study examined four stages of commercialization: idea generation, IP protection, prototyping, and

commercialization, identifying 13 key activities. The findings suggest that carefully considering these activities throughout the commercialization process enhances efficiency and quality, providing valuable insights for similar institutions.

## **Research Methodology**

### **Population and Sample**

The target population for this study comprises owners of small and medium-sized enterprises (SMEs) located in Chiang Mai Province, Thailand, who have expressed interest in participating in commercially oriented collaborative research and development (R&D) projects with Chiang Mai University's College of Arts, Media, and Technology. The sample comprises 29 SME owners, selected from participants registered in a university-led digital innovation program for SMEs.

### **Research Instruments**

The primary research instrument was a researcher-developed questionnaire.

### **Data Collection**

Due to the COVID-19 pandemic, data were collected via telephone interviews. Data collection followed a one-respondent-per-SME approach. This qualitative study prioritized an in-depth understanding of the phenomenon under investigation. Data were gathered through semi-structured interviews with key informants and/or in-depth interviews, each lasting approximately 20 minutes.

### **Data Analysis**

Data analysis involved coding the completed questionnaires and using the Statistical Package for the Social Sciences (SPSS) software to perform descriptive statistical analysis and cross-tabulation to identify relationships between variables.

## **Research Finding**

### **SME Characteristics**

1. Gender: 75.9% of respondents were female business owners; 24.1% were male.
2. Age: The most significant proportion of respondents (44.8%) were aged 40-49; 27.6% were aged 30-39.
3. Business Size: All respondents were classified as small businesses (100%). Further questions were asked regarding business registration status to gather additional relevant information.
4. Business Registration Status: The majority of businesses were registered as companies (58.6%), followed by community enterprises (27.6%), and in the process of registering companies (13.8%).
5. Business Type: The dominant business type was manufacturing (75.9%), followed by services (13.8%) and trading (10.3%).
6. Research Interests: The most popular areas for collaborative R&D were Content and Media (44.8%), followed by Tools and Equipment (24.1%), Platform Systems

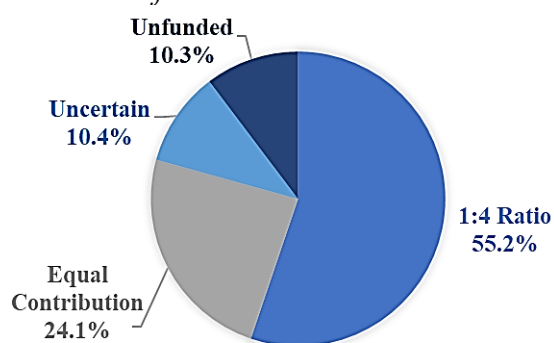
(17.2%), and New Product Development (10.3%). A small percentage (3.4%) expressed interest across multiple areas.

### Investment Preferences

Figure 1 highlights the preferred funding ratios among SMEs engaging in commercial collaborative research and development projects. The majority of respondents (55.2%) preferred an investment ratio of 1:4 (SME: University), suggesting their reliance on substantial institutional support while contributing a smaller portion of the required funding themselves. The second most favored preference, chosen by 24% of respondents, was an equal funding arrangement (1:1). Meanwhile, 10.4% were uncertain about their investment preferences, while 10.3% indicated no intention to provide financial contributions. These findings underscore SMEs' financial constraints and strategic priorities when engaging in collaborative research initiatives.

**Figure 1**

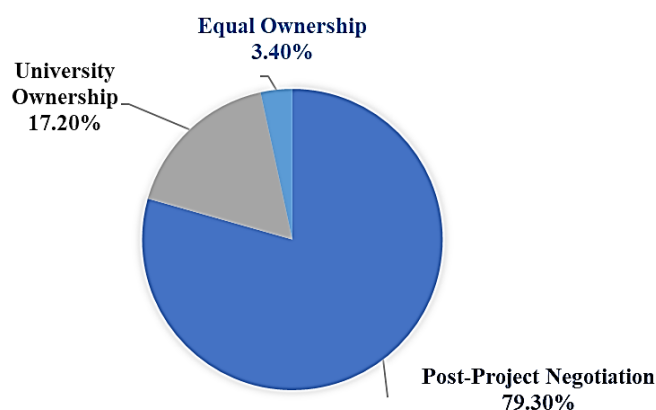
*Investment Preferences*



### Intellectual Property (IP) Ownership Preferences

Figure 2 illustrates SMEs' intellectual property (IP) ownership preferences in commercial collaborative research and development projects. Most respondents (79.3%) preferred to negotiate IP ownership arrangements after the completion of the research project, highlighting the need for flexibility and adaptability in such agreements. Additionally, 17.2% of respondents preferred that Chiang Mai University retain full ownership of the resulting intellectual property. Meanwhile, a smaller proportion of respondents (3.4%) preferred shared IP ownership on an equal basis with Chiang Mai University. These findings underscore the importance of accommodating diverse SME expectations to foster effective academic-industry collaborations.

**Figure 2**  
*Intellectual Property (IP) Ownership Preferences*



## Conclusion

### Summary

This study explores the characteristics, investment preferences, and intellectual property (IP) ownership expectations of small and medium-sized enterprises (SMEs) involved in collaborative research and development (R&D) with Chiang Mai University. The findings reveal key demographic and operational profiles, highlighting critical factors influencing academia-industry partnerships.

### *SME Characteristics*

The majority of respondents were female business owners (75.9%), aged 40-49 (44.8%), and operating small businesses (100%). Most businesses were registered as companies (58.6%) and predominantly involved in manufacturing (75.9%), with services (13.8%) and trading (10.3%) following behind. SMEs showed the most interest in R&D in the areas of Content and Media (44.8%), Tools and Equipment (24.1%), and Platform Systems (17.2%).

### *Investment Preferences*

Most SMEs (55.2%) preferred an investment ratio of 1:4 (SME: University), reflecting their dependence on institutional financial support. Equal funding arrangements (1:1) were selected by 24%, while 10.4% were uncertain about their preferences, and 10.3% did not intend to contribute financially. These preferences emphasize SMEs' financial constraints and strategic priorities when engaging in academic collaboration.

### *Intellectual Property Ownership Preferences*

The preferred model for 79.3% of SMEs was negotiating IP ownership after project completion, indicating a need for flexibility in such agreements. A smaller proportion (17.2%) supported full IP ownership by Chiang Mai University, and only 3.4% favored equal shared ownership. These findings suggest that accommodating diverse IP expectations is crucial for fostering effective academic-industry collaborations.

## Discussion

The findings from this study provide critical insights into the collaborative dynamics between small and medium-sized enterprises (SMEs) and Chiang Mai University. The demographic profile of SMEs, predominantly led by female entrepreneurs aged 40-49, reflects the significant role of experienced women in driving small businesses. The dominance of manufacturing (75.9%) as the primary operational sector highlights a key area for targeted academic-industry collaboration.

The investment preferences of SMEs, with the majority (55.2%) favoring a 1:4 funding ratio (SME: University), indicate their firm reliance on institutional financial support. This reliance underscores the financial constraints that small businesses face, likely exacerbated by external economic pressures such as the COVID-19 pandemic. By contrast, the minority preference for equal funding contributions (24%) reveals opportunities to engage more financially capable SMEs in deeper collaboration. For institutions like Chiang Mai University, adopting tiered funding models could accommodate diverse financial capabilities among SMEs and encourage higher participation rates.

The preference for negotiating intellectual property (IP) ownership post-project (79.3%) highlights a critical need for flexibility in IP agreements. This approach suggests that many SMEs prefer to retain adaptive options depending on research outcomes. However, the low awareness of IP's commercial value among SMEs may also play a role, reinforcing the need for universities to provide IP education as part of R&D agreements. The small proportion of respondents (3.4%) favoring equal IP ownership further demonstrates diverse expectations, emphasizing the importance of personalized collaboration frameworks.

In conclusion, these findings highlight the need for adaptable, inclusive research models and transparent negotiations to bridge gaps in funding and IP ownership preferences. Chiang Mai University is pivotal in fostering trust, empowering SMEs through capacity-building initiatives, and strengthening academia-industry partnerships to drive regional innovation and growth.

## Recommendations for Aligning Policy and Practices for Effective Collaboration

The study identifies gaps between current university practices and the preferences of SMEs, particularly in terms of funding and IP ownership. To build stronger and more sustainable academia-industry partnerships, universities should aim to bridge this gap by adopting more adaptable research models and enhancing transparency in collaboration agreements. Facilitating open dialogue during initial collaboration stages can help address SME concerns and establish mutually beneficial frameworks. Additionally, integrating capacity-building initiatives, such as financial planning and IP management training, can empower SMEs to participate more effectively in collaborative research.

## References

- Amnuaypravit, S. (2016). Strategies for accessing funding sources for SMEs in Bangkok. *RMUTT Global Business & Economics Review*, 11(1), 186–199.
- College of Arts, Media and Technology. (2020). *Programs & Admissions*. Retrieved from <https://www.camt.cmu.ac.th/en/home/>
- Laosirihongthong, T. (2008). A study of university-industry collaboration in innovation development. *Journal of Business Administration*, 31(119), 32–47.
- Lee, Y. S. (2000). The sustainability of university-industry research collaboration: An assessment of behavioral outcome. *Journal of Technology Transfer*, 25(2), 111–133.
- The Ministry of Industry. (2002). *Ministerial regulation on employment numbers and fixed asset value criteria for SMEs B.E. 2545 (2002)*.
- National Research Council of Thailand. (2016). *Proceedings of the policy and strategy brainstorming meeting (Draft) of the 9th National Research Strategy (2017–2021)*. Retrieved from [http://www.ams.cmu.ac.th/researchnew/web/images/article/documents/0\\_19408447\\_1494820317.pdf](http://www.ams.cmu.ac.th/researchnew/web/images/article/documents/0_19408447_1494820317.pdf)
- Sáez, C., Marco, T. G., & Arribas, E. H. (2002). Collaboration in R&D with university and research centers: An empirical study of Spanish firms. *R&D Management*, 32, 321–341.
- Sinsomboon, P., & Disthanon, A. (2019). The commercialization process of research outcomes: A case study of a research university in Thailand. *Dusit Graduate School Journal*, 15(3), 117–128.
- Sukasiriwat, N., & Kerdsi, N. (2014). Challenges and limitations of innovation promotion in Thai SMEs. *KMUTT Research and Development Journal*, 37(1), 119–131.
- Tesarint, B. (2017). *Thailand 4.0: A new economic model*. Retrieved from <http://www.drborworn.com/articledetail.asp?id=16223>
- Viboolsakchai, D. (2012). *Developing a collaborative research model between universities and industry (Master's thesis)*, Srinakharinwirot University.

**Contact email:** thanaporn.ngam@cmu.ac.th