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TECHNOPRENEURIAL INTENTION IN MALAYSIAN HIGHER EDUCATION: A CONCEPTUAL REVIEW OF INDIVIDUAL BELIEFS, COMPETENCY READINESS AND UNIVERSITY ENTREPRENEURIAL ECOSYSTEM

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Abstract:

Technopreneurship has become increasingly important in higher education as universities are expected to produce graduates who are not only employable but also capable of creating technology-driven ventures. In Malaysia, this agenda is closely aligned with national aspirations to strengthen graduate entrepreneurship, digital transformation and innovation-led economic development. Despite the expansion of entrepreneurship education and institutional initiatives within higher education institutions, the translation of entrepreneurial exposure into genuine technopreneurial intention remains a continuing concern. Existing studies on entrepreneurial intention have widely applied the Theory of Planned Behaviour (TPB), yet findings remain inconsistent, particularly when entrepreneurship is situated within technology-intensive and digital economy contexts. This conceptual paper reviews the literature on entrepreneurial intention, technopreneurial competency readiness and university entrepreneurial support in Malaysian higher education. It argues that technopreneurial intention should not be understood only through individual attitudes or general entrepreneurial beliefs, but also through students' perceived readiness to engage with technology-based opportunities and the extent to which university ecosystems enable entrepreneurial development. Based on the reviewed literature, the paper proposes a conceptual framework that positions individual beliefs, technopreneurial competency readiness and university entrepreneurial ecosystem as interrelated domains shaping students' technopreneurial intention. The paper contributes to the literature by extending the Theory of Planned

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Behaviour through technopreneurial competency readiness as a contextualised form of perceived behavioural control, by reconceptualising university support as a multidimensional entrepreneurial ecosystem rather than a single institutional variable, and by proposing an integrated conceptual framework, with directional propositions, that jointly links these domains to technopreneurial intention in the Malaysian higher education context.

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Keyword:

Belief, Competency, Higher Educational Institution, Technopreneurial Intention, Theory of Planned Behaviour, University Support

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Introduction

Entrepreneurship has become a strategic priority in higher education, particularly in those countries which wish to improve innovation, employment opportunities, and their economic competitiveness. In the context of the digital economy, universities are now required to not only graduate students who are employable but also to help individuals learn how to spot opportunities, make use of technology, deal with market challenges, and set up their own businesses. This shift has led to greater attention from both the academic community and policymakers on technopreneurship, which is understood to mean entrepreneurial activities that are mainly motivated by technology, innovation, and digital skills.

It is important to draw a conceptual distinction between technopreneurship and general entrepreneurship. By general entrepreneurial intention is meant an individual's readiness to start any kind of business venture, while technopreneurial intention refers to the willingness to seek out business opportunities using technology, digital tools, or innovation-driven solutions. The reason for this distinction lies in the fact that setting up a business based on technology requires a number of extra qualities, such as technological confidence, digital literacy, and the ability for innovation, qualities which are not completely covered by the existing concepts of general entrepreneurship. For these reasons, technopreneurial intention is considered to be a related but conceptually separate construct and therefore needs its own theoretical framework.

The intention to become a technopreneur is different from general entrepreneurial intention since it involves a more specific and demanding kind of action — that is, the creation of a venture in which technology acts as the main means of generating value, not just as a supplementary tool. This greater specificity changes what is meant by 'control' with regard to the behaviour. In the Theory of Planned Behaviour (TPB), perceived behavioural control is

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specific to the behaviour in question; hence a student's feeling of control over starting any kind of business is different from their feeling of control over setting up a technology-based enterprise. Two extensions to the TPB follow directly from this distinction. On the one hand, technopreneurial competency readiness is essential, since the TPB does not include a construct that reflects students' perception of their ability to carry out the technological and innovation-related tasks needed in technopreneurship; general entrepreneurial self-efficacy is not specific enough. On the other hand, the university entrepreneurial ecosystem is necessary because the TPB, as a model that focuses on the individual, does not take into account the institutional conditions that allow students to develop and test their technology-specific competencies. If this addition is not made, competency readiness would be treated as an unexplained individual characteristic rather than as an outcome that is shaped by the university. These two extensions are therefore suggested as the specific adjustments that should be made when the behaviour in question changes from general entrepreneurship to technopreneurship.

Technopreneurship is especially important in Malaysia since the country is making active efforts to pursue a development strategy based on digital technologies and innovation. The Malaysia Digital Economy Blueprint identifies digital transformation, digital talent, digital infrastructure, and an inclusive digital society as the key pillars of national development (Government of Malaysia, 2021). The New Industrial Master Plan 2030 also places a priority on technological upgrading, industrial transformation, and the development of higher-value economic activities (Ministry of Investment, Trade and Industry [MITI], 2023). In the field of higher education, the Entrepreneurship Action Plan for Higher Education Institutions 2021–2025 is concerned with reinforcing the entrepreneurial mindset, promoting graduate entrepreneurs, and improving the entrepreneurial ecosystems within universities (Ministry of Higher Education Malaysia [MOHE], 2021). Taken together, these policy initiatives show that there is the expectation that universities will play a vital role in preparing graduates to take part in technology-based entrepreneurship.

Even though there have been various policy initiatives, it is still a major difficulty to produce graduate students who are entrepreneurial. Though entrepreneurship education and similar programs have now become common in universities in Malaysia, the fact that students are exposed to them does not mean that they will definitely develop a strong intention to become entrepreneurs or actually set up their own businesses. Many students still see formal employment as a safer and more stable career choice, while entrepreneurship is generally considered to be risky, uncertain, and requiring a great deal of resources. The difficulty in this area is even greater when it comes to technopreneurship, since this kind of entrepreneurship requires not only an interest in entrepreneurship but also confidence in technology, the ability to innovate, digital literacy, and the capacity to identify opportunities.

The idea of entrepreneurial intention is generally regarded as a person's deliberate plan or readiness to start a business at a later date. It is important since entrepreneurship is typically a planned and intentional activity and not something that happens spontaneously (Ajzen, 1991; Krueger et al., 2000; Liñán & Chen, 2009). In the field of entrepreneurship, the Theory of Planned Behaviour has been extensively used to explain why some people are more likely than others to develop entrepreneurial intention. As the TPB states, intention is influenced by one's attitude towards the behaviour, subjective norms, and perceived behavioural control (Ajzen, 1991). These elements are still very relevant when it comes to explaining students' entrepreneurial intention. Yet, when the theory is applied to technopreneurship, it may need to

be adapted because the creation of ventures driven by technology requires extra kinds of competency readiness.

Ongoing research has still demonstrated that entrepreneurial intention is affected by a variety of individual, social, educational and institutional factors (Xanthopoulou et al., 2024). In Malaysia, too, the importance of attitude, subjective norms, perceived behavioural control, entrepreneurship education and opportunity recognition in influencing entrepreneurial intention among students has been pointed out (Koe et al., 2023; Musa et al., 2023; Wiramihardja et al., 2022). However, the research is still scattered since a great many of the studies look at general entrepreneurial intention rather than focusing on technopreneurial intention. Consequently, there is still a lack of clear understanding as to how individual entrepreneurial beliefs, technology-related competencies and support available at the university level together affect students' technopreneurial intention.

More specifically, the existing studies have looked at these areas separately rather than together. Koe et al. (2023) look at individual entrepreneurial orientation as a mediator of technopreneurial intention yet do not include university-level ecosystem factors. Musa et al. (2023) and Wiramihardja et al. (2022) examine entrepreneurial intention by means of the TPB-based individual belief constructs but fail to consider technology-specific competency readiness. Mustafa et al. (2023) and Ratkovic et al. (2025) look at university entrepreneurship support and student characteristics but do not place this support within a technopreneurship-specific framework and also do not jointly model support together with competency readiness. As a result, these studies have not shown how TPB beliefs, technology-specific competency readiness, and the university entrepreneurial ecosystem are related jointly to technopreneurial intention among Malaysian higher education students. The synthesis presented here identifies a question for future investigation rather than proving that no previous study has looked at the combination.

The paper deals with this gap by providing a conceptual review of technopreneurial intention within Malaysian higher education. More precisely, it looks at three main conceptual areas: individual beliefs, technopreneurial competency readiness and the university entrepreneurial ecosystem. Instead of suggesting a definite empirical model, it presents a proposed conceptual framework in order to assist future research. This method is suitable since the aim of the paper is to enhance theoretical understanding and to identify possible lines for further research rather than to test empirical relationships.

The approach to the review is to use a narrative format in this conceptual paper, the review being based on a systematic examination of the literature. The sources were mainly found using Scopus, Web of Science and Google Scholar by means of keyword combinations such as "technopreneurial intention", "entrepreneurial intention", "theory of planned behaviour", "entrepreneurial competency", "digital readiness" and "university entrepreneurial support/ecosystem", together with "Malaysia" and "higher education" when appropriate.

Priority was given to peer-reviewed journal articles published between 2015 and 2025, with earlier foundational sources (for example, Ajzen, 1991) included where a construct was first proposed, and Malaysian national policy documents were also taken into account in order to ensure relevance to the local context. Articles were included only if they looked at entrepreneurial or technopreneurial intention, the antecedents related to competency, or university or institutional support among students in higher education; non-English sources,

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non-peer-reviewed materials and any studies not relating to higher education were excluded. This method is intended to make the foundation for the proposed conceptual framework clear and traceable, not because it constitutes a formal systematic review.

Entrepreneurial Intention in Higher Education

Entrepreneurial intention is defined as the deliberate mental state of an individual which focuses their attention, experiences and actions on planned entrepreneurial behaviour (Krueger et al., 2000; Liñán & Chen, 2009). It is important in the context of higher education since students are at a stage where their careers are being shaped. While at university they come into contact with knowledge, social networks, role models, the institution's culture and career advice, all of which may affect their view of entrepreneurship as something desirable and feasible.

To simply show an interest is not what entrepreneurial intention amounts to; it involves a more profound cognitive process which includes personal assessment, an estimate of feasibility, social approval and an assessment of one's own abilities. Even if students have a favourable view of entrepreneurship, they might still be reluctant to pursue it if they lack confidence, resources or support. On the other hand, students who have technical skills will not necessarily become inspired to engage in entrepreneurship if they do not see setting up a business as attractive or if they do not consider it to be socially supported. This is the reason why the connection between entrepreneurship education and entrepreneurial intention is so often inconsistent.

Over the last twenty years there has been a great deal of literature concerning entrepreneurial intention among university students. Yet recent reviews indicate that the findings are still mixed due to variations in theoretical models, settings, samples, and the way the concepts are defined (Putra et al., 2025; Xanthopoulou et al., 2024). In some cases, attitude is found to be the best predictor of entrepreneurial intention, in others perceived behavioural control, subjective norms, entrepreneurship education, self-efficacy, personality traits or the ability to recognise opportunities are emphasised. The fact that there are such inconsistencies implies that entrepreneurial intention is influenced not by one factor alone but by a mix of personal, social, competency-related and contextual factors.

In Malaysia, there has been considerable policy and academic focus on students' entrepreneurial intentions because of worries about the employability of graduates and the desire to produce graduate entrepreneurs. Entrepreneurship is generally seen as a way of reducing reliance on formal employment and of promoting innovation-driven economic growth. Yet many students might take part in entrepreneurship-related activities without actually intending to become entrepreneurs. For instance, they may study entrepreneurship since it is a required subject, enter business pitching competitions in order to get academic credits, or take part in entrepreneurial activities without having the aim of eventually starting a business.

The matter becomes even more important in the context of technopreneurship. Since technology-based entrepreneurship calls for both entrepreneurial and technological readiness, students might be interested in business but still lack digital skills. On the other hand, students might have a good understanding of technology but be missing in terms of market orientation or entrepreneurial confidence. As has already been mentioned, technopreneurial intention

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should therefore be regarded as conceptually different from general entrepreneurial intention, since it demands an extra level of competency readiness.

Theory of Planned Behaviour as a Theoretical Lens

The paper uses the Theory of Planned Behaviour as the main theoretical basis, not just as a general background. This theory forms the foundation of the individual-belief aspect of the proposed framework. The framework then extends the Theory of Planned Behaviour in two specific respects: first, by considering technopreneurial competency readiness as a contextual development of perceived behavioural control in the context of technology-based venturing, and second, by placing the university entrepreneurial ecosystem as an external, institutional-level antecedent that affects both beliefs and competency readiness. Although the Theory of Planned Behaviour remains the central organising theory, competency readiness and the features of the ecosystem are seen as necessary extensions rather than as alternative or replacement theories. The Theory of Planned Behaviour offers a useful theoretical perspective for understanding entrepreneurial intention. According to Ajzen (1991), behavioural intention is affected by three key constructs: attitude towards the behaviour, subjective norms and perceived behavioural control. Attitude means the degree to which an individual assesses a behaviour as positive or negative. Subjective norms refer to the social pressure that is perceived to come from important others. Perceived behavioural control refers to the extent to which someone believes a behaviour can be carried out easily or with difficulty.

In the field of entrepreneurship, attitude is concerned with whether students see entrepreneurship as desirable, meaningful, rewarding or appropriate as a future career. A favourable attitude can result from the expectation of financial rewards, independence, creativity, making a social contribution or achieving personal satisfaction. Subjective norms involve the impact of family, friends, lecturers, mentors and society; in a collectivist situation like Malaysia, social expectations can be important since family approval, the way peers view it and social legitimacy often affect students' choices about their careers. Perceived behavioural control means the extent to which students believe they can set up and run a business.

The Theory of Planned Behaviour has been widely used in research on entrepreneurial intention since entrepreneurship is a planned behaviour which involves intention, evaluation and perceived control (Krueger et al., 2000; Liñán & Chen, 2009). Recent studies have carried on extending the TPB by including further variables such as entrepreneurship education, self-efficacy, creativity, personality traits and entrepreneurial motivation (Duan, 2022; La Barbera & Ajzen, 2020; Nayak et al., 2025). This is because it is believed that although TPB offers a solid foundation it may have to be adapted in a contextual way depending on the behaviour in question.

TPB is still relevant in the context of technopreneurship but by itself might not be enough. In order to engage in technology-based entrepreneurship, students need to not only believe that entrepreneurship is desirable and socially supported but also feel that they either already have or can acquire the skills related to technology. For instance, a student might have a favourable attitude towards entrepreneurship yet may still lack confidence in using digital tools, in developing technology-based solutions or in spotting technology-related market opportunities. It therefore follows that the intention to become a technopreneur must be understood in a more context-specific way in terms of perceived behavioural control.

Ajzen (2002) later made it clear that perceived behavioural control is closely linked to self-efficacy and controllability. In the context of technopreneurship, this implies that students' sense of control can be affected by their confidence when carrying out technological, innovative and market-related tasks. Competency readiness thus constitutes an important contextual aspect which gives practical significance to perceived control in technology-based entrepreneurship. It does not replace the TPB; rather, it enhances the theory by acknowledging that perceived control in technopreneurship is influenced by particular technological and entrepreneurial capabilities.

Technopreneurial Competency Readiness

The level of readiness among students to take on technology-driven entrepreneurial activities is known as technopreneurial competency readiness. It involves the knowledge, skills and attitude necessary for identifying, assessing and pursuing business opportunities based on technology. Although ordinary entrepreneurship may include opportunity recognition, taking risks and raising resources, technopreneurship places a greater focus on the use of technology as a means of achieving innovation, creating value and achieving market differentiation.

Digital skills are at the heart of being ready for technopreneurship. Tee and others (2024) discovered that employers in Malaysia are increasingly requiring digital skills and that the skills gap among graduates can have an impact on their employability. Even though employability and entrepreneurship are not the same, the results are still relevant since technopreneurship calls for graduates who are at ease with digital tools, data, online platforms, and technology-enabled problem-solving. On this point, digital literacy goes beyond being just a technical ability; it becomes an aspect of entrepreneurial readiness since students have to know how technology can be used to develop new products, services or business models.

Innovation capability is also a vital aspect of technopreneurial readiness. Entrepreneurship based on technology involves more than just making use of existing digital tools; it also requires the application of creative thinking when addressing problems. Students should identify market needs, come up with new ideas, test out possible solutions and adjust themselves to changing technological environments. It is therefore important to have creativity and innovation since they enable students to go beyond simple and routine technology use and move towards creating opportunities.

The identification of opportunities is just as important. In the context of entrepreneurship, opportunity recognition means having the ability to spot unmet needs, market gaps, or new possibilities. In the case of technopreneurship, it usually means understanding how technology can be used to solve customer problems, improve inefficiencies in an industry, or meet social needs. A student who has digital skills but is unable to recognise business opportunities may not develop a strong intention to become a technopreneur. On the other hand, a student who can see opportunities but lacks confidence in technology might hesitate to take action.

Studies of technopreneurship recently indicate that technology-related self-efficacy, technological optimism, and technopreneurial education can affect intention to engage in technology-driven entrepreneurship (Koe et al., 2023; Maziriri et al., 2025). The literature is still fragmented since various studies employ different constructs and definitions. Whilst some concentrate on ICT self-efficacy, others concentrate on entrepreneurial orientation, innovation,

education or technological optimism. This lack of coherence makes it hard to develop a clear understanding of technopreneurial competency readiness.

In higher education in Malaysia the issue is important since students come from a variety of academic backgrounds. While business students might have more contact with topics such as business planning, marketing and entrepreneurship, they could still lack confidence in their technical abilities. On the other hand, students studying engineering, computing or technology may have a solid knowledge of technical subjects but do not necessarily possess a strong entrepreneurial attitude or a good understanding of the market. It follows that technopreneurial intention must be seen as the result of both the development of entrepreneurial beliefs and readiness in terms of competence.

A major point in the literature is whether or not universities are providing students with technopreneurial readiness in an integrated way. While entrepreneurship courses can give students an introduction to business ideas, they do not enough to foster the recognition of technological opportunities. Technical courses might develop students' technological skills but do not always link these skills to the creation of ventures. It follows that technopreneurial education needs to be integrated over the areas of business, technology, innovation and market application. Such integration is particularly important when universities want to graduate students who can take an active part in the digital economy.

University Entrepreneurial Ecosystem

In the field of entrepreneurial intention research, support provided by universities has become a matter of significant importance. Such support can be given by means of the formal curriculum, co-curricular activities, mentoring, business incubation, innovation labs, exposure to funding, collaboration with industry, entrepreneurship centres, role models and an entrepreneurial culture. The various types of support contribute to the creation of an ecosystem which may lead students to see entrepreneurship as a viable and legitimate career option.

The connection between university support and entrepreneurial intention is not always simple. According to Mustafa et al. (2023), university support led to an increase in entrepreneurial intention among students who had a low-to-moderate level of proactive personality, but not necessarily among those with a strong proactive personality. This indicates that students do not react to university support in the same manner; university support might have a greater impact on students who need confidence, exposure and encouragement, whereas those who are highly proactive may already have a strong internal motivation.

There is also recent evidence to indicate that support for entrepreneurship provided by universities may have an impact on students' intention to become entrepreneurs via their entrepreneurial capacity. Ye et al. (2025) discovered that university support had a positive but weak direct effect on entrepreneurial intention, yet it greatly increased entrepreneurial capacity, this capacity then serving as a predictor of intention. This point is significant since it implies that university support will be most effective when it focuses on developing students' capabilities rather than just running programmes. To put it simply, universities should not only give students exposure to entrepreneurship but also help to build their practical readiness to act as entrepreneurs.

Ratkovic et al. (2025) also demonstrate that the support for entrepreneurship provided by universities plays a role in shaping students' entrepreneurial intentions, particularly when student diversity and social identity are taken into account. Their results indicate that the process of forming entrepreneurial intentions is not the same for all students; factors such as age, gender, academic background, whether or not a student is from a first-generation family and the education level of their parents can affect how students react to the support offered by their university. This is pertinent to Malaysia since the country's higher education sector includes students coming from a wide range of socioeconomic, regional, ethnic and institutional backgrounds.

In the field of technopreneurship, the entrepreneurial environment at universities ought to extend beyond general entrepreneurship education by offering experience in technology-based entrepreneurship, providing digital innovation spaces, giving students access to mentors who have experience in technology ventures, promoting interdisciplinary collaboration, involving industry-based problem solving, and providing opportunities to test digital business ideas. Should university support still remain too general, it might not be enough to foster technopreneurial intention.

A university environment that is effective in promoting entrepreneurship should therefore carry out at least four roles. The first of these is to create awareness by giving students information about entrepreneurship and technopreneurship as possible career options. The second role is to build capability by enhancing students' digital, innovative and entrepreneurial skills. The third is to offer validation by enabling students to test out their ideas, get feedback and make contacts with industry. The fourth is to foster confidence by offering mentoring, providing role models and giving institutional support. These functions are important since students may need both psychological and practical assistance before they are able to see themselves as future technopreneurs.

It is essential that universities do not regard entrepreneurship support as a series of tasks to be completed. The presence of incubation centres, business competitions or entrepreneurship courses does not ensure that there is an intention to become an entrepreneur. What is important is whether students find these supports accessible, relevant and useful. For this reason, future research should look at university support not only from the point of view of the institutions' supply side but also from the students' personal experience and the value that they perceive in it.

Conceptual Gaps in Existing Literature

The literature reveals several conceptual gaps. One of these is that a great many studies still look at general entrepreneurial intention without clearly separating it from technopreneurial intention. This leads to conceptual vagueness since technology-based entrepreneurship calls for extra kinds of readiness which may not be picked up by the existing constructs of general entrepreneurship. In the digital economy, the intention to start a business and the intention to start a technology-based business may involve different capabilities, confidence levels and perceived barriers.

Secondly, there is a poor integration of TPB and technopreneurial competency readiness. The TPB accounts for intention by referring to attitude, subjective norms and perceived behavioural control; yet in the case of technopreneurship, perceived control may rely heavily on

technology-related competencies. If students do not feel digitally capable or innovation-ready, then they may not see technopreneurship as feasible. It therefore follows that competency readiness should be conceptually connected to the belief formation process which underlies entrepreneurial intention.

Thirdly, the role of university support is still not well developed in a theoretical sense. While a number of studies look at whether university support has a direct impact on entrepreneurial intention, recent evidence indicates that the effect of university support might be indirect, conditional or depend on students' individual characteristics (Mustafa et al., 2023; Ratkovic et al., 2025; Ye et al., 2025). It therefore needs to be seen as part of an entrepreneurial ecosystem which influences students' exposure to opportunities, their confidence, their capacity, and their recognition of opportunities.

Fourth, the Malaysian higher education context requires more nuanced analysis. Malaysia has strong national policies supporting entrepreneurship and digital transformation, but policy aspirations do not automatically translate into student-level intentions. We need to understand how national entrepreneurship and digital economy agendas translate into university practices and how students interpret them. Without this understanding, a gap may exist between institutional efforts and student entrepreneurial outcomes.

Fifth, most existing studies regard entrepreneurship education as if it were a single entity. In fact, entrepreneurship education can take on a number of different forms, such as formal courses, experiential learning, business simulations, mentoring, incubation, industry projects, and interdisciplinary innovation activities. These different forms may have differing effects on students' technopreneurial readiness. It therefore follows that future research should break down university support into more significant dimensions rather than assuming that all forms of entrepreneurship support work in the same way.

In this section a conceptual framework is suggested which separates the three explanatory domains from technopreneurial intention and lays down the relationships for future empirical evaluation. It should be stressed that these relationships are theoretical expectations and not already established causal effects.

Proposed Conceptual Model

Drawing on the literature that has been reviewed, the present paper puts forward a conceptual framework intended to assist in guiding future research into technopreneurial intention within Malaysian higher education. The framework is deliberately given in the form of a high-level conceptual structure rather than as a definite empirical model, and it seeks to organise the main themes identified in the literature without specifying any particular measurement items, analytical techniques or causal pathways.

The proposed model consists of four main conceptual domains: individual entrepreneurial beliefs, technopreneurial competency readiness, university entrepreneurial ecosystem and technopreneurial intention.

Personal beliefs regarding entrepreneurship are directly based on the TPB and are defined by three factors: (i) attitude towards technopreneurship, which refers to students' general judgement of technology-oriented venturing as desirable and rewarding; (ii) subjective norms,

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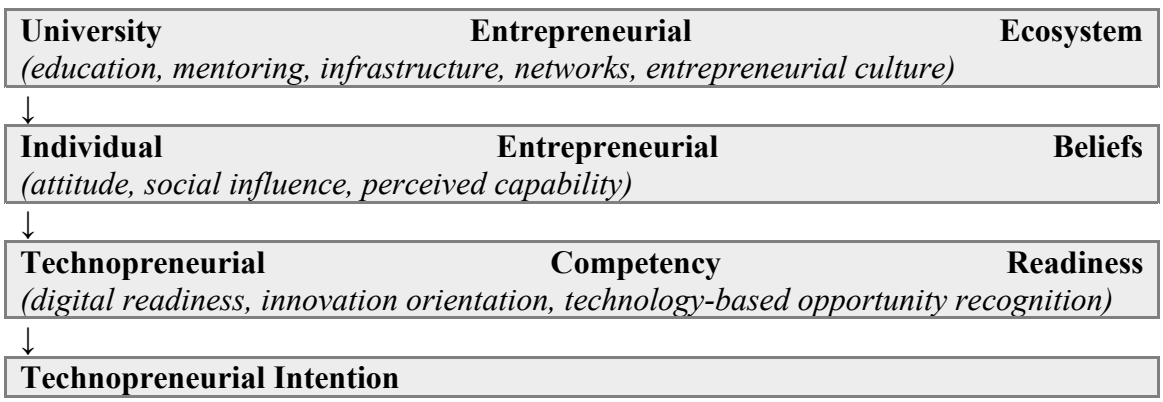
which refer to the amount of approval or pressure that students feel coming from their family, peers and lecturers with regard to technopreneurship; and (iii) perceived behavioural control, which refers to students' general confidence in their ability to start a venture. It is these three factors that determine whether students see entrepreneurship as desirable, socially acceptable and feasible.

The term technopreneurial competency readiness describes the extent to which students feel prepared to take part in technology-oriented entrepreneurial activities and is defined by four dimensions: (i) digital literacy together with a sense of technical confidence when using digital tools and platforms; (ii) innovation capability, which means having a creative and problem-solving attitude towards technology-based solutions; (iii) the ability to recognise opportunities based on technology, that is, the capacity to identify market needs that can be met through technology; and (iv) technological self-efficacy, which refers to the confidence one has in his or her ability to carry out technology-related entrepreneurial tasks. This area is important since technopreneurship involves a level of readiness that goes beyond a general interest in entrepreneurship and is here conceived as the mechanism by which perceived behavioural control acquires meaningful context within the TPB.

The entrepreneurial ecosystem at the university describes the institutional environment which fosters entrepreneurial development and is defined by four dimensions, these being the same four functions that will be discussed later in this section: (i) entrepreneurship education and curriculum, covering both formal courses and experiential learning; (ii) mentoring and role models, which involves access to entrepreneurs and academics who have technopreneurial experience; (iii) incubation and infrastructure, comprising innovation labs, incubators and opportunities for funding; and (iv) industry linkages and networks, which include industry collaboration and opportunities that are interdisciplined. This ecosystem can influence both the beliefs of students and their readiness and competence.

Technopreneurial intention refers to students' willingness, readiness and future orientation toward pursuing technology-based entrepreneurship. It reflects the extent to which students can imagine themselves creating, joining or developing ventures that use technology as a core element of value creation.

Figure 1: Proposed Conceptual Model of Technopreneurial Intention in Malaysian Higher Education



Source: Authors' conceptualisation based on Ajzen (1991), Koe et al. (2023), Mustafa et al. (2023), Ratkovic et al. (2025), Tee et al. (2024) and Ye et al. (2025).

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Based on this framework, the following expected relationships are proposed to guide future empirical testing: P1 – university entrepreneurial ecosystem is positively associated with individual entrepreneurial beliefs; P2 – university entrepreneurial ecosystem is positively associated with technopreneurial competency readiness; P3 – individual entrepreneurial beliefs are positively associated with technopreneurial intention; P4 – technopreneurial competency readiness is positively associated with technopreneurial intention, over and above individual beliefs; and P5 – technopreneurial competency readiness strengthens the perceived-behavioural-control component of TPB, such that its influence on technopreneurial intention is partly channelled through, rather than fully independent of, individual beliefs. These propositions are directional expectations drawn from the reviewed literature, not statistically tested hypotheses.

The model also suggests that the university entrepreneurial ecosystem functions as an enabling context. It may not automatically produce technopreneurial intention, but it can strengthen the conditions under which students develop positive beliefs, relevant competencies and confidence to pursue technology-based entrepreneurship. This view aligns with recent studies showing that university support influences entrepreneurial intention through capacity development, perceived support, and contextual conditions (Mustafa et al., 2023; Ratkovic et al., 2025; Ye et al., 2025).

The pathways shown in Figure 1 must not be understood as strictly linear or uniformly deterministic. Recent studies show that these relationships are generally conditional rather than direct. For instance, Mustafa et al. (2023) found that university support had a greater effect on enhancing entrepreneurial intention among students who had low-to-moderate levels of proactive personality, the impact being weaker among those who were highly proactive. Likewise, Ratkovic et al. (2025) showed that student characteristics such as being a first-generation student and one's academic background affect how entrepreneurial support leads to intention. These results suggest that individual differences act as boundary conditions for the pathway from ecosystem to intention, rather than the ecosystem having the same effect on all students. As a result, the conceptual framework should be seen as illustrating a general enabling sequence, in which the strength of each relationship can differ depending on student-level moderators such as prior exposure, personality, and socioeconomic background.

There are three reasons why this model is useful. The first is that it does not regard technopreneurial intention as merely a psychological concept by instead taking into account competency readiness. The second is that it does not view university support as a straightforward direct predictor but rather sees it as an ecosystem which influences beliefs and readiness. The third is that it offers a lens which is sensitive to the context when it comes to studying technopreneurship in Malaysia, a country where universities are expected to make contributions to both graduate entrepreneurship and to the development of the digital economy.

It is important to note that the model stays broad and conceptual, without asserting that all relationships are linear or universal. The way different students experience the model may vary according to the academic discipline they are in, their previous experience in entrepreneurship, their family background, their digital skills, and their access to institutional support. For this reason, the model should be regarded as a conceptual framework to guide future empirical research rather than as a final and tested framework.

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Research Agenda for Future Studies

The discussion outlined above points to a number of possible areas for future research. One thing that future studies should do is to look into how Malaysian university students understand technopreneurship. Although many of the students may be familiar with entrepreneurship as a general concept, they might not have a full grasp of the differences between technopreneurship and the creation of conventional businesses. Qualitative research could be used to investigate the students' perceptions, motivations, fears and expectations about technology-based entrepreneurship.

Second, further research ought to look at the relationship between entrepreneurial beliefs and technopreneurial competency readiness. Although the TPB remains useful, it is necessary for researchers to examine whether students perceived behavioural control in the area of technopreneurship is influenced by their digital skills, innovation capability and ability to recognise opportunities. This would help to clarify if competency readiness enhances students' confidence in pursuing technology-based ventures.

Third, future studies should investigate how students experience university entrepreneurial ecosystems. Rather than focusing only on whether entrepreneurship programmes exist, researchers should examine whether students perceive these programmes as accessible, relevant, practical and confidence-building. This is important because institutional support may fail to influence intention if students view it as too theoretical, generic or disconnected from real entrepreneurial practice.

Fourth, future research could involve comparing students from a range of subject areas. Since students in business, engineering, computing and the social sciences may have different levels of exposure to entrepreneurship and technology, such comparisons would allow universities to develop specific technopreneurship interventions rather than sticking to one-size-fits-all entrepreneurship programmes.

Fifth, future research into technopreneurial intention should take diversity and inclusion into account. Students coming from lower-income families, those in rural areas or individuals who are the first in their families to attend university may face different obstacles when compared with students from more privileged backgrounds. This is significant since while digital entrepreneurship might generate opportunities, it could also perpetuate inequalities if such students do not have access to devices, networks, mentors or capital.

Sixth, future research ought to look at the gap between intention and action, especially focusing on the role of fear, limited resources, and the uncertainty regarding the sustainability of businesses in stopping students from turning their expressed interest into actual venture creation.

Eventually, empirical studies could create and verify context-sensitive models of technopreneurial intention within Malaysian higher education. These studies could adopt quantitative, qualitative, or mixed methods approaches, according to their research objectives. Yet the development of empirical models should be based on clear conceptual understanding and should take into account the particular realities of technology-based entrepreneurship among university students.

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Theoretical Implications

The paper has a number of theoretical implications. Firstly, it adds to the existing literature on entrepreneurial intention by asserting at the theoretical level that technopreneurial intention should be regarded as a concept distinct from general entrepreneurial intention and not instead treated as an equivalent construct that can be explained by the same set of predictors.

Second, the article extends the application of the TPB in the field of entrepreneurship. Although the TPB still forms a valuable basis, technopreneurship calls for a more context-sensitive understanding of perceived behavioural control. The paper examines technopreneurial competency readiness as an area which gives practical significance to perceived control in the context of technology-driven entrepreneurship. This reinforces the general idea that context-specific variables can enhance the TPB.

Thirdly, the paper advances the body of literature on university entrepreneurship by viewing university support as an entrepreneurial ecosystem rather than as a single institutional factor. This is important since universities affect students through a number of channels such as the curriculum, mentoring, infrastructure, networks, culture, and role models. Seeing university support as an ecosystem allows for a more comprehensive understanding of how students develop their entrepreneurial beliefs and readiness.

Fourthly, the paper advances the body of literature on higher education in Malaysia by connecting students' technopreneurial intentions with the country's aims for its digital economy. Although policy documents stress entrepreneurship, innovation and digital transformation, academic research needs to show how these broad policy objectives are turned into students' individual intentions and level of readiness. The present paper therefore provides a conceptual basis for this type of research.

Practical Implications

The practical aspects of the discussion are important for universities, educators and policymakers. With regard to universities and educators, the paper states that entrepreneurship programmes should go beyond those which are based only on raising awareness or which are purely theoretical. Students should be given the opportunity to gain practical, hands-on and interdisciplinary experience, such as through problem-based learning, the development of digital business models and involvement with actual technology-based enterprises. Such approaches ought to combine business knowledge with the application of technology, help students to identify problems and test their ideas using digital tools, and provide them with feedback from industry mentors in order to boost their confidence and technological preparedness.

University administrators are shown in the paper how important it is to develop an integrated entrepreneurial ecosystem. Incubators, innovation labs, entrepreneurship centres, business competitions and mentorship programmes should not function on their own; instead they must be linked by a clear student development route which supports students right from the stage of becoming aware to that of developing their ideas and finally to venture readiness.

The paper states that policymakers should ensure strong institutional implementation when it comes to graduate entrepreneurship and policies relating to the digital economy. National targets can only be reached if universities have the necessary capacity, resources, and incentives to produce technopreneurial graduates. Policy support should therefore pay attention not just to the number of programmes but also to the quality of the programmes, the outcomes for students, and integration into the ecosystem.

For students, the discussion highlights that technopreneurship requires more than business interest. Students need to develop digital confidence, an innovation mindset, opportunity recognition and resilience. Universities can support this process, but students must also actively engage with available opportunities.

Conclusion

The study of technopreneurial intention is an important one within Malaysian higher education, especially since the country is aiming to enhance graduate entrepreneurship, digital innovation and technology-based economic development. While the Theory of Planned Behaviour offers a useful basis for understanding entrepreneurial intention, the technopreneurship context demands a wider consideration of competency readiness and institutional ecosystem factors.

This conceptual paper reviewed the literature on entrepreneurial intention, technopreneurial competency readiness and the university entrepreneurial ecosystem. It argued that students' willingness to pursue technopreneurship is shaped not only by individual beliefs but also by their perceived readiness to engage with technology-based opportunities and the support they receive from university environments. The paper proposed a conceptual framework linking individual entrepreneurial beliefs, technopreneurial competency readiness and the university entrepreneurial ecosystem to technopreneurial intention.

The contribution of this paper lies not only in clarifying conceptual gaps but in extending existing entrepreneurial intention research in three specific ways: by repositioning perceived behavioural control within TPB as contextually shaped by technopreneurial competency readiness, by reframing university support as a multidimensional ecosystem construct rather than a single institutional predictor, and by integrating both extensions into a single framework directed specifically at technopreneurial, rather than general entrepreneurial, intention. Rather than presenting technopreneurship as merely another form of entrepreneurship, the paper highlights the need to recognise its technology-related and institutional dimensions as necessary theoretical extensions. Future empirical studies can build on this conceptual framework to examine how universities can more effectively support students in developing technopreneurial intention and readiness. By advancing this discussion, the paper provides a foundation for more context-sensitive research on technopreneurship, higher education and digital economy development in Malaysia.

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