

Examining a Model of Entrepreneurial Success Factors among Undergraduate Students: A Quantitative Study [†]

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Abstract: Promoting entrepreneurship is important to develop competitive advantages, as it is one of the determinants of a country's economy and development. Students are the future pillar of society, so stimulating entrepreneurship from education is the best way to shape their entrepreneurial mindset and attitudes. Empirical studies have demonstrated the important relationship between entrepreneurship education and its success among higher education students. However, the impact of technology enablement on perceived entrepreneurial outcomes has received minimal focus. In total, 304 data were collected from universities in the Philippines showing that, among entrepreneurial success factors, technology enablement has the greatest impact. Our results demonstrated that related stakeholders should understand the importance of and need to enhance the use of technology in relation to entrepreneurship.

Keywords: entrepreneurial education mechanism; perceived entrepreneurial outcome; technology enablement



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1. Introduction

The effect of entrepreneurship has been widely studied in various respects such as innovation, economic growth, and country development [1]. It has been proved that entrepreneurship education positively impacts stimulating entrepreneurial activities by providing practical skills such as problem-solving skills and critical thinking [2]. However, technology enablement's influence on entrepreneurship is yet to be discussed and investigated widely [3]. It is well known that technology has a huge impact on people's daily life in different areas, making life easier. Hence, there is a need for scholars and the public to study how technology can be a push factor for entrepreneurship. This study aims to provide a comparative study to evaluate perceived entrepreneurial success and adopt technology enablement so as to incorporate these findings into the conventional education system. With the proposed hypotheses, this study hopes to provide results that demonstrate that technological enablement can have a higher and more significant influence on perceived success. This result will guide institutions and the government to implement sound strategies to focus on the adoption and usage of technologies on entrepreneurial activities.

2. Literature Review

2.1. Definition of Entrepreneurship

Entrepreneurship acts as a link between economic growth and self-satisfaction. This can be shown in a country's development, as entrepreneurship both creates job opportunities and pursues innovative ideas to meet the market needs [4]. Entrepreneurship is an achievement that reaches something tangible and new, such as the introduction of goods and services to society [5]. In this case, entrepreneurs need to have a sense of

unerring market understanding to recognise market opportunities by using technology such as social media and blogs. Consumers nowadays may utilise social media to share their experiences on a particular product or service, enabling entrepreneurs to search for unmet demands. Entrepreneurship is a challenging journey as it is risky and uncertain [6]. Therefore, promoting entrepreneurship is important for economic growth.

2.2. Entrepreneurship in Education

Entrepreneurship education aims to provide syllabi and programmes that can shape students' entrepreneurial mindsets with skilled-based learning outcomes [7]. This refers to their willingness to be involved directly or indirectly in entrepreneurship activities by using the skills learned, such as technology-related tools and knowledge, to compete in a dynamic business environment. Hence, entrepreneurship education can provide sufficient and diverse learning approaches that shape entrepreneurial attitudes. Additionally, higher education institutions adapt to the rapid changes in the education system by improving teaching content and entrepreneurship-related events for students to learn how to start a new business [8]. For example, these might include teaching content improvements, including designed-based thinking skills, as an experiential learning process can deliver entrepreneurs' intention and business basics. Hence, institutions and educators need to promote the entrepreneurial ecosystem in order to offer interesting and practical learning experiences to develop students' entrepreneurial intentions.

2.3. Entrepreneurship Education in Philippines

The Philippines' economy is dominated by SMEs (99.6%), just like other ASEAN countries [9], forcing the Philippines to focus on entrepreneurship stimulation. It is well known that the United States influenced the Philippines' education system; as such, English is the language of delivery. The education system focuses on delivering practical knowledge and training for students to start a new business. However, the sustainability of entrepreneurship growth is not focused [10]. Therefore, there is urgent attention needed to be aware of entrepreneurship sustainability by combining technology adoption in the learning process. Moreover, institutions play a key role in creating opportunities and growth for students by offering, enhancing and stimulating proper training to develop students' entrepreneurial intentions and initiation.

2.4. Entrepreneurship Education Mechanism (EEM)

An entrepreneurship education mechanism refers to programmes that are effective for entrepreneurship skills' enhancement [11]. Some studies pointed out that higher institutions' entrepreneurial environment, such as providing related events and competition, can motivate students' learning process and performance [12]. For example, business plan competitions that can provide students with real-life experiences, teamwork, and problem-solving skills to help them understand the process of entrepreneurship. Moreover, some entrepreneurship-related events will assign an instructor to each team to maximise educational outcomes by providing supervision for venture creation's theories and practical skills [13]. In short, an entrepreneurial education mechanism can provide valuable mentoring that can enhance and develop students' intentions by removing institutional obstacles to venture creation.

2.5. Technological Enablement (TE)

Technology enablement in entrepreneurship refers to the streamlining of business internal operation processes through the adoption of technology. Technology implementation in entrepreneurship has been widely investigated [14]. Technology's capabilities are proven to improve overall business efficiency. For instance, increased speed allows businesses to enhance process systems and overall business performance. It is claimed that entrepreneurship success depends on the adoption of technology [15]. With the adoption of technology, a business can gain competitive advantages in terms of enhancing

customer relationships, increasing sales, and increasing its market share. It is believed that technological enablement can greatly impact entrepreneurial success.

2.6. Perceived Entrepreneurial Outcome (PEO)

There are different driving forces behind venture creation. The most popular perceived outcome is a financial reward that will strongly motivate an individual to achieve their goals [16]. Self-satisfaction by pursuing original ideas to the market by gaining a loyal customer group and market share is another one of the most popular drivers in entrepreneurship [17]. Moreover, individuals seeking a work–life balance between family and work, and the positive return between the time and money invested, will have a higher chance of achieving entrepreneurial success [18]. In short, this study considers various outcome indicators to determine potential entrepreneurial success.

3. Research Methodology

3.1. Research Rationale

This study investigates the direct and indirect impacts of technology enablement to boost higher education students’ perceived entrepreneurial outcomes. The recognition and adoption of digital transformation is a new trend that can help in improving socio-economic development and improve overall business efficiency, thus developing competitiveness to achieve short- and long-term goals [19]. The result generated should provide a brief understanding of the importance of technology enablement in relation to students’ perceived entrepreneurial success. Therefore, related agencies such as policymakers and universities can implement supportive strategies to ensure the success of entrepreneurial mindset enhancements.

3.2. Research Questions

1. What are the effects of the variables ‘education mechanism’ and ‘technological enablement’ on higher education students’ perceived entrepreneurial success?
2. Is the impact of technological enablement more critical than the conventional educational system?

3.3. Research Framework and Hypothesis

The importance of education mechanisms and technology enablement was covered in the previous sections. Both factors have proved to have a positive impact on entrepreneurial outcomes among higher education students. Therefore, the factors are grouped into the success elements for perceived entrepreneurial outcomes. Figure 1 shows the research framework of the study.

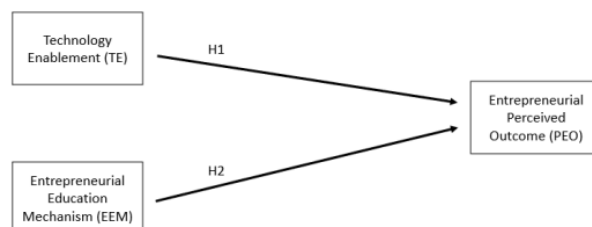


Figure 1. Research framework.

The hypotheses are proposed as follows:

- H₁.** *Technology Enablement (TE) will positively impact Perceived Entrepreneurial Outcome (PEO).*
- H₂.** *Entrepreneurial Education Mechanism (EEM) will positively influence Perceived Entrepreneurial Outcome (PEO).*

3.4. Research Procedure

This study uses the Philippines as example and proposes to identify the critical elements that will positively impact perceived entrepreneurial outcomes. The study first goes through a literature review, collects information for the designed questionnaire, and analyses the findings. The questionnaire was randomly sent to the intended respondents in universities in the Philippines via Google Form. A 5-Likert scale was used to represent the respondents' level of agreement, from (5) Strongly Agree to (1) Strongly Disagree. In order to reduce common method bias (CMB) in the research, a clear instruction was included in the Google Form to provide a basic understanding of the research. The data were collected separately from different higher institutions to minimise the CMB. As a result, 304 respondents from Philippines were surveyed. Moreover, partial least squares structural equation modelling (PLS-SEM) was conducted, which the measurement model refers to as the relationship between latent variables and observed data [20]. Hence, SEM-PLS with Smart PLS 3.0 software was implemented to analyse the proposed research model.

4. Findings

4.1. Descriptive Analysis

Table 1 indicates the respondents' demographic information. There are 104 male and 200 female respondents. Most of the students are postgraduates (52.96%), followed by undergraduates (38.82%), diploma (5.92%) and foundation (2.3%). Moreover, 150 respondents had prior experience or involvement in entrepreneurial fields, and we able to answer based on personal experiences. In contrast, the remaining 154 students were surveyed based on knowledge and opinions, as they had not previously participated in entrepreneurial pursuits.

Table 1. Demographic analysis.

Demographic Characteristics	Items	Philippines Respondents	%
Gender	Male	104	34.21
	Female	200	65.79
Education level	Foundation	7	2.3
	Diploma	18	5.92
	Undergraduate	118	38.82
	Postgraduate	161	52.96
Ventured into entrepreneurial activities either directly or indirectly	Yes	150	49.34
	No	154	50.66

4.2. Measurement Model

4.2.1. Construct Validity and Reliability Test

Before the test, the outer loadings for each item were defined in order to measure the relationship. The acceptable value for outer loadings was equal to or bigger than 0.5, and 0.7 or above was considered as highly satisfactory [21]. Construct validity was measured by composite reliability (CR) and average variance extracted (AVE); any CR values greater than 0.7 and AVE values larger than 0.5 were acceptable [22]. Construct validity is important for research that cannot be measured or observed directly; in this case, it refers to perceived entrepreneurial outcome. Table 2 shows the result of construct validity; PEO3 was removed due to a higher VIF. The values of CR and AVE are all greater than 0.7 and 0.5, indicating the satisfactory nature of both construct validity and reliability.

Table 2. Construct validity and reliability.

Construct	Items	Outer Loadings	Composite Reliability	Average Variance Extracted (AVE)
EEM	EEM1	0.901	0.944	0.809
	EEM2	0.907		
	EEM3	0.879		
	EEM4	0.91		
PEO	PEO1	0.893	0.953	0.835
	PEO2	0.923		
	PEO4	0.914		
	PEO5	0.925		
TE	TE1	0.799	0.944	0.740
	TE2	0.869		
	TE3	0.898		
	TE4	0.906		
	TE5	0.882		
	TE6	0.800		

4.2.2. Discriminant Validity Test

A discriminant validity test is needed to ensure there is no overlapping between the factors [23]. The Fornell–Larcker criterion and HTMT value are used to determine the ability to differentiate between two constructs in a model. The acceptable value of the Fornell–Larcker criterion is any value greater than the other correlation, while the HTMT value should be smaller than 0.9 [24]. Table 3 refers to the value of the Fornell–Larcker criterion of this model; all the values are greater than other correlations. Table 4 indicates the HTMT values, all of which are smaller than 0.9. Both of the results show the existence of discriminant validity in the model.

Table 3. Fornell–Larcker Criterion.

Construct	EEM	PEO	TE
EEM	0.899		
PEO	0.508	0.914	
TE	0.546	0.705	0.860

Table 4. HTMT Value.

Construct	EEM	PEO	TE
EEM			
PEO	0.542		
TE	0.590	0.755	

4.3. Structural Model

Multicollinearity Test

Multicollinearity occurs when there is a substantial intercorrelation between independent variables. The existence of multicollinearity will lead to misleading conclusions [25]. The acceptable VIF value is smaller than 5; PEO3 was removed due to the higher VIF and the model was then run again to obtain better results. Table 5 shows that all the VIF values are below 5, indicating no multicollinearity in the model.

Table 5. Variance inflation factor (VIF) value.

Construct	Items	VIF
EEM	EEM1	3.176
	EEM2	3.498
	EEM3	2.885
	EEM4	3.234
PEO	PEO1	3.002
	PEO2	3.954
	PEO4	3.662
	PEO5	4.043
	TE	TE1
	TE2	3.148
	TE3	3.89
	TE4	4.011
	TE5	3.098
	TE6	2.282

4.4. Hypothesis Testing

The hypothesis was tested based on two-tailed test at a 95% confidence level to prove the null hypothesis’s plausibility [26]. Table 6 indicates the path coefficient and the *p*-value for each relationship. All *p*-values are smaller than 0.05, which supports the null hypothesis. In other words, the TE has a positive impact on PEO ($\beta = 0.610, p < 0.05$). In addition, the EEM is critical in relation to influencing PEO in entrepreneurship ($\beta = 0.175, p < 0.05$). Lastly, the research hypotheses and relationship are depicted in Figure 2.

Table 6. Hypothesis testing.

Hypothesis	Beta	SE	Standard Deviation (STDEV)	T Statistics (O/STDEV)	<i>p</i> Values	Decision
H ₁ : TE → PEO	0.610	0.617	0.049	12.471	0	Accepted
H ₂ : EEM → PEO	0.175	0.170	0.053	3.300	0.001	Accepted

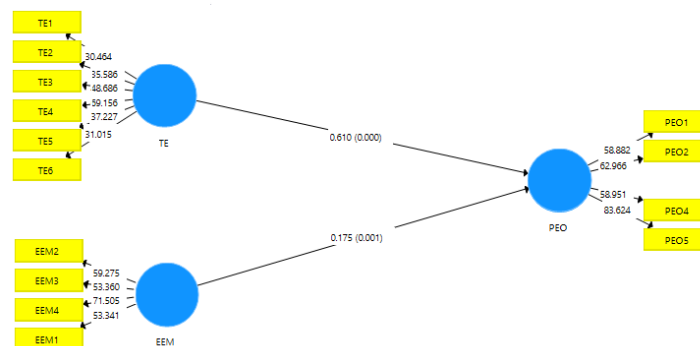


Figure 2. Research model.

5. Discussion

This research uses the Philippines as an example and aims to identify the impact of technology enablement and conventional education systems on perceived entrepreneurial outcomes. As a result, H₁ is supported, as it is believed that the greater the technology support, the better the achievement of students’ perceived entrepreneurial outcome. Technology adoption enables business to quickly adapt to dynamic business environments that may encounter various market possibilities and difficulties [27]. For example, customer needs are changing dynamically with the growth of different digital platforms. Technology can also help students to recognise market opportunities and discover innovative solutions that can develop sustainable business models [28]. Therefore, the adoption of technology

will greatly increase the likelihood of achieving entrepreneurial outcomes. Moreover, H₂ showed statistically significant results. The results demonstrate the importance of entrepreneurial education, as it believed that the stronger the support from education mechanisms, the greater the perceived entrepreneurial outcomes among higher education students [29]. This is because supportive education mechanisms, such as faculty support, professional lecturers, financial support and many others, are able to help in shaping students' attitude and mindsets, thus encouraging them to be involved in entrepreneurship [30]. With the skills and mindset gained from educational support, students can understand the best and most efficient ways to achieve their goals. In short, the results generated refer to a higher impact of TE than the conventional education mechanism. This may be due to the fast-changing pace of technology, which can help businesses operate effectively and better encourage students' intentions due to the greater outcomes achieved.

6. Conclusions

This study has pointed out the importance of the influence of critical elements on perceived entrepreneurial success. Moreover, the results generated show that the impact of technology enablement is greater than effect of an entrepreneurial education mechanism on the perceived outcomes. This is a relatively novel result, as the majority of prior studies have not measured the importance of technology enablement in relation to entrepreneurship. Therefore, major stakeholder in the Philippines need to pay attention to the implementation of technology in higher education systems in order to enhance and increase the likelihood of students achieving perceived entrepreneurial outcomes. In short, there is a need for the government and institutions to be aware of the use of technology in entrepreneurship in order to develop its economic goals.

7. Limitation

There were only 304 data collected from a few universities in Philippines, which is a small sample size for analysing the impact of critical factors. Moreover, there were only a few items included in each factor, meaning that the result generated may not be accurate enough. Lastly, the impact of the mediator factor, i.e., technology enablement, is not specific enough, as the research could have included more aspects to generate a more accurate result.

8. Future Study

It is suggested that the future studies should collect more respondents from more universities in order to have a larger sample size. This is because the standard error and bias will be reduced and minimised due to the larger sample size. More items should be included in each factor to better interpret the impact of the critical elements on perceived success. Lastly, the effect of technology as a mediating factor should be analysed in a more diverse manner to provide a broader picture for readers.

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References

1. Muhhammad Shafiu, A.; Abdul Manaf, H.; Muslim, S. Utilization entrepreneurship for job creation, poverty reduction and national development. *J. Soc. Sci. Res.* **2020**, *6*, 97–102. [[CrossRef](#)]
2. Hameed, I.; Irfan, Z. Entrepreneurship education: A review of challenges, characteristics and opportunities. *Entrep. Educ.* **2019**, *2*, 135–148. [[CrossRef](#)]
3. Wang, W.; Pan, C.; Ray, P.K. Technology entrepreneurship in developing countries: Role of telepresence robots in healthcare. *IEEE Eng. Manag. Rev.* **2021**, *49*, 20–26. [[CrossRef](#)]
4. Ali, A.; Kelley, D.J.; Levie, J. Market-driven entrepreneurship and institutions. *J. Bus. Res.* **2020**, *113*, 117–128. [[CrossRef](#)]
5. Mehmood, T.; Al-Gasaymeh, A. Schumpeterian entrepreneurship theory: Evolution and relevance. *Acad. Entrep. J.* **2019**, *25*, 1–10.
6. Nuhu, S.; Abdullaheem, N.; Abubakar, H.; Abdurauf, A.; Sulaiman, K. Entrepreneur Skills as Determinants to Job Opportunities among LIS Postgraduate Students in University of Ilorin. Available online: <https://digitalcommons.unl.edu/libphilprac/5876> (accessed on 20 March 2022).
7. Ratten, V.; Usmanij, P. Entrepreneurship education: Time for a change in research direction? *Int. J. Manag. Educ.* **2021**, *19*, 100367. [[CrossRef](#)]
8. Wang, S.Y.; Wu, X.L.; Xu, M.; Chen, Q.X.; Gu, Y.J. The evaluation of synergy between university entrepreneurship education ecosystem and university students' entrepreneurship performance. *Math. Probl. Eng.* **2021**, 3878378. [[CrossRef](#)]
9. Velasco, A.L. Entrepreneurship education in the philippines. *DLSU Bus. Econ. Rev.* **2013**, *22*, 1–14.
10. Mubanga, P.; Hock, O.Y.; Karim, A.M.; Mulenga, I.M. Methods of financing technical and vocational education and training, and entrepreneurship education to support skills development in Lusaka Province, Zambia. *Int. J. Res. Sci. Innov.* **2019**, *6*, 96–107.
11. Hynes, B.; Richardson, I. Entrepreneurship education: A mechanism for engaging and exchanging with the small business sector. *Educ. Train.* **2007**, *49*, 732–744. [[CrossRef](#)]
12. Watson, K.; McGowan, P. Rethinking competition-based entrepreneurship education in higher education institutions: Towards an effectuation-informed cooperation mode. *Educ. Train.* **2020**, *62*, 31. [[CrossRef](#)]
13. Indarti, S. The effects of education and training, management supervision on development of entrepreneurship attitude and growth of small and micro enterprise. *Int. J. Organ. Anal.* **2021**, *29*, 16–34. [[CrossRef](#)]
14. Leong, C.; Tan, F.T.C.; Tan, B.; Faisal, F. The emancipatory potential of digital entrepreneurship: A study of financial technology-driven inclusive growth. *Inf. Manag.* **2022**, *59*, 103384. [[CrossRef](#)]
15. Cunningham, J.A.; Lehmann, E.E.; Menter, M.; Seitz, N. The impact of university focused technology transfer policies on regional innovation and entrepreneurship. *J. Technol. Transf.* **2019**, *44*, 1451–1475. [[CrossRef](#)]
16. Shepherd, D.A.; Patzelt, H. Motivation and entrepreneurial cognition. *Entrep. Cogn.* **2018**, 51–103. [[CrossRef](#)]
17. Ojo, S. Black African perceptions of entrepreneurial outcomes in the UK. *Soc. Bus. Rev.* **2021**, *16*, 278–305. [[CrossRef](#)]
18. Hassan, S.; Shamsudin, M.F. Measuring the effect of service quality and corporate image on student satisfaction and loyalty in higher learning institutes of technical and vocational education and training. *Int. J. Eng. Adv. Technol.* **2019**, *8*, 533–538. [[CrossRef](#)]
19. Rodrigues, M.; Franco, M. Composite index to measure cities' creative performance: An empirical study in the Portuguese context. *Sustainability* **2019**, *11*, 774. [[CrossRef](#)]
20. Shmueli, G. Predictive model assessment in PLS-SEM: Guidelines for using PLSpredict. *Eur. J. Mark.* **2019**, *53*, 2322–2347. [[CrossRef](#)]
21. Taylor, T.; Geldenhuys, S. Using partial least squares to measure tourism students' satisfaction with work-integrated learning. In *Tourism-Perspectives and Practices*; Sabah, S., Ed.; Intechopen: London, UK, 2019.
22. Shrestha, N. Factor analysis as a tool for survey analysis. *Am. J. Appl. Math. Stat.* **2021**, *9*, 4–11. [[CrossRef](#)]
23. Berteau, P.; Zait, A. Methods for testing discriminant validity. *Ed. Univ. Craiova* **2011**, *2*, 217–224.
24. Franke, G.; Sarstedt, M. Heuristics versus statistics in discriminant validity testing: A comparison of four procedures. *Internet Res.* **2019**, *29*, 430–447. [[CrossRef](#)]
25. Gujarati, D. *Econometrics by Example*; Palgrave Macmillan: New York, NY, USA, 2011.
26. Emmert-Streib, F.; Dehmer, M. Understanding statistical hypothesis testing: The logic of statistical inference. *Mach. Learn. Knowl. Extr.* **2019**, *1*, 945–961. [[CrossRef](#)]
27. Ndifirepi, T.M. Relationship between entrepreneurship education and entrepreneurial goal intentions: Psychological traits as mediators. *J. Innov. Entrep.* **2020**, *9*, 2. [[CrossRef](#)]
28. Evans, D.; McKee, J. *Social Marketing*; AG Printing & Publishing: Nairobi, Kenya, 2021.
29. Chen, L.; Ifenthaler, D.; Yau, J.Y.-K. Online and blended entrepreneurship education: A systematic review of applied educational technologies. *Entrep. Educ.* **2021**, *4*, 191–232. [[CrossRef](#)]
30. Shen, T.; Osorio, A.E.; Settles, A. Does family support matter? The influence of support factors on entrepreneurial attitudes and intentions of college students. *Acad. Entrep. J.* **2017**, *23*, 24–43. [[CrossRef](#)]