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Empowering Digital Entrepreneurship in Technical and Vocational Education and Training (TVET) Education

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ABSTRACT

The article "Empowering Digital Entrepreneurship in Technical and Vocational Education and Training (TVET) Education" embarks on a detailed exploration of the integration of digital entrepreneurship within Technical and Vocational Education and Training (TVET). Utilizing advanced searching techniques across Scopus, WoS, ERIC, and Google Scholar databases, the study synthesizes findings from 34 articles, focusing on four main themes: the overview of TVET education, the impact of digital entrepreneurship on TVET, the issue and challenge in integrating digital entrepreneurship into TVET, and the potential pathways for such integration. This study emphasizes how important it is for TVET institutions to include digital entrepreneurship skills in order to prepare a workforce that can successfully navigate the digital economy. It discusses on the precise balance that needs to be achieved between entrepreneurial digital skills and technical vocational training, highlighting how this synergy is essential to developing creativity, flexibility, and competitiveness in the modern workforce. The study also discusses the difficulties in developing curricula, allocating resources, and the importance of industry-academic collaboration, offering thorough solutions for resolving these issues. This paper significantly advances educational policy and practice by providing an in-depth understanding of how digital entrepreneurship can transform Technical and Vocational Education (TVET) and directing industry and educational stakeholders toward the development of a more dynamic, future-focused vocational training ecosystem.

Keywords: Education; digital entrepreneurship; Technical and Vocational Education and Training (TVET)

INTRODUCTION

Given how rapidly the digital world is moving these days, it would be interesting to empower digital entrepreneurship in TVET education. In order to prepare students for the workforce, Technical and Vocational Education and Training (TVET) is essential in providing them with real-world information and skills (McCallum 2019). However, it is imperative that entrepreneurial education be incorporated into TVET curricula in this era of digital revolution. In order to develop a new generation of entrepreneurs who are knowledgeable about digital technology and business strategies, this empowerment is essential (Guan et al. 2019; Wang et al. 2022). The ecosystem model for TVET shown in Figure 2 illustrates the elements that are often thought to encourage and accelerate the high-quality application of entrepreneurial learning. These elements, which are indicative of TVET, are equally pertinent to a strategy that integrates entrepreneurial learning across the whole education and training system at all learning levels (McCallum 2019).

FIGURE 1. Entrepreneurial learning ecosystem in TVET
Sources: McCallum 2019

The onset of the digital era has completely changed how companies operate. The global economy now depends more and more on digital entrepreneurship due to the widespread use of social media, the internet, and e-commerce platforms (Demiroglu 2021; W Anggraeni & Persada 2021). It presents previously unheard-of chances for economic expansion, employment development, and innovation (Kimutai & Gakobo 2022). This makes the inclusion of digital entrepreneurship education in TVET programs crucial since it fills the knowledge gap between traditional vocational skills and the demands of the contemporary digital economy.

Digital entrepreneurship education in TVET curriculum covers a broad spectrum of competencies. It involves knowing how to use the many digital tools and platforms necessary for managing a business in the 21st century, as well as digital marketing tactics, e-commerce, web development, and digital finance management. Moreover, it involves cultivating a mindset for innovation, critical thinking, and adaptability, which are vital skills in the rapidly changing world of digital business (Roslan & Abd Ghafar 2021; Tatpuje et al. 2022).

The workforce's and the job market's evolving characteristics emphasize the significance of this integration even more. As artificial intelligence and automation transform many industries, there is an increasing need for workers who possess not only technical expertise but also entrepreneurial spirit and flexibility (Harahap et al. 2023). By incorporating digital entrepreneurship into TVET, educators can prepare students not just for jobs but for careers as innovative entrepreneurs and leaders in the digital age.

However, implementing digital entrepreneurship education in TVET is not without its challenges. It requires a significant overhaul of current curricula, teaching methodologies, and resources. In order for educators to successfully teach these new subject areas, they must receive the appropriate training, and students must have access to the platforms and technology tools. Furthermore, there needs to be a strong link between TVET institutions and the industry to ensure that the skills and knowledge imparted are relevant and up-to-date (Roslan & Abd Ghafar 2021; Tatpuje et al. 2022).

In order to prepare a future workforce capable of navigating and creating the digital economy, digital entrepreneurship education must be integrated into Technical and Vocational Education and Training (TVET). This is an action that will help achieve both the more general objectives of social and economic development as well as the needs of individual students. The importance of TVET in fostering the next wave of digital entrepreneurs grows as we move forward in this digital era (Zhao et al. 2023). This article aims to explore this integration in depth, examining its implications, challenges, and the potential pathways to its successful implementation.

AN OVERVIEW OF TECHNICAL AND VOCATIONAL (TVET) EDUCATION

Technical and Vocational Education and Training (TVET) is an integral part of global education systems, providing a pathway to empower individuals with practical skills and vocational knowledge. TVET plays a critical role in helping close the skills gap across a range of industries, especially in an era where technological advancements and market demands are rapidly evolving. The United Nations Educational, Scientific and Cultural Organization (UNESCO) emphasizes the significance of TVET in fostering sustainable development and improving the employment prospects of young people and adults (McCallum 2019). This educational approach is tailored to develop specific skill sets and knowledge bases, enabling learners to be industry-ready, contributing directly to the workforce and the economy.

In Malaysia, TVET plays an important role in the country's education system. The Malaysia Ministry of Education on its official website states that TVET is an educational and training process with a career-oriented direction, with a primary emphasis on industry practices aimed at producing competent workforce in certain fields. The scope of TVET needs to be based on recognized job standards, with an emphasis on practical components, psychomotor skills, and exposure to industrial training. The Malaysian government, as outlined in the Eleventh

Malaysia Plan (2016-2020), has placed a strong emphasis on enhancing TVET programs to meet the demands of the industry and to address the country's unemployment issues (Dahalan et al. 2020). The plan focuses on aligning TVET institutions with industry needs, ensuring that the curriculum and training provided are relevant and up-to-date. The marketability of Technical and vocational education and training (TVET) graduates is a significant aspect in encouraging Malaysia's economic growth and development (Rus et al. 2023). This alignment is essential in creating a workforce that is not only technically proficient but also adaptable to the changing technological landscape. Furthermore, Malaysia's commitment to TVET is reflected in its efforts to elevate the status of vocational education, making it a preferred choice for youth and thereby reducing the skill mismatch in the job market (Kementerian Pendidikan Malaysia 2015).

TVET is one of the fields of education aimed at producing skilled workers for the country's economic development. The United Nations Organization for Education, Science and Culture (UNESCO) defines TVET as an aspect of the educational process besides general education that involves learning in the fields of technology and science, practical skills training, attitudes, understanding, and knowledge about jobs in various economic sectors and social life (Shafarizan Abd Samad et al. 2019). The government is highly committed to upgrading and making TVET institutions in Malaysia a choice for students to further their studies. The government's commitment is very high in advancing the infrastructure of TVET education, and this is evidenced by the increasing allocation in this field from year to year (Mohd Azrone Sarabatin 2019).

In the context of an increasingly dynamic global education, Vocational and Technical Education (TVET) has played an important role in preparing a skilled and competitive workforce (Abd Majid et al. 2022). In Malaysia, TVET is not only seen as an alternative track in education but also as a major driver in the development of skill-oriented human capital. TVET programs in Malaysia have evolved in line with industry and economic needs, offering students the opportunity to acquire technical and vocational skills relevant to today's job market needs (Noorizda Emellia Mohd Aziz et al. 2018).

The importance of TVET in the country's education ecosystem cannot be taken lightly. As technology and innovation change the economic landscape, the need for a workforce that is not only skilled technically but also flexible and adaptable becomes increasingly important. TVET provides a platform for continuous learning that integrates theory and practice, ensuring graduates are not only prepared in terms of technical skills but also possess critical thinking skills, creativity, and the ability to innovate (Mesuwini et al. 2023). This directly contributes to the country's economic development and enhances Malaysia's competitiveness on a global stage.

Globally, TVET is seen as a catalyst for sustainable development. According to the International Labour Organization (ILO), effective TVET systems are key to tackling global challenges such as unemployment, poverty, and environmental degradation (McCallum 2019). By providing skills that are directly applicable to the labor market, TVET enhances employability and entrepreneurial opportunities, thus contributing to economic development and social inclusion. In the context of the Sustainable Development Goals (SDGs), particularly Goal 4 which aims to ensure inclusive and equitable quality education, TVET plays a vital role in equipping individuals with the necessary skills to thrive in a fast-changing world (Jayasooria & Yi 2023). As such, investing in and prioritizing TVET is not just an educational imperative, but a strategic move towards achieving broader economic and social goals on a global scale.

IMPLICATIONS DIGITAL ENTREPRENEURSHIP IN TVET EDUCATION

According to the most recent definitions, Entrepreneurship is a type of specialized economic venture that operates like a business with the emphasis on creating and offering products and services (Gutterman 2021). Hence, digital entrepreneurship is slightly different from conventional entrepreneurship in that it is predominately or totally online, meaning it is built around the usage of ICT and the Internet. In actuality, the digital entrepreneur is the person who establishes and runs an internet-based enterprise, leveraging web-based resources like AI and digital marketing to accomplish their objectives (Jo 2023). Figure 2 below illustrates the opportunities presented by digital entrepreneurship in aiding entrepreneurs to expand their businesses in the increasingly evolving era of technology.

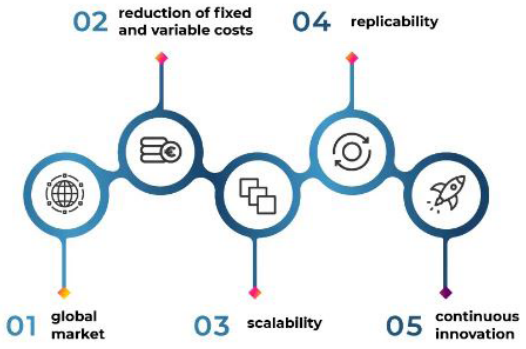

FIGURE 2. The opportunities offered by digital entrepreneurship. (Source: Jo 2023)

In the context of TVET education, digital entrepreneurship is a critical component that enables students to develop a range of essential skills, such as problem-solving, creativity, and collaboration, preparing them for the rapidly changing digital landscape and equipping them with the skills necessary to succeed in the modern world of work. The integration of digital technology in TVET education is a key focus area for researchers and educators alike. Numerous studies have shown that students actively engaged in digital entrepreneurship initiatives, such as social entrepreneurship, demonstrate an increased reliance on digital technology, which contributes to the enhancement of their skill sets and prepares them for the digital economy (Jamil et al. 2023).

Innovation is another crucial aspect of TVET education, particularly in the context of digital entrepreneurship. As the workforce and economy evolve, it is essential for TVET education to adapt to these changing demands. This includes incorporating new activities, such as the Development of applied research, business incubators, and intellectual property activities, to enhance local innovation capacity and create greater social and economic impacts (Alyani & Guile 2017). The development of digital pedagogy policy for TVET students is a further essential aspect of digital entrepreneurship in education. The Fuzzy Delphi Technique (FDT) has been used to determine the experts' consensus on the objectives of the digital pedagogy policy for TVET students (Jamil et al. 2023). This policy is crucial for promoting the effective use of digital platforms in vocational colleges and ensuring that students are well-prepared for the digital economy.

The impact of digital entrepreneurship on TVET outcomes is a significant area of study, particularly in the context of preparing students for the rapidly changing digital landscape and the modern world of work. A comparative study on advanced skills of technology and entrepreneurial skills with the awareness and preparedness among rural youths emphasizes the importance of integrating digital entrepreneurship into the TVET curriculum to meet the requirements of the 4th Industrial Revolution (4IR) and enhance students' competencies (Tatpuje et al. 2022).

The study highlights that life skills, applied transformational skills, soft skills, skills of digital entrepreneurship, and ICT should be inherent components of the Entrepreneurship Education (EE) curriculum, underscoring the crucial role of digital entrepreneurship in TVET outcomes (Korzhov & Pasko 2021). Furthermore, the study addresses the significance of digital pedagogy for TVET and EE in the post-COVID era, emphasizing the need to identify industry trends, job demands, and possibilities that may arise in the 4IR. It also aims to explore the opportunities of the 4IR for enhancing Entrepreneurship Education in TVET for the entry-level workforce and provide recommendations for TVET of the 4IR and Entrepreneurship Education (Cera et al. 2020; Cui et al. 2021).

ISSUE AND CHALLENGE INTERGRATION DIGITAL ENTREPRENEURSHIP IN TVET EDUCATION

Digital entrepreneurship has become increasingly important in Technical and Vocational Education and Training (TVET) due to the rapid development of technology and the need for innovation in the workforce. However, the integration of digital entrepreneurship in TVET education poses several challenges and issues that need to be addressed. This article aims to explore these challenges and issues and provide recommendations for the integration of digital entrepreneurship in TVET education.

One of the main challenges in integrating digital entrepreneurship in TVET education is the lack of digital skills among TVET educators and students. According to a research on TVET teacher training in South Africa, digital skills are not embedded in TVET lecturers' training programs (Zascerinska 2022). This lack of digital skills can hinder the effective integration of digital entrepreneurship in TVET education. The rapid evolution of digital technologies requires educators to continuously update their knowledge and teaching methodologies (Onyema 2020). TVET educators have a need for professional development. The ability of educators to adapt and teach modern digital knowledge and skills is a major factor in the success of incorporating digital entrepreneurship in TVET.

The lack of entrepreneurship education in TVET programs is another issue that needs to be addressed. A literature review on the theoretical gap of knowledge work between knowledge and skilled workers found that entrepreneurship education is not embedded in TVET lecturers' training programs (Janis et al. 2021). This lack of entrepreneurship education can hinder the development of digital entrepreneurship skills among TVET students.

The gap between current TVET curricula and the dynamic requirements of digital entrepreneurship is another issue. Conventional TVET programs may not sufficiently address the wider range of digital literacy and entrepreneurial skills needed in today's digital economy because they are primarily focused on particular vocational skills. This gap calls for a thorough revision of the current curriculum to incorporate instruction in digital marketing, e-commerce, digital skills training, and other relevant topics (Tatpuje et

al. 2022). Others emphasize the necessity for curriculum revision in order to effectively integrate these components and focus on the gap that exists between traditional TVET curricula and the demands of the modern digital economy.

The availability and accessibility of the infrastructure and resources needed for this kind of integration presents a further significant challenge. A lot of TVET institutions, particularly those in developing countries, face with a lack of modern computers, speed internet access, and digital learning tools. The effective implementation of digital entrepreneurship education is complicated by this lack of infrastructure (Bulatova et al. 2023). The importance of strong digital infrastructure in TVET institutions to support the integration of digital entrepreneurship, emphasizing that without this, the effectiveness of such programs is severely compromised.

The integration of digital entrepreneurship in TVET faces the challenge of aligning with industry needs and expectations. It is essential for TVET programs to be closely connected with the industry to ensure that the skills taught are relevant and meet current market demands. This requires establishing strong partnerships between educational institutions and the business community (Tennakoon et al. 2020).

POTENTIAL PATHWAYS FOR DIGITAL ENTREPRENEURSHIP IN TVET EDUCATION

TVET landscape is changing due to the shift to a green economy, the use of digital technologies in the workplace, and the rise of new forms of entrepreneurship. This is opening up new opportunities for developing innovations that address social and economic issues. (Rauner & Dittrich 2006). As a result, TVET systems are increasingly focusing on improving their capacity to identify the future demand of skills, such as soft and specific technical skills, including digital, greening, and entrepreneurial skills, and expanding access to these skills (Mbore 2021).

One way to enhance the social and economic benefits of TVET is by incorporating new activities, such as applied research, business incubators, and intellectual property activities, with the aim of enhancing local innovation capacity and creating greater social and economic impacts (Dahalan et al. 2018). These changes represent a great challenge for the future of TVET, but they also present opportunities for innovation and growth in the sector. In this context, it is crucial to address the digital skills gap in TVET education, as TVET lecturers play a central role in preparing students for the digital world. However, the research on TVET lecturers' training programs often overlooks the importance of digital skills and entrepreneurship education in TVET. To address this gap, it is necessary to implement empirical studies analyzing TVET training programs and their incorporation of digital skills and entrepreneurship education (Zascerinska 2022).

Creating a curriculum that combines technical skills with digital enterprises is another pathway. In addition to standard vocational studies, this curriculum should cover topics like digital marketing, e-commerce, and data analytics. In order to enable students to apply their learning in real-world situations, the pedagogical method needs to be interactive and project-based (McCallum 2019). This method develops students' critical thinking and problem-solving skills in addition to giving them the necessary tools.

Promoting partnerships between TVET institutions and the digital business industry is another important pathway. These kinds of collaborations can give students real-world experience to digital entrepreneurship and useful ideas. Students have the opportunity to network and receive invaluable mentoring from professionals in the business (Chye Fhern Yeap et al. 2021). The benefits of industry participation in educational initiatives for job preparedness and learning outcomes for students.

Digital platforms and tools must be included into TVET curriculum. This involves training students in the use of current digital technologies relevant to entrepreneurship, such as social media analytics tools, e-commerce platforms, and digital finance systems (Agrawal & Ting 2022). Familiarity with these digital tools enhances the students' ability to start and manage online businesses effectively, thus bridging the gap between vocational training and digital entrepreneurship. Students now enjoy many advantages from the use of technology in the classroom, such as increased motivation, a focus on student-centered learning, and active engagement in the educational process (Ridhuan et al. 2023).

CONCLUSION

In conclusion, the integration of digital entrepreneurship education into Technical and Vocational Education and Training (TVET) is crucial in preparing students for the rapidly changing digital economy. It fills the knowledge gap between traditional vocational skills and the demands of the contemporary digital world, equipping students with the necessary skills and mindset for innovation and adaptability. However, implementing digital entrepreneurship education in TVET comes with challenges such as curriculum overhaul, teacher training, and industry relevance. Nonetheless, this integration is essential for fostering the next generation of digital entrepreneurs and leaders.

However, there are several challenges and issues that need to be addressed, including the lack of digital skills

among educators and students, the absence of entrepreneurship education in TVET programs, the gap between current curricula and the requirements of digital entrepreneurship, the lack of infrastructure and resources, and the need to align with industry needs. Potential pathways for digital entrepreneurship in TVET education include incorporating new activities like applied research and business incubators, creating a curriculum that combines technical skills with digital enterprises, promoting partnerships with the digital business industry, and integrating digital platforms and tools into the curriculum.

In the journey towards a future where TVET and digital entrepreneurship education are seamlessly integrated, we stand at a turning point. This integration is not just an educational enhancement but a necessary step in preparing a workforce equipped for the digital era. As we embrace this change, we must collectively strive to ensure that our education systems evolve to meet the demands of an increasingly digitalized world economy.

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DECLARATION OF COMPETING INTEREST

None

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