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Modelling Multilevel Predictors of Academic Entrepreneurship: Empirical Evidence across ASEAN Countries

(Permodelan Peramal Pelbagai Peringkat terhadap Keusahawanan Ahli Akademik: Bukti Empirikal di Negara ASEAN)

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ABSTRACT

Universities are widely recognized as educational hubs to nurture entrepreneurship. However, there is criticism that not all lecturers are entrepreneurs themselves. To better understand the phenomenon, this study attempts to examine the multi-level factors of the academic e-entrepreneurial self-efficacy. It specifically tests predictors at three levels: individual (human capital, social capital, and internet competence), organizational (university support), and country (internet infrastructure). Drawing on social cognitive and institutional theory, this study constructs several hypotheses on the direct, mediating, and moderating effects. Hierarchical regression analysis was performed on survey data gathered from 210 academics in seven ASEAN countries. The results show that both human and social capitals are positively related to academic e-entrepreneurial self-efficacy. Furthermore, the effect is channeled via internet competence. However, university support negatively moderates the relationship between individual predictors and academic e-entrepreneurship self-efficacy, while internet infrastructure exhibits no significant effect. Overall, the study contributes to the literature and practice by modelling and testing the multilevel predictors of academic entrepreneurship across countries.

Keywords: Academic entrepreneurship; internet entrepreneurial self-efficacy; multi-level predictors

ABSTRAK

Universiti diiktiraf secara meluas sebagai hab pendidikan untuk memupuk keusahawanan. Namun begitu, terdapat kritikan bahawa tidak semua pensyarah adalah usahawan itu sendiri. Untuk lebih memahami fenomena tersebut, kajian ini cuba mengkaji faktor pelbagai peringkat efikasi kendiri e-keusahawanan akademik. Ia secara khusus menguji peramal pada tiga peringkat: individu (modal insan, modal sosial dan kecekapan internet), organisasi (sokongan universiti) dan negara (infrastruktur internet). Berdasarkan teori kognitif dan institusi sosial, kajian ini membina beberapa hipotesis mengenai kesan langsung, pengantara dan penyederhanaan. Analisis regresi hierarki telah dilakukan ke atas data tinjauan yang dikumpul daripada 210 ahli akademik di tujuh negara ASEAN. Keputusan menunjukkan bahawa kedua-dua modal insan dan sosial mempunyai kaitan positif dengan efikasi kendiri e-keusahawanan akademik. Tambahan pula, kesannya disalurkan melalui kecekapan internet. Walau bagaimanapun, sokongan universiti secara negatif menyederhanakan hubungan antara peramal individu dan efikasi kendiri e-keusahawanan akademik, manakala infrastruktur internet tidak menunjukkan kesan yang ketara. Secara keseluruhannya, kajian ini menyumbang kepada literatur dan amalan dengan memodelkan dan menguji peramal pelbagai peringkat keusahawanan akademik merentas negara.

Kata kunci: Keusahawanan akademik; kecekapan kendiri keusahawanan internet; peramal pelbagai peringkat

INTRODUCTION

For decades, encouraging entrepreneurship has been a socio-economic priority in many countries whereas the national initiatives for entrepreneurship focus on young people, especially university students (Abaho et al. 2015; Malebana & Swanepoel 2019; Memon et al. 2019; Sedlan-König 2016, Ayob et al. 2023). For that, the responsibility is heavily borne by the universities.

Despite the vital role of university entrepreneurship education, there is a lot of criticism that lecturers in business-related fields are not entrepreneurs themselves (Abreu & Grinevich 2013; Adelowo & Surujlal 2020; Alexander et al. 2017; Blair & Shaver 2020; Davey & Galan-Muros 2020; Shi et al. 2020). Although they can effectively deliver knowledge, nurture skills, and produce new entrepreneurs among their students, many academics have never practically experienced running a business. One common explanation is that institutions do not actively encourage lecturers to engage in activities other than the traditional roles of teaching and research. Hence, faculty members might never know if they possess adequate entrepreneurial competencies.

As a medium, online platforms are a more accessible tool for nascent entrepreneurs than having a conventional physical store (Chang et al. 2020; Wang et al. 2020). First, technological advancement has pushed all businesses into digital platforms (Idris et al. 2023). Second, it allows people to own an online business while pursuing other professions. As such, digital business ventures require specific internet skills, including a conducive internet infrastructure, beyond the conventional entrepreneurship capabilities (Aesaert et al. 2014).

This current study attempts to build and examine a multilevel predictor model of academic entrepreneurship. Specifically, it tests the effect of individual- (human capital, social capital, and internet competence), organizational- (university support), and country-level (internet infrastructure) factors on e-entrepreneurship self-efficacy among 210 academics in seven Association of South East Asian Nations (ASEAN) countries. Hypotheses are constructed by drawing on social cognitive theory and institutional theory and analyzed through hierarchical regression models.

This research aims to fill in the knowledge gaps thus advancing the existing literature both theoretically and methodologically. First, our model integrates three-level predictors to understand the phenomenon more comprehensively. Unlike prior studies that focused mainly on the individual (Clarysse et al. 2011; Goethner et al. 2012; Wang et al. 2020; Shi et al. 2020) or country level (Mueller & Conway Dato-on 2013; Fini & Grimaldi 2017), we argue that academic entrepreneurship is better explained by micro, meso, and macro variables (Jaya et al. 2023). This approach allows us to test internet competence as a mechanism for intrinsic factors to be translated into online entrepreneurship, as well as examine the moderating effects of organizational and country variables.

Second, we consider entrepreneurial self-efficacy as the dependent variable to replace entrepreneurial intention commonly used in prior works (i.e. Alkhalaileh 2021; Guo et al. 2016; Goethner et al. 2012). This is a solid approach because academics are unlikely to quit their current job simply to start a business. Instead, they can own an online business while holding a position at the university, or at the least demonstrate a certain degree of belief in their ability to successfully launch a business (Wang et al. 2020). Lastly, our empirical approach offers generalizability as we compare the samples across seven ASEAN countries. Because these countries are largely heterogeneous in terms of the socio-economic development (i.e. Singapore versus Vietnam) (Ayob et al. 2021), our data allows us to examine the effect of a country's internet infrastructure on academic entrepreneurial self-efficacy.

The study proceeds as follows. The next section presents the updated academic entrepreneurship literature: theories and multi-level predictors, leading to the proposed hypotheses. The third section describes the methodology and empirical approach. The fourth section presents the results of the statistical analysis. Finally, we discuss the findings and conclude with the implications and avenues for future research.

LITERATURE REVIEW

STATE-OF-ART IN ACADEMIC (ONLINE) ENTREPRENEURSHIP LITERATURE

Academic entrepreneurship has garnered increasing attention among scholars, practitioners, and policymakers, allowing us to derive a few definitions from prior studies. Abreu and Grinevich (2013) describe academic entrepreneurship as entrepreneurial activities that occur outside the traditional academic roles of teaching and research. More generally, it may involve the process of creating new businesses based on knowledge developed within the university, also known as academic start-ups or spin-offs (Fini et al. 2020).

The literature on academic entrepreneurship has been focusing on technology-based commercialization in universities via patenting, licensing, start-up creation, and university-industry partnerships (Grimaldi et al. 2011). Universities are commonly regarded as open innovation centers that promote economic and social development through research commercialization (Wang et al. 2020). This has become an effective mechanism for transferring university-based knowledge into society, thus fostering regional innovation (Halbinger 2020; Klofsten et al. 2019).

However, this study discusses academic entrepreneurship from a broader perspective. We argue that entrepreneurship self-efficacy among lecturers does not necessarily involve commercialized products from university-supported research. Instead, it captures a general proficiency in running a business, including products or services, outside the university.

Nonetheless, academic entrepreneurship is a unique research domain given the particular nature of the non-commercial university environment that greatly differs from conventional business ventures. Foremost, lecturers are expected to translate their scientific knowledge into innovative product development which requires skills such as effective communication with outsiders (Davey & Galan-Muros 2020; Schaeffer & Matt 2016; Wang et al. 2020). Yet, academics are often criticized for their lack of entrepreneurial mindset and practical skills (Blair & Shaver 2020; Goethner et al. 2012; Shi et al. 2020). This particularly motivates the current study to further understand entrepreneurial self-efficacy among lecturers.

As a research topic, academic entrepreneurship is studied as a multifaceted phenomenon that includes many actors, operates at different levels, and engages in multiple processes that spread over extended time periods (Fini & Grimaldi 2017). The literature has identified the determinants of academic entrepreneurship at three levels. First, research at the individual level has concentrated on the academics' personal attributes (Goethner et al. 2012), motivations (Nguyen et al. 2020), as well as entrepreneurial orientation (Adelowo & Surujlal 2020).

Second, at the organizational level, past studies have examined the characteristics of the organizations in which the faculty work (Abreu & Grinevich 2013). Examples of these characteristics include the organizational structure (Fini & Toschi 2016), the type of network (Shi et al. 2020), as well as the supporting mechanisms (Alessandrini et a. 2013; Alexander et al. 2017). Lastly, literature on academic entrepreneurship at the country level focuses on internet infrastructure (Chang et al. 2020; Secundo et al. 2020) or national culture (Abreu & Grinevich 2013; Abaho et al. 2015; Davey & Galan-Muros 2020).

The present study focuses on academic internet entrepreneurship following the advancement of digital technology that pushes entrepreneurs to capitalize on online platforms for conducting business activities (Schiavone et al. 2020). Specifically, internet entrepreneurship refers to the use of information technology to start a business and then carry out subsequent business activities via the internet (Wang et al. 2020). The growth of internet entrepreneurship today is driven by advances in communication technology, computers, and smart devices, which facilitate lower operating costs and broader customer reach (Chang et al. 2020; Guo et al. 2016). Therefore, venturing into online platform business is more viable for lecturers because it does not require them to quit their current job.

EXPLAINING ACADEMIC ENTREPRENEURSHIP SELF-EFFICACY: BLENDING SOCIAL COGNITIVE THEORY AND INSTITUTIONAL THEORY

The model of our study draws on social cognitive theory (SCT) and institutional theory (IT) to integrate the three level predictors above.

As an extension of Social Learning Theory, SCT was developed by Albert Bandura in 1982. SCT argues that learning results from internal and external social reinforcement of a dynamic interaction between the individual and the environment. It explains the specific way in which individuals acquire and maintain behavior, while also acknowledging the social environment in which individuals exhibit the behavior.

In this study, we specifically use entrepreneurial self-efficacy to proxy the academic entrepreneurship behavior commonly used in prior works (Hinz 2017; Memon et al. 2019; Udayanan 2019). Self-efficacy is the core element of SCT that emphasizes an individual's belief in one's capability to organize and execute required actions to attain the intended results (Bandura 1977). In the context of academic entrepreneurship, it is believed that business ventures among faculty are motivated by their perceived self-efficacy more than their objective ability like intention to start one (Li et al. 2020; Tsai et al. 2016).

SCT upholds that a person's actions, thoughts, and behaviors are stimulated by a combination of cognitive, behavioral, personal, and environmental factors. Applying SCT into the present study, we believe that entrepreneurial self-efficacy is determined by their characteristics and the external environment they are in (Bandura 1978). This is supported by prior works that found both intrinsic (i.e. educational background (Goethner et al. 2012), experience (Wang et al. 2020), and personality (Shi et al. 2020), and extrinsic factors (i.e. social support (Neneh 2020) and organizational context (Huyghe & Knockaert 2014) influence academic entrepreneurship behavior.

At the country level, this study draws on IT that is highly relevant for cross-country entrepreneurship research. IT generally proposes that the institutional environment strongly shapes individuals' behavior and beliefs (Scott 1987). Individuals are encouraged to pursue an interest that is legitimized within the regulatory and cultural domain of the institution (Su et al. 2017). For that, IT is adopted to scrutinize how macro-level elements influence micro-level activities.

In expanding the institutional perspective, scholars posit entrepreneurial mindsets and behavior are also developed by regulatory, normative, and cognitive institutional systems. Entrepreneurship is an economic behavior that is embedded inside the institutional environment of a society, community, or country (Baumol 1990; Kazumi & Kawai 2017). Even in the context of the university, entrepreneurship is found to be significantly affected by formal

(e.g. financial assistance, infrastructure etc.) and informal institutions (e.g. innovation, risk tolerance etc.) (Ayob 2021).

HYPOTHESES DEVELOPMENT

INDIVIDUAL-LEVEL FACTORS: HUMAN CAPITAL, SOCIAL CAPITAL, AND INTERNET COMPETENCE

Entrepreneurial self-efficacy is developed through cognitive and social skills acquisition (Bandura 1982; Kasouf et al. 2015). Human capital has long been recognized as the stock of personal knowledge, skills, and abilities acquired from investments in education, training, and experience (Becker 1964) that provide potential entrepreneurs with superior cognitive abilities (Schultz 1961). Generally, human capital is divided into two categories: general (formal) forms such as level of education, and specific (informal) forms like industry and entrepreneurial experience (Davidsson & Honig 2003; Kasouf et al. 2015). Both types of human capital are deemed necessary to increase the ability of an individual to start and sustain in business (Kasouf et al. 2015).

First, human capital can be a source of competitive advantage for a firm's survival (Schultz 1961). Second, stronger human capital stocks lead to a significantly improved capability to attract other resources, such as financial support (Hmieleski et al. 2011), that increase a start-up's credibility and legitimacy (Unger et al. 2011). For example, entrepreneurial experience adds to a lecturers' specific human capital by providing direct learning and episodic knowledge about the entrepreneurial process, which in turn predicts recurrent entrepreneurial activity (Adelowo & Surujlal 2020).

On the other hand, social capital measures an individual's social ties to different individuals, groups, or organizations. It describes the benefits that entrepreneurs earn from their networks, social structures, and memberships to be marshaled toward the creation of new ventures (Hmieleski et al. 2011).

Generally, there are two types of social capital: weak ties and strong ties (Granovetter 1973). The former refers to relationships with a variety of acquaintances where the interactions are infrequent, transaction-oriented, and non-affective. The latter, on the other hand, signifies relationships with close friends and family members where the interactions are more frequent, based on mutual trust and have a strong emotional connection.

Nonetheless, both types of social capital potentially increase entrepreneurial self-efficacy as a platform to access resources more quickly and easily (Kasouf et al. 2015). For example, the founder of a new business can capitalize on his or her network when introducing a new product or service, thus boosting sales or getting initial feedback about the offerings. Prior works also found that network ties with industries and government agencies are favorable in supporting academic entrepreneurial capabilities (Fini & Toschi 2016; Alexander et al. 2017).

H_{1a} Human capital is positively related with academic internet entrepreneurial self-efficacy.
H_{1b} Social capital is positively related with academic internet entrepreneurial self-efficacy.

Internet competence goes beyond merely mastering technical information communication technology (ICT) skills (Aesaert et al. 2014). It describes the critical thinking, problem-solving, and creative and innovative use of computers (Aesaert et al. 2014). Generally, there are four levels of digital or internet competence (Conde-Jiménez 2018). First, possession of basic instrumental skills and abilities related to ICT. Second, the knowledge, skills, values, and attitudes that prioritize ICT over other sources for personal development. Third, the skills and abilities to use ICT vigorously and embrace it as a digital culture. Finally, the skills and technological attitudes to capitalize ICT for the construction and creation of new things.

Understanding and acquiring related skills on the internet are necessary for academics to pivot traditional endeavors into online businesses (Conde-Jiménez 2018). Internet competence boosts attitudes towards e-entrepreneurship as entrepreneurs become more confident when exploiting digital platforms (Arnim & Mrozewski 2020). For that, digital proficiency allows individuals to translate their cognitive potential into materialized new start-ups.

H_{2a} Internet competence is positively related with academic internet entrepreneurial self-efficacy.
H_{2b} Internet competence mediates the relationship between individual factors (human capital and social capital) and academic internet entrepreneurial self-efficacy.

ORGANIZATIONAL-LEVEL FACTOR: UNIVERSITY SUPPORT

Academic entrepreneurship is a multi-level phenomenon resulting from both the characteristics of people as well as the organizational and institutional context in which they work (Urban & Gamata 2020). Universities ought to play a

critical role in generating knowledge and promoting innovation and entrepreneurship (Alessandrini et al. 2013; Fini et al. 2020). This is particularly true for commercialization of in-house research project where supportive university policies encourage lecturers to establish spin-off companies (Abreu & Grinevich 2013; Goethner et al. 2012; Hmieleski & Powell 2018; Huyghe & Knockaert 2014).

The literature has recently explicated university support for entrepreneurship as a shift in focus from traditional roles of teaching and researching into embracing entrepreneurial ventures among academics (Hmieleski & Powell 2018; Klofsten et al. 2019). Key fulfillment elements for a university's entrepreneurial agenda comprises developing formal institutional structures, planning clear policies and initiatives, building top management commitment, and cultivating a supportive culture (Keat et al. 2011; Klofsten et al. 2019; Urban & Gamata 2020). This means that universities, while exercising their core responsibility of teaching and research, are broadening their perspective to embody what is termed as third mission activities (Cunningham & Menter 2020; Klofsten et al. 2019).

In practice, empirical works found that lecturers remain reluctant to establish a start-up if they felt that publications were more rewarded by the university (Alessandrini et al. 2013). Hence, we argue that organizational support would accelerate the effect of academic personal endowment on their entrepreneurial confidence.

H_{3a} University support is positively related with academic internet entrepreneurial self-efficacy.

H_{3b} University support positively moderates the relationship between individual factors (human capital, social capital, and internet competence) and academic internet entrepreneurial self-efficacy.

COUNTRY-LEVEL FACTOR: INTERNET INFRASTRUCTURE

Digital infrastructure is a crucial driver for promoting entrepreneurship in countries (Finkle & Olsen 2019, Idris et al. 2023). Empirically, it can be measured by the total investment in software, communications and computing equipment, and related activities related to the operation of information technology (Schiavone et al. 2020). As a broader term, it refers to government initiatives to provide supportive digital frameworks that transform the business environment of a country.

Previous research ascertains the importance of internet infrastructure in encouraging more entrepreneurial attempts. With the increase in ownership of digital tools such as mobile phones and computers, ICT offers easy and speedy access to knowledge that creates countless opportunities for business establishment and growth (Kossaï & Piget 2014).

However, there is a disparity in digital infrastructure across countries. In ASEAN, countries like Brunei, Malaysia, and Singapore have the highest internet penetration: above 95 percent as compared to only 44 percent in Myanmar and 53 percent in the Philippines (International Telecommunication Union 2022). The trend is consistent using quality indicators such as bandwidth and transmission speeds. This leads to the by-product effect of the cost in acquiring the internet connection (Tranos 2012).

This study postulates that conducive internet infrastructure is needed for building online entrepreneurship adequacy as it helps to offer better services to customers and ease business activities. Academics would feel self-assured to own a digital business if the internet coverage, cost, and speed facilitate the operations. Also, it further strengthens the impact of human, social, and digital capital on entrepreneurial self-efficacy among lecturers because the possession of intrinsic resources is better materialized in a supportive environment like digital infrastructure (Sardar et al. 2021).

H_{4a} Internet infrastructure is positively related with academic internet entrepreneurial self-efficacy.

H_{4b} Internet infrastructure positively moderates the relationship between individual factors (human capital, social capital, and internet competence) and academic internet entrepreneurial self-efficacy.

Research model is shown in Figure 1.

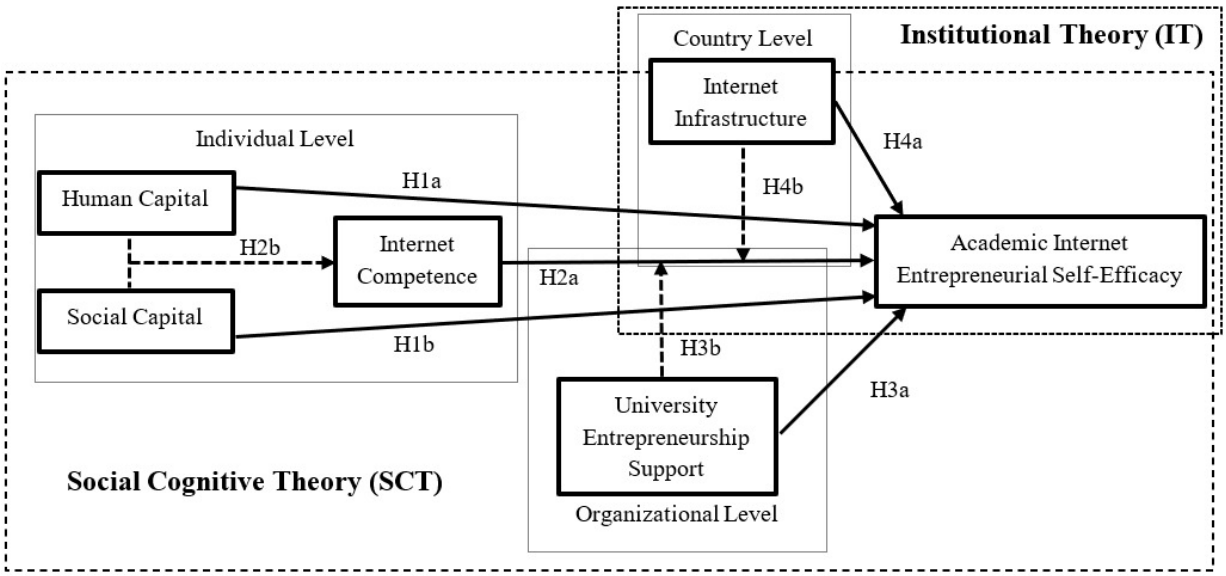

FIGURE 1. Model of the study

METHODOLOGY

This research is designed to examine the multi-level factors associated with internet entrepreneurial self-efficacy among academics using a cross-sectional survey method. Respondents of the survey are business school/business-related faculty from universities across ASEAN with the individual as a unit of analysis. We focused only at those faculties as they are regarded as centers of university-based entrepreneurship where entrepreneurial lessons and activities are mainly conducted (Adelowo & Surujlal, 2020; Bachmann et al. 2021; Halbusi et al. 2022).

The sampling technique used to determine the respondents is a multiphase sampling. First, we determine the organizational-level samples: universities in ASEAN listed in the QS World University Ranking 2021 which has a business school or business-related faculty. If a country does not have a university that is included in the QS World Ranking, the best university in the country is chosen. Notably, there is no representative from Cambodia, Laos, and Myanmar due to their low sosio-economic development. Then, for the individual level, a simple random sampling technique is employed as each element is known and has equal chance of selection (Cooper & Schindler, 2013).

A total of 2072 questionnaires were distributed via email to the respondents during a 4-month period between November 2022 to February 2023. From that, we yielded 210 usable responses (10.14 percent response rate) for analysis. Table 1 shows the number of respondents for each university.

TABLE 1. Number of respondents by the university

Country	University	Number of Respondents
Brunei	Universiti Brunei Darussalam	6
	Universiti Teknologi Brunei	7
Indonesia	Gadjah Mada University	21
	Universitas Indonesia	23
	Bandung Institute of Technology	17
	Universitas Muhammadiyah Surakarta	6
Malaysia	Universiti Malaya	5
	Universiti Putra Malaysia	16
	Universiti Kebangsaan Malaysia	13
	Universiti Sains Malaysia	6
	Universiti Utara Malaysia	8
Philippines	University of the Philippines	10
	Ateneo de Manila University	7
	De La Salle University	14
Singapore	National University of Singapore	12

	Nanyang Technological University	4
	Singapore Management University	10
Thailand	Chulalongkorn University	17
	Mahidol University	6
Vietnam	Vietnam National University, Ho Chi Minh City	1
	Vietnam National University, Hanoi	2

MEASURES

The survey was designed entirely in English to preserve the consistency of meaning and with the assumption that academics in top universities have adequate English proficiency.

The measurement items for each construct in this study were adjusted and refined from prior research to suit the research objectives and research questions. Table 2 lists the statements for all variables together with the main references. The scale used in the questionnaire is a five-point Likert scale (5 = Strongly Agree, 4 = Agree, 3 = Neutral, 2 = Disagree, 1 = Strongly Disagree).

Lastly, we include several cross level controls including gender (0 = female, 1 = male), age (1 = less than 31 years old, 2 = 31 to 40 years old, 3 = 41 to 50 years old, 4 = 51 to 60 years old, 5 = more than 60 years old), faculty position (1 = lecturer, 2 = associate professor, 3 = professor), country (Indonesia is omitted), and current business ownership (0 = No, 1 = Yes). Tables 3 show the descriptive of respondent profile.

TABLE 2. List of measurement items for each construct

Items of Measurement	Source
Human Capital	
I am considered a skilled person in this industry	
I am an expert in designated roles and functions	Hsiao et al. (2016)
I am creative and smart	
Social Capital	
I easily collaborate with team members to identify and solve problems	
I easily share information with and learn from others	Hsiao et al. (2016)
I easily interact and exchange ideas with people who specialize in different fields	
Internet Competence	
I feel comfortable using the Internet	Schumacher & Morahan-Martin (2001)
I feel competent using the Internet	
I am able to seek information using the Internet	Conde-Jiménez (2018)
University Support	
My university infrastructures and policies encourage entrepreneurship among academics	
My university is a good place to meet lots of people with good ideas for new business	Keat et al. (2011)
My university environment focuses on creativity to develop ideas for new business	
My university provides resources to support entrepreneurship among academics	
Internet Infrastructure	
I often experience internet breakdown in my country	
I consider internet infrastructure in my country as a major constraint	Entreprise Survey (2017)
Overall, I am satisfied with the internet speed and coverage in my country	
Internet Entrepreneurial Self-Efficacy	
I know how to formulate an innovative internet marketing strategy	
I know how to formulate a profitable business model for internet business	Wang et al. (2020)
I know how to gain access to the resources needed to operate internet business	

TABLE 3. Respondent's profile

Demographics	Frequency	Percentage
Gender:		
Male	115	54.8%
Female	95	45.2%
Age (years):		
20-30	29	13.8%
31-40	41	19.5%
41-50	68	32.4%
51-60	47	22.4%
61-70	25	11.9%
University (Country):		
Brunei	13	6.2%
Indonesia	66	31.4%
Malaysia	48	22.9%

Philippines	31	14.8%
Singapore	26	12.4%
Thailand	23	11.0%
Vietnam	3	1.4%
Faculty Position:		
Lecturer	105	50.0%
Associate Professor	71	33.8%
Professor	34	16.2%
Academics Doing Business:		
Yes	54	25.7%
No	156	74.3%

Based on Table 4 it can be seen that the average value of Human Capital is 4.3020, the average value of Social Capital is 4.3985, the average value of Internet Competence is 4.6795, the average value of University Support is 3.6988, the average value of Internet Infrastructure of 3.6923, and the average value of Internet Entrepreneurial Self-Efficacy is 3.5901. The standard deviation is used to see the variation in the value of each data against the average value. The standard deviation is relatively low, namely below the coefficient of ±1.5. This finding indicates that the data points tend to be close to the data mean, which in turn suggests that the construct being tested theoretically measures exactly what it is supposed to measure.

TABLE 4. Descriptive statistics

Variable	Min	Max	Mean	Standard Deviation
Human Capital	2.67	5.00	4.3020	0.56575
Social Capital	3.00	5.00	4.3985	0.47103
Internet Competence	3.33	5.00	4.6795	0.42267
University Support	1.00	5.00	3.6988	0.99192
Internet Infrastructure	1.00	5.00	3.6923	1.05201
Internet Entrepreneurial Self-Efficacy	1.00	5.00	3.5901	1.04898

Based on Table 5, the correlation of each predictor with the dependent variable shows a positive and significant value. The correlation coefficient for all variables exhibits a value below 0.9. This finding suggests the collected data does not exhibit severe collinearity problems (Hair et al. 2019). In the regression model there should not be a very strong correlation between the variables that affect the dependent variable. If this happens, it raised a concern that the variables that affect the dependent variable have a very strong relationship so the influence of each variable on the dependent variable is difficult to be identified.

TABLE 5. Correlations

		1	2	3	4	5	6
1	Human Capital	1					
2	Social Capital	0.511**	1				
3	Internet Competence	0.273**	0.268**	1			
4	University Support	0.295**	0.297**	0.087	1		
5	Internet Infrastructure	0.170*	0.031	0.192**	0.111	1	
6	Internet Entrepreneurial Self-Efficacy	0.494**	0.385**	0.291**	0.538**	0.140*	1

**. Correlation is significant at the 0.01 level (2-tailed)

*. Correlation is significant at the 0.05 level (2-tailed)

RESULTS AND DISCUSSION

DATA ANALYSIS

Prior to estimation, we first ran several checks to ensure the robustness of our data. First, the validity of each measurement item was carried out using Pearson Correlation Product Moment analysis. We found that all scores have a positive correlation with the total score and the calculated correlation coefficient value is greater than the critical coefficient value to prove that all statements in the questionnaire are valid. Second, we tested the reliability of the data using the Cronbach Alpha value of between 0.721 to 0.933; thus verifying that all constructs are internally reliable.

Other classical assumption tests on the data include common method bias (Bartlett's test), homoscedasticity (Glejser test), linearity, multi-collinearity, and normality (Kolmogorov-Smirnov test), following the technical suggestions by Hair et al. (2019).

This research employs hierarchical regression to examine the effect of mediator and moderators within the model, following the procedural guidelines outlined by Baron & Kenny (1986). Specifically, we used SPSS PROCESS

Model 16 to test one mediating variable and two moderating variables. This software package is commonly used in prior studies because of its ease of use and ability to test complex path models with a bootstrapping analysis (Liu et al. 2022; Meng et al. 2022). In addition, SPSS PROCESS also has a feature to perform bootstrap analysis, which is a random sampling technique with replacement. This bootstrap technique is useful for obtaining more accurate estimates from the analysis model, especially if the data does not meet the normal distribution assumption requirements.

Table 6 presents the full results of the model. Model 1 includes only the control variables, Model 2 tests the individual predictors of human and social capital, Model 3 analyzes the mediating effect of internet competence, and Model 4 examines the complete model with the moderators. It is worth noting that the explanatory power, adjusted R^2, improved by 0.4472 in Model 4 compared to that in Model 1. In addition, adding the interactions in the estimation increased the adjusted R^2 by 0.1401 from the mediating effects in Model 3.

Model 1 shows that academics who currently run a business have stronger entrepreneurial self-efficacy. Indonesia was excluded as a control variable and given a value of 0 among the respondent countries because it is omitted and used as a reference for other countries. Also, academics in the Philippines, Singapore, and Thailand have lower self-efficacy than their counterparts in Indonesia. Nonetheless, we found no significant effect of demographics like age, gender, or academic position.

TABLE 6. Hierarchical regression models

	Model 1	Model 2	Model 3	Model 4
Human Capital (HC)		0.481*** (7.000)	0.8365*** (6.5021)	0.6331*** (5.3780)
Social Capital (SC)		0.160* (2.420)	0.2827 (1.8850)	0.0803 (0.5892)
Internet Competence			0.3441* (2.1635)	
Mediating				
Internet Competence (IC)			0.0295* (2.1635)	0.3221* (2.2620)
			(0.0013 - 0.0668)	
Moderating				
University Support (US)				0.3038*** (6.8601)
Internet Infrastructure (II)				0.0908 (1.4152)
IC x US				-0.0161* (-3.1321)
				(-0.0329 - -0.0027)
IC x II				0.0059 (0.9286)
				(-0.0063 - 0.0234)
Controls				
Gender	-0.004 (-0.053)	-0.051 (-0.867)	-0.0605 (-1.0394)	0.3098 (0.9181)
Age	-0.073 (-0.844)	-0.131 (-1.820)	-0.0759 (-1.0044)	-0.2071 (-1.1817)
Position	0.102 (1.140)	-0.038 (-0.501)	-0.0450 (-0.5972)	-0.2316 (-0.8172)
Current Entrepreneur	0.165* (2.293)	0.176** (2.964)	0.1700** (2.8838)	0.6253** (3.3375)
Brunei	-0.024 (-0.331)	0.035 (0.594)	0.0200 (0.3357)	0.3898 (0.5659)
Malaysia	-0.019 (-0.215)	-0.010 (-0.134)	-0.0395 (-0.5471)	0.0122 (0.0250)
Philippines	-0.226**	-0.171** (-2.467)	-0.1765* (-2.5707)	-1.1989* (-2.1349)
	(-2.708)			
Singapore	-0.211**	-0.211** (-2.633)	-0.1935** (-2.8382)	-1.6373* (-2.5110)
	(-2.633)			
Thailand	-0.164*	-0.070 (-1.103)	-0.1003 (-1.5551)	-1.2055* (-1.9721)
	(-2.161)			
Vietnam	-0.095 (-1.383)	-0.039 (-0.678)	-0.0395 (-0.6996)	-0.7904 (-0.5846)
R^2	0.102	0.395	0.4091	0.5492
F	2.272*	10.720***	10.4401***	13.7591***

***p < .001, **p < .01, *p < .05

HYPOTHESES TESTING

From the results on direct effects testing in Model 2, hypotheses 1a and 1b are supported: human capital and social capital have a positive effect on academic internet entrepreneurial self-efficacy. The findings are consistent with some early works of Goethner et al. (2012) and Kasouf et al. (2015) that although each of these intrinsic capitals are developed separately; both are deemed vital for maximizing individual capabilities in entrepreneurship (Wang et al. 2020). For example, interactions and connections with collaborators like industry partners serve as avenues for knowledge transfer to provide insights and information to boost an academic's involvement in entrepreneurship (Shi et al. 2020). The findings of this study strengthen the statement that self-efficacy is shaped by the individual's collection of skills, experiences, and assets, which are a series of human and social capital antecedents (Kasouf et al. 2015).

Next, Model 3 shows that internet competence has a significant positive effect on academic internet entrepreneurial self-efficacy (β = 0.3441; p value <0.05) supporting hypothesis 2a. Hypothesis 2b is also supported that internet competence mediates the relationship between individual factors (human capital and social capital) and academic internet entrepreneurial self-efficacy. Table 7 shows that the bootstrap value in the mediation test ranges from 0.0013 - 0.0668 (0 is not included) to confirm significant mediation in the model. The findings corroborate Aesaert et al. (2014), that expertise in the internet field is vital in shaping internet entrepreneurship. Through testing these two hypotheses, it can be concluded that the role of internet competence is very strong in influencing academic internet entrepreneurial self-efficacy.

TABLE. 7 Bootstrap results for mediation test

Mediator	Effect	BootSE	Bias corrected and accelerated 95% confidence interval	
			Lower	Upper
Internet Competence	0.0295	0.0170	0.0013	0.0668

Model 4 verifies hypothesis 3a; university entrepreneurship supports has a positive effect on academic internet entrepreneurial self-efficacy (β = 0.3038; p value <0.001). The results offer an insight into the role played by university entrepreneurship supports to directly increase academic internet entrepreneurial self-efficacy, similar to previous research (Padilla-Meléndez et al. 2020; Schaeffer & Matt 2016; Urban & Gamata 2020). The essential components for successful academic entrepreneurship are well-defined policies, strong commitment from senior management, and a conducive work environment (Alessandrini et al. 2013).

However, hypothesis 3b is not supported. University supports negatively moderate the relationship between individual factors and academic internet entrepreneurial self-efficacy. In other words, either personal capital or university supports favorably increase the entrepreneurship efficacy, but having both will have a deteriorating effect on academic e-entrepreneurship self-efficacy. It is quite a puzzling finding to argue. Nonetheless, one possible explanation is that not all types of university support are beneficial in encouraging entrepreneurship among lecturers. For instance, Adelowo & Surujlal (2020) ascertain that formal supports like financial grants and internal regulations do not explain entrepreneurial self-efficacy. Instead, informal supports such as the acceptance by the university and other stakeholders towards entrepreneurship are deemed more important. Practically, we could also argue that 'high performer' academics with stronger individual capitals do not necessarily require extra support from the university which otherwise could be overwhelming.

Lastly, hypothesis 4a and 4b receive no support in Model 4 as country internet infrastructure is found to have no significant direct or moderating effect on academic entrepreneurship self-efficacy. This is still in line with the findings of Kazumi & Kawai (2017) that formal institutional support is not correlated with entrepreneurial self-efficacy. Our argument is that digital infrastructure in a country is available for many other purposes beyond merely encouraging online business. It is a major driving force behind the overall national economic and social productivity, competitiveness, collaboration, and distribution of resources (Popova et al. 2005). Thus, it does not necessarily have a straight effect on e-entrepreneurship and cannot be used to differential between academics with high and low self-efficacy.

THEORETICAL AND MANAGERIAL IMPLICATION

This study offers theoretical, methodological, and practical contributions to academic entrepreneurship research. First, our model advances SCT in the context of academic internet entrepreneurship by testing university support and IT by examining the impact of country-level internet infrastructure on entrepreneurial self-efficacy. We also refine the characterization of academic entrepreneurship, using internet entrepreneurial self-efficacy instead of the intention to venture into traditional business like many prior works. For that, our model includes a unique variable of internet competence to explain the mechanism of the phenomenon.

The model of this study is also novel as it integrates predictors at the individual, organizational and country level. This approach addresses the existing fragmented research on a specific level that is unable to explain the issue comprehensively. Thus, the multilevel analysis offers a wide perspective on the effect of various factors (Jaya et al. 2023). Lastly, the empirical approach provides a cross-country analysis that enriches our understanding of this general phenomenon in different countries. This compensates for a majority of single-country studies that limit the generalizability of the findings.

The practical implications of this study apply to lecturers and universities. Academics require both human and social capital to stimulate their abilities in entrepreneurship. More importantly, they need to sharpen their digital capabilities. Although they are not required to start businesses, it is necessary that they have adequate knowledge on how do to that. Thus, lecturers can suppress the complaints that in-class delivery is solely based on textbooks and less on practicality. Also, our findings suggest that universities can promote entrepreneurial attitudes by providing support such as conducive infrastructures, creativity-stimulated policies, and sufficient resources.

CONCLUSION

Academics play a vital role in supporting the university-entrepreneurship agenda by teaching students how to start, run, and sustain a business. However, most faculty members are not entrepreneurs themselves or have little real-life experience. Thus, an important question to ask is: what explains business efficacy among lecturers?

To answer it empirically, this study examines the influence of multi-level factors (direct, mediating, and moderating effect) on academic internet entrepreneurial self-efficacy. The model focuses on three level predictors: individual (human and social capital, and internet competence), organization (university support), and country (internet infrastructure). Our sample consists of academics at business or business-related faculty in seven ASEAN countries.

Our model only supports five of the eight hypotheses constructed. In general, we found that human and social capitals are positively related with e-entrepreneurship self-efficacy. The effects are better explained with internet competence as the mechanism. At the organization level, the results show that university support directly influences e-entrepreneurship self-efficacy positively though is not significant as a moderator. Lastly, we do not find evidence that country internet infrastructure would increase e-entrepreneurship self-efficacy to suggest the macro factor is less influential in the context of individual entrepreneurial behavior (Ayob et al. 2021).

The caveats of the study are cause for concern and can provide directions for future research. First, our puzzling findings on the negative moderating effect of university supports and the insignificant effect of internet infrastructure are probably caused by incomprehensive measurements of the constructs. Instead, previous works have offered alternative measurements; for example, different types of organizational supports, that might caution the interpretation of our results. Also, the distribution of the number of respondents in each university/country is uneven due to the different sizes of the university and country representations in the QS World University Rankings.

Nonetheless, this research is expected to be a driving force for further researchers who wish to advance the theme of academic e-entrepreneurship. Future studies can test other related variables that are relevant to academic e-entrepreneurship such as academic e-entrepreneurship performance using more objective measures such as number of patents and spin-offs. There are also many country-level variables that can be explored as well in understanding academic entrepreneurship as a global issue.

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