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ChatGPT adoption and digital entrepreneurial intentions: An empirical research based on the theory of planned behaviour

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ABSTRACT

Objective: The objective of the article is to adopt the theory of planned behaviour to explore how ChatGPT adoption in entrepreneurship can inspire individuals' intentions to become digital entrepreneurs underlying the nuanced mediation mechanism of psychological and cognitive constructs (attitude towards digital entrepreneurship, subjective norms, and perceived behavioural control).

Research Design & Methods: Drawing on the sample of 604 higher education students at six universities in Vietnam, I used Cronbach's alpha and confirmatory factor analysis to test the construct's consistent reliability and validity. Then, I used multiple regression to test hypotheses.

Findings: Results of the current research reported that ChatGPT adoption in entrepreneurship significantly and positively affects individuals' attitudes towards digital entrepreneurship, subjective norms, perceived behavioural control, and digital entrepreneurial intentions. Interestingly, three core antecedents in the theory of planned behaviour significantly mediate the impacts of ChatGPT adoption in entrepreneurship on digital entrepreneurial intentions.

Implications & Recommendations: The practical takeaways include enhancing education with tech-positive modules, personalized guidance for digital entrepreneurs, hands-on skill development through workshops, and AI-friendly policies for business integration.

Contribution & Value Added: The current research is the first study which provides empirical evidence indicating the impacts of ChatGPT adoption in entrepreneurship on individuals' attitudes towards digital entrepreneurship, subjective norms, and perceived behavioural control, which, in turn, inspire their digital entrepreneurial intentions. Thus, these findings contribute to the extent of entrepreneurship literature, especially in the landscape of the AI revolution.

Article type:	research article
Keywords:	ChatGPT adoption in entrepreneurship; Theory of Planned Behaviour; digital entrepreneurial intentions; attitudes towards digital entrepreneurship; subjective norms; perceived behavioural control
JEL codes:	L26, M13

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INTRODUCTION

Business venturing offers solutions to economic challenges and opens the doors for unemployed youths (Nguyen, 2023; Wach *et al*., 2023), especially in the digital economy (Davidsson & Sufyan, 2023). The Internet has revolutionized international commercialization, enabling businesses to function on a global level (Mir *et al*., 2022). Digital entrepreneurship often leads to business creation that empowers entrepreneurs to create, promote, negotiate, deliver, and sell their products and services within the Internet economy (Abaddi, 2023). The advent of the Internet has transformed the landscape of company ecosystems by shifting marketplaces online, attracting both novice and experienced en-

trepreneurs to engage in the realm of digital commerce (Davidsson & Sufyan, 2023). Consequently, exploring how technology-related factors affect youths' digital entrepreneurial intentions is vital to inspiring entrepreneurial activities in the digital economy.

Today, artificial intelligence (AI) is transforming the entrepreneurial terrain, bringing about a revolution in how businesses are initiated, expanded, and managed (Vecchiarini & Somià, 2023). This transformation is underpinned by a diverse array of digital technologies within the scope of AI, crafted to adeptly process information and assist humans across various tasks (Short & Short, 2023). In contrast to conventional computers, AI systems exhibit the capability to learn and adjust dynamically, consistently advancing without requiring manual interventions from humans (Gupta *et al*., 2023).

Recent advancements in AI, such as automation, data analysis, and natural language processing (NLP), have streamlined operations for companies spanning various industries (Vecchiarini & Somià, 2023). In addition to contributing to the process of established enterprises, AI plays a crucial role in supporting the establishment of new ventures (Davidsson & Sufyan, 2023). It can affect how individuals intend to create a business venture, foster their recognition of the business opportunity, and redefine the processes by which innovative business ideas are identified and capitalized upon (Shepherd & Majchrzak, 2022). Moreover, AI functions as a valuable asset for entrepreneurs, assisting in strategic decision-making, bolstering sales functions, enhancing performance outcomes, and reducing costs for start-ups by implementing AI-powered bots to manage accounts and operations (Korzynski *et al*., 2023). In other words, the emergence of generative pretrained transformer (GPT) technology not only signifies the process and implementation of advanced AI systems (Abaddi, 2023) but also introduces novel opportunities and challenges for entrepreneurship research and education (Wach *et al*., 2023).

Despite increasing interest and research focused on AI adoptions, such as ChatGPT, and entrepreneurship (Davidsson & Sufyan, 2023; Short & Short, 2023), no empirical studies, according to our best knowledge, examine how individuals' ChatGPT adoption in entrepreneurship (CGA) can foster their digital entrepreneurial intentions (DEI), especially underlying a cognitive reasoned mechanism, which can be explained by three core components (attitude towards digital entrepreneurship-ATD, subjective norms-SN, and perceived behavioural control-PBC) in the theory of planned behaviour (TPB) (Al-Mamary & Alraja, 2022; Ashraf *et al*., 2021). Consequently, I adopted the TPB to address the following research questions (RQs):

RQ1: Are the TPB suited to explore individuals' digital entrepreneurial intentions in the context of the AI (and GPTs) revolution?

RQ2: Does individuals' ChatGPT adoption in entrepreneurship significantly increase their subjective norms, attitude towards digital entrepreneurship, perceived behavioural control, and intentions to create a digital firm?

RQ3: Do three components in the TPB (subjective norms, attitude towards digital entrepreneurship, perceived behavioural control) significantly mediate the relationship between individuals' ChatGPT adoption in entrepreneurship and their digital entrepreneurial intentions?

The remainder of the article consists of four sections, *i.e.* literature review, materials and methodology, results and discussion, and conclusions and avenues for further research.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Digital Entrepreneurship and Theory of Planned Behaviour

Recognized as a fundamental driver of economic growth, job generation, and innovative inspiration, entrepreneurship involves both establishing a new venture and the evolution of existing ones (Hussen, 2023; Wach *et al*., 2022). Digital venturing creation represents a contemporary manifestation of entrepreneurial activity, stemming from opportunities generated by digitization and digitalization (Aloulou *et al*., 2023), which introduce transformative disruptions to businesses and industries (Abaddi, 2023). These transformative shifts occur at the convergence point of digital technologies and entrepreneurial initiatives (Mir *et al*., 2022). Digital entrepreneurship is defined as the pursuit of new business opportunities facilitated by emerging media and internet technology (Mir *et al*., 2022). While traditional and digital

entrepreneurship shares fundamental principles such as opportunity identification, idea generation, and product and/or service commercialization, the key distinction lies in the utilization of digital technologies across the various value chain activities of the business venturing (Abaddi, 2023).

Recently, digital business venturing has been a subject of growing interest in the field of entrepreneurship, garnering global attention and significantly affecting entrepreneurial research (Al-Mamary & Alraja, 2022; Xin & Ma, 2023). Its significance in the realm of entrepreneurship has been firmly established in recent years, both in terms of research and academic exploration (Aloulou *et al*., 2023). Indeed, academic focus on digital business ventures has intensified, which is evident in the rising number of recent studies (Kraus *et al*., 2023; Xin & Ma, 2023). The body of digital entrepreneurship literature is becoming more organized, and the field is obtaining credibility and a distinct identity, overcoming challenges of research disintegration and multiplicity (Aloulou *et al*., 2023). Digital business venturing, which emerges from the utilization of new media, the internet, information and communication technologies (ICT), and digital emerging technologies (Aloulou *et al*., 2023), can be classified into three categories, including mild, moderate, and extreme, based on the degree of integration of technology tools into venture-related activities. In mild digital entrepreneurship, a website complements the physical existence of the venture. The moderate category entails the digitization of the marketing function, and in the extreme form, the website functions as just one of several digital interfaces, where the product itself is digital (Mir *et al*., 2022).

Given that entrepreneurial intentions play a pivotal role in comprehending the entrepreneurial process and subsequent entrepreneurial behaviour (Al-Mamary & Alraja, 2022; Ashraf *et al*., 2021), it is crucial to delve into how these intentions take place in the digital context (Xin & Ma, 2023). Entrepreneurial intentions fundamentally represent individuals' plans to establish new business ventures in the future (Tran *et al*., 2023). When this deliberate objective is applied to pursuing an entrepreneurial career facilitated by information and communication technology, DEI can be defined as the individual's intention to launch a new business by leveraging digital technologies, which includes, but is not limited to the Internet, World Wide Web, mobile technologies, Web 2.0, and other related technologies nature (Mir *et al*., 2022). Although various theoretical frameworks, such as the theory of bounded rational planned behaviour (Ashraf *et al*., 2021), technology acceptance model (Abaddi, 2023), and the capital theory (Mir *et al*., 2022), have been applied to explore the antecedents of technology-driven entrepreneurial intentions, Aloulou *et al*. (2023) argue that the TPB, developed by Ajzen (1991), has proven to be robust in predicting and elucidating different social behaviours through recent decades. Moreover, the TPB was applied to explore the entrepreneurial phenomenon in a body of prior studies (Abaddi, 2023; Al-Mamary & Alraja, 2022; Aloulou *et al*., 2023) indicating that this model is appropriate to explain how CGA inspire individuals' intent to become digital entrepreneurs.

According to the TPB, intention, and subsequently behaviour, are sculpted by three core components, *i.e.* attitude, subjective norms, and perceived behavioural control. While attitude represents the extent to which someone judges the impact of the desired behaviour (becoming a digital entrepreneur, for example) favourably or unfavourably, subjective norms involve the pressure exerted by referent others (social groups), such as family, friends, relatives, regarding whether the specific behaviour is likely to be performed or not. Perceived behavioural control serves not only as a predictor of intentions but also actual behaviour (Ajzen, 1991). The impacts of TPB antecedents differ across studies. Indeed, earlier research indicates that ATD and PBC play significant roles in explaining DEI (Al-Mamary & Alraja, 2022; Aloulou *et al*., 2023). However, the impacts of SN on DEI remain a point of contention in entrepreneurial research, with some studies confirming its significance (Al-Mamary & Alraja, 2022; Ashraf *et al*., 2021) and others not supporting this impact (Aloulou *et al*., 2023). Consequently, in this study, we assumed that there are significant relationships between the three components in the TPB and higher education students' intentions, as well as between these components with each other in the context of Vietnam.

H1: Intended decisions are positively correlated with (a) ATD, (b) SN, and (c) PBC.

H2: Attitudes are positively correlated with (a) SN and (b) PBC.

H3: Self-confidence is positively correlated with SN.

ChatGPT Adoption in Entrepreneurship

The introduction of GPTs marks a noteworthy accomplishment in the realms of large language models (LLMs). These models can generate diverse types of information, encompassing texts, codes, audio, figures, and videos, contingent upon the data on which they were trained (Korzynski *et al*., 2023). Recent progress in the field has given rise to conversational agents like ChatGPT, Bard (Google), Chatsonic, and Amazon Code-whisperer (Short & Short, 2023). In the context of business venturing, prior studies indicated an extensive report delineating the criteria for entrepreneurs to harness ChatGPT in the formation of their business plans (Abaddi, 2023). It also emphasized the practical application of ChatGPT by providing tailored prompts designed to aid entrepreneurs in developing various sections of their business plans, encompassing aspects like marketing and financial plans (Davidsson & Sufyan, 2023). Research also elucidated the merits and demerits of using ChatGPT compared to traditional business planning methods (Vecchiarini & Somià, 2023). Recently, Short and Short (2023) explored the role of generative language models, such as ChatGPT, in the entrepreneurial discourse. They demonstrated the models' ability to replicate CEO archetypes, underscoring the importance of skilful prompt engineering.

The assimilation of ChatGPT within entrepreneurial practices is intricately linked to individuals' attitudes towards digital entrepreneurship. This attitude serves as a lens through which individuals evaluate the value and efficacy of ChatGPT adoption in the entrepreneurial landscape (CGA) (Short & Short, 2023). Entrepreneurs harbouring a favourable attitude towards digital entrepreneurship are more inclined to perceive ChatGPT as an invaluable tool capable of enhancing productivity and fostering innovation (Duong *et al*., 2023). This positive outlook is rooted in the alignment of ChatGPT with the foundational principles of digital entrepreneurship, where technology is harnessed for business growth and operational efficiency. Individuals, including higher education students, viewing ChatGPT as a strategic means to gain a competitive edge within the dynamic digital landscape are naturally predisposed to its adoption, considering it an integral component of their positive attitude towards digital entrepreneurship. Moreover, the emergence of a shared perception with the entrepreneurial community (peers, friends, family business, colleges) that GPT is instrumental for business development can foster a positive perception of approval from surrounding people (SN), whereas higher education students who firmly believe in the possession of their requisite skills and resources to seamlessly integrate ChatGPT into their entrepreneurial pursuits are thereby predisposed to a positive entrepreneurial self-efficacy.

Finally, the positive correlation between ChatGPT adoption and digital entrepreneurial intentions underscores a reciprocal relationship between individuals' intentions and the integration of advanced technologies, such as ChatGPT. Moreover, DEI encapsulates individuals' strategic plans to initiate a new business through the adept use of digital technologies (Elnadi & Gheith, 2023). Individuals with pronounced ChatGPT adoption are more likely to perceive digital business venture creation as a proactive pathway towards realizing their digital business goals (Abaddi, 2023). They can also perceive the adoption of ChatGPT as a strategic and forward-thinking move to actualize their digital business aspirations and thus foster their intentions to become a digital entrepreneur.

H4: ChatGPT adoption in the entrepreneurial landscape is positively correlated with (a) SN, (b) PBC, (c) ATD, and (d) DEI.

Mediation Effects

Being aligned with the TPB framework, prior studies affirmed that three core components of TPB (ATD, SN, and PBC) were found to mediate the impacts of different factors, such as digital entrepreneurial knowledge (Aloulou *et al*., 2023), GPT revolution (Abaddi, 2023), soft and hard skills (Garcez *et al*., 2023), on DEI. It is therefore assumed that ATD, SN, and PBC serve as the mediators, which receive the impacts of CGA, which, in turn, inspire higher education students' intentions to engage in digital entrepreneurial activities. Firstly, the AI technology adoption (*i.e.* ChatGPT) is predicted to enhance PBC since positive experiences and increased proficiency with the technology contribute to individuals'

feeling more in control of their tasks. In turn, this heightened control, indirectly affects digital entrepreneurial intention while surrounding people with the entrepreneurial community (SN) are also expected to be affected positively as individuals adopt ChatGPT, creating a supportive environment and, consequently, shaping DEI (Abaddi, 2023). Moreover, the positive experiences and perceived value of ChatGPT when using it can also cultivate individuals' attitudes towards digital business ventures, subsequently affecting higher education students' strategic plans for digital ventures. Indeed, some psychological and social theories argue that the adoption of emerging technology affects not only personal perceptions of control, perceived approvals from surrounding people, and favourable beliefs about certain behaviours but also indirectly arouses individuals' behavioural intentions through these perceptions. The following hypotheses are thus supported.

H5: ChatGPT adoption in the entrepreneurial landscape has indirect effects on DEI through (a) ATD, (b) SN, and (c) PBC.

Figure 1 demonstrates the hypothesized model.

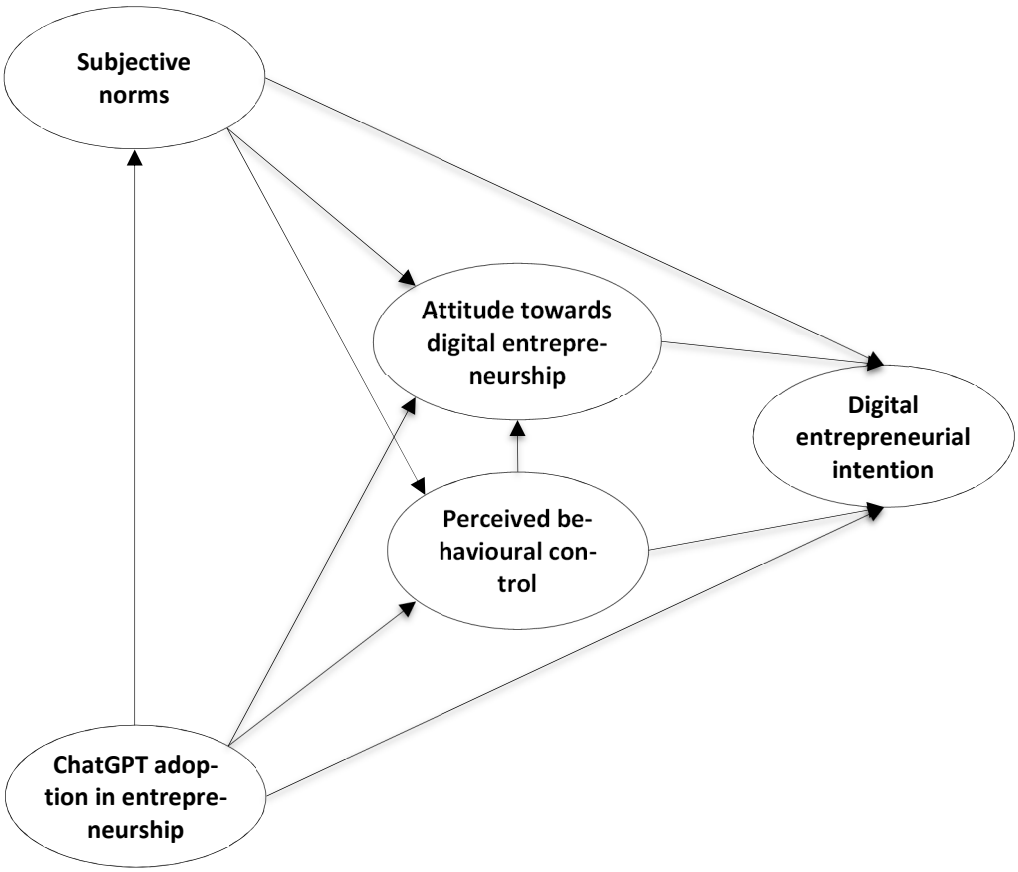

Figure 1. Hypothesized model
Source: own elaboration.

RESEARCH METHODOLOGY

Sampling and Data Collection

The current study included 604 higher education students selected through stratified random sampling across six universities in Vietnam, employing a four-stage procedure between 10 August and 10 September 2023. In the initial stage, the selection focused on two primary regions in Vietnam, *i.e.* the Northern and Southern areas with the demarcation line located in Quang Tri province. A thorough evaluation of the educational terrain revealed that Vietnam boasts 224 higher education institutions, with 123 universities in the Northern region and 101 in the Southern region. Collectively, these universities serve an

estimated two million students (Tran *et al*., 2023). During the second phase, I used a strategic randomization method to choose three universities in each region. I based the selection on the impact rank, utilizing the ranking web of Vietnam universities as a criterion (Webometrics, 2023). In the third stage, I sampled two to four classes from each university based on their fields of study. In the last sampling stage, I enlisted research participants through questionnaires directly delivered to higher education students with the support of lecturers and assistants. Participants explicitly noted that their involvement in the survey was voluntary. They assumed that their responses would be handled with confidentiality and security and the gathered data would be solely utilized for academic purposes.

The majority of higher education students aged from 20 to 21 (43.0%), followed by the 18-19 age group (32.6%), 22-23 (20.0%), and only 4.3% of them aged over 23 years old. Furthermore, 47.7% of students were women and 56.6% of them enrolled in the field of economics and business management. In total, 51.2% of higher education students reported that they have business experience, whereas only 44.7% of them used to participate in entrepreneurship-related courses.

Scales

I developed the scales and their items by referencing existing literature, with minor adjustments made to align with the context and objectives of the research. I conducted a pilot study involving 30 higher education students from the target population to evaluate the appropriateness and effectiveness of the adopted scales and their items. I utilized a seven-point Likert scale to assess the items, providing a rating continuum from 1 (strongly disagree) to 7 (strongly agree). I adopted and slightly modified five items from the research of Zaremohzzabieh *et al*. (2016) and Abdelfattah *et al*. (2022) to measure CGA. I adapted SN (two items) and ATD (five items) from Taylor and Todd's research. I also adopted and slightly adjusted PBC from the study of Ashraf *et al*. (2021). Finally, the scale measured for DEI (three items) was adopted from the research of Xin and Ma (2023). The final items of the scales were summarized in Table 1.

RESULTS AND DISCUSSION

Scale Assessment

I used SPSS 28.0 and AMOS 25.0 to conduct all analyses in our study. First, Cronbach's alpha (α was utilized to test the consistent reliability of scales. Results reported that Cronbach's alpha if item deleted of ATD5 'I believe that digital entrepreneurship has a special feature that requires low investment' was 0.937 > 0.905 (α of ATD construct). Moreover, ATD5 was thus eliminated from further analyses (Christmann & Van Aelst, 2006). Then, I conducted confirmatory factor analysis (CFA) to examine the scales' validity. The excellent indices of model fitness have been presented in the measurement model (see Figure 2): χ^2 = 400.319, df = 97, GFI = 0.921, AGFI = 0.876, CFI = 0.969, TLI = 0.957, NFI = 0.960, and RMSEA = 0.072. Moreover, Table 1 revealed that the standardized regression weights of all items were above 0.5, α of all constructs was higher than the cut-off value of 0.63, and CR of all constructs were higher than the threshold value of 0.7. The AVE of CGA reached only 0.497, however, according to Hair *et al*. (2020), when its CR was higher than 0.7 (CR of CGA = 0.830), it can be satisfied for further analyses. Consequently, all constructs demonstrated their reliability and validity. I used Harman's single-factor test to examine common method bias (CMB), indicating that a mere 45.548 of the overall variance, failing below the 50% threshold, could be accounted for by a single factor (Duong *et al*., 2023). This result demonstrates the absence of significant CMB in the study.

Hypothesis Testing and Discussion

Multiple linear regression with age, gender, and major as control variables was then employed to test hypotheses. Table 2 and Table 3 present the results of multiple linear regression. Results revealed that DEI is positively affected by SN (β = 0.093, p < 0.5), PBC (β = 0.500, p < 0.001), and ATD (β = 0.442, p < 0.001). Thus, H1a, H1b, and H1c were supported. Moreover, ATD was positively associated with SN (β = 0.108, p < 0.05) and PBC (β = 0.552, p < 0.001) while SN positively affected PBC (β = 0.689, p < 0.001). Therefore, H2a, H2b, and H3 were supported. Thus, our study corroborated the existing literature within the TPB model, especially on the impacts of ATD and PBC on DEI (Al-Mamary & Alraja, 2022;

Ashraf *et al*., 2021). The positive correlations between ATD, PBC, and DEI resonate with the broader literature, highlighting the importance of attitude and self-confidence in affecting entrepreneurial decision-making (Aloulou *et al*., 2023). It also means that higher education with a constructive attitude and self-efficacy are more likely to exhibit a proactive stance in leveraging innovative solutions to achieve their entrepreneurial goals (Abaddi, 2023). These findings also align with previous studies that adopted the TPB to explore individuals' DEI (Al-Mamary & Alraja, 2022; Aloulou *et al*., 2023; Ashraf *et al*., 2021). However, unlike some prior studies (Aloulou *et al*., 2023; Truong *et al*., 2022), our study found that SN inspires higher education students' ATD, PBC, and intention to become digital entrepreneurs. It reflects that higher education students are not isolated actors; instead, their attitudes (ATD), self-confidence (PBC), and intended decisions (DEI) are intricately linked to the perceptions and expectations of those around them (Al-Mamary & Alraja, 2022).

Table 1. Scale items and convergent validity analysis

Constructs	Codes	Measures	M	S.D.	λ	α	CR	AVE
ChatGPT adoption in entrepreneurship	CGA1	I use ChatGPT to obtain information on the benefits realized in the area of digital entrepreneurship.	5.041	1.259	0.615	0.820	0.830	0.497
	CGA2	I use ChatGPT to obtain information about the problems and obstacles that will be encountered in the area of digital entrepreneurship.	4.475	1.260	0.626			
	CGA3	I obtain information about entrepreneurial opportunities offered by government agencies/individuals through ChatGPT adoption.	4.843	1.016	0.802			
	CGA4	I use ChatGPT to obtain information on loan deals for digital entrepreneurship.	3.084	1.352	0.745			
	CGA5	I can increase lots of knowledge about digital entrepreneurship through ChatGPT adoption.	4.581	0.784	0.720			
Attitude towards digital entrepreneurship	ATD1	I would like to start up a digital firm.	4.101	1.560	0.868	0.937	0.941	0.803
	ATD2	Starting up a digital firm is a good idea.	4.725	1.445	0.981			
	ATD3	Starting up a digital firm would be pleasant for me.	4.768	1.433	0.975			
	ATD4	Starting up a digital firm is a wise idea.	4.296	1.090	0.738			
Subjective norms	SN1	People who influence my behaviour would think that I should start a digital firm.	3.010	0.912	0.796	0.851	0.864	0.762
	SN2	People who are important to me would think that I should start a digital firm.	2.980	1.077	0.944			
Perceived behavioural control	PBC1	I am capable of starting and operating a digital firm.	3.151	1.459	0.950	0.909	0.916	0.787
	PBC2	Starting up and operating a digital firm is entirely within my control.	2.742	1.227	0.934			
	PBC3	I have the financial ability to start and operate a digital firm.	3.220	1.133	0.765			
Digital entrepreneurial intentions	DEI1	If I have the opportunity or make decisions freely, I will choose to be a digital entrepreneur.	4.238	1.787	0.750	0.866	0.900	0.751
	DEI2	Considering various restrictions (such as lack of money), I will still choose digital entrepreneurship.	2.834	1.246	0.855			
	DEI3	I am likely to be a digital entrepreneur in the next five years.	3.118	1.362	0.980			

Notes: N= 604; M: Mean; S.D.: Standard deviation; λ: Standardized regression weights; α: Cronbach's alpha; CR: Composite reliability; AVE: Average variance extracted.
Source: own study.

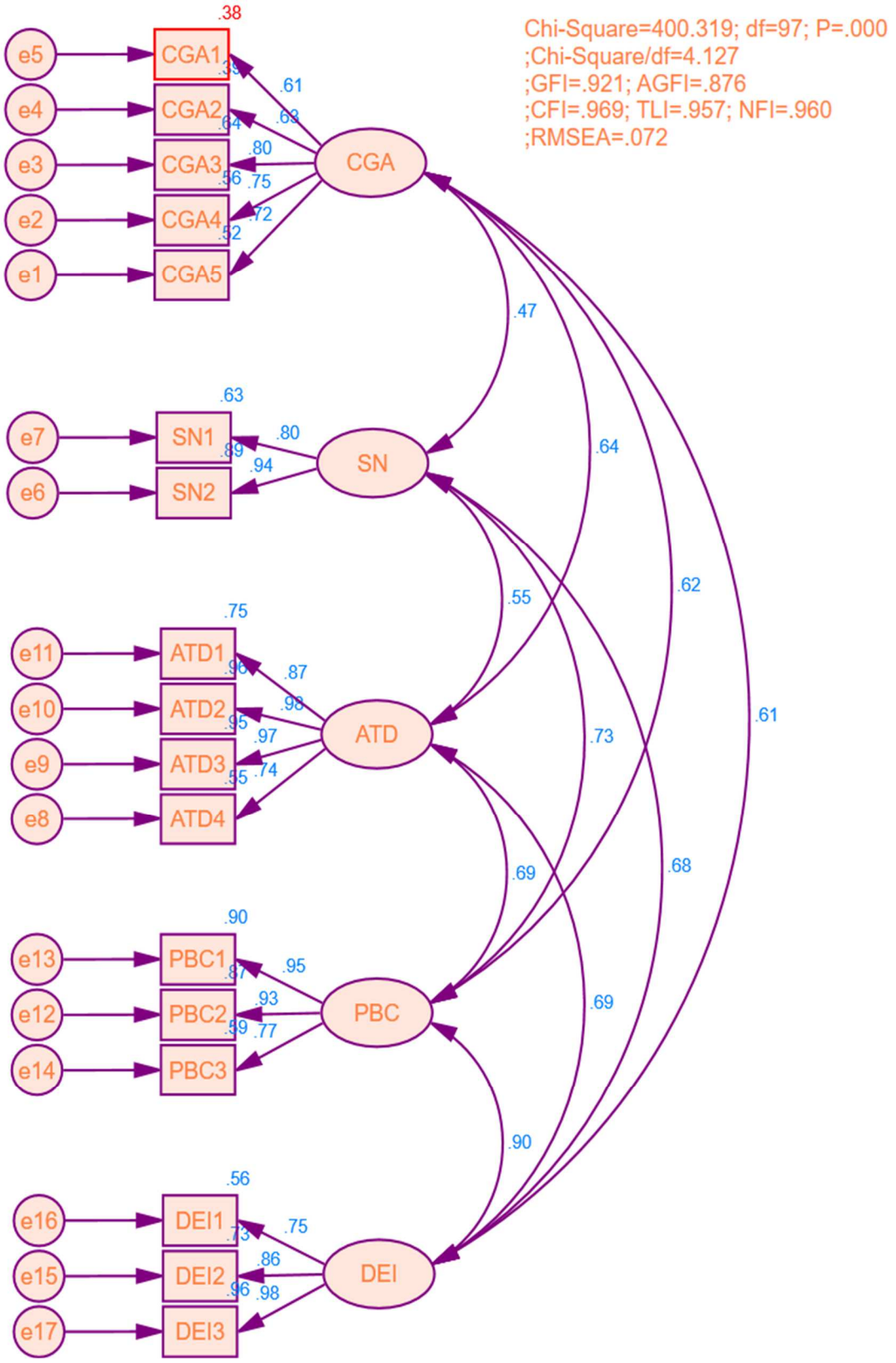

Figure 2. Measurement model
Source: own elaboration.

Table 2. Linear regression models (DVs: Subjective norms and Perceived behavioural control)

Variables	Subjective norms				Perceived behavioural control			
	Model 1				Model 2			
	β	SE	t	p-value	β	SE	t	p-value
Constant	1.343***	0.251	5.346	< 0.001	-0.642**	0.240	-2.679	0.008
Gender	-0.017	0.071	-0.246	0.806	-0.076	0.066	-1.157	0.248
Age	0.015	0.043	0.356	0.722	0.028	0.040	0.717	0.474
Major	-0.050	0.072	-0.705	0.481	-0.116	0.067	-1.735	0.083
ChatGPT adoption	0.391***	0.040	9.654	< 0.001	0.418***	0.041	10.318	< 0.001
Subjective norms	–				0.689***	0.038	18.090	< 0.001
R^2	0.140				0.534			
Adjusted R^2	0.134				0.530			
F Change	24.394***				136.963***			

Notes: N= 604. *p < 0.05. **p < 0.01, ***p < 0.001. DVs: Dependent variables.
Source: own study.

Table 3. Linear regression models (DVs: Attitude towards digital entrepreneurship and digital entrepreneurial intention)

Variables	Attitude towards digital entrepreneurship				Digital entrepreneurial intention			
	Model 3				Model 4			
	β	SE	t	p-value	β	SE	t	p-value
Constant	0.968***	0.213	4.547	< 0.001	-0.906***	0.191	-4.748	< 0.001
Gender	0.040	0.058	0.688	0.492	-0.041	0.051	-0.795	0.427
Age	0.061	0.035	1.729	0.084	0.040	0.031	1.305	0.192
Major	-0.088	0.059	-1.488	0.137	-0.004	0.052	-0.077	0.939
ChatGPT adoption	0.291***	0.039	7.493	< 0.001	0.135***	0.036	3.755	< 0.001
Subjective norms	0.108*	0.042	2.582	0.010	0.093*	0.037	2.498	0.013
Perceived behavioural control	0.552***	0.036	15.271	< 0.001	0.500***	0.038	13.333	< 0.001
Attitude towards digital entrepreneurship	–				0.442***	0.036	12.251	< 0.001
R^2	0.614				0.775			
Adjusted R^2	0.610				0.772			
F Change	157.023***				293.445***			

Notes: N= 604. *p < 0.05. **p < 0.01, ***p < 0.001. DVs: Dependent variables.
Source: own study.

Noticeably, CGA positively influenced SN (β = 0.391, p < 0.001), PBC (β = 0.418, p < 0.001), ATD (β = 0.291, p < 0.001), and DEI (β = 0.135, p < 0.001). Thus, H4a, H4b, and H4c were supported. Although the role of AI tools, such as ChatGPT, in therepreneurship activities has been highlighted in the body of prior studies (Abaddi, 2023; Davidsson & Sufyan, 2023; Short & Short, 2023), no studies explore the impacts of CGA on DEI as well as the components (ATD, SN, and PBC) in the TPB. Therefore, this finding provides some valuable insight into the dynamics of technology adoption within the digital entrepreneurial context. First, individuals who adopt ChatGPT in their ventures are more likely to perceive a positive environment and encouragement from their network. It can also resonate with the idea that witnessing peers and mentors embracing emerging technologies, such as ChatGPT, creates a supportive atmosphere, contributing to a shared perception of its value within the entrepreneurial community (Elnadi & Gheith, 2023). Second, the positive relation between CGA and PBC emphasizes that hands-on experience with ChatGPT, coupled with supportive resources and training, enhances individuals' confidence in incorporating digital entrepreneurial activities. Finally, the positive impact of CGA on ATD and DEI suggests that experiencing the benefits of ChatGPT for entrepreneurship, such as building plans for productivity, searching the market information, etc., can not only contribute to an individuals' favourable evaluation of digital entrepreneurship as whole, but also harbour their intentions to involve

in digital entrepreneurial activities. Abaddi (2023) states that the ChatGPT model developed by Open AI has gained significant prominence, revolutionizing various industries and reaching one million users within five days. The obstacles and prospective avenues for future research in AI competencies are crucial for aiding companies and entrepreneurs in cultivating and utilizing these competencies. This facilitates business venture creation and competitive businesses. Based on the lights from the TPB, our study is the first to show how ChatGPT adoption in the entrepreneurial landscape can foster individuals' ATD, SN, PBC, and intentions to become digital entrepreneurs.

Table 4. Mediation analyses

Mediation regression coefficients	Effects	Bias	P-value	Bootstrap 95% CIs	
				LLCI	ULCI
CGA → SN → ATD → DEI	0.015**	-0.000	0.002	0.006	0.025
CGA → SN → ATD	0.041**	-0.000	0.001	0.017	0.067
CGA → SN → PBC	0.210***	0.000	0.000	0.170	0.254
CGA → PBC → ATD → DEI	0.060***	-0.000	0.000	0.043	0.079
SN → ATD → DEI	0.037**	-0.000	0.002	0.015	0.063
CGA → SN → PBC → DEI	0.104***	0.000	0.000	0.081	0.130
CGA → ATD → DEI	0.103***	0.000	0.000	0.076	0.131
SN → PBC → DEI	0.264***	-0.000	0.000	0.222	0.310
PBC → ATD → DEI	0.179***	-0.001	0.000	0.140	0.224
CGA → SN → DEI	0.026*	0.000	0.018	0.005	0.049
CGA → SN → PBC → ATD → DEI	0.038***	-0.000	0.000	0.027	0.052
SN → PBC → ATD → DEI	0.096***	-0.001	0.000	0.073	0.124
SN → PBC → ATD → DEI	0.268***	-0.001	0.000	0.227	0.317
CGA → PBC → ATD	0.167***	0.000	0.000	0.125	0.210
CGA → PBC → DEI	0.165***	0.001	0.000	0.122	0.210
CGA → SN → PBC → ATD	0.106***	0.000	0.000	0.082	0.133

Notes: N= 604. *p < 0.05. **p < 0.01, ***p < 0.001. DVs: CGA = ChatGPT adoption in entrepreneurship; SN = Subjective norms; PBC = Perceived behavioural control; ATD = Attitude towards digital entrepreneurship; DEI = Digital entrepreneurial intention.
Source: own study.

Mediation analyses in Table 4 revealed that SN (β = 0.026, p < 0.05, 95% CI [0.005, 0.049]), PBC (β = 0.165, p < 0.001, 95% CI [0.122, 0.210]), and ATD (β = 0.103, p < 0.001, 95% CI [0.076, 0.131]) significantly mediated the relation between CGA and DEI. The data also supported H5a, H5b, and H5c. This finding was in line with some prior studies which affirmed that ATD, SN, and PBC served as significant mediators in the transformation of the impacts of various precursors on DEI (Abaddi, 2023; Aloulou *et al*., 2023; Garcez *et al*., 2023). Nevertheless, my study is the first research providing empirical evidence of how ATD, SN, and PBC significantly mediate the impacts of CGA on DEI. The inclusion of these mediating variables strengthens the explanatory power of the TPB in the context of technology adoption and entrepreneurial decision-making. Finally, although not performing related hypotheses, I also found that CGA had a serial impact on DEI through the CGA-SN-PBC-ATD-DEI path (β = 0.038, p < 0.001, 95% CI [0.027, 0.052). The identification of a serial mediation pathway (CGA-SN-PBC-ATD-DEI) unveils the impact of ChatGPT adoption in the digital entrepreneurial landscape. This sequential influence suggests that the psychological mechanisms triggered by ChatGPT adoption unfold in a specific order, starting with perceived approval from surrounding people (SN), moving through perceived self-efficacy (PBC), and evaluation of digital entrepreneurial endeavours (ATD), and culminating in intentions to become digital entrepreneurs.

CONCLUSIONS

Theoretical Contributions

The current study makes some notable theoretical contributions to digital entrepreneurial literature amidst the AI (and ChatGPT) revolution. Firstly, this is the first study to provide empirical evidence af-

firming the sufficient and appropriate application of the TPB in examining individuals' digital entrepreneurial intentions within the transformative landscape of AI (and ChatGPT). The theoretical framework of TPB, encompassing SN, ATD, and PBC, proves effective in elucidating the complex psychological processes guiding entrepreneurial decision-making in the era of advanced AI technologies. Secondly, with the rapid adoption of ChatGPT, surpassing the adoption rates of well-established platforms, like Instagram, Spotify, Dropbox, Facebook, and Netflix, as highlighted in earlier research (Korzynski *et al*., 2023), underscoring the uniqueness and significance of ChatGPT in the technological landscape, our study establishes a significant relationship between individuals' ChatGPT adoption in entrepreneurship and key psychological constructs (SN, ATD, and PBC) and their intentions to become digital entrepreneurs. These findings contribute to a nuanced understanding of how the adoption of specific AI technologies, such as ChatGPT, affects individuals' cognitive and attitudinal aspects, sculpting their inclination towards digital business venturing establishments. Thirdly, our study provides empirical evidence of a novel mediation and serial mediation pathway, illustrating that the impacts of ChatGPT adoption unfold sequentially through SN, PBC, and ATD before affecting DEI. This sequential influence adds depth to the theoretical understanding of the intricate cognitive processes involved in technology adoption within entrepreneurial contexts. Finally, building on prior research highlighting ChatGPT's rapid adoption surpassing established platforms, the current research empirically supports and extends this observation. The distinctive adoption pattern of ChatGPT underscores its unique and significant role in the technological landscape, providing empirical grounding for the theoretical contributions in the extant literature.

Practical Implications

The practical implications derived from this research can offer some valuable insight into various stakeholders, such as educators, institutions, policymakers, and administrators. Firstly, educational institutions can use the insights from this research to enhance digital entrepreneurial programs. The findings highlight the significance of SN, ATD, and PBC in shaping higher education students' DEI. Curriculum designers can integrate modules that foster a positive attitude towards technology, provide training on digital skills, and emphasize the social impacts of AI adoption. This equips students with a holistic understanding of the psychological factors contributing to successful digital entrepreneurship. Secondly, universities and colleges can offer targeted guidance and counselling services to students interested in digital entrepreneurship. Recognizing the positive impact of ChatGPT adoption on DEI, counselling sessions can focus on building a supportive social network, fostering a positive attitude towards AI adoption in business ventures, and enhancing students' confidence in using AI tools in entrepreneurship. These sessions can address the psychological aspects highlighted in the study, providing personalized support for aspiring digital (potential) entrepreneurs. Thirdly, practical implications extend to skill development initiatives tailored for higher education students. Institutions may offer workshops and training programs to develop the digital skills necessary for successful entrepreneurial endeavours. Emphasizing PBC, these initiatives can provide hands-on experiences with AI technologies, like ChatGPT, ensuring students feel confident and capable of interacting with such tools for their entrepreneurial future venture.

Moreover, higher education institutions may offer AI resources, funding opportunities, and collaborative spaces where students can experiment with AI technologies. Such support reinforces perceived behavioural control and empowers students to translate their intentions into concrete entrepreneurial actions. Finally, policymakers can benefit from these findings to formulate policies that encourage the integration of AI technologies, such as ChatGPT, within entrepreneurial ecosystems. Understanding the psychological factors influencing digital entrepreneurial intentions can guide policymakers in creating an environment that supports and incentivizes the adoption of AI tools, especially in the digital entrepreneurial landscape. This may include initiatives to promote digital literacy, provide resources for technology training, and facilitate collaborative networks that positively shape subjective norms.

Limitations and Avenues for Further Research

Although the research provided valuable insights, certain limitations should be acknowledged. Firstly, the generalizability of the findings may be constrained by the specific cultural and educational context of the research sample, which primarily consisted of higher education students in

two regions of Vietnam. Replicating the study in diverse cultural settings would enhance the external validity of the results. Furthermore, the cross-sectional design employed in this research provides a static snapshot, and future studies could adopt longitudinal approaches to track the dynamic evolution of attitudes, subjective norms, and perceived behavioural control over time. Secondly, reliance on self-report measures introduces the possibility of common methods and social desirability biases. Integrating objective measures or employing multi-source data collection methods could enhance the robustness of future research. Despite efforts to control for relevant variables, potential confounding variables might influence the observed relationships. Future studies could consider a more comprehensive set of control variables to isolate the effects of interest.

Furthermore, qualitative approaches such as interviews or focus groups could complement quantitative research, offering richer insights into the nuanced factors influencing students' perceptions and intentions regarding ChatGPT adoption in entrepreneurship. Expanding participant demographics beyond higher education students to include professionals, entrepreneurs, and individuals from diverse age groups would contribute to a more comprehensive understanding of the broader implications of ChatGPT adoption on digital entrepreneurial intentions. Lastly, further research should explore the underlying mechanisms through which subjective norms, attitudes, and perceived behavioural control mediate the relationship between ChatGPT adoption and digital entrepreneurial intentions. Exploring the psychological processes and contextual factors shaping these mediating effects would deepen our understanding of the complex interplay between AI adoption and entrepreneurial psychology. Addressing these limitations and pursuing these avenues for further study will contribute to the ongoing scholarly discourse on the intersection of AI adoption, entrepreneurial intentions, and digital business strategies.

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Conflict of Interest

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