KARYA ILHAM PUBLISHING
CONNECTING MINDS, BRIDGING IDEAS, INSPIRING READERS

Journal of Advanced Research in Business and Management Studies

Journal homepage:
https://karyailham.com.my/index.php/arbms/index
ISSN: 2462-1935

Multi-Level Predictors of Academic E-Entrepreneurship: A Review and Future Directions

Rico Saktiawan Jang Jaya[1], Abu Hanifah Ayob[2,*], Zafir Khan Mohamed Makhbul[3], Wan Mohd Hirwani Wan Hussain[3]

[1] Faculty of Economics and Business, Universitas Gadjah Mada, Indonesia
[2] Faculty of Economics and Management, Universiti Kebangsaan Malaysia, Malaysia
[3] UKM-Graduate School of Business, Universiti Kebangsaan Malaysia, Malaysia

ARTICLE INFO

Article history:
Received 13 June 2025
Received in revised form 15 July 2025
Accepted 20 August 2025
Available online 25 August 2025

Keywords:
Academic E-Entrepreneurship; internet entrepreneurship; multi-level predictors; review article

ABSTRACT

Research on academic entrepreneurship is growing quickly and is accompanied by an increase in more sophisticated technology. Within the field of entrepreneurship, internet entrepreneurship is a major area of study. This paper attempts to examine previous research on predictors of academic e-entrepreneurship at multi-levels. Additionally, this study combines internet entrepreneurship with academic entrepreneurship to investigate the intention of academics as well as entrepreneurs. This study conducts a narrative review of articles, identifies predictors that trigger academics to become entrepreneurs, and proposes a multilevel analysis of the conceptual model. This study finds three levels of analysis that can influence academic e-entrepreneurship. At the individual level, there are human capital and social capital variables. At the organizational level, there is the university entrepreneurship support variable. Finally, at the country level, there is the internet infrastructure variable. This paper introduces the term academic internet entrepreneurial self-efficacy to explain academic e-entrepreneurship among lecturers. This paper presents future research directions based on research of predictors of academic e-entrepreneurship.

1. Introduction

Entrepreneurship is a significant priority for countries, particularly in developing nations, due to the potential benefits it brings to the academic sector. Many countries actively encourage greater entrepreneurial activity, especially among university graduates [22,23] and a university education plays a crucial role in promoting entrepreneurship and fostering students' entrepreneurial intentions [26]. Consequently, entrepreneurship education has witnessed a substantial increase in higher education institutions worldwide [11].

* *Corresponding author.*
E-mail address: abuhanifah.ayob@ukm.edu.my

https://doi.org/10.37934/arbms.39.1.243257

A university is an ideal place to teach students about entrepreneurship. However, there has been criticism regarding entrepreneurship lecturers who may not have direct entrepreneurial experience [1,2,9,30], likely due to their existing professional income. Notably, Goethner *et al.,* [15] conducted a significant study on the entrepreneurial intentions of academics. They integrated comprehensive assessments of distal predictors, including academic human capital, social capital, and expected entrepreneurial benefits, as well as proximal predictors such as attitudes, social norms, and perceived behavioral control. Their study examined the relationship between these predictors and academic entrepreneurial intention.

Internet entrepreneurship entails utilizing information technology to start a business and conduct all associated transactions exclusively through the internet [33]. The advent of internet technology has sparked a significant increase in internet entrepreneurship worldwide [7] because it offers the advantage of reduced operating costs and a lower entry barrier compared to traditional business models. Consequently, it has become increasingly popular and accessible, particularly among the younger generation [33]. With these advancements in technology, lecturers now have the opportunity to venture into online platform businesses without having to leave their jobs as educators. This allows them to pursue their academic careers and become internet entrepreneurs simultaneously.

However, the mechanism for forming the desire of academics to be involved in e-entrepreneurship has not been well explained. Predictors were needed from various levels to explain and support the creation of academic e-entrepreneurship. This study raises questions about what predictors can influence academic e-entrepreneurship. To answer the research question, this study reviews articles related to academic e-entrepreneurship, formulating predictors that trigger academics to become entrepreneurs, and proposes a conceptual model that can shape academic e-entrepreneurship. This study is expected to contribute to the development of a framework of predictors that can influence academic e-entrepreneurship and provide guidelines for researchers when conducting research using this conceptualized model.

Research on academic e-entrepreneurship has progressed significantly in recent years [9,27,32]. Here, this paper attempts to review previous research on predictors of academic e-entrepreneurship at multi-levels. Specifically, it investigates individual, organizational, and country level predictors. Although internet entrepreneurship is a likely choice for lecturers because they can teach and participate in business activities at the same time, not all lecturers have the desire to become entrepreneurs. Therefore, appropriate mechanisms and variables are needed to explain academic e-entrepreneurship among lecturers. This study uses the academic internet entrepreneurial self-efficacy variable to explain academic e-entrepreneurship among lecturers.

The structure of this paper is as follows: Part 1 is the introduction. Part 2 examines the literature review. Part 3 describes the methodology. Predictors of academic e-entrepreneurship will be discussed in Part 4. The discussion and future research directions are addressed in Part 5. Part 6 concludes.

2. Literature Review

2.1 Definition of Academic E-Entrepreneurship

In recent years, there has been an increasing focus on academic entrepreneurship in scholarly research [2,8,12,28,31], as well as among practitioners and policymakers. Drawing from Abreu and Grinevich [1], academic entrepreneurship refers to entrepreneurial activities that extend beyond the traditional roles of teaching and research within academia. It involves innovation, entails a certain degree of risk, and has the potential to generate financial rewards for individual academics or

institutions. Fini and Grimaldi [12] further define academic entrepreneurship as various initiatives aimed at fostering technological entrepreneurship in universities, such as patenting, licensing, establishing startups, and forming collaborations between universities and industries. These efforts share the common objective of commercializing innovations developed by lecturers. In addition to the general entrepreneurship literature, academic entrepreneurship is seen as a complex phenomenon involving multiple actors, operating at various levels, and characterized by processes that unfold over extended periods of time [12].

2.2 Related Studies in Academic Entrepreneurship

Table 1 summarizes previous studies on academic entrepreneurship:

Table 1
Previous Studies on Academic Entrepreneurship

Year and Authors	Topics	Variables Used	Key Findings
Adelowo and Surujlal [2]	Universities depend on their faculty who play crucial roles in education, research, community engagement, and student-related activities. This study explores how academic entrepreneurship affects faculty teaching and publishing. The goal is to suggest policies that foster innovation and enhance traditional practices in Nigeria's academic community.	IV: Academic entrepreneurship activities DV: Academic performance (teaching and publication productivity)	Academic entrepreneurship involves various activities, like university-related entrepreneurial involvement, the establishment of startups and collaboration with industries, faculty externships, and entrepreneurial engagements related to training. The findings indicate that faculty members' participation in startup formation and industry collaboration, as well as faculty externships, have a statistically significant and positive impact on their publishing capabilities. However, training-related entrepreneurial engagement, while positive, does not show statistical significance for publishing potential. University-related entrepreneurial engagements, in contrast, negatively impact both publishing and teaching performance.
Cunningham and Menter [8]	This paper highlights the significance of examining academic entrepreneurship at a detailed, micro-level perspective. It introduces a research agenda to better understand how individual actions connect with larger trends in academic entrepreneurship. While there are already studies	This paper reviewed academic literature on academic entrepreneurship and posited a research agenda.	This paper introduces a structured framework for studying academic entrepreneurship at a detailed level. It emphasizes the importance of investigating the actions, behaviors, and methods of individual participants to understand how they contribute to academic entrepreneurship in various institutions,

	examining individual scientists, there's a recognized need for a more explicit micro-level approach to truly grasp the dynamics of academic entrepreneurship. The aim of this paper is to outline a research agenda specifically dedicated to studying academic entrepreneurship at this detailed level.		environments, and cultures. Furthermore, the paper outlines various promising directions for future research in this field: (1) star scientists and principal investigators, (2) TTO professionals, (3) graduate entrepreneurs, (4) university administrators, (5) policy makers and funders, as well as (6) micro-level organizational routines.
Davey and Galan-Muros [9]	The paper highlights that fewer than half of the samples engage in any form of academic entrepreneurship activity, and only a small fraction of them are involved in the more traditional forms of academic entrepreneurship, such as spin-off creation and commercialization of research and development.	Individual activities, motivation, barriers, supporting mechanism	There has been a lack of clear understanding regarding the specific activities that fall under the category of academic entrepreneurship, the various types of entrepreneurial academics, and how their perceptions of the environment are connected to their involvement in entrepreneurial endeavors.
Fini and Grimaldi [12]	This study focuses on academic entrepreneurship. Researchers use a method that looks at the steps involved in turning university research into successful businesses. They gather data from twelve countries on three continents, using both qualitative and quantitative research methods. By studying various cases, this research sheds light on how entrepreneurship works in universities around the world.	Illuminate how and to what extent entrepreneurship develops from universities worldwide	This research aims to thoroughly study academic entrepreneurship from various perspectives to organize what we already know and identify areas that need more research. The study covers these aspects: 1. Academic entrepreneurship, which is closely tied to open organizations like universities and has a broad scope, offers a fertile ground for advancing knowledge in various fields like organizational theory, sociology, psychology, geography, institutional theory, and evolutionary theories. 2. Despite researchers looking at different levels of analysis, there is a gap in the literature when it comes to studies that take a multi-level approach. This shows the need for

			more research in this direction. 3. The third aspect involves looking at academic entrepreneurship from an international perspective, emphasizing the importance of studying and comparing how it works in different countries.
Nguyen *et al.,* (2020)	Scientist entrepreneurship means turning research discoveries into new products or processes for business reasons, which can have a big impact on development. Researchers know that scientists become entrepreneurs for various reasons, such as money, reputation, or a love for knowledge. This study looks for a link between wanting to do good for others (prosocial motivation) and becoming a scientist entrepreneur.	IV: Pro-social motivation DV: Scientist Entrepreneurship ModV: Pro-self-motivation	Using the motivated information processing theory, this study creates a model to link pro-self and pro-social motivation to scientist entrepreneurship. The findings of this research demonstrate a positive correlation between both pro-self and pro-social motivation and scientist entrepreneurship, but when people are more focused on pro-self-motivation, the connection between helping others and scientist entrepreneurship is not as strong.
Oppong *et al.,* [27]	Digital technologies are crucial for businesses and are getting noticed in academia. There's a new idea called "digital academic entrepreneurship" that focuses on using digital tools like Facebook and Instagram to help academic entrepreneurs succeed and grow their startups. These platforms offer various ways to run their businesses well. This research wants to find out what opportunities and problems academic entrepreneurs face when using digital tools for their startups.	This research used a qualitative method, including in-depth interviews with academic entrepreneurs who have startups. Then, the respondents were given a questionnaire with yes or no questions.	Social media platforms like Facebook, Twitter, Instagram, and TikTok have greatly improved how academic entrepreneurs' startups work. The research shows that using digital technology in entrepreneurship is affected by things like how businesses interact with customers, building their brand, managing their reputation, dealing with competition, and dealing with cultural and language differences. The study also finds that when academic entrepreneurs use digital media platforms, it helps their businesses grow.
Schaeffer and Matt [28]	This paper looks at how changes in a university and its Technology Transfer Office (TTO) affect academic entrepreneurship in an entrepreneurial ecosystem that's not yet fully	Case study methodology with a focus on the role of the university, its TTO, and academic start-up creation at	This paper shows how the TTO is important in making academic entrepreneurship work on a day-to-day basis. It talks about how the TTO changed over time, shifting from a focus on making money to also caring about the

	established. It aims to show how a university and its TTO help create a sustainable entrepreneurial environment. Using the University of Strasbourg as an example, this study showed how the university played a key role in making the entrepreneurial ecosystem grow. It did this by connecting different groups and organizing the network of people involved in the local innovation system.	the University of Strasbourg.	social and economic growth of the region. As time passed, the TTO started connecting with more people and taking on roles in building networks and organizing things.
Shi *et al.,* [30]	Academic entrepreneurs constantly grapple with a conflict of identities. This study examines the inherent tension between their academic identity and their entrepreneurial identity. By delving into the paradox of academic entrepreneurs and the hybrid nature of their founder identities, the research provides fresh perspectives on this topic. Social identity theory is employed in this paper to investigate the paradox experienced by academic entrepreneurs, as it holds the potential to enhance our understanding of their behaviors.	IV: Social identity continuity, experiences of multiple identities. MedV: Identity conflict, DV: Academic entrepreneurship performance.	This study shows that when academic entrepreneurs have different identities, it affects how well they perform. These multiple identities can be both helpful and challenging because they interact with each other. The research suggests that academic entrepreneurs should engage in academic events like forums and seminars. This can help them get useful information and business prospects. By using these opportunities, academic entrepreneurs can turn conflicting identities into ones that work well together and manage any identity conflicts effectively.
Urban and Gamata [31]	This research shows that the environment in which academics work can help or hinder their entrepreneurial efforts. Many times, there's a lack of strong support from institutions and organizations, which makes it hard to turn academic ideas into successful businesses or new technologies. The article adds to the existing research by studying how things like management support, rewards, and how academics spend their time affect their entrepreneurial results.	IV: Senior management support, rewards, time availability, DV: Academic entrepreneurship outputs	This article examined how organizational factors within the university context predict academic entrepreneurship. The study identified several positive associations between these organizational factors and academic entrepreneurship outputs. However, among the factors investigated, only rewards were found to have a significant influence on the outcomes of academic entrepreneurship.
Wang *et al.,* [32]	Based on the social cognition theory, this research	IV: Academic-related	The results indicate that determinants related to

	investigates the impact of individual and organizational factors on academic entrepreneurial intentions. The selected determinants include individual academic output, previous commercialization experience, organizational scientific reputation, and entrepreneurial support policies. The study examines how these factors influence intentions related to spin-off creation, patenting and licensing, and contract research and consulting. The analysis is conducted using the theory of planned behavior modeling.	determinants (individual academic output and organizational scientific reputation), entrepreneurial-related determinants (individual previous commercialization experience & organizational entrepreneurial supportive policies) DV: Academic entrepreneurial intentions (spin-off intention, patenting and licensing intention, contact research and contacting intention) MedV: Entrepreneurial attitude, subjective norms, perceived behavioral control	academic factors, such as individual academic output and organizational reputation, have a greater impact on academic scientists' intention to engage in spin-off creation. These determinants are mediated through the theory of planned behavior (TPB) modeling. On the other hand, determinants associated with entrepreneurial factors, such as individual previous commercialization experience and entrepreneurial support policies in higher education organizations, have a stronger influence on promoting intentions for all types of academic entrepreneurship activities. TPB modeling is effective in explaining the involvement in formal academic entrepreneurship, particularly when considering the continuous mediating effects of subjective norms, entrepreneurial attitude, and perceived behavioral control, which are particularly effective in the context of spin-off activities. Moreover, in the Chinese context, subjective norms play a more significant role in mediating the relationships between individual or organizational antecedents and academic entrepreneurial intentions.

2.3 Measure of Academic E-Entrepreneurship in the Context of Lecturer

Because universities, as institutions, are expected to create entrepreneurs, they must provide a good entrepreneurial environment [11,26]. Although not all lecturers have the desire to become entrepreneurs, they are still expected to teach entrepreneurship appropriately. But how can the lecturer teach entrepreneurship correctly if he is not an entrepreneur? This study needed a measurement that could measure entrepreneurship in the context of lecturers, especially if the lecturer only teaches, but does not practice in, entrepreneurship.

A review of existing literature concerning entrepreneurial behavior reveals that the research on entrepreneurial self-efficacy holds significant importance, and exploring the relationship between these two areas can yield valuable insights [16]. Self-efficacy refers to an individual's confidence in their capability to effectively organize and execute the actions required to attain specific accomplishments [25]. It not only serves as a foundation for human motivation through belief but

also cultivates personal accomplishment. The greater the sense of efficacy individuals possess in themselves, the more proactive and tenacious their endeavors will be.

Self-efficacy has been linked to increased entrepreneurial commitment [4], decision-making [10], intention to pursue possibilities [19], choices about whether to start a new business or not [17], and persistence over time [25]. Scholars emphasize the importance of entrepreneurial self-efficacy in relation to an individual's perception of their ability to perform entrepreneurial tasks [21] or the skills needed to launch a new business [33]. It is widely acknowledged that entrepreneurial self-efficacy plays a crucial role in determining the likelihood of individuals becoming entrepreneurs or having entrepreneurial intentions [4,6,16].

Entrepreneurs show increased interest in digital technology, which serves as a catalyst for their engagement in digital entrepreneurship [29]. Digital entrepreneurship, also known as internet entrepreneurship, involves leveraging information technology to initiate and conduct business activities exclusively through online platforms [33]. Internet entrepreneurship is an emerging form of entrepreneurship [7], involving entrepreneurial activities that primarily occur in a digital environment rather than through traditional means [29].

This study formulates a combined focal variable of academic self-efficacy in the field of entrepreneurship and internet entrepreneurship: namely academic internet entrepreneurial self-efficacy. Previous studies show that academics can become entrepreneurs at the same time [2,8,9]. However, not all academics are interested in becoming entrepreneurs. Therefore, self-efficacy in the field of internet entrepreneurship is a fitting variable for explaining academic entrepreneurship in the present.

Adapted from Wang *et al.,* [33], academic internet entrepreneurial self-efficacy is the belief in one's ability to successfully launch an entrepreneurial venture on the internet. Entrepreneurial self-efficacy encompasses individuals' perceived capacity to fulfill the responsibilities and functions of an entrepreneur and their anticipations of the outcomes associated with establishing a new business [21]. Past research has established that entrepreneurial self-efficacy has a significant impact on an individual's intention and competence to pursue entrepreneurship. It influences the level of effort they invest in establishing a new business, their ability to persevere in the face of challenges and adaptations throughout the entrepreneurial journey, and their overall success in fulfilling entrepreneurial roles and responsibilities [4,19,24]. Consequently, entrepreneurial self-efficacy not only shapes an individual's choice to embark on an entrepreneurial career but also guides their future performance in managing and growing a new venture [22].

3. Methodology

This study adopts a narrative review approach, which is widely recognized in entrepreneurship research for its ability to synthesize, organize, and critically evaluate existing literature. Narrative reviews provide a comprehensive overview of conceptual developments, identify theoretical gaps, and offer directions for future inquiry [5]. In this context, the review focuses on the intersection of academic entrepreneurship and internet-based entrepreneurial activities—an emerging domain shaped by digital transformation in higher education and entrepreneurial ecosystems.

Data for this review were sourced from peer-reviewed journal articles indexed in the Clarivate Web of Science database, ensuring scholarly rigor and relevance. A total of 33 articles published between 2012 and 2022 were selected. The rationale for this time frame is twofold: first, it captures a decade of scholarly discourse following the widespread adoption of digital platforms that have reshaped entrepreneurial practices; second, it reflects the post-global financial crisis era, during which universities and policymakers increasingly emphasized innovation and entrepreneurship as

key drivers of economic recovery and growth. This period also aligns with the rise of Industry 4.0, which has significantly influenced both academic and internet entrepreneurship.

To ensure thematic relevance, the article selection was guided by a set of targeted keywords: *"predictors of internet entrepreneurship," "academic internet entrepreneurship," "entrepreneurship among lecturer,"* and *"internet entrepreneurial ventures."* These terms were chosen to encompass the core dimensions of the study, particularly the motivational and contextual factors influencing academics' engagement in internet-based entrepreneurial activities. The inclusion of terms such as *"predictors"* and *"entrepreneurship among lecturer"* reflects the study's focus on identifying multi-level determinants—individual, organizational, and country—that shape entrepreneurial self-efficacy in academic settings. Meanwhile, *"internet entrepreneurial ventures"* captures the digital modality of entrepreneurship, which is central to the conceptual framework proposed in this review.

The selection process for articles is carried out using the inclusion and exclusion criteria in Table 2. Articles that do not meet the criteria will be discarded. Each selected article was summarized, synthesized, and analyzed to answer the research questions and implement the research objectives.

Table 2
The inclusion and exclusion criteria

Criterion	Inclusion	Exclusion
Document Type	Empirical, Systematic Review, Review Article	Chapter in a book, book, conference proceeding, unpublished papers
Timeline	2012-2022	2011 and earlier
Language	English	Non-English
Subject Area	Internet Entrepreneurship, Academic Entrepreneurship Business, Management	Other than Internet Entrepreneurship, Academic Entrepreneurship Business, Management

To enhance the credibility and analytical depth of this narrative review, a thematic synthesis approach was employed [5]. After selecting the 33 articles based on predefined inclusion and exclusion criteria, each article was carefully read and summarized. Key themes, concepts, and variables were extracted and categorized according to their relevance to individual [e.g., 15,16,32], organizational [e.g., 13,17,31], and country-level predictors [e.g., 14,24,29] of academic e-entrepreneurship. This thematic categorization enabled the identification of recurring patterns and conceptual linkages across studies. This approach ensured that the synthesis was not merely descriptive but also interpretive, allowing for the integration of diverse findings into a coherent theoretical model.

4. Predictors for Academic E-Entrepreneurship

There are multiple factors that can influence an academic's decision to pursue entrepreneurship, including a combination of personal characteristics, qualities, backgrounds, experiences, and attitudes [6]. Among these factors, entrepreneurial self-efficacy (ESE) stands out as a crucial determinant of one's intention to start a new business [10,23]. Put simply, ESE refers to an individual's belief in their capability to successfully initiate and manage an entrepreneurial venture. ESE is particularly valuable as it considers both personal traits and environmental factors, making it a robust predictor of entrepreneurial intentions and subsequent actions [25].

This paper formulates three levels of predictors that can shape internet entrepreneurial cell-efficacy in lecturers: individual predictors, organizational predictors, and country predictors. These

three levels are used simultaneously in explaining the emergence of academic internet entrepreneurial self-efficacy which will later encourage academics to become entrepreneurs.

4.1 Individual Predictors (IP)

As human resources become increasingly recognized as a competitive advantage in today's global economy, the importance of human capital and social capital has gained prominence in theory, research, and practice. Human capital refers to an individual's knowledge and skills acquired through education, on-the-job training, and other experiences, which can enhance productivity in the workplace [15]. From an entrepreneurial perspective, human capital is believed to provide aspiring entrepreneurs with superior cognitive abilities necessary for undertaking challenging tasks such as starting a new business [32]. It has been established that higher levels of initial human capital significantly increase the likelihood of new business survival [18].

Social capital plays a crucial role in facilitating resource access and mobilization for ventures [18]. Establishing credibility is a significant challenge for new startups [18], but social capital helps expedite the attraction of resources and a network that offers referrals, thereby enhancing legitimacy [30]). According to *Wang et al.,* [32], social capital assists aspiring entrepreneurs by exposing them to novel ideas and diverse perspectives, providing them with a broader reference framework that is supportive and nurturing to potential ideas or ventures.

Self-efficacy is influenced by a range of factors, including the individual's skill set, experiences, and resources, which contribute to their human and social capital [18]. Therefore, experiences that foster the development of skills, resources, and capabilities, as well as the creation of social and human capital, are invaluable for business formation and performance [32]. To attain entrepreneurial self-efficacy, individuals need to acquire experience by cultivating cognitive and social skills [18]. Through experience, they gain a better understanding of the positive and negative outcomes resulting from their actions [16]. In their studies, Kasouf *et al.,* [18] examined the antecedents of entrepreneurial self-efficacy and highlighted the importance of entrepreneurial experience in the form of human and social capital. They noted that human capital encompasses formal education, such as a bachelor's degree, as well as informal education, such as experience with startups. Regarding social capital, they emphasized social networks, such as professional affiliations, and relational capital in terms of the information acquired.

Arnim and Mrozewski [3] suggest that internet competence can be assessed through internet self-efficacy, highlighting a strong connection between internet competence and one's belief in their ability to effectively use the internet. They conducted research that highlighted the importance of digital competence in shaping one's intentions to engage in internet entrepreneurship. Their findings indicated that digital competence has a positive impact on an individual's attitude towards international entrepreneurship and perceived behavioral control. While existing research emphasizes the role of digital technologies in facilitating the internationalization of entrepreneurial ventures, it often overlooks the significance of individuals and their ability to effectively utilize these technologies [27]. By incorporating internet competence into cognitive theory at the individual level and examining its relationship with the cognitive variables, a more precise understanding of the subject can be achieved.

4.2 Organizational Predictors (OP)

Universities play a vital role in fostering the knowledge economy and driving the advancements of Industry 4.0 [20]. It is crucial for universities to actively contribute to knowledge creation,

innovation, and entrepreneurship [13,31]. However, there exists significant variation among institutions in terms of the support provided for commercialization activities [17]. The need for universities to assist lecturers in engaging in science commercialization is evident in a study by Goethner *et al.,* [15], which found that economic perspectives and institutional support are linked to the intentions of academic scientists to establish spin-off companies. Hence, support for science commercialization can encourage involvement in technology transfer activities and align with university expectations regarding norms for science commercialization. Several studies emphasize the importance of creating an environment within universities that supports commercialization and helps mitigate conflicts of interest between traditional academic pursuits and entrepreneurial endeavors [17,20,31].

Fini *et al.,* [13] provide valuable insights into the impact of academic institutions on entrepreneurial outcomes. Their research suggests that university regulations regarding academic entrepreneurship play a facilitative role in the establishment of academic spin-offs. This demonstrates that university regulations that support academic entrepreneurship have a positive influence on the creation of academic spin-offs. Specifically, the implementation of such regulations can enhance the positive effects of diverse knowledge on academic entrepreneurship. Urban and Gamata [31] concluded that organizational elements play a crucial role in promoting academic entrepreneurship. Academics often encounter a range of institutional and organizational challenges that hinder the process of commercialization and technological innovation. To foster the growth of academic entrepreneurship, it is imperative to establish several organizational mechanisms that facilitate the commercialization process.

4.3 Country Predictors (CP)

Theoretically, the level of entrepreneurial self-efficacy (ESE) is influenced by the national context, where the availability of opportunities to gain self-confidence through experience and role models can either enhance or hinder ESE [24]. However, global comparative studies on ESE are limited. Mueller and Dato-on [24] conducted a comparative analysis of ESE among undergraduate business students in the United States and Spain. Interestingly, they discovered no significant differences between the two groups in terms of self-efficacy related to most entrepreneurial tasks.

Current utilization of advanced digital technologies is widely recognized as a key catalyst for promoting entrepreneurship across countries [14]. Moreover, the internet and various technologies have revolutionized the process of establishing businesses, fundamentally reshaping the structure of the business environment, and giving rise to a new entrepreneurial opportunity known as Digital Entrepreneurship [7,33]. The overall performance of many developed nations is closely linked to the utilization of information communication technology (ICT). The internet has provided easy access to knowledge and information, creating numerous opportunities, and the adoption of ICT has rapidly expanded to developing and emerging economies, unlocking new possibilities for growth. Internet infrastructure encompasses the digital tools and systems that enable communication, collaboration, and computing capabilities, supporting innovation and entrepreneurship [29], and can facilitate end-to-end entrepreneurial activities, shape the reach of new ventures, determine the scope of innovation and operations, enable multiple stakeholders to coordinate their service and content requirements, and transform the nature and process of venture scaling.

5. Discussion and Future Research Direction

5.1 Implications

Academic entrepreneurship research still has many gaps. The inclination of an academic who teaches and practices entrepreneurship is still a big question. However, if an academic teaches entrepreneurship but does not master entrepreneurial practice, then he or she will only teach theory and may not understand practice in the field. To overcome the disparity, this study conducted a review article and introduced the academic internet entrepreneurial self-efficacy variable to explain the ability of academics to become entrepreneurs. This study also introduces multi-level predictors that influence academic internet entrepreneurial self-efficacy.

This study contributes knowledge regarding the relationship between factors that can affect academic internet entrepreneur self-efficacy. First, it advances an entrepreneurial self-efficacy framework in the context of academic entrepreneurship. Second, it introduces a framework for testing in academic internet entrepreneurship circles. Third, the framework includes new internet-related variables including individual internet competence, country internet infrastructure, and academic internet entrepreneurial self-efficacy. Lastly, this study conducted a multi-level analysis to account for effects at different levels.

Previous research has shown that individual and organizational factors play a major role in the emergence of academic entrepreneurship [20,30,31,32]. Although technological advances have made online entrepreneurship or e-entrepreneurship more common [7,33] online entrepreneurship has not been widely discussed in in the literature and is the main focus of this study. We combine online entrepreneurship with academic entrepreneurship to address the intentions of academics and entrepreneurs.

Thus, this study seeks to investigate the factors or predictors that impact on academic internet entrepreneurial self-efficacy by introducing new variables, new measures, new propositions, and multi-level analysis of the conceptual model. For practitioners, this study can help universities to realize the importance of providing conducive infrastructure to encourage more academic involvement in business. For the government, it can positively affect a country's efforts to improve internet infrastructure to support internet entrepreneurship.

5.2 Potential Methods and Future Research Directions

The phenomenon of lecturers teaching and practicing entrepreneurship is a continuing topic of debate. Lecturers have career paths and professional compensation which makes becoming an entrepreneur financially unnecessary. However, universities have a mission to promote entrepreneurship, and lecturers who teach entrepreneurship must also understand entrepreneurial practices. Moreover, the rapid rise of internet entrepreneurship makes it easier to run than a traditional business. Examining academic e-entrepreneurship using lecturers as research subjects is an interesting and important focus of study.

Research using multi-level analysis up to the country level should use multiphase sampling. This method allows researchers to use two or more sampling methods simultaneously and to get a sample that truly represents the problem or variable you want to measure in a very large population. For this study, multiphase sampling involves purposive sampling followed by simple random sampling. For example, purposive sampling will identify a university that is registered in a country and has a business school or business-related faculty. From there, every academic in that business school or business-related faculty has an equal opportunity to become a respondent of our survey and provide individual-level data.

The study can use a survey method to collect data. The use of survey methods in research aims to obtain primary data in the form of direct answers from respondents through distributing questionnaires. Questionnaire distribution can be done online. Data collection time can use cross-section to save time, effort, and costs used for research. The conceptual model uses mediation and moderation resulting in a Hierarchical Regression Test to analyze the data.

6. Conclusion

This study uses a literature study approach to formulate predictors at the individual, organizational, and country levels that influence academic e-entrepreneurship among university lecturers. Internet entrepreneurship is the main choice for entrepreneurs due to technological developments [3,14] and can be done by academics without having to leave their jobs as educators. Therefore, this study formulates a conceptual model containing multi-level predictors that can influence academic internet entrepreneurial self-efficacy.

The likelihood of lecturers participating in internet entrepreneurship can be influenced by factors at the individual, organizational, and country levels. Firstly, at the individual level, the presence human capital and social capital plays a significant role in facilitating the initiation of online businesses for lecturers. However, the acquisition of additional internet-related skills, such as internet competence, acts as a mediating factor in this process. Secondly, at the organizational level, entrepreneurial support from universities is important for enabling lecturers to pursue internet entrepreneurship ventures. Lastly, at the country level, the quality of internet infrastructure plays a crucial role in fostering academic e-entrepreneurship. The proposed framework model is a mediation-moderation relationship to include predictors in multi-level analysis.

This research provides academic and practical contributions. Academically, this study is expected to contribute to the development of a framework of predictors that can influence academic e-entrepreneurship. This research also provides a contribution in the form of a proposed conceptual model developed from multi-level analysis and enriches knowledge regarding the emergence of academic e-entrepreneurship among lecturers. For practical contributions, this research provides guidelines for researchers who are interested in researching multi-level predictors that influence academic e-entrepreneurship. Additionally, this research also contributes by providing a new perspective when a lecturer becomes an internet entrepreneur simultaneously.

This research has two limitations in terms of methods and database. Research that uses the review articles method does not undergo a systematic and structured process in analyzing articles so that the results are like a summary of a collection of articles. Future research could use the SLR (Systematic Literature Review) method in processing articles related to multi-level predictors in academic e-entrepreneurship. Next research can use a combination of several databases such as Scopus, Web of Science, Proquest, Emerald, and others. Using databases from only high impact factor journals would improve the quality of the discussion.

Acknowledgement

This work was supported by the Faculty of Economics and Management, Universiti Kebangsaan Malaysia (Grant Number: EP-2023-059).

References

[1] Abreu, Maria, and Vadim Grinevich. "The nature of academic entrepreneurship in the UK: Widening the focus on entrepreneurial activities." *Research Policy* 42, no. 2 (2013): 408-422. https://doi.org/10.1016/j.respol.2012.10.005

[2] Adelowo, Caleb Muyiwa, and Jhalukpreya Surujlal. "Academic entrepreneurship and traditional academic performance at universities: Evidence from a developing country." *Polish Journal of Management Studies* 22, no. 1 (2020): 9-25. https://doi.org/10.17512/pjms.2020.22.1.01

[3] von Arnim, Laura, and Matthias Mrozewski. "Entrepreneurship in an increasingly digital and global world. Evaluating the role of digital capabilities on international entrepreneurial intention." *Sustainability* 12, no. 19 (2020): 7984. https://doi.org/10.3390/su12197984

[4] Bachmann, Anna Katharina, Thomas Maran, Marco Furtner, Alexander Brem, and Marius Welte. "Improving entrepreneurial self-efficacy and the attitude towards starting a business venture." *Review of Managerial Science* 15, no. 6 (2021): 1707-1727. https://doi.org/10.1007/s11846-020-00394-0

[5] Bacq, Sophie, Will Drover, and Phillip H. Kim. "Writing bold, broad, and rigorous review articles in entrepreneurship." *Journal of Business Venturing* 36, no. 6 (2021): 106147. https://doi.org/10.1016/j.jbusvent.2021.106147

[6] Cadenas, Germán A., Elizabeth Angélica Cantú, Nathalie Lynn, Tameka Spence, and Alissa Ruth. "A programmatic intervention to promote entrepreneurial self-efficacy, critical behavior, and technology readiness among underrepresented college students." *Journal of Vocational Behavior* 116 (2020): 103350. https://doi.org/10.1016/j.jvb.2019.103350

[7] Chang, Shu-Hsuan, Yu Shu, Chih-Lien Wang, Mu-Yen Chen, and Wei-Sho Ho. "Cyber-entrepreneurship as an innovative orientation: Does positive thinking moderate the relationship between cyber-entrepreneurial self-efficacy and cyber-entrepreneurial intentions in Non-IT students?." *Computers in Human Behavior* 107 (2020): 105975. https://doi.org/10.1016/j.chb.2019.03.039

[8] Cunningham, James A., and Matthias Menter. "Micro level academic entrepreneurship: a research agenda." *Journal of Management Development* 39, no. 5 (2020): 581-598. https://doi.org/10.1108/JMD-04-2020-0129

[9] Davey, Todd, and Victoria Galan-Muros. "Understanding entrepreneurial academics-how they perceive their environment differently." *Journal of Management Development* 39, no. 5 (2020): 599-617. https://doi.org/10.1108/JMD-09-2019-0392

[10] Eniola, Anthony Abiodun. "Entrepreneurial self-efficacy and orientation for SME development." *Small Enterprise Research* 27, no. 2 (2020): 125-145. https://doi.org/10.1080/13215906.2020.1752295

[11] Fretschner, Michael, and Susanne Weber. "Measuring and understanding the effects of entrepreneurial awareness education." *Journal of small business management* 51, no. 3 (2013): 410-428. https://doi.org/10.1111/jsbm.12019

[12] Fini, Riccardo, and Rosa Grimaldi. "A multicountry, process-based approach to academic entrepreneurship." In *THE WORLD SCIENTIFIC REFERENCE ON ENTREPRENEURSHIP: Volume 4: Process Approach to Academic Entrepreneurship—Evidence from the Globe*, pp. 1-17. 2017. https://doi.org/10.1142/9789813220621_0001

[13] Fini, Riccardo, Rosa Grimaldi, and Azzurra Meoli. "The effectiveness of university regulations to foster science-based entrepreneurship." *Research policy* 49, no. 10 (2020): 104048. https://doi.org/10.1016/j.respol.2020.104048

[14] Finkle, Todd A., and Timothy Olsen. "Entrepreneurship in the digital era: creating your own online business." *Entrepreneurship Education and Pedagogy* 2, no. 2 (2019): 133-150. https://doi.org/10.1177/2515127418820680

[15] Goethner, Maximilian, Martin Obschonka, Rainer K. Silbereisen, and Uwe Cantner. "Scientists' transition to academic entrepreneurship: Economic and psychological determinants." *Journal of economic psychology* 33, no. 3 (2012): 628-641. https://doi.org/10.1016/j.joep.2011.12.002

[16] Hinz, Andreas. "Entrepreneurial behaviour revisited: Linking self-efficacy with effectuation." *International Journal of Business and Society* 18, no. S2 (2017): 245-260.

[17] Hmieleski, Keith M., and E. Erin Powell. "The psychological foundations of university science commercialization: A review of the literature and directions for future research." *Academy of Management Perspectives* 32, no. 1 (2018): 43-77. https://doi.org/10.5465/amp.2016.0139

[18] Kasouf, Chickery J., Sussie C. Morrish, and Morgan P. Miles. "The moderating role of explanatory style between experience and entrepreneurial self-efficacy." *International Entrepreneurship and Management Journal* 11, no. 1 (2015): 1-17. https://doi.org/10.1007/s11365-013-0275-2

[19] Kazumi, Tomoyo, and Norifumi Kawai. "Institutional support and women's entrepreneurial self-efficacy." *Asia Pacific Journal of Innovation and Entrepreneurship* 11, no. 3 (2017): 345-365. https://doi.org/10.1108/APJIE-12-2017-041

[20] Klofsten, Magnus, Alain Fayolle, Maribel Guerrero, Sarfraz Mian, David Urbano, and Mike Wright. "The entrepreneurial university as driver for economic growth and social change-Key strategic challenges." *Technological Forecasting and Social Change* 141 (2019): 149-158. https://doi.org/10.1016/j.techfore.2018.12.004

[21] Li, Cai, Majid Murad, Fakhar Shahzad, Muhammad Aamir Shafique Khan, Sheikh Farhan Ashraf, and Courage Simon Kofi Dogbe. "Entrepreneurial passion to entrepreneurial behavior: role of entrepreneurial alertness, entrepreneurial self-efficacy and proactive personality." *Frontiers in psychology* 11 (2020): 1611. https://doi.org/10.3389/fpsyg.2020.01611

[22] Malebana, M. J., and E. Swanepoel. "The relationship between exposure to entrepreneurship education and entrepreneurial self-effi cacy." *Southern African Business Review* 18, no. 1 (2014): 1-26. https://doi.org/10.25159/1998-8125/5630

[23] Memon, Maqsood, Bahadur Ali Soomro, and Naimatullah Shah. "Enablers of entrepreneurial self-efficacy in a developing country." *Education+ Training* 61, no. 6 (2019): 684-699. https://doi.org/10.1108/ET-10-2018-0226

[24] Mueller, Stephen L., and Mary Conway Dato-on. "A cross cultural study of gender-role orientation and entrepreneurial self-efficacy." *International Entrepreneurship and Management Journal* 9, no. 1 (2013): 1-20. https://doi.org/10.1007/s11365-011-0187-y

[25] Newman, Alexander, Martin Obschonka, Susan Schwarz, Michael Cohen, and Ingrid Nielsen. "Entrepreneurial self-efficacy: A systematic review of the literature on its theoretical foundations, measurement, antecedents, and outcomes, and an agenda for future research." *Journal of vocational behavior* 110 (2019): 403-419. https://doi.org/10.1016/j.jvb.2018.05.012

[26] Okręglicka, Małgorzata, Katarína Havierniková, Monika Mynarzová, and Anna Lemańska-Majdzik. "Entrepreneurial intention creation of students in Poland, Slovakia and Czechia." *Polish Journal of Management Studies* 15 (2017). https://doi.org/10.17512/pjms.2017.15.2.15

[27] Oppong, Gladys Yaa Saah, Saumya Singh, and Fedric Kujur. "Potential of digital technologies in academic entrepreneurship–a study." *International Journal of Entrepreneurial Behavior & Research* 26, no. 7 (2020): 1449-1476. https://doi.org/10.1108/IJEBR-06-2019-0401

[28] Schaeffer, Véronique, and Mireille Matt. "Development of academic entrepreneurship in a non-mature context: the role of the university as a hub-organisation." *Entrepreneurship & Regional Development* 28, no. 9-10 (2016): 724-745. https://doi.org/10.1080/08985626.2016.1247915

[29] Schiavone, Francesco, Ilaria Tutore, and Nicola Cucari. "How digital user innovators become entrepreneurs: a sociomaterial analysis." *Technology Analysis & Strategic Management* 32, no. 6 (2020): 683-696. https://doi.org/10.1080/09537325.2019.1696955

[30] Shi, Yan, Bo Zou, and Roberto S. Santos. "Dr. Jekyll and Mr. Hyde: How do academic entrepreneurs deal with identity conflict?." *Review of Managerial Science* 15, no. 8 (2021): 2165-2191. https://doi.org/10.1007/s11846-020-00420-1

[31] Gamata, S., and B. Urban. "Academic entrepreneurship and organisational support factors." *South African Journal of Higher Education* 34, no. 1 (2020): 249-266. https://doi.org/10.20853/34-1-3404

[32] Wang, Miao, Jianfeng Cai, and Hina Munir. "Promoting entrepreneurial intentions for academic scientists: combining the social cognition theory and theory of planned behaviour in broadly-defined academic entrepreneurship." *European Journal of Innovation Management* 24, no. 2 (2021): 613-635. https://doi.org/10.1108/EJIM-07-2020-0257

[33] Wang, Yi-Shun, Timmy H. Tseng, Yu-Min Wang, and Chun-Wei Chu. "Development and validation of an internet entrepreneurial self-efficacy scale." *Internet Research* 30, no. 2 (2020): 653-675. https://doi.org/10.1108/INTR-07-2018-0294