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## Article

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# Using technology acceptance model to investigate digital business intention among Indonesian students

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## ABSTRACT

The digitalization of entrepreneurship articulates concepts from various streams of literature to promote entrepreneurial intentions. This study investigates the influence of digital entrepreneurship education, perceived usefulness, and perceived ease of use on digital entrepreneurial intentions. Drawing on knowledge-based literature, this research explores the mediating effect of digital entrepreneurial self-efficacy. The data were collected from 309 university students in Indonesia through a self-administered survey, and the hypotheses were estimated using PLS-SEM with Smart-PLS 3.0. The findings indicate that digital entrepreneurship education significantly affects digital entrepreneurial self-efficacy and intention among Indonesian students. This study also demonstrates that the variables of the technology acceptance model can promote digital entrepreneurial self-efficacy and intention. In addition, the result confirms the mediating role of digital entrepreneurial self-efficacy in explaining the association between digital entrepreneurship education, perceived ease of use, and entrepreneurial intentions.

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## 1. Introduction

Creating new ventures is essential to the economic prosperity of both developed and emerging countries. Some studies reported that new business initiations have the potential to create jobs, generate wealth, and foster innovation, all of which are critical components of economic development (Alferaih, 2022; Kollmann et al., 2022). From the educational side, the universities in many countries have responded by promoting new business creation through entrepreneurship education and raising entrepreneurial intentions among students (Saptono et al., 2021; Wardana et al., 2023). Universities can extend a platform to promote entrepreneurial intention within students through various initiatives, such as entrepreneurship programs, incubation centers, and start-up accelerators (Mukhtar et al., 2021). These initiatives provide students the necessary resources, guidance, and mentorship to pursue their entrepreneurial intentions and new business creations (Ratten & Usmanij, 2021).

The rapid development of digital technologies is seen as essential for reshaping the social economy, including entrepreneurial activities. Digitalization continues to expand and change economic behavior from offline to online activity using digital platforms (Alferaih, 2022). Hence, the urgency for digital entrepreneurial intentions increases due to a growing market demand for digital products or services (Saptono et al., 2021). Preliminary papers mentioned that digitalization promotes opportunities for aspiring digital entrepreneurs (Alferaih, 2022; Youssef et al., 2021). Concerning Indonesia, there is an increasing demand for internet usage.

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According to the data from the Ministry of Communications and Informatics (Kominfo, 2023), the number of Internet users in Indonesia has touched 82 million. With this achievement, Indonesia ranked eighth largest in the sphere (Kominfo, 2023). This has the potential to involve digital entrepreneurial intention and behavior.

In response to the sophistication of technology, Internet usage, and digital market demands, digitalization provides new opportunities to integrate digital technology and entrepreneurial activities. Digital entrepreneurship offers new and prominent insights for entrepreneurs compared to conventional models as it relies on faster and more massive business opportunities (Elia et al., 2020; Kollmann et al., 2022). Additionally, digital entrepreneurship notably changes the conventional business model and brings many positive effects, such as in terms of time efficiency, increased profits, business expansion, and ease of access for both entrepreneurs themselves and consumers (Nambisan et al., 2017; Nambisan & Baron, 2021). From student perspectives, digital entrepreneurship enables them to work from any location with internet access, providing them the flexibility to balance their academic and business matters.

The superiority of digital entrepreneurship has fostered the need for education transformation from conventional to digital-based activities. In particular, entrepreneurship education is a process of promulgating knowledge, skills, attitudes, and competencies to prepare students to identify, create, and manage a business venture (Ratten & Usmanij, 2021). In this context, digital entrepreneurship education enables a content adaptation linked with cognitive abilities to concede opportunities and inaugurate new business creation (Nowiński et al., 2019). Digital entrepreneurship education also provides knowledge on how to commence a business undergoing a digital platform (Clinkard, 2018). The diverse approach in digital entrepreneurship education also facilitates students with adaptation and openness to various changes in the new digital environment (Kickul et al., 2018).

Despite the significance of digital entrepreneurship and the role of education, however, few studies have analyzed the predictors of digital entrepreneurship. A large number of scholars are taking points from conventional entrepreneurial perspectives in understanding entrepreneurial intentions among students (e.g., Barba-Sánchez et al., 2022; Fragoso-Díaz et al., 2021; Mahfud et al., 2020). The prevailing studies (e.g., Younis et al., 2020) investigated the motivation factors linked to digital entrepreneurship intention among students, while a recent study by Alferaih (2022) reported that subjective norm, perceived feasibility, and innovativeness can promote the digital entrepreneurial intentions of students. Additionally, most studies are performed on digital entrepreneurship intention using a systematic literature review (Hueso et al., 2021; Seow, 2022).

Therefore, this study is intended to fill the gap by providing an empirical examination of factors affecting digital entrepreneurship in Indonesia. This study provides some contributions to theory and practice. First, this paper contributes to the current business and entrepreneurship literature by exploring how digital entrepreneurship education can promote business intention. In addition, it offers a greater understanding of digital entrepreneurship in emerging countries, i.e., Indonesia. In particular, our study found that digital entrepreneurship education is a powerful tool for increasing insight and knowledge related to the digital entrepreneurship of students. Second, this research contributes to the study theme of the emerging relevance of digital technologies by revealing how digital technology adoption contributes positively to entrepreneurial self-efficacy and the intention to become digital entrepreneurs along with entrepreneurship education.

This study proposes the following research questions: (RQ1) how does digital entrepreneurship education promote digital entrepreneurial intentions? (RQ2) how do the variables of the technology acceptance model influence digital entrepreneurial intentions? and (RQ3) how does digital entrepreneurial self-efficacy mediate the variables involved in this research? The rest of the research dispenses a literature review on digital entrepreneurship in Section 2, followed by the method used to confirm the hypothesis in Section 3. Accordingly, Section 4 and Section 5 provide the result and discussion, supported by the conclusion in Section 6.

## 2. Literature review

### 2.1 Underpinning theory

The technology acceptance model (TAM) is appropriate for explaining the acceptance of technology use. It was initiated by Davis (1986) as an extension of the theory of reasoned action (TRA) by Ajzen and

Fishbein (1975). The digital market and economic activities are affected by technology, and digitalization can be involved in entrepreneurial activities. The model for digital entrepreneurship intention is founded on the theory of planned behavior (TPB) by Ajzen (1991). This theory illustrates how perceived intentions and expediency can be influenced by various factors such as knowledge, education, and circumstance, which can drive feasibility perceptions. According to this model, a range of factors has a direct impact on the intention to demonstrate an obvious behavior, while external factors like enumeration and educational foreground have no direct influence on an individual's intentions (Ajzen, 1991; Kolvereid, 1996; Linan, 2004).

In principles, TAM can be applied to numerous domains, including digital entrepreneurial intention and behavior. In this context, TAM enables to understand the dimensions that influence individuals' intention to be involved in digital entrepreneurship using technology. The technology acceptance model (TAM) proposes that an individual's intention to use a technology is primarily influenced by two key factors: the perceived benefit of using the technology and the ease of using it. TAM identifies perceived usefulness (PU) and perceived ease of use (PEOU) as primary factors driving an individual's intention to involve a technology. PU refers to how much a person believes that using the technology will raise their performance, while PEOU remarks to the extent to which a person believes that involving the technology will help to deal with goals.

## ***2.2 Digital entrepreneurship education, entrepreneurial self-efficacy, and digital entrepreneurial intention***

Digital entrepreneurship education (DEE) is becoming increasingly important in today's economy (Ratten & Usmanij, 2021). With the rise of digital technologies, there has been a shift towards entrepreneurship from traditional to digital matters. This has created a demand for DEE that prepares students for the challenges of starting and running a successful digital business (Mukhtar et al., 2021). The majority of authors noted that entrepreneurship education has remained an entry point for escalating conventional and digital entrepreneurship intentions of students during the few recent years (e.g., Dimcheva, 2019; Zen et al., 2022). A prior study by Ratten and Usmanij (2021) noted that the purpose of DEE is not only to equip students with knowledge but also to change their mindsets regarding innovative activities and risk-taking in entrepreneurship. To determine whether student behavior has been changed, it is required to focus on entrepreneurship education, which incorporates both cognitive and affective domains (Saptono et al., 2021).

DEE has been shown to be effective in developing entrepreneurial self-efficacy—an individual's belief accompanying the skills and abilities necessary to start and run a business. Research has shown that entrepreneurial self-efficacy is a robust predictor of entrepreneurial intention, which is the desire to start a business (Alferaih, 2022). Several studies have investigated the interconnectedness between digital entrepreneurship education, entrepreneurial self-efficacy, and entrepreneurial intention. For instance, a work by Al-Mamun et al. (2022) indicated that digital entrepreneurship education had a positive effect on both entrepreneurial self-efficacy and entrepreneurial intention. Similarly, Wang et al. (2020) reported that DEE has a statistically significant effect on students' entrepreneurial intention, in which this effect is partially mediated by students' perceived entrepreneurial self-efficacy. The study also found that the effect of DEE on students' entrepreneurial intentions is stronger for those who have prior entrepreneurial experience.

Overall, the literature claims that digital entrepreneurship education effectively enhances entrepreneurial self-efficacy and increases digital entrepreneurial intention (DEI). For instance, Jena (2020) reported that DEE, when carried out effectively and accompanied by systematic practice, will significantly influence student intentions. Indeed, the studies of Ho M-HR et al. (2018) noted that DEE has the potential to positively impact entrepreneurs by boosting their profitability, entrepreneurial mindset, attitude, and chances of success. Multiple studies (e.g., Ahmed et al., 2020; Bischoff et al., 2018) have shown that DEE is still a valuable tool for promoting entrepreneurial activity. As a result, universities are striving to enhance the role of entrepreneurship education by providing their graduates with the necessary knowledge for effective entrepreneurial creation and continuation. Based on this explanation, the hypothesis of the study is provided as follows.

**H1:** DEE will be positively related to DEI

**H2:** DEI will be positively related to DESE

### ***2.3 Perceived usefulness, perceived ease of use, and digital entrepreneurial intention***

Using the technology acceptance model (TAM) to study digital entrepreneurial intention can provide insights into the dimensions that promote a student's decision to pursue digital entrepreneurship. The concept of perceived usefulness (PU) is also relevant to digital entrepreneurship, as it refers to an individual's perception of how valuable a new technology or innovation will be in facilitating the success of their business (Davis, 1989). A prior study found a positive correlation between perceived usefulness and entrepreneurial self-efficacy (Venkatesh & Davis, 2000). When individuals perceive that a new technology or innovation will be useful in facilitating the success of their business, they are more likely to believe in their ability to inaugurate and run a business successfully. This belief stems from their confidence in their ability to overcome challenges and obstacles that may arise. PU is also a considerable factor in individuals' intention to use technology. A previous study reported that PU significantly impacts students' intention to become digital entrepreneurs (Chatterjee et al., 2022). Students who perceive digital technologies as useful for their entrepreneurial endeavors are more likely to have a positive attitude toward entrepreneurship and to pursue a digital entrepreneurship career (Rajesh, 2021; Soluk et al., 2021).

In addition to PU, perceived ease of use (PEOU) is a critical factor that affects digital entrepreneurial self-efficacy. Studies have reported that individuals who perceive digital entrepreneurship as easy to use have higher self-efficacy in starting and managing their ventures. For instance, Venkatesh and Bala (2008) stated that PEOU positively affects an individual's self-efficacy in digital entrepreneurship. They mentioned that individuals who perceived digital entrepreneurship as easy had higher self-efficacy than those who perceived it as difficult. Later, a prior study also recognized that PEOU also influences digital entrepreneurial intention. As an example, a study by Karimi et al. (2017) revealed that perceived ease of use is positively related to entrepreneurial intention among students.

Prompts scientists and practitioners are in agreement with corrective action (Davis, 1989). There is also a prominent link between PEOU and PU, indicating that PEOU is a predictor of PU. The robust connectivity between PEOU and PU indicates that those who find new technologies easy to use also discover them highly useful (Davis, 1989). The involvement of digital technology in entrepreneurship refers to the studies of Bharadwaj (2000) and Urbinati et al. (2020), namely the use of computer-based technology as a significant solution in entrepreneurship. For example, smartphone applications can profit from entrepreneurial activities due to low-cost allocation but reach a wider marketing segment, increase income, and provide flexibility in building and developing new businesses (Rajesh, 2021; Soluk et al., 2021). Thus, the hypothesis is presented below.

**H3:** PU will be related to DEI

**H4:** PU will be related to DESE

**H5:** PEOU will be related to DEI

**H6:** PEOU will be related to DESE

### ***2.4 The role of self-efficacy in mediating digital entrepreneurship education and entrepreneurial intention***

Digital entrepreneurship education is considered to be a new area of interest that aims to provide individuals with the skills and knowledge to stimulate and grow digital ventures. The majority of works have evidenced a positive impact of digital entrepreneurship education on entrepreneurial intention (Bilal et al., 2021; Yu et al., 2022). However, the effectiveness of digital entrepreneurship education programs depends on several factors, including the role of self-efficacy. Self-efficacy plays a critical role in mediating the association between digital entrepreneurship education and entrepreneurial intention. Some works have manifested the interconnectedness between self-efficacy, digital entrepreneurship education, and entrepreneurial intention. These works suggest that self-efficacy can take a role as a mediator in the relationship between digital entrepreneurship education and entrepreneurial intention (Bilal et al., 2021; Yu et al.,



2022). In short, digital entrepreneurship education can enhance an individual's self-efficacy, which in turn can escalate the entrepreneurial intention. Thus, the hypothesis is provided below.

**H7:** DESE will be related to DEI

**H8:** DESE mediates the influence of DEE on DEI

### ***2.5. The role of self-efficacy in mediating PU, PEOU, and digital entrepreneurial intention***

Entrepreneurial intention has long been considered important in promoting new business creation. While self-efficacy is often linked to the drive for entrepreneurship. Self-efficacy refers to beliefs in the motivation, cognitive resources, and ability to initiate actions necessary to meet the demands of a particular situation (Wood & Bandura, 1989; Zhao et al., 2005). Bandura (1986) elucidated that self-efficacy determines actions to take, effort to put in, how long it takes to persevere, and what methods to use in difficult situations. It has nothing to do with the number of skills but with the students' belief that they can do what they can in a various situations and circumstances (Bandura, 1997). Darmanto et al. (2022) noted that one of the main factors for successful technology adoption in entrepreneurship is related to students' self-efficacy.

Digital entrepreneurial self-efficacy (DESE) is crucial for building motivation that can affect individual opportunities, purposes, emotional reactions, efforts, and persistence. In this regard, students with better levels of self-efficacy favor to improve their abilities to accomplish certain tasks. Preliminary scholars have reported that perceived self-efficacy positively predicts accomplishment-related behaviors, such as motivation, effectiveness, and positive attitudes (Bachmann et al., 2021; Saeid & Eslaminejad, 2016). A preliminary publication showed that an increase in DESE is highly correlated with DEI (Darmanto et al., 2022). Finally, the results of Abdullah and Ward (2016) noted that the effect of PEOU on DESE confirms a positive and significant association. Meanwhile, Abdullah et al. (2016) also noted that PEOU and PU positively influence DESE. Therefore, the hypothesis is presented as follows.

**H9:** DESE mediates the influence of PU on DEI

**H10:** DESE mediates the influence of PEOU on DEI

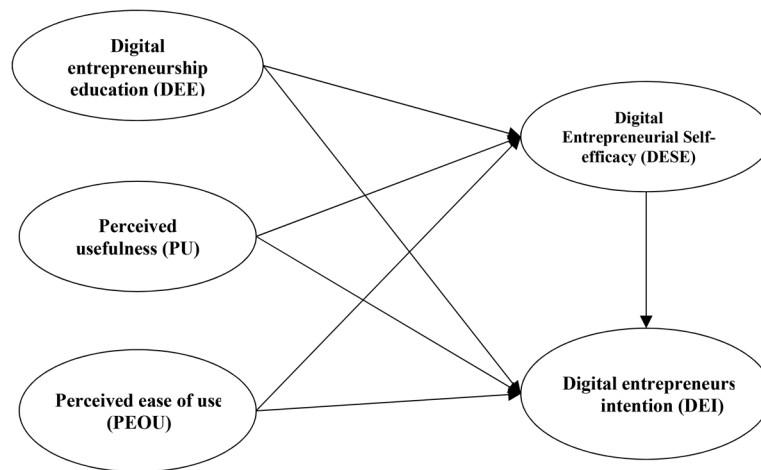
## **3. Method and materials**

### ***3.1 Design***

In this study, a cross-sectional survey with a quantitative approach was used to empirically validate a concept study model using structural equation models (PLS-SEM). PLS-SEM is contemplated suitable for this study as it has the highest potential to predict all construct relationships simultaneously, and it is widely implemented in business and entrepreneurship research (e.g., Nowiński et al., 2019). This paper is an initial attempt to investigate the mediating role of DESE in affecting DEI. In more detail, this research attempted to examine how DEE, PU, and PEOU directly promote DEI and also indirectly through DESE as a mediating variable (see Figure 1).

### ***3.2 Sample and data collection***

The Indonesian university students provided suitable research context as the Indonesian government campaigns to enhance the number of entrepreneurs among university graduates. This study adopted a convenience sampling directed at educational-based university students in Malang and Jakarta, Indonesia. The rationale of using convenience sampling is largely used by scholars on this theme (e.g., Nowiński et al., 2019). The research participants were defined as individuals who had followed education in entrepreneurship and were currently engaged in entrepreneurial pursuits. The determination of the geographical area for this research is due to the fact that the cities of Malang and Jakarta are well-known as educational centers in Indonesia. Moreover, the city of Malang is renowned for its burgeoning tourism



**Figure 1.** Research framework.

Source: Own elaboration based on Vejayaratnam et al. (2019), Hasan et al. (2017), Liñán and Chen (2009), Venkatesh and Bala (2008).

**Table 1.** Descriptive statistics of participants.

Characteristics	% (N=309)
Gender	
Female	50.4 (156)
Male	49.6 (153)
Age Statistics	
19-22 years old	60.5 (187)
23-25 years old	39.5 (122)
Min: 19 years old	9.4 (29)
Max: 25 years old	21.4 (66)
Mean	22.6
Median	23.0
SD	2.03
Year class	
2019	52.1 (161)
2020	47.9 (148)
Parents' occupation	
Entrepreneur	57.6 (178)
Teacher/Lecturer	16.1 (50)
Farmers	15.8 (49)
Civil Servants	10.5 (32)
Subject	
Management	33.3 (103)
Economic Education	33.6 (104)
Accounting	33.1 (102)

industry and the assistance offered by the local government to escalate the development of new businesses.

The research instrument was provided in self-administrated questionnaires using Google Forms, which were shared with participants using email and WhatsApp during September–November 2022, and we followed up three weeks later. In the provided questionnaires, the participants were asked for their anonymity, and it was informed that this research is intended for academic purposes only. Later, the information given by the respondents would be kept confidential. In addition, the institutional review board approved all ethical issues at Universitas Negeri Jakarta, Indonesia. Around 350 participants took part in this survey, and we found that 320 completed the questionnaires. In addition, we performed an investigation to determine the eligible responses, which resulted in 309 questions for further analysis. The profile of the respondents in this research is exhibited precisely in Table 1.

According to Table 1, over half of the participants in the survey were female (50.4%). In terms of their academic level, more than half were from the 2019 cohort (52.1%), with the remaining being from the 2020 cohort (49.6%). The majority of respondents had parents who were entrepreneurs (57.6%), while



only a small percentage had parents who were civil servants (10.5%). The table also shows that the most common major among respondents was economics education (33.6%), while accounting (33.1%) was the least common.

### 3.3 Measures

We extracted the measurement items in this research from well-established studies. We adopted back-to-back translation to ensure the comparability of original and translated items. The variables of the research were estimated on a five-point Likert scale ranging from (1) “strongly disagree to (5) “strongly agree”. In detail, digital entrepreneurship education (DEE) was measured by nine items proposed by Hasan et al. (2017) and Denanyoh et al. (2015), while perceived usefulness (PU) was calculated by adopting five items from Davis (1989) and Chin (2009). Later, the variable of perceived ease of use (PEOU) was measured using five items from Davis (1989) and Chin (2009). Additionally, for the measures of the digital entrepreneurial self-efficacy variable (DESE), we adopted five items from Zhao et al. (2005). Finally, digital entrepreneurial intention (DEI) was measured using eight items proposed by Liñán and Chen (2009) and Vejayaratnam et al. (2019).

### 3.4 Data analysis

Structural equation modeling was employed to investigate the hypotheses proposed. More precisely, variance-based partial least squares structural equation modeling (PLS-SEM) was applied as its superiority in estimating mediation analysis with a large number of sample sizes (Hair et al., 2017). Additionally, PLS-SEM has more advantages from high efficiency in parameter estimation in comparison to covariance-based structural equation modeling (CB-SEM). The procedure of analysis using PLS-SEM follows several stages, including outer model estimation, inner model evaluation, structural model, hypothesis analysis, and mediating testing.

## 4. Results and analysis

### 4.1 Outer model evaluation

A series of PLS-SEM guidelines from Hair et al. (2020) were applied to analyze the data. The first matter is to test the convergent validity of the variable. Hair et al. (2013, 2020) provided a cut-off value of the loading factor that must be 0.70 and over, as a condition for the variable to accomplish convergent validity. As depicted in Table 2, it can be remarked that of the nine items in the digital entrepreneurship education (DEE), five of them have a loading factor value ( $\lambda$ ) between 0.833 and 0.852 ( $> 0.70$ ), so they pass convergent validity. While the rest of the four items (DEE3, DEE6, DEE8, and DEE9) have to be removed since they have values lower than 0.70. Furthermore, of the eight DEI variable items, three items need to be removed, considering the values are smaller than the threshold ( $< 0.70$ ). In the digital entrepreneurial self-efficacy (DESE) variable, all four proposed items pass because they are greater than the threshold ( $> 0.70$ ). In the perceived usefulness (PU) variable, out of four items, two items (PU2 and PU3) must be dropped because they are smaller than the threshold ( $< 0.70$ ). Finally, on the perceived ease of use (PEOU) variable, four items meet the threshold ( $> 0.70$ ) so that it meets convergent validity. Table 2 also informs that all models have been good according to the suggestion of Hair et al. (2013, 2020), where Cronbach's alpha ( $\alpha$ ) is higher at 0.70, composite reliability (CR) is higher at 0.70, and average variance extracted (AVE) is higher at 0.50.

The next procedure that follows the trace of Hair et al. (2013, 2020) is to assess the discriminant validity. Hair et al. (2013, 2020) provided a cut-off value of cross-loading for each variable should higher or equal to 0.70, so that the variable meets discriminant validity. Table 3 exhibits that the cross-loading value of the DEE, DEI, DESE, PEOU, and PU variables  $> 0.70$ , so that all variables meet convergent validity.

**Table 2.** Measurement model.

Items	$\lambda$	$\alpha$	CR	AVE	Mean	SD
<b>Digital entrepreneurship education (DEE)</b>		0.899	0.925	0.713		
DEE1	0.848				3.638	1.066
DEE2	0.852				3.967	0.983
DEE4	0.842				3.481	1.220
DEE5	0.833				3.543	1.060
DEE7	0.847				3.152	1.259
<b>Digital entrepreneurial intention (DEI)</b>		0.851	0.893	0.626		
DEI1	0.792				3.933	1.089
DEI3	0.793				4.314	0.974
DEI5	0.772				3.690	1.282
DEI6	0.857				3.810	1.220
DEI7	0.740				3.652	1.230
<b>Digital entrepreneurial self-efficacy (DESE)</b>		0.857	0.903	0.701		
DESE1	0.850				3.481	1.001
DESE2	0.806				3.595	0.922
DESE3	0.823				3.500	1.143
DESE4	0.868				3.321	1.210
<b>Perceived usefulness (PU)</b>		0.820	0.840	0.724		
PEOU1	0.860				3.390	1.159
PEOU4	0.842				3.476	1.101
<b>Perceived ease of use (PEOU)</b>		0.838	0.891	0.673		
PU1	0.877				3.405	1.228
PU2	0.724				3.190	1.254
PU3	0.811				3.143	1.287
PU4	0.861				3.122	1.231

Note. CR=composite reliability,  $\alpha$  = Cronbach's alpha, AVE=average variance extracted,  $\lambda$  = loading, SD=standard deviation.

**Table 3.** Discriminant validity.

	DEE	DEI	DESE	PEOU	PU
DEE	0.844	–	–	–	–
DEI	0.775	0.791	–	–	–
DESE	0.557	0.620	0.837	–	–
PEOU	0.672	0.690	0.612	0.851	–
PU	0.582	0.621	0.519	0.768	0.821

Note. DEE=digital entrepreneurship education, DEI=digital entrepreneurial intention, DESE=digital entrepreneurial self-efficacy, PEOU=perceived ease of use, PU=perceived usefulness.

**Table 4.** Discriminant validity using HTMT.

	DEE	DEI	DESE	PEOU	PU
DEE	0.877	–	–	–	–
DEI	0.632	0.724	–	–	–
DESE	0.632	0.724	0.836	–	–
PEOU	0.898	0.841	0.591	0.805	–
PU	0.667	0.725	0.591	0.805	–

Note. DEE=digital entrepreneurship education, DEI=digital entrepreneurial intention, DESE=digital entrepreneurial self-efficacy, PEOU=perceived ease of use, PU=perceived usefulness.

Although cross-loading has been tested, the majority of scholars believe that the criteria of Fornell and Larcker (1981) and Chin (2009) must be complemented by the criteria of Henseler et al. (2014) and Henseler and Schuberth (2020), namely a heterotrait-monotrait (HTMT) ratio. According to the results of the HTMT evaluation, the constructs of DEE, DEI, DESE, PEOU, and PU have a ratio value of < 0.90 to meet the threshold (Table 4).

## 4.2 Assessing structural model

Once we completed testing the outer model, we prosecuted with testing the structural model using the analysis stage outlined by Hair et al. (2013, 2020). During the inner model test, we carried out some procedures, including a check for multicollinearity, an R-square test, an F-square test, and the Q-square predictive test. Our first step was to check for multicollinearity between the variables. Hair et al. (2013) recommended using the Variance Inflation Factor (VIF) coefficient for this check, with a VIF threshold of

**Table 5.** Variance inflation factor (VIF).

	DEE	DEI	DESE	PEOU	PU
DEE		1.972	1.858		
DEI			1.712		
DESE		3.245		2.998	
PEOU		2.498	2.488		
PU					

Note. DEE=digital entrepreneurship education, DEI=digital entrepreneurial intention, DESE=digital entrepreneurial self-efficacy, PEOU=perceived ease of use, PU=perceived usefulness.

**Table 6.**  $R^2$  estimation.

	$R^2$	Category
DESE	0.416	Moderate
DEI	0.680	Substantial

Note. DEE=digital entrepreneurship education, DEI=digital entrepreneurial intention, DESE=digital entrepreneurial self-efficacy, PEOU=perceived ease of use, PU=perceived usefulness.

**Table 7.**  $f^2$  estimation.

	$f^2$	Category
DEE → DEI	0.400	Large effects
DEE → DESE	0.361	Large effects
PU → DESE	0.386	Large effects
PU → DEI	0.217	Medium effects
PEOU → DEI	0.182	Medium effects
PEOU → DESE	0.282	Medium effects

Note. DEE=digital entrepreneurship education, DEI=digital entrepreneurial intention, DESE=digital entrepreneurial self-efficacy, PEOU=perceived ease of use, PU=perceived usefulness.

< 5.00. Upon examination of the VIF values, we found that they matched the VIF threshold of <5.00, indicating that there was no multicollinearity. Therefore, the variables DEE, DESE, PU, PEOU, and DEI did not exhibit collinearity. Table 5 presents the outcome of the collinearity evaluation, which demonstrates that all estimated construct is free from collinearity and can be used in the subsequent inner model estimation.

In the inner model test, the procedure is to use the R-Square ( $R^2$ ) evaluation to determine the robustness or vigor of the prediction of the endogenous latent constructs to the model. The benchmark  $R^2$  value serves as the attestation of the rigor of the prediction of endogenous variables to the model. Chin (2009) has provided criteria for  $R^2$  values of 0.67, 0.33, and 0.19, indicating a strong, moderate, and weak model.

From Table 6, it is witnessed that the DESE value of 0.416 means that DEE, PU, and PEOU can predict 41.6% of the DESE variant with moderate accuracy. Moreover, the DEI  $R^2$  value of 0.680 indicates that DEE, PU, PEOU, and DESE can accurately predict 68.0% of DEI variance. The research paper also evaluated the effect size ( $f^2$ ) undergoing the guidelines of Hair et al. (2013) and Chin (2009), where values of 0.02, 0.15, and 0.35 remark for small, medium, and large effect sizes, respectively.

The  $f^2$  estimation in Table 7 shows that DEE has an effect on DEI with a large/wide level ( $f^2$  value = 0.400). Similarly, DEE has an effect on DESE with a large/wide level ( $f^2$  value = 0.361). PU also influences DESE with a large level ( $f^2$  value = 0.386). Then successively the effect of PU on DEI, PEOU on DEI and PEOU on DESE is medium level ( $f^2$  = 0.217, 0.182, 0.282). In the fourth procedure, the value of  $Q^2$  is higher than 0, meaning to meet predictive relevance and vice versa. From the structural calculation, it concludes that the  $Q^2$  of the DEE, PU, PEOU, DESE, and DEI variables is better than 0, remarking that the model has accomplished the predictive relevance criteria. In addition, we performed a goodness of fit based on the research findings. Referring to the criteria of Henseler et al. (2014), the model is stated to be fit when the SRMR value is < 0.10, NFI > 0.90, or close to 1. Table 8 informs that the SRMR value is < 0.10 and the NFI value is > 0.90, or close to 1, indicating this research model is declared fit.

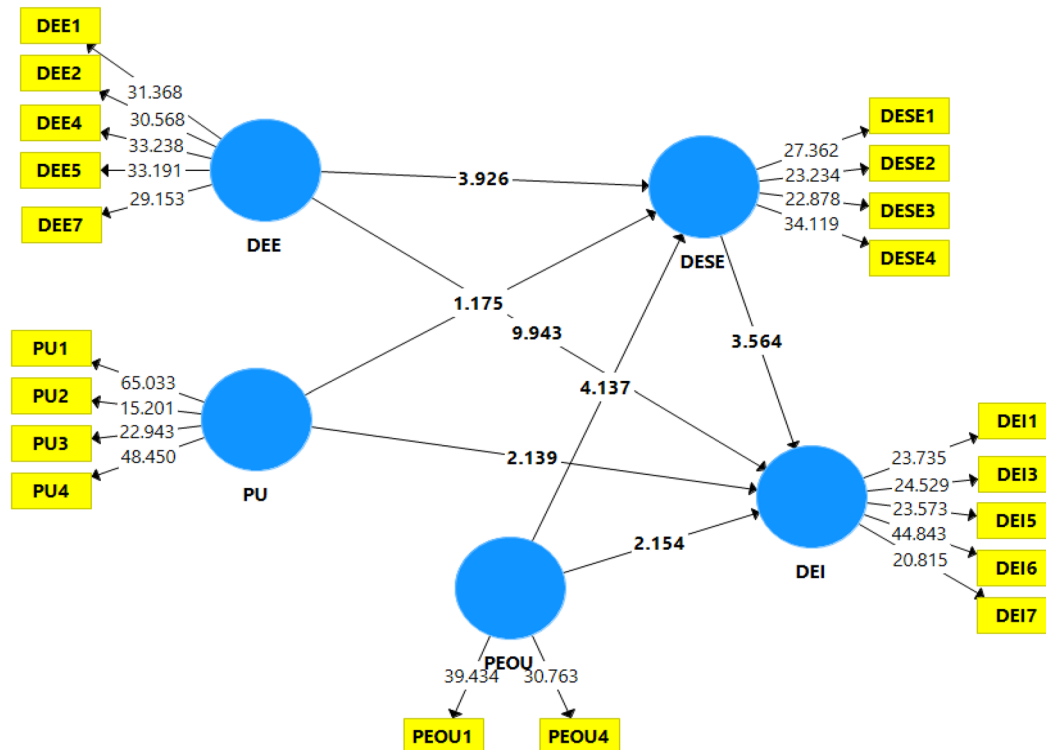
#### 4.2.1. Common method bias (CMB)

Since this study used a self-administrated online survey questionnaire, it has the fear of the existing bias. Thus, a common method bias (CMB) analysis needs to be performed. To diminish the chance of CMB, the participants in this survey were assured of confidentiality and anonymity. This study involved Harman's

**Table 8.** Evaluation result of fit model.

	Saturated model	Estimated model
SRMR	0.066	0.066
d_ULS	0.907	0.907
d_G	0.431	0.431
Chi-Square	782.723	782.723
NFI	0.916	0.916

Note. SRMR=standardized root mean squared residual, d\_ULS=the squared Euclidean distance, d\_G=the geodesic distance, NFI=Normed fit index.

**Figure 2.** The result of structural model.

single-factor test and resulted in the first factor appeared only for 29.6% of the variance, which is less than the threshold of 50% (Podsakoff et al., 2003). As advocated by Pesämaa et al. (2021), Harman's single factor is not robust enough to access CMB, thus, this study also followed Lindell and Whitney (2001) to estimate CMB. It occurs that the correlational differences of CMB and adjusted CMB for all the constructs are lower than 0.06, meaning to meet the criteria for CMB.

#### 4.3 Direct effects and indirect effects

Our final stage in testing the inner model is hypothesis testing, and the final structured model is illustrated in Figure 2. We evaluated the hypothesis by analyzing the model results undergoing the PLS-SEM bootstrapping resampling technique. To test the hypothesis, we set a *t*-test threshold with a *t*-count of 1.96 for one-tailed testing and the *p*-value < 0.05. As informed in Table 9, it was informed that DEE and DEI were significant (*t*-value = 0.943 > 1.96, *p*-value < 0.05), supporting H1. Indeed, DEE and DESE were statistically significant (*t*-value = 3.926 > 1.96, *p*-value < 0.05), confirming H2. Different from previous hypotheses, this study rejected the third hypothesis (H3), considering a *t*-value of 1.175 (< 1.96) and *p*-value of 0.120 (*p* > 0.05). It was also observed that H1, H2, H3, H4, H5, H6, and H7 were statistically significant, considering *t*-value and *p*-value have upper cut-off values. For the indirect estimation, this research adopted the suggestion from Preacher and Hayes (2008), using the criteria of the lower level (LL) of 5% and upper level (UL) of 95% that should not contain zero. As illustrated in Table 9, the finding

**Table 9.** Path coefficient.

Path	$\beta$	SE	t-value	p-value	BC		Decision
					LL	UL	
DEE $\rightarrow$ DEI	0.502	0.050	9.943	0.000	0.410	0.571	H <sub>1</sub> Supported
DEE $\rightarrow$ DESE	0.257	0.066	3.926	0.000	0.155	0.370	H <sub>2</sub> Supported
PU $\rightarrow$ DESE	0.077	0.066	1.175	0.120	-0.030	0.188	H <sub>3</sub> Not supported
PU $\rightarrow$ DEI	0.117	0.055	2.139	0.016	0.028	0.206	H <sub>4</sub> Supported
PEOU $\rightarrow$ DEI	0.147	0.068	2.154	0.016	0.027	0.257	H <sub>5</sub> Supported
PEOU $\rightarrow$ DESE	0.379	0.092	4.137	0.000	0.223	0.514	H <sub>6</sub> Supported
DESE $\rightarrow$ DEI	0.147	0.068	3.564	0.000	0.105	0.277	H <sub>7</sub> Supported
DEE $\rightarrow$ DESE $\rightarrow$ DEI	0.049	0.019	2.606	0.005	0.022	0.081	H <sub>8</sub> Supported
PU $\rightarrow$ DESE $\rightarrow$ DEI	0.015	0.014	1.923	0.155	0.005	0.042	H <sub>9</sub> Not supported
PEOU $\rightarrow$ DESE $\rightarrow$ DEI	0.072	0.026	2.800	0.003	0.031	0.800	H <sub>10</sub> Supported

Note. t-value > 1.96,  $p < 0.05$ , BC=bias corrected, UL=upper level, LL=lower level, SE=standard error,  $\beta$ = path coefficient, DEE=digital entrepreneurship education, DEI=digital entrepreneurial intention, DESE=digital entrepreneurial self-efficacy, PEOU=perceived ease of use, PU=perceived usefulness.

revealed that DESE can mediate DEE and DEI ( $t$ -value = 2.606,  $p$ -value = 0.005, LL = 0.022, UL = 0.081), confirming H9. Similarly, it was observed that DESE significantly mediates PEOU and DEI ( $t$ -value = 2.800,  $p$ -value = 0.003, LL = 0.031, UL = 0.800), supporting H10. However, this current survey is found deficient in explaining the role of DESE to mediate PU and DEI, since it does not meet the cut-off value.

## 5. Discussions

This study proposed a conceptual framework to examine how digital entrepreneurship education (DEE), perceived usefulness (PU), and perceived ease of use (PEOU) can influence digital entrepreneurial intentions (DEI). Later, this study also analyzes the mediating role of digital entrepreneurial self-efficacy (DESE). We discuss the results below.

First, the finding demonstrates that DEE has a robust influence on the DEI of students, and this result confirms some preliminary studies on this relationship (e.g., Ahmed et al., 2020; Bischoff et al., 2018). The explanation to support this finding is that DEE enables students to obtain entrepreneurial knowledge and digital abilities that shape their intention to be involved in digital business (Ratten & Usmanij, 2021). Compared to previous studies that focused on conventional entrepreneurship education, DEE provides a better cognitive understanding and capability of entrepreneurship (Saptono et al., 2021; Wardana et al., 2023). In addition to influencing DEI, the findings also show that DEE has an essential role in driving the DESE of students (Table 8). This result confirms several prior research which found that DEE was influential in increasing attitudes and mindsets, while DESE can enhance the innovation of an existing business (Saptono et al., 2021; Darmanto et al., 2022; Ratten & Usmanij, 2021). The results of this research are reasonable, considering that the cognitive domain elaborates on critical thinking ability, which is gathered from new knowledge and experience in entrepreneurship education.

Second, the empirical findings suggest that technology acceptance model (TAM) variables involved in this research can influence DESE and DEI. The results of this research corroborate some previous studies which stated that TAM variables can promote either DESE or DEI (Abdullah & Ward, 2016; Darmanto et al. (2022). The reason behind these findings is that users will consider perceived usefulness and perceived ease of use in confronting technological adoption (Teo et al., 2009). PEOU and PU directly influence the intention of digital entrepreneurship (Emmanuel et al., 2022). Some studies also note that the technology acceptance model variables influence the intention to engage technology in entrepreneurship and the intention to do digital-based entrepreneurship (Bharadwaj, 2000; Urbinati et al., 2020). For instance, the ease of use of smartphone applications in entrepreneurial activities has been beneficial in terms of low-cost allocation, a wider marketing segment, increased income, and flexibility in building and developing new businesses (Rajesh, 2021; Soluk et al., 2021). This remarks that PEOU and PU are the primary considerations for students related to their digital entrepreneurship intentions.

Although the results of previous studies indicate that PU has a direct effect on DESE, this study shows the opposite result (see Table 9: H3  $t$ -value  $1.175 < 1.96$ ). This indicates that the respondents involved in this study perceived that PU had no influence on DESE. The possible explanation for this surprising finding is that students do not become familiar with entrepreneurial technology for supporting business

activities. Thus, students have no information or prior knowledge about PU, and they perceive that PU does not really matter in promoting DESE. This empirical finding offers an important input for universities looking to increase digital literacy and entrepreneurial literacy to gain PU. Additionally, DEE not only provides knowledge to construct a business on a digital platform or develop a digital start-up but also provides a new perspective on DESE and how to integrate it into daily activities (Ratten & Usmanij, 2021). Later, perspectives that are diverse from these findings need to be strengthened in digital entrepreneurship education (Clinkard, 2018).

Lastly, the findings of the study confirm that DESE can mediate the influence of the variables involved in this study (see Table 9). These results strengthen some previous studies which remarked that DESE can mediate the influence of TAM variables and DEE on the DEI of students (Abdullah et al., 2016; Darmanto et al., 2022). The underlying reason for these findings is that self-efficacy is related to the belief in a person's ability to initiate motivation, cognitive resources, and actions demanded to fulfill the needs of a particular situation (Wood & Bandura, 1989; Zhao et al., 2005). Further, this study expands the social cognitive theory from Bandura (1986), which explicated that self-efficacy determines actions to take, how long to persist, and what methods to use in difficult situations.

### **5.1 Theoretical implications**

Based on the results of the analysis, this research provides several theoretical implications. Firstly, this paper proposes some educational implications that promote current digital entrepreneurship by increasing digital entrepreneurial intentions among university students. Secondly, it expands the theoretical literature that examines the relationship between digital entrepreneurship education, self-efficacy, and intentions (e.g., Volkmann & Grünhagen, 2022). Thirdly, this paper provides a dynamic and contextual approach to studying digital entrepreneurship education in the context of university students, escalating new business creation from universities. Lastly, the study of digital entrepreneurship intention and digital entrepreneurship education can contribute to the technology acceptance model (TAM) by providing empirical evidence on how entrepreneurship education and other factors influence individuals' adoption and use of digital entrepreneurship as a technology. The study highlights the prominence of digital entrepreneurial education, TAM, and entrepreneurial intention in the success of entrepreneurs. The output of the survey provides insights into the factors that influence the development of entrepreneurial intention among individuals. The study underscores the matter of incorporating digital technologies into entrepreneurship education to enhance the learning experience of entrepreneurs.

### **5.2 Practical implications**

In its practical implications, first, this study can enhance the development of effective digital entrepreneurship education programs that are tailored to the specific needs of individuals interested in starting and running a digital venture. In detail, the programs can be designed to address the knowledge and skills gaps identified in the study, such as technology use, online marketing, and financial management. Second, this present study has an implication for university policymakers to design the entrepreneurship curriculum based on the digitalization needed to enhance digital business creation among students. Third, the practical implications of this work are that policymakers and educators can use the findings to design educational programs that foster entrepreneurial intention. Policymakers and universities can use the findings to design and implement effective digital entrepreneurship education programs that foster the skills and competencies of entrepreneurs in the digital economy. Lastly, the teaching and learning activities in the classroom should favor experimentation and original approaches to creative ideas and innovation through a digital business proposal, which can be applied to digital business activities.

### **5.3. Limitations**

Like other works, this research has its limitations. First, a self-administered survey has a potential for bias in filling out the questionnaires, thus, it is advisable to provide printed-based questionnaires or

accompany students while they fill out the questionnaires. Second, the current research was conducted at the university level, and the data was collected from respondents in a few selected areas in Indonesia. The fact that the data was gathered in a specific location may affect the generalizability of the study's findings. Therefore, further researchers may elaborate on more provinces for data collection to reach a better understanding. Later, this study concerns the mediating role of entrepreneurial self-efficacy, while future scholars can consider other mediators, entrepreneurial ideas, and ecosystems. Lastly, the limitation is that the study was conducted in a specific cultural and educational context, and may not be generalizable to other contexts. Therefore, further research is required to understand the impact of digital entrepreneurship education, entrepreneurial self-efficacy, and digital entrepreneurial intention in other educational contexts.

## 6. Conclusion

This present study empirically investigates the link between DEE, PU, and PEOU on DEI, as well as explores the role of DESE in mediating the nexus between variables. The results show that DEE has a robust effect on DESE and intention to engage in digital entrepreneurship (DEI). Additionally, the influence of the technology acceptance model variables for DESE and DEI was revealed. Surprisingly, the findings document that perceived usefulness failed in influencing the DESE of students. Using structural equation modeling, this research confirms the mediating role of DESE in explaining DEE and DEI, as well as the link between PEOU and DEI. However, DESE failed to mediate PU and DEI.

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## Disclosure statement

No potential conflict of interest was reported by the author(s).

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