

Mediating Effect of Technological Enablement on Entrepreneurial Adoption among Students in Higher Education: A Confirmatory Analysis of Technological Enablement Entrepreneurial Model (TEEM)

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Abstract

With the advent of the COVID-19 pandemic, students at higher education institutions have recently relied greatly on technological support for their studies and remote support from their universities. Technological enablement is a major determinant of entrepreneurial initiation among higher education students in Malaysia. Empirical studies demonstrate the growing interest in investigating the impact of entrepreneurship education on entrepreneurial success among the country's higher education students. The focus areas include how governmental support, entrepreneurial intention, entrepreneurial education, and technological enablement (mediator factor) can influence entrepreneurial initiation. Therefore, this study aims to determine the factors that affect entrepreneurial initiation (action) among graduating students and the mediating effect of technological enablement on entrepreneurial adoption among students at higher education institutions in Malaysia. The study used Google Form to obtain information related to the topic. Data collection from 297 students in Peninsular Malaysia was voluntary and based on informed consent and anonymity. PLS-SEM (partial least squares structural equation modeling) with a formative-reflective model was adopted to assess the direct and indirect effects alongside the mediating factor. Hence, Smart PLS software was adopted for data analysis. Empirical results also proved that technological enablement as a mediating factor has a greater and significant impact on perceived entrepreneurial success. The results empirically demonstrate that the technological enablement factor has a major impact and influence when students at higher education institutions start businesses. Through such findings, policymakers at the institutional level will be able to identify and deliver the technological support and initiatives necessary to achieve a higher rate of entrepreneurial adoption success.

Keywords:

Entrepreneurial Education System, Technology Enablement, Entrepreneurial Intention, Entrepreneurial Initiation, Entrepreneurial Perceived Outcome

INTRODUCTION

The impact of entrepreneurship on economic growth has been widely discussed in various studies (de la Hoz-Rosales et al., 2019; Ivanovic-Djukic et al., 2018; Stoica et al., 2020). This is because entrepreneurship does not only encourage innovation but provides job opportunities to decrease the unemployment rate (Keoy et al., 2006; Urbano & Aparicio, 2016). It is empirically proven that entrepreneurship education has a significant impact on entrepreneurship activities (Hameed & Irfan, 2019). Entrepreneurial education plays a role as a stimulant to equip students with practical skills such as inventiveness and problem-solving skills. The value of entrepreneurship can be seen as contributory from the strategic planning and implementation derived from entrepreneurial education.

However, the impact of technology enablement on entrepreneurship activities has not been widely discussed and investigated (Wang et al., 2021). It is a common fact that technology contributes to people's daily life in every aspect, making life easier and lighter. Therefore, it is crucial to investigate how technology enablement can be adopted as a push factor for entrepreneurial activity that has become a critical topic that deserves public and institutional attention.

This study seeks to conduct a comparative study to investigate the success of entrepreneurial adoption by comparing the impact of technological enablement as a mediating factor in comparison to conventional entrepreneurial adoption through entrepreneurial initiation as one of the success factors. Independent critical success factors from the education perspective were taken into consideration, namely education mechanism, education support system, and entrepreneurial intention. A literature review to support the importance of these contributory factors will be presented that will lead to the development of the research framework and hypotheses. With the proposed hypotheses, it is hoped that the empirical results of this research will demonstrate that the mediating factor of technological enablement will have a higher and more significant impact on perceived outcomes compared to the conventional entrepreneurial initiation pathway. These empirical results will indirectly encourage students in higher education to be more entrepreneurial mindset driven and encourage them to adopt technology in their entrepreneurial endeavors. The study will also discuss adopting a suitable research design and methodology. Findings and discussions are included upon quantitative data analysis using Structural Equation Modelling and SMARTPLS.

LITERATURE REVIEW

Entrepreneurship by definition

Several empirical studies have been conducted to establish the link between economic growth and entrepreneurship initiation (Ali Abbas, 2018; Mohammadali & Abdulkhaliq, 2019; Sinatti, 2018). This link can also be easily demonstrated by common sense, economic observation, or simple intuition: entrepreneurship is built on actions that translate ideas into economic opportunities. A successful entrepreneur requires an 'unerring market sense' in order to continuously access market demand and meet the consumers' needs (Ali et al., 2020). Entrepreneurs recognize unmet market demands and respond with unique and functional goods that address those needs. Entrepreneurs can perceive unmet needs using technology in various methods, including blogs and social media. For example, some customers may utilise social media to share their user

experiences with certain products or services, allowing entrepreneurs to identify unmet needs and strive to meet them.

Entrepreneurship in education

Entrepreneurship education aims to change the students' mindset with practical and skilled-based learning outcomes. These outcomes refer to the change in attitudes in terms of the willingness to get directly or indirectly involved in entrepreneurial activities (Ratten & Usmanij, 2021). The skills learned from the proper entrepreneurship education syllabus, including critical thinking, knowledge implementation skills, and technology-related tools, are important for the complex and dynamic business environment. Besides, these outcomes will significantly change students' emotions (Koronios et al., 2019). For example, students can learn about the joy and hardship of the entrepreneurship process through the learning outcomes. Therefore, entrepreneurship education diversifies learning approaches that focus on skillful and experiential learning to promote the willingness to contribute to the innovative process (Ferreira et al., 2018). In short, the entrepreneurial environment created by the institutions allows students to exploit and access entrepreneurial opportunities.

Entrepreneurship education in Malaysia

Like other countries, Malaysia's higher education institutions offer entrepreneurship education for undergraduate and postgraduate programs. Studies focus on the effectiveness of entrepreneurship education implementation in Malaysia for venture creation (Lim et al., 2021). The measurements are focused on students' intention of starting a new business and the perception of the universities on entrepreneurship education. It is important to understand the role of entrepreneurship education's impact on the entrepreneurial intention of the related agencies, especially the policymakers, to be the best predictor for the growth of entrepreneurship. Besides, technology-based entrepreneurship education is the most critical factor (Lamine et al., 2021). High education institutions have the role of supporting technopreneurship to develop an innovative ecosystem. The literature review suggested that there is not much research being done in Malaysia, which require urgent attention from scholars and the government to create competitive advantages in the global market.

Entrepreneurial education mechanism (EEM) – *What*

Watson and McGowan (2020) stated that competition-based learning (CBL) could motivate students' learning performance. Similarly, business plan competitions can stimulate and enhance entrepreneurial skills. This is because problem-solving skills and creative thinking can be developed and enhanced through CBL. For example, business plan competitions provided a guideline for students to understand the concepts and process of entrepreneurship activities, enhancing their entrepreneurial intention (Indarti, 2021). The competitions and practical mentoring are able to develop and enhance the capacity for new venture creation. For example, institutional environments can spread knowledge and information related to entrepreneurial opportunities and provide trained skills and networking support to remove the institutional barriers to entrepreneurship. Therefore, for the development of the research framework, the "how" mechanism is defined as an entrepreneurial education mechanism (EEM).

Entrepreneurship education support system (EES) – *How*

Aside from entrepreneurship education support, some studies focused on financial support (Munari et al., 2015) and business consultants (Chemborisova et al., 2019). Universities with such backing are proven to increase the success rate of entrepreneurship and the willingness to start a venture (Zhao & Zhao, 2021). Supportive universities can set up venture funds to offer some financial support for the students or help them find resources. Universities can collaborate with other organizations to provide training, space, equipment, and sponsors as students provide detailed entrepreneurship proposals to realize the entrepreneurship ideas. The expensive professional business consultant is not affordable for small businesses in most cases; universities can offer a collaborative consultation team made of professors and students. Students can gain real-world experience working as a consultation team, such as providing recommended strategic plans on market differentiation, social media, and branding (Linton & Klinton, 2019). The appropriate support provided by education will enhance the students' intention toward entrepreneurship. For this research, the “how” factor will be defined as the entrepreneurial education support system (EES) critical factor.

Entrepreneurial intention (EIten) – *mindset*

Students' entrepreneurial intention can define as “actions” with the mindset to improve. Students' access to the entrepreneurial social networks will interact with people who have entrepreneurship experience, which is helpful to have a positive impact on venture creation (Shirokova et al., 2016). Besides, Umair et al. (2018) argued that the entrepreneurial social network could help recognize market opportunities. This is because the nascent entrepreneurs lack formal channels and information to explore new markets and customer groups. They can get the advice, knowledge, and strategies to overcome challenges faced by their friends. Friends' achievement in venture creation can also encourage others to follow the same career in order to have the same success. Besides, friends can also negatively affect students' entrepreneurial intentions. When friends display frustration, the entrepreneurial process may be seen as risky and uncertain (Dou et al., 2019). Students that observe the stress experienced by their friends may think that the process highly demands attention and effort that leads to personal exhaustion. In short, access to entrepreneurial social networks can impact students' entrepreneurial intention.

Entrepreneurial initiation (EIni) – *action*

Besides, entrepreneurial initiation is the mindset that decides and prepares to create a new venture. This initiation occurs when the students' entrepreneurial beliefs are highly relative to the perceived demand for the opportunity (Pavico & Mercado, 2018). This is because the intention is believed to be the primary determinant to involve in entrepreneurial activities. Furthermore, entrepreneurial initiation implies that the choice to start a new enterprise necessitates an aptitude for entrepreneurship as well as the belief that beginning a new company is feasible (Branner, 2020). Entrepreneurial capability necessitates at least a threshold degree of feasibility and attractiveness and a willingness to act on the opportunity. Therefore, support from the education system and technological enablement is important to determine entrepreneurial capability. It is important to develop entrepreneurial initiation, as it is the main determinant for an individual's willingness to carry the entrepreneurial behavior and entrepreneurial activities.

Technological enablement (TE)

The application of technology in entrepreneurship has been studied in various factors (Wu et al., 2018). This is because the technology with various capabilities and functions can improve overall entrepreneurship efficiency. For example, increasing speed and enhancing accuracy can allow the organization to improve system effectiveness. Besides, innovative entrepreneurship's success depends heavily on the mediator factor, technology implementation (Cunningham et al., 2019). The technological system can affect a business's product and service, which is necessary to implement to have sustainable development. With the implementation of technology as a mediator factor, the entrepreneur can gain competitive advantages and expand the business compared to other businesses. Few indicators have been identified that will be distributed and tested under the technological enablement (TE) critical factor. It is anticipated that the success of entrepreneurial adoption among students at higher institutions will have a higher impact through this mediating factor in comparison with the non-technological approach as a vehicle for success.

Perceived entrepreneurial outcome (PEO)

Individuals who decide to start their own business are likely to experience a variety of consequences. There is a link between financial incentives and the drive to attain goals (Shepherd & Patzelt, 2018). This is because potentially profitable business opportunities will appeal to individuals and encourage them to engage in entrepreneurial activity. It will be more attractive than an employee's set compensation. Furthermore, entrepreneurs may seek self-satisfaction as a crucial view of entrepreneurial operations (Ojo, 2021). Entrepreneurs might also attain work-life balance, such as career satisfaction, while also balancing family duties. Maximizing consumer happiness can signal that the market has accepted an idea. This is because the customer is a high-spending, value-seeking individual who is tough to please (Kadir & Shamsudin, 2019). Entrepreneurs can obtain self-satisfaction in this situation if they are satisfied with the perceived outcomes of their entrepreneurial activity. The research has taken consideration few indicators that may be defined by respondents as perceived entrepreneurial outcome factor (PEO).

RESEARCH METHODOLOGY

Research rationale

This research targets to identify the direct and indirect influence of technological enablement as the mediator factor to drive the entrepreneurial perceived outcomes among higher education students in Malaysia. Digitalization is a new trend and opportunity for socio-economic development that requires the ability of an intangible network (Youssef et al., 2021). The recognition and implementation of technological transformation can enhance the business operation system and provide them with competitive advantages in the global market (Satalkina & Steiner, 2020). As a result, the entrepreneur can detect and take advantage of internet and media technology in the diverse and distinct market potential. By demonstrating the direct impact of technological enablement, major stakeholders including policymakers and institutions will be able to identify and implement the appropriate support and strategies needed

to ensure the success of cultivating an entrepreneurial mindset among higher education students and to provide continual improvements towards more desirable outcomes.

Research framework

The previous section has claimed the importance of the university education mechanism and the entrepreneurial intention on the entrepreneurial perceived outcome among the higher education students. Besides, this study also proposed a mediator factor, technological enablement, to positively impact the perceived outcome. These factors have been classified into the success-related elements in the Technology Enablement Entrepreneurial Model (TEEM) (Figure 1).

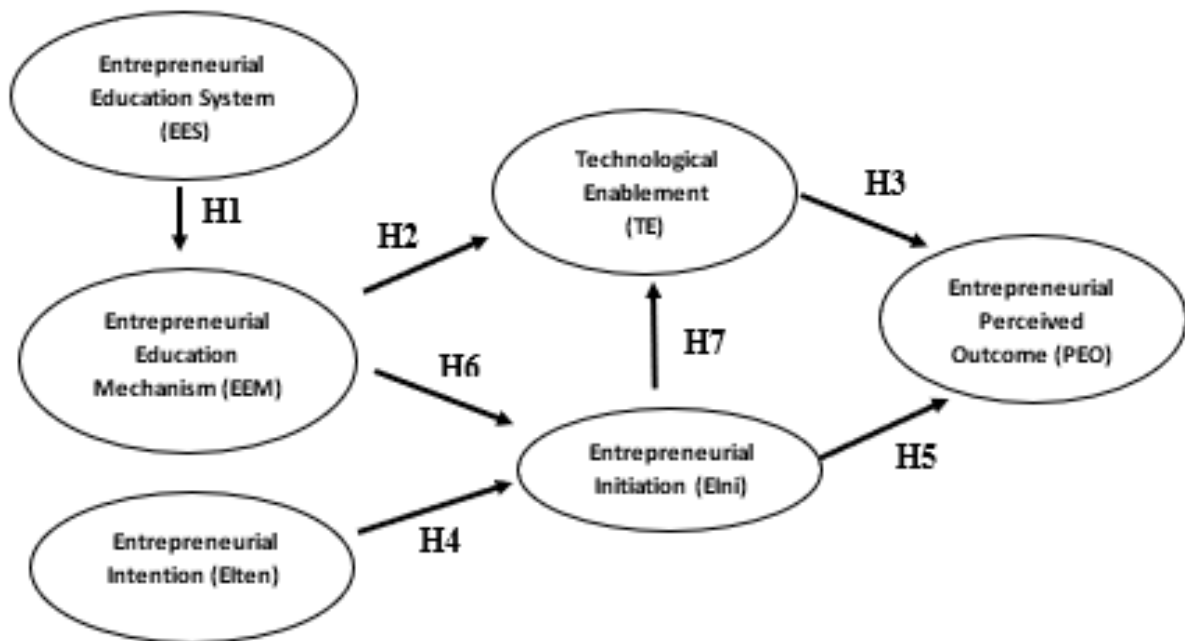


Figure 1. Research framework

Research question

1. What effects are the suggested Technological Enablement Entrepreneurial Model (TEEM) critical factors on higher education students' entrepreneurial success?
2. Is the technology enabling aspect more important than the support provided by the traditional educational system?

Hypothesis development

The hypotheses are proposed as follows:

H₁: Successful implementation of Entrepreneurship Education System (EES) will have a positive impact on Entrepreneurial Education Mechanism (EEM)

H₂: Successful implementation of Entrepreneurship Education Mechanism (EEM) will have a positive impact on Technological Enablement (TE) among higher education students.

H₃: Technological Enablement (TE) drivers will have a positive impact on Perceived Entrepreneurial Outcomes (PEO).

H₄: Entrepreneurial Intention (EIten) will have a positive impact on Entrepreneurial Initiation (EIni).

H₅: Entrepreneurial Initiation (EIni) will have a positive impact on Perceived Entrepreneurial Outcomes (PEO)

H₆: Successful implementation of Entrepreneurial Education Mechanism (EEM) will have a positive impact on Entrepreneurial Initiation (EIni) among higher education students.

H₇: Entrepreneurial Initiation (EIni) will have a positive impact on Technological Enablement (TE)

Research procedure

This research aims to verify the important factors influencing the entrepreneurial perceived success among higher education students in Malaysia. The research starts with literature reviews, then designs the questionnaire, collects data, and analyzes the finding of the impact of critical factors in TEEM Model on Entrepreneurial Perceived Outcome (PEO). The questionnaire was randomly sent through Google Form to the intended respondents, who are the higher education students in Malaysia. Random sampling is a technique used to choose samples randomly to avoid biased representation of the total population (Acharya et al., 2013).

In order to ensure the target respondents, two questions were designed to filter out the unfit audiences: “My institution is based in_” and “Current Education Level”. Hence, the untargeted respondents would be excluded from the analysis. As a result, 294 valid respondents were surveyed from universities in Peninsular Malaysia. The respondent’s level of agreement was measured using a 5-point Likert scale, from (1) Strongly Disagree to (5) Strongly Agree. This is because it is easier to operationalize personality traits and impressions using the five scale. The structural equation modeling (SEM) methodology was used to evaluate the data further. It is a multivariate statistical analysis approach for detecting structural linkages that are commonly used to investigate links and many dependencies in a single investigation (Sarstedt & Cheah, 2019). Hence, Partial Least Squares Structural Equation Modelling (SEM- PLS) with Smart PLS 3.0 software was used to analyze the proposed study model.

Measurement and instrument

In order to examine the relationship between each variable, six constructs followed by questionnaires were developed from a comprehensive literature review as stated in the previous section.

Table 1. Measurement

Construct	Questions	References
EEM	My institution provides a suitable syllabus and curriculum relating to entrepreneurship to assist in my business start-up.	(Basheer & Sulphrey, 2017; Malekipour et al., 2017)
	My institution provides entrepreneurship enhancement through various business start-up competitions and practical mentoring	(Abushakra et al., 2019)
	I have learned a lot about entrepreneurial start-ups through internship placement during my study at the institution	(Neeson & Billington, 2021)
	My institution offers a positive and encouraging culture and support system (peer support) to practice my entrepreneurial journey during my studies.	(Zhao & Zhao, 2021)
EES	Entrepreneurship education at my institution has enhanced my understanding of the entrepreneur’s characteristics, such as perseverance, personal values, and self-motivation	(Pauceanu et al., 2018)
	Entrepreneurship education in my institution has improved my analytics skills through the need to have proper planning of a business start-up	(Looi & Maritz, 2021)
	Entrepreneurship education support system has upskilled my practical management skills in order to start a business	(Sarea et al., 2018)
	Entrepreneurship education in my institution has exposed me to practical business acumen, built self-confidence and developed skills in order to succeed in running a business venture	(Watson & McGowan, 2020)
EIten	My surroundings, including family and peers, encouraged me to venture into business start-up (Environmental)	(Shen et al., 2017)
	My professional goal is to become an entrepreneur before I graduate (Self Efficacy)	(Salhieh & Al-Abdalla, 2022)
	I’m determined to create a firm in the future (Personal Traits – Self Motivation)	(Özsungur, 2019)
	I will start my own business if I detect an opportunity (Opportunist)	(Hassan et al., 2020)
	I will make every effort to manage my own firm (Determination)	(Mumi, 2020)
EIni	I have a well-planned business strategy to before embarking in the entrepreneurship journey	(Fauzi, 2019)
	I will make every effort to create and run my own company in the future.	(Mumi, 2020)
	My focus is to execute the goals to become a successful entrepreneur.	(Yan, 2012)
	I am determined to create a sustainable company with expansion execution in the next 5 years	(Hassan et al., 2020)
	I will ensure the knowledge that I learned from my institution will apply to my business start-up.	(Fauzi, 2019)
	I intend to start a company before I graduate from my institution	(Cera et al., 2020)

TE	To what extent has the infrastructure helped significantly to start your entrepreneurship?	(Ajide, 2020)
	To what extent has the connectivity helped significantly to start your entrepreneurship?	(Paschen et al., 2020)
	To what extent has the user-friendly platforms helped significantly to start your entrepreneurship?	(Ridout et al., 2021)
	To what extent has integrated social media helped significantly to start your entrepreneurship?	(Wee et al., 2020)
	To what extent has the e-business support helped significantly to start your entrepreneurship?	(Vlachopoulou et al., 2021)
	To what extent has the peer support helped significantly to start your entrepreneurship?	(Ridout et al., 2021)
PEO	Increase in Revenue (Monetary)	(Shepherd & Patzelt, 2018)
	Self-Satisfaction (Self-Fulfilment)	(Ojo, 2021)
	Customer Satisfaction (Product/Service Proof Concept)	(Kadir & Shamsudin, 2019)
	Employee Teamwork (Leadership)	(Brattstrom & Delmar, 2019)
	Entrepreneurial Knowledge & Experiential Journey (Persistent)	(Chereau & Meschi, 2021)

FINDINGS

Descriptive analysis

Table 2 refers to the demographic distribution of the respondents. There are 119 male and 175 female respondents. The majority of respondents are undergraduate (66.67%), followed by foundation (7.14%), diploma (16.67%), and postgraduate (9.52%). 168 students have prior experiences with the entrepreneurial activity that can answer the questionnaire based on their personal experience, while 126 students have no prior experience, neither direct nor indirect involvement in the entrepreneurial activity, responded based on their knowledge and opinions.

Table 2. Demographic information

Demographic Characteristics	Items	Number of Respondents	%
Gender	Male	119	40.48
	Female	175	50.52
Education Level	Foundation	21	7.14
	Diploma	49	16.67
	Undergraduate	196	66.67
	Postgraduate	28	9.52
Ventured into Entrepreneurial Activities, Either Direct or Indirect	Yes	168	57.14
	No	126	42.86

Construct validity and reliability test

All the forms of validity such as content validity and criterion validity are covered and can be measured by construct validity (Calong & Soriano, 2019). Average Variance Extracted (AVE) value measures the level of variance that captured by a construct against the measurement error level. Any AVE value that is greater than 0.5 and above is acceptable (Shrestha, 2021). Composite Reliability (CR) level is another determinant to review the convergent validity, and any value greater than 0.7 is acceptable (Memon & Rahman, 2014) The outer loadings determine the importance between each observable items or variables in defining the hidden variable or construct (Taylor & Geldenhuys, 2019). The acceptable value for outer loadings is equal to or greater than 0.7. Internal consistency for Cronbach’s Alpha, which is calculated using correlations between all pairs of items, any value greater than 0.7 indicated an acceptable range for reliability (Taylor & Geldenhuys, 2019).

Table 3. Construct validity and reliability

Construct	Item	Outer Loadings	CR	AVE	Cronbach's Alpha
EEM	EEM1	0.923	0.941	0.843	0.907
	EEM3	0.909			
	EEM4	0.922			
EIni	EIni1	0.901	0.949	0.756	0.935
	EIni2	0.857			
	EIni3	0.897			
	EIni4	0.814			
	EIni5	0.855			
	EIni6	0.89			
EIten	EIten2	0.917	0.925	0.755	0.892
	EIten3	0.865			
	EIten4	0.855			
	EIten5	0.837			
	ESS1	0.876			
EES	ESS2	0.836	0.91	0.717	0.869
	ESS3	0.862			
	ESS4	0.811			
	PEO1	0.897			
PEO	PEO2	0.833	0.931	0.729	0.907
	PEO3	0.796			
	PEO4	0.866			
	PEO5	0.873			
	TE1	0.809			
TE	TE2	0.798	0.922	0.662	0.899
	TE3	0.824			
	TE4	0.803			
	TE5	0.808			
	TE6	0.839			

The items EEM2 and EIten1 were removed due to the higher VIF (>5). After that, the researchers conduct data analysis again and get the results as shown in Table 3. The value of

outer loadings is all greater than 0.7, CR and Cronbach’s Alpha values are all greater than 0.7, and the AVE value is all larger than 0.5. Hence, both construct validity and reliability are satisfactory.

Discriminant validity

Discriminant validity looks for the substantial differences between the variables that may be caused by the same reason. It refers to the ability to distinguish between two constructs in the same research model (Ab Hamid et al., 2017). Heterotrait-Monotrait Ratio (HTMT) and the Fornell-Larcker criterion are the determinants. HTMT values the similarity of the variables; thus, any value below 0.9 is proven to have discriminant validity between two variables (Franke & Sarstedt, 2019). Fornell-Larcker criterion indicates that discriminant validity is established in the model if the value is higher than the correlation of other hidden variables (Ab Hamid et al., 2017). Table 4 shows that all HTMT values are less than 0.9, demonstrating the established discriminant validity between the constructs. Besides, Table 5 refers to the result of the Fornell-Larcker Criterion. All values are larger than the correlation of the other hidden variables. Hence, there is no effect on the changes of any variables other than those to which they are conceptually connected.

Table 4. HTMT value

	EEM	EES	EIni	EIten	PEO	TE
EEM						
EES	0.605					
EIni	0.598	0.495				
EIten	0.575	0.359	0.478			
PEO	0.376	0.243	0.556	0.322		
TE	0.38	0.368	0.495	0.519	0.663	

Table 5. Fornell-Larcker criterion

	EEM	EES	EIni	EIten	PEO	TE
EEM	0.918					
EES	0.546	0.847				
EIni	0.553	0.454	0.869			
EIten	0.515	0.32	0.444	0.869		
PEO	0.346	0.221	0.52	0.288	0.854	
TE	0.358	0.335	0.466	0.469	0.604	0.814

Multicollinearity test

Multicollinearity occurs when substantial intercorrelations exist between two or more independent variables, which can lead to skewed or misleading conclusions (Gujarati, 2011). Variance Inflation Factor (VIF) assesses how much an independent variable’s behavior (variance) is impacted (inflated) by its interaction or correlation with other independent variables. Any value greater than 5 is a sign of the existence of multicollinearity issue (Shrestha, 2020). As mentioned above, the item EEM2 is removed due to the higher VIF. Table 6 shows

the VIF value for all the constructs are smaller than 5. Hence, it can be stated that there is no multicollinearity exist in the research model.

Table 6. Variance inflation factor (VIF) value

Construct	Items	VIF
EEM	EEM1	3.031
	EEM3	2.827
	EEM4	3.04
EIni	EIni1	4.238
	EIni2	3.461
	EIni3	4.476
	EIni4	2.379
	EIni5	2.793
	EIni6	3.582
EIten	EIten2	3.461
	EIten3	2.443
	EIten4	2.363
	EIten5	2.304
	ESS1	2.322
EES	ESS2	1.906
	ESS3	2.38
	ESS4	1.945
	PEO1	3.271
PEO	PEO2	2.194
	PEO3	2.091
	PEO4	2.59
	PEO5	2.697
	TE	TE1
TE2		2.392
TE3		2.302
TE4		2.306
TE5		2.328
TE6		2.268

Mediation analysis

Mediation analysis is conducted to analyze the mediating role of mediating variables on the linkage between independent and dependent variables (Laili et al., 2019). As Table 7 shows, all the indirect effects, $\beta=0.279$, $\beta=0.171$, $\beta=0.242$, $\beta=0.153$, $\beta=0.170$, $\beta=0.179$, $\beta=0.103$ and $\beta=0.082$ are significant with P value less than 0.05. Therefore, it can be concluded that the mediation effects are statistically significant in this research.

Table 7. Mediation analysis

Path	Original Sample (O)	Sample Mean (M)	Bias	2.50%	97.50%	P Values
EEM -> EIni						
EEM -> PEO	0.279	0.275	-0.004	0.206	0.374	0
EEM -> TE	0.171	0.17	-0.001	0.121	0.243	0
EES -> EEM						
EES -> EIni	0.242	0.241	-0.001	0.164	0.333	0
EES -> PEO	0.153	0.151	-0.002	0.105	0.215	0
EES -> TE	0.170	0.168	-0.002	0.119	0.235	0
EIni -> PEO	0.179	0.179	0	0.11	0.252	0
EIni -> TE						
EIten -> EIni						
EIten -> PEO	0.103	0.107	0.004	0.037	0.178	0.004
EIten -> TE	0.082	0.086	0.004	0.027	0.149	0.009
TE -> PEO						

Structural model

Before reporting the hypothesis test, it is important to look into the R², F², and Q² of the research model. R² refers to how much change of dependent variables can be measured by the independent variable(s) (Gujarati, 2011). Table 8 indicates the R² value for the constructs; all values are smaller than 0.5, which refers to a low effect (Moore et al., 2013).

Table 8. R² of the research model

Construct	R Square
EEM	0.298
EIni	0.341
PEO	0.438
TE	0.231

Besides, F² is used to examine how close the relationship among the variables. The effect size is considered as follows: small (F²≥0.02), medium (F²≥0.15), and large (F²=0.35) (GHOZALI, 2006). Table 8 shows the F² of all the relationships between each construct. For example, the F² value of EEM on TE is 0.019, which means that the effect is medium. On the other hand, the F² value of EES on EEM is 0.425, which means that the effect is large.

Table 9. F² of the research model

Construct	EEM	EES	EIni	EIten	PEO	TE
EEM			0.218			0.019
EES	0.425					
EIni					0.129	0.135
EIten			0.052			
PEO						
TE					0.298	

Lastly, Q^2 is used to measure the predictive relevance of a model. Any value larger than 0 refers to the model having predictive relevance, and the values are well constructed (Gujarati, 2011). Table 10 refers to the Q^2 value of the construct, which is all greater than 0, indicating that the model has predictive relevance.

Table 10. R^2 of the research model

Construct	SSO	SSE	$Q^2 (=1-SSE/SSO)$
EEM	882	665.043	0.246
EES	1176	1176	
EIni	1764	1348.438	0.236
EIten	1176	1176	
PEO	1470	1020.2	0.306
TE	1764	1514.752	0.141

Hypothesis testing

A hypothesis is tested to prove the null hypothesis’s plausibility (Emmert-Streib & Dehmer, 2019). The hypothesis is tested based on the two-tailed on a 95% confidence level. Table 11 shows the results of the hypothesis testing. All hypotheses are supported. There is a positive impact on the EES towards EEM ($\beta=0.546$, $P<0.05$). The relationship between EEM and TE is significant ($\beta=0.141$, $P<0.05$). TE positively impacts the PEO ($\beta=0.466$, $P<0.05$), indicating that strong technology enablement will impact the entrepreneurial perceived outcome. Furthermore, the factor EIten is proved to have a positive impact on the EIni ($\beta=0.214$, $P<0.05$). The relationship between EIni and PEO is supported to be positive ($\beta=0.303$, $P<0.05$). Moreover, the EEM factor shows a statistically significant impact on EIni ($\beta=0.443$, $P<0.05$). Lastly, the relationship between EIten and TE is proven to be positive and will impact the PEO ($\beta=0.385$, $P<0.05$). The hypotheses and relationship between each factor are concluded in Figure 2.

Table 11. Path coefficient and hypothesis testing

Hypothesis	Beta	SE	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values	2.50%	97.50%	Decision
H1	0.546	0.548	0.05	10.965	0	0.445	0.633	Supported
H2	0.141	0.145	0.049	2.901	0.004	0.034	0.236	Supported
H3	0.466	0.466	0.059	7.945	0	0.336	0.573	Supported
H4	0.214	0.216	0.067	3.216	0.001	0.079	0.348	Supported
H5	0.303	0.301	0.045	6.772	0	0.217	0.388	Supported
H6	0.443	0.439	0.059	7.527	0	0.309	0.551	Supported
H7	0.385	0.383	0.058	6.65	0	0.272	0.492	Supported

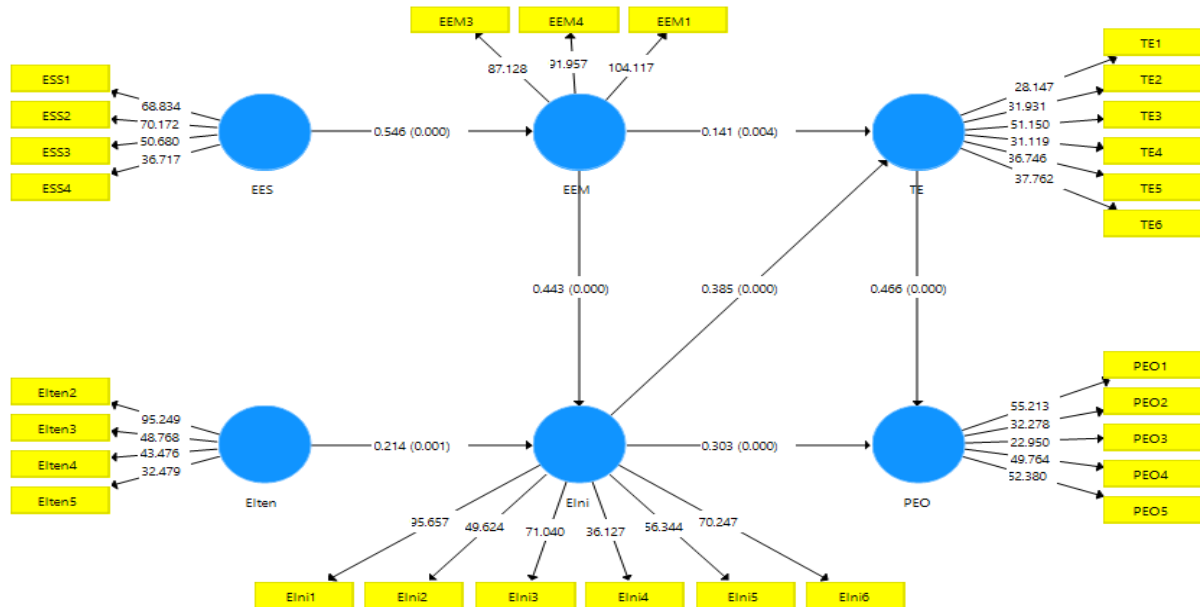


Figure 2. Research model

DISCUSSION

This research investigates the impact of the critical factors' influence on the entrepreneurial perceived success outcome among higher education students in Malaysia. As the result shows, H₁ is supported, thus, verifying the positive impact of EES on the EEM. Ndofirepi (2020) claimed that the stronger the education support on entrepreneurship-related fields, the better the education mechanism could provide for students. For example, faculty support, financial support, syllabus, and event support for the education mechanism, will result in positive change in the entrepreneurship education mechanism. Therefore, entrepreneurship education is important in shaping a strong entrepreneurship education mechanism for students and enhancing their intention to involve in entrepreneurial activities. Besides, H₂ indicates the significant relationship between EEM and TE. This is because the education mechanism will provide support for enhancing the technology usage among students (Urbano et al., 2019) Supportive education environment offers entrepreneurial culture, mindset, values, and beliefs that can influence students' technology usage. For example, providing entrepreneurship-related assignments and courses that need the use of technology can improve students' awareness of technology.

On the other hand, H₃ indicates the importance of technology enablement toward the entrepreneurial perceived outcome. Technology enablement act as an important mediating factor that allows the entrepreneur to identify a market opportunity, replace human function to be more seamlessly, quickly, and seamlessly, as well as to increase overall business operation performance (Polas & Raju, 2021). The impact is larger than EIni ($\beta=0.466 > \beta=0.303$) due to the increasing importance of technology usage on business operations. Technology enables entrepreneurs to develop positive and successful customer relationships, increasing the likelihood of establishing a long-term business (Ezeani & Oludele, 2021). Besides, businesses that rely more on technology can gain competitive advantages such as predicting and planning for the market demand and better allocating the resources. In general, entrepreneurs with the use of technology allow businesses to be more likely to achieve the entrepreneurial perceived

outcome. On the other hand, H₄ shows that EIten significantly impacts EIni. Entrepreneurial intention, represented by self-efficacy and self-motivation, enables entrepreneurs to enhance their initiation to start a venture (Bilgiseven & Kasimoğlu, 2019). Such supportive emotional factors have demonstrated a higher level of entrepreneurial attitude, which is important to the entrepreneurship journey.

Furthermore, H₅ indicates the positive relationship between EIni and PEO. Initiation such as the willingness to take the risk and capture the market opportunities and innovation will influence an individual's readiness to persist in taking entrepreneurial action. This is supported by the study of Kim et al. (2018) that the entrepreneurial initiation will lead to successful business creation and gain a more satisfying outcome. Besides, H₆ indicates that the EEM significantly impacts EIni, which is aligned with several studies (Cera et al., 2020). The entrepreneurial education mechanism offers several courses with helpful and needful knowledge and infrastructure that can enhance students' initiation. It can be stated that the study programs will affect students' overall effectiveness and willingness to participate in entrepreneurial activities. Lastly, H₇ shows that the EIni has a positive impact on TE. In order to catch up with the dynamic entrepreneurial environment, there is a need to utilize technology. Entrepreneurial initiation is proven to be a supportive factor in encouraging entrepreneurs to take advantage of technology to be competitive enough to survive in the global market (Turan & Kara, 2018). For example, the initiation to establish a successful business will drive entrepreneurs to learn and catch up with the technology trend.

CONCLUSION

This study aims to determine the contributing factors that affect entrepreneurial initiation (action) among graduating students and the mediating effect of technological enablement on entrepreneurial adoption among students at higher education institutions in Malaysia. In conclusion, this research presents a direct and indirect impact of the elements under TEEM model, education support, entrepreneurial intention, and technology enablement toward entrepreneurial perceived success among Malaysian higher education students. The main outcome is there is a greater impact of technology enablement on entrepreneurial success. It is important to be aware of the technology implementation in order to achieve a sustainable outcome. Promoting and encouraging entrepreneurship among students can simultaneously stimulate the country's and the economy's growth. This research provides a broader picture with empirical evidence that the purposed critical factors will influence entrepreneurial success. From the result, technology enablement is an important mediator for entrepreneurial success. Therefore, related agencies such as government and institutions can pay attention to and promote the use and adoption of technology in entrepreneurial education and activities to develop students with competitive advantages for future entrepreneurship. In short, this research aims to raise awareness of entrepreneurial education and technology enablement towards the entrepreneurial activities in the country and economic growth.

This study is conducting a sampling method through data collection from three Malaysian universities. Hence, the result may not represent the whole of Malaysia regarding the critical factors that impact entrepreneurial success. Besides, there are only 294 respondents took part in the survey. Thus, more respondents are suggested to generate a better and more accurate result. Only a few items for each factor were used for data analysis, which may not be good enough to interpret their effect. Lastly, the research may not focus specific enough on the impact of technology enablement on success.

There are a few suggestions for future studies to provide a better analysis of the impact of the critical factors on entrepreneurial success. First, it is suggested to collect more respondents from different universities in Malaysia to help in minimizing the standard error and bias of the result. Furthermore, future studies are recommended to include more items for each factor to better interpret their effect of them in order to provide a bigger picture and suggestions for the related agencies. There is a need to include different aspects when analyzing the effect of the mediating factor, technology enablement, so that the readers can be aware of the importance of technology on entrepreneurship.

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