

Developing a Framework for Technopreneurial Behavior: The Mediating Role of Technopreneurial Intention and Moderating Role of Attitudes

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Abstract: Technopreneurship is a combination of technology and entrepreneurship. Entrepreneurs who are involved in technology-based ventures called technopreneurs employ technology throughout their venture operations and produce technology-based services or products. In the era of globalization, especially post-COVID-19 pandemic, technopreneurship has become more significant as it can drive economic growth. Hence, it is very crucial to further investigate technopreneurship behaviour among university students, as they are the future generation that will lead the development of the country and magnify globalization. Few technopreneurs studies have been conducted previously, however, technopreneurs in the Malaysian context are scarce. Thus, this study proposes to investigate the relationship between subjective norms, perceived behavioural control, and technopreneurs' education towards technopreneurs' behaviour, to ascertain the mediating effect of technopreneurs' intention between subjective norms, perceived behavioural control, and technopreneurs' education towards technopreneurs behaviour, and lastly to determine the moderating effect between attitudes, technopreneurs intention, and technopreneurs behaviour, that is based on the Theory of Planned Behaviour. This study proposed a research method through a survey via questionnaire. In determining the sample size, the software of Raosoft is proposed, and for data analysis, the study has proposed SPSS for data screening and PLS-SEM for the main analysis.

Keywords: *Technopreneurs' behaviour, technopreneurs' intention, theory planned behavior*

1. Introduction

The post-COVID-19 pandemic has had an impact on the technological landscape as the world has experienced the transition after post pandemic era ended. The world is evolving rapidly in fostering the adoption of digital technology and reshaping the global economy Brynjolfsson et al. (2020). The Ministry of Higher Education (MOHE) in Malaysia has made entrepreneurship education one of its top agendas in its effort to promote the nation's economic growth and human capital formation. This is agreed by Farinha et al. (2020) who emphasize that entrepreneurship able to promote economic growth and development, particularly by generating innovation and creating jobs, which are crucial for retaining competitiveness in the global market. MOHE is also keen on technology entrepreneurship (technopreneurship) among university students, and specific KPIs (Key Performance Indicators) have become their annual target to be achieved to portray their seriousness in ensuring technopreneurship among future generations. Two out of seven of their annual KPIs highlight technopreneurship which are the number of students participating in the technopreneurship programs and also the number of technology-based start-ups among students (MOHE, 2021). The universities play a pivotal role in cultivating future technopreneurs among students by comprehending the factors that influence students' technopreneurs' behaviour for developing successful educational programs and policies. The role of the Ministry of Education as a policymaker and the universities is where the place students can thrive in their technopreneurship. Universities play a crucial role in fostering technopreneurship by designing interdisciplinary curriculums that combine technology skills and training (Hisrich, Peters, and Shepherd, 2017), as incubators and accelerators that provide mentorship and platform among student start-ups (Mian, Lamine and Fayolle, 2016) and to become R&D centre that focused on fostering technopreneurship ecosystem and support students in transforming their idea into viable business (Audretsch, 2020).

According to the Theory of Planned Behaviour (TPB), behavioural intentions drive individual behaviour and are influenced by subjective norms, perceived behavioural control, and attitudes (Ajzen, 1991). In the context of technopreneurship, these constructs have significantly influenced students' intentions and behaviour in setting up technology-based businesses. However, the existing research lacks a comprehensive framework that conducted the factors that influence technopreneurial behaviour, as agreed by Fayolle and Gailly (2015), most of the studies concentrate on specific variables such as educational interventions or personality without

examining the broader impact on entrepreneurial behaviour. The existing empirical studies on technopreneurship are scarce and tend to rely on self-reported intention rather than the ultimate actual behaviours. Bagheri and Pihie (2014) stated that limited research has delved into how individuals take action from intention to behaviour and what specific behaviours and approaches they engage in the process.

Technopreneurial studies are crucial as it driven by social missions and technology adoption can promote technological entrepreneurship, address social challenges, offer job opportunities, stimulate technology transfer and innovation, and contribute to national economic progress (Pratiwi et.al, 2022). Technopreneurial study has been conducted by researchers which mostly focuses on technopreneurial intention rather than perceived actual behaviour or perceived behaviour. Previous researchers determined technopreneurial intention by technopreneurial self-efficacy, entrepreneurial learning (Hoque et al., 2017), environment, attitudes (Utami and Brawija, 2019), education, university support, university research excellent (Yordanova et al., 2020), personal social training, negotiated enterprise and contextual learning (Nurhayati and Machmud, 2019). Unfortunately, to date, the study on technopreneurials is very limited. Previous studies on technopreneurship have underpinned their study by the Theory of Planned Behaviour (TPB). However, very limited research has been conducted on technopreneurial behaviour. Therefore, this study aims to conduct a study with the outcome of TPB which is Technopreneurial Behaviour.

This study aims to propose a comprehensive framework for technopreneurial behaviour among students. The objective of the study is to investigate the relationship between subjective norms, perceived behavioural control and technopreneurial education towards technopreneurial behaviour, the mediating effect of technopreneurial intention between subjective norms, perceived behavioural control and technopreneurial education and technopreneurial behaviour and also the moderating effect of attitudes between technopreneurial intention and technopreneurial behavior.

Proposed Research Objective

This conceptual study intended to propose a framework for technopreneurial behaviour study. The illustration of the framework for this study can be referred to in the next section. The proposed research objectives are as follows:

- To determine the relationship between subjective norms and technopreneurs' intention
- To determine the relationship between perceived behavioural control and technopreneurs' intention
- To determine the relationship between technopreneurs' education and technopreneurs' intention
- To determine the relationship between technopreneurs' intentions and technopreneurs' behavior
- To investigate whether attitudes moderate the relationship between technopreneurial intention and technopreneurial behavior.
- To investigate whether technopreneurial intention mediates the relationship between subjective norms, perceived behavioural control and technopreneurial education with technopreneurial behavior.

2. Hypotheses Development

The objective of the research is to identify the relationship between subjective norms, perceived behavioural control and technopreneurial education towards technopreneurial behaviour, mediates by technopreneurial intention and moderates by attitudes.

Subjective Norms

The first proposed variable for the study is the subjective norm that refers to a close person to someone that significantly important to his or her life including family, friends, or any individual that may influence someone's decision whether to become an entrepreneur or not (Al-Jubari, 2019). Typically, people seek advice or opinions from people surrounding them to make important life decisions since humans need a reference that encourages their desire to succeed. Ayeh, Simpson and Baah (2022) added the degree of peer pressure or support varies frequently from one individual to another and they can also act as a reference while making life decisions.

Haryanto et al. (2023) have demonstrated the significant influence of subjective norms on entrepreneurial intentions, underlining the crucial role in fostering entrepreneurial behaviour. However, a study conducted among SMEs demonstrated that subjective norms particularly family and friends have a poor impact towards behaviour (Selamat, 2023). Moreover, (Dewantara et al., 2024) have emphasized the importance of offering supportive surroundings to accelerate confidence and entrepreneurial intention which has a role in mediating the impact of subjective technology entrepreneurship behaviour. Therefore, understanding and leveraging subjective norms that refer to the influence of family and close acquaintances can significantly influence technopreneurial intention and technopreneurial behaviour subsequently.

H1: Subjective Norms have a positive effect on Technopreneurial Intention

Perceived Behavioral Control

The second variable is perceived behavioural control which refers to a person's impression of their ability to regulate their behaviour acts as an indicator of their self-efficacy, and self-confidence plays a critical part in influencing technopreneurial behaviour Astuti and Fatimah (2022). Perceived behavioural control includes students' perceived ease of forming a business, students' preparation, capacity to regulate the creative process, adequate knowledge, knowledge of how to construct technopreneurs' endeavours, and belief in high odds of success Al-Jubari (2019).

Perceived behavioural control has played a significant role towards technopreneurial behaviour, mediated by technopreneurial intention. This is agreed by Dewantara et al., (2024), Simamora and Sulisty (2023), and Tsaknis and Sahinidis (2024) stated that perceived behavioural control favourably influences entrepreneurial intention, which affects the entrepreneurial subsequently. Although the influence between perceived behavioural control and behaviour has been demonstrated by many studies, nevertheless, a study conducted by Ogiemwonyi et.al (2022) found that there is no relationship between perceived behavioural control and green behaviour. As the result was found inconsistently, hence further investigation is needed to discover more evidence.

H2: Perceived Behavioural Control has a positive effect on Technopreneurial Intention

Technopreneurial Education

Technopreneurial education plays an important role in fostering technopreneurship behaviour. Yan, Huang and Xiao, (2022); and Sampene et al., (2022) stated entrepreneurship education may encourage graduates to develop their ventures and boost their entrepreneurial talents, knowledge and attitudes. After understanding the importance of this discipline for economic growth, educational institutions throughout the world have begun to provide students with training in technopreneurship (Hoque and Awang, 2017). Belmonte et al. (2022) have stated that technopreneurship education enables the identification of business-related opportunities, technopreneurship education improves students' skills, knowledge, and interest in entrepreneurship, and triggers interest in technopreneurship.

Wang et.al (2023); Hoang et. al (2020) emphasize the critical role of entrepreneurship education in boosting students' entrepreneurial intents and recommend that universities and policymakers should focus on building creative, technology-based curricula to promote students' engagement in entrepreneurship education.

H3: Technopreneurial Education has a positive effect on Technopreneurial Intention

Technopreneurial Behaviour

Technopreneurial behaviour is the main objective of this study. It refers to overt behaviour that reflects a person's reaction to something that he or she considers favourable. Mok (2022) addresses technopreneurial behaviour, including inventive thinking, risk-taking, and the ability to navigate the use of technology in business goals such as internet advertising, data analytics, and automated machines, which drive corporate performance. As a result, technopreneurs' activity has a tremendous influence on the national economic landscape, not only improving the quality of life but also magnifying economic growth.

The entrepreneurial behaviour in technology-based businesses evolves. In early phases, entrepreneurs display strong self-confidence and rapid decision-making, whereas later stages observe increasing determination, group activity focus, and task timeliness (Michelin et al., 2023).

H4: Technopreneurial Intention has a positive effect on Technopreneurial Behavior

Attitudes

Attitudes are what individuals may have perceived about what is or is not good in practice, as well as thoughts about the consequences of performing specific actions Setiaji (2018). Ayeh, Simpson and Baah (2022) mentioned that attitude plays an important role since it can influence the decisions made whilst starting a business and attitude training is necessary. Attitudes refer to specific habits or actions, such as entrepreneurship, that represent individuals' views (Al-Jubari, 2019). Such habits can be positive or negative, and as a result, they influence how people participate in a particular event, whether they act or not.

The role of attitudes is suggested in this study as an attitude can influence an individual's decision towards certain circumstances. Ajzen (1991) who introduced the Theory of Planned Behaviour highlighted that people with more favourable attitudes reflect their behaviour, and the more their intention to accomplish it should be. Thus, having favourable attitudes indicates that the individuals have favourable intentions to accomplish their behaviour to perform (Koe et al., 2018).

H5: Attitudes moderate the relationship between technopreneurs' intentions and technopreneurs behavior

Technopreneurial Intention

Technopreneurial intention is a personality attribute in individuals who embrace the way of their thinking in stressing the potential to produce a new value and develop their profession, especially for Malaysian graduates (Mohd and Shamsudin,2017). Technopreneurial intention is the students' learning session to become entrepreneurs, the efforts they put to become entrepreneurs, opportunism to seize every opportunity, entrepreneurship is their priority after graduation, and the best investment in life Hassan, Sade and Migin (2020).

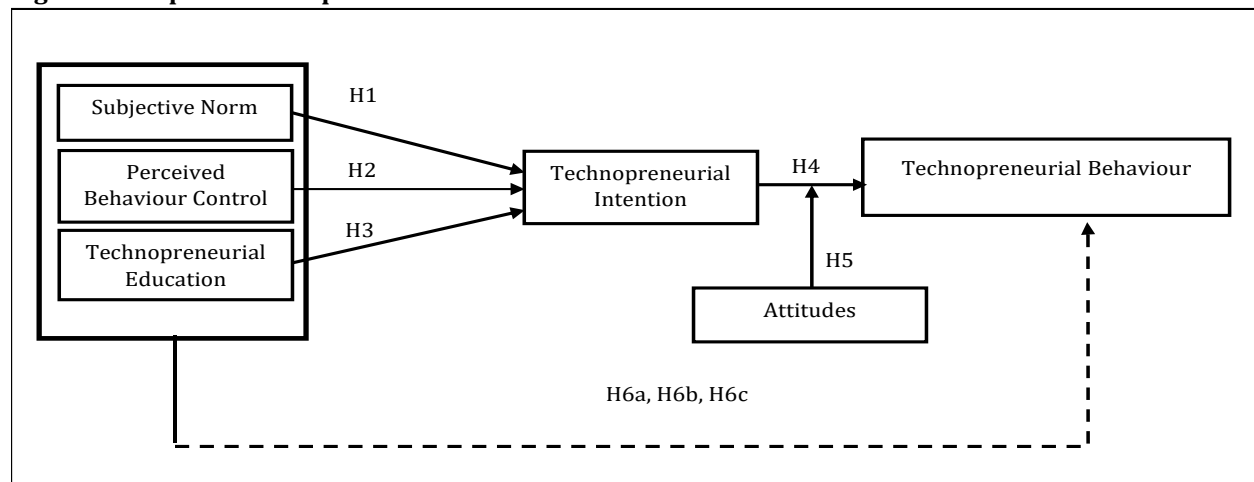
Technopreneurship has to become prominent to improve societies and economies throughout the world in the age of technology globalisation (Hoque, Awang & Siddiqui, 2017) Hence it is very important to investigate students' technopreneurial intention as it could affect the economy subsequently. Entrepreneurial motivation, cognitive traits and opportunities for entrepreneurship have a substantial impact on the entrepreneurial mindset, which then drives technopreneurial intention (Rumangkit and Hadi, 2023). Rozan (2001) mentioned that cultural variations may influence entrepreneurial behaviour and intention, with perceived desirability demonstrating significant values in connection to race among IT technopreneurs in Malaysia. The findings of the technopreneurial behaviour study may contribute to the understanding of the technopreneurial process to magnify technology entrepreneurship programs in universities.

H6: Technopreneurial intention mediates the relationship between subjective norms, perceived behavioral control and technopreneurs education with technopreneurs' behavior

Conceptual Framework

Figure 1 demonstrates the conceptual framework developed for this research. The framework is designed and based on a thorough review of literature to examine the inclination for technopreneurial behaviour.

Figure 1: Proposed Conceptual Framework



3. Proposed Direction for Future Research

The conceptual framework of this study was designed through a comprehensive literature review from various sources and authors. The quantitative method is deemed to be the research method for empirical study in the future. The framework can be applied among undergraduate universities, especially those who enrol in a technology entrepreneurship course or subject. The best research strategy for future studies is the research conducted through a survey or questionnaire to be distributed among university students. In determining the sample size, the software of Raosoft is suggested, as this software is suitable for a known number of populations as compared to GPower, which is more suitable if the total population is unknown. The use of this software will allow the researcher to expedite the process of calculating the sampling size. For the sampling technique, simple random sampling is suggested as all cases in the sample will get equal chances to get selected as a respondent. Lastly, for data analysis, Statistical Package for Social Sciences (SPSS) software (latest version) is suggested for data screening, and the main analysis is to employ Partial Least Squares Structural Equation Modelling (PLS-SEM) via SmartPLS software that comprises a measurement model and a structural model as well as hypotheses testing.

4. Study Implications

The findings of this study may be useful for future research in the area of technopreneurship or technology entrepreneurship. The government has spent a lot and introduced various technology entrepreneurship programs to instil technopreneurship intention among students and to encourage a greater number of technology-based start-ups produced among students. The result may help the Ministry of Education as a policymaker and the universities that are responsible for ensuring the ministry's annual target is achieved. This can be fulfilled by understanding students' behaviour and how their family and friends, perceived behaviour control, and technopreneurship education provided by their college influence their intention to become technopreneurs.

On the other hand, this study will benefit academicians by providing analysis information on previous studies on technopreneurship. The data may supplement the current research findings and assist researchers in improving their current research.

Conclusion

In a nutshell, this research on technopreneurial behaviour offers strong recommendations for students who want to pursue a career in technopreneurship or become entrepreneurs who venture into technology-based business. Stronger technopreneurial behaviour would boost national productivity and contribute to economic growth. It also assists prospective graduates in determining their career paths after graduating from current schooling. In this study, the proposed objective is to investigate the relationship between subjective norms, perceived behavioural control and technopreneurial education towards technopreneurial behaviour, to ascertain the mediating effect of technopreneurial intention between subjective norms, perceived behavioural control and technopreneurial education towards technopreneurial behaviour, and lastly to determine the moderating effect between attitudes technopreneurial intention and technopreneurial behaviour.

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