

## The moderating role of attitude-related variables in the link between personality characteristics and digital entrepreneurship desire: A study of Ha'il's efforts for competitive advantage in Saudi Arabia

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### ABSTRACT

This research article aims to explore the influence of attitude-related variables on the relationship between personality traits and the inclination to participate in digital entrepreneurship, within the context of Ha'il's endeavors for competitive advantage in Saudi Arabia. In alignment with global trends, the emerging generation of Saudi entrepreneurs is increasingly reliant on technology for commercial operations. Consequently, digital entrepreneurship research has gained early attention, particularly in Ha'il, Saudi Arabia. The attitudes under examination comprise three components: behavioral, cognitive, and affective. We specifically targeted undergraduate students enrolled in the College of Business Administration at the University of Ha'il and distributed 241 questionnaires among them. Employing SMART PLS software for analysis, we discovered that personality traits significantly shape the interplay between attitudes and entrepreneurial intentions. This study's findings hold potential implications for understanding Ha'il's competitive advantages and aligning with Saudi Arabia's Vision 2030. Despite limitations in sample size and the use of electronic data collection, future research could delve into the drivers of digital entrepreneurial intention in Ha'il, as a strategic means to gain a competitive edge.

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### 1. Introduction

The shift towards digital business platforms necessitates the establishment of an education system capable of producing graduates proficient in digital entrepreneurship (Schiuma et al., 2022). Electronic entrepreneurship is defined as the utilization of the internet to conduct business operations by managers or founders (Ramadani et al., 2021). As per the United Nations' trade and development reports of 2021, internet commerce has surged by 19%, with over 1.4 billion individuals worldwide engaging in online shopping. The pandemic has induced significant changes in shopping behavior in many countries, leading individuals to adopt new patterns, resulting in the

widespread utilization of digital platforms (Secundo et al., 2021; Ibáñez et al., 2022; Modgil et al., 2022). Furthermore, exploring the factors that contribute to the intention to participate in digital entrepreneurship is essential to strengthening digital transformation strategies in many nations (Suparno et al., 2020; Tomy and Pardede, 2020; von Arnim and Mrozewski, 2020; Ramadani et al., 2021; Upadhyay et al., 2022). Previous studies remained inconclusive about differentiating between personality traits as a determinant factor of entrepreneurship intention, and the role it could be in the relationship between attitudes and digital entrepreneurship (Rogers and Hewson, 2016; Bandera and Passerini, 2020; Gustavsson and Ljungberg, 2018; Sinno, 2019; Chae and Goh, 2020; Graham et al., 2020; Zhao et al., 2021). Hence, the impact of personality traits on potential relationships remains uncertain. For a more comprehensive understanding, it should be noted that students may be hesitant to initiate new ventures due to a lack of typical attitude and personality traits, coupled with the substantial risks associated with firm creation and limited available support. Nevertheless, certain aspects of their

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personalities, such as a propensity for risk-taking and an internal locus of control, may drive them to pursue new business ventures.

Despite these complexities, this study holds significant relevance for several reasons. Firstly, digital entrepreneurship intention differs from conventional entrepreneurship intention research, as the process of establishing an online firm possesses distinct characteristics that can lead to various outcomes. Secondly, a prevailing misconception regarding the technological complexities of digital entrepreneurship may discourage individuals from embracing the necessary risks. Thirdly, the conflicting findings from prior studies on the relationship between personality traits and digital entrepreneurship warrant further investigation. Fourthly, while research on digital entrepreneurship has predominantly focused on developed countries, it is imperative to consider emerging economies like Saudi Arabia. Lastly, attitudes and personality traits have typically been assessed in isolation, with attitudes analyzed independently from their core elements, while personality traits are primarily evaluated using the Big Five dimensions.

In the context of Saudi Arabia, the literature pertaining to digital entrepreneurship is still considered to be in its nascent stage (Danish and Smith, 2012; Al-Khateeb, 2021; Mahmud, 2020). The majority of studies have primarily focused on examining the determinants of general entrepreneurship intention rather than specifically addressing digital entrepreneurship intention. Notably, in 2006, Saudi Arabian policymakers initiated plans for digitalization, culminating in the establishment of a national strategy for digital transformation. This strategic plan aims to propel the country's artificial intelligence market to a projected value of \$135.2 billion by 2030, with an anticipated contribution of 12.4% to the nation's GDP (Mahmud, 2020). Despite the government and regulatory authorities endeavors to promote the development of new ventures, numerous individuals continue to encounter challenges in establishing their businesses. The surge towards technological advancement surpasses the availability of skilled workers, resulting in a technology market size exceeding \$40 billion, making Saudi Arabia the largest technology market in the region. Experts assert the criticality of preparing the next generation to foster tech-related companies to ensure sustained growth and success (Mohammed et al., 2021).

Ha'il, a city in the northern region of the kingdom, aims to establish itself as a technological leader in the competition for competitive advantage. Regional policy authorities are concerned about digital entrepreneurship for this reason (Mohammed et al., 2021). By focusing on the situation in the Ha'il region, this study constitutes an empirical contribution to a broader understanding of Saudi Arabia's digital transformation stance. Furthermore, examining whether personality traits contribute to the formation of appropriate attitudes, and

intentions for digital entrepreneurship constitutes the theoretical contribution. The introduction is given in the first section, which is followed by a review of the topic's fundamental concepts and pertinent research, keeping a Saudi Arabian context in mind. The final part of the research examines and discusses the findings.

## 2. Literature review

### 2.1. Underlining theory

For many aspects, psychology and management are now interlinked. The individual's competence to establish an enterprise and its relationship to interpretations of intention and behavior are nevertheless subject to debate. However, reading literature from Ajzen (2011, 2020), Sussman and Gifford (2019), Bosnjak et al. (2020), and Sok et al. (2021) showed that the theory of planned behavior is the basis for explaining factors related to the determinants of intention; Intentions are the foundation of human conduct and are influenced by attitude toward the behavior, subjective norms, and perceived behavioral control. The theory is an updated version of the theory of reasoned action, the update is implemented by adding subject norms and perceived behavior control to the factors determining intention despite that the result of empirical data on entrepreneurial intention is inconsistent when measuring items are altered (Tommasetti et al., 2018; Mohammed et al., 2020a; 2020b). In particular, with respect, the theory has also been applied to the exploration of the determinants of behavior and intention in a broad range of fields (Si et al., 2019; Aboelmaged, 2021; Soliman, 2021). Policymakers in various countries are attempting to comprehend the ways whereby entrepreneurship is motivated, and they have related these to the education systems that influence the behavior of young students (Valencia-Arias and Restrepo, 2020). For this rationale, we have grounded our paper's analysis on the theory of planned behavior.

### 2.2. Digital entrepreneurship

Policymakers are interested in business models that make use of the Internet to generate revenues. Entrepreneurship in the online environment is predicted to exert a significant impact on the economy of the nations (Jawad et al., 2021). However, compared to traditional entrepreneurship, digital entrepreneurship incorporates many of the same fundamental elements. The difference is based on the use of technology in doing business, such as social media, website creation, cloud or mobile system usage, and conducting business in a completely digital environment (Gontareva et al., 2018; Li et al., 2020; Manea et al., 2021). Furthermore, as we advance in our utilization of technology, distinctions become more pronounced,

as individuals' behavior and intentions may vary based on their educational background, attitudes, and personality characteristics. Notably, digital entrepreneurship intention has received less attention compared to classical entrepreneurship intention, particularly with regard to the impact of personality traits on attitudes, which ultimately influence and shape intentions (Venkateswaran et al., 2017; Bandera and Passerini, 2020).

### 2.3. Previous studies on digital entrepreneurship intention

Previous research examined the factors of digital entrepreneurship from a range of perspectives. Young Chinese individuals are more likely to engage in digital entrepreneurship if their electronic commerce education impacts their attitudes and therefore their intention (Millman et al., 2009; Lai and To, 2020; Luo and Chan, 2021; Sukumar et al., 2021). On the other hand, studies have investigated gender disparities in regard to digital entrepreneurship, and their findings indicate that women are encouraged to enter digital entrepreneurship after finance is obtained (Leung, 2018; Ughetto et al., 2020; Luo and Chan, 2021; Suseno and Abbott, 2021; Wang, 2022). In addition, it has been discovered that women's social status has a role in entrepreneurship in several nations (Leung, 2018; Yu and Cui, 2019). It has also been shown that social and cultural differences impact the transformation toward digital entrepreneurship by influencing attitudes (Hamid et al., 2018; Fahmi and Savira, 2023; Skivko, 2021). Moreover, researchers have discovered that personal characteristics impact attitudes, which eventually impact the tendency to engage in digital entrepreneurship (Graham et al., 2020).

### 2.4. Previous studies on digital entrepreneurship intention in Saudi

Digital entrepreneurship in Saudi Arabia is currently in its emergent phase, characterized by the government's proactive efforts in initiating digital transformation plans for both the education and business sectors (Danish and Smith, 2012; Al-Khateeb, 2021; Mahmud, 2020; Mohammed, 2022). Therefore, studies on digital entrepreneurship intention using Saudi Arabia as a context are considered recent (Mohammed, 2022). Applying the theory of planned behavior to explore the determinants of digital entrepreneurship intention dominated the studies about the Saudi Arabia context; attitudes, subjective norms, prior education on electronic commerce, and locus of control have been found to influence digital entrepreneurship intention (Danish and Smith, 2012; Mohammed et al., 2021). However, few studies have found that gender disparities play a role in impacting digital entrepreneurship along with showing inconsistent results (Mohammed, 2022). Moreover, empirical studies have demonstrated that the Big Five

personality traits significantly impact digital entrepreneurship intention, with the exception of agreeableness, which was found to be insignificant in its influence. Additionally, there appears to be a mediating effect, wherein personal attitudes play a crucial role in shaping the relationship between personality traits and digital entrepreneurship intention (McAdam et al., 2019; Alqahtani et al., 2020).

### 2.5. Gap and issue of the study

Reviewing the literature revealed that there is substantial scope for additional explanations regarding the determinants of digital entrepreneurial intention in Saudi Arabia. Previous studies on the predictors of classical entrepreneurial intention proposed that personality characteristics have a moderating role to play (Srivastava et al., 2015; Dalvi-Esfahani et al., 2020; Watjatrakul, 2020; Bhatt, 2022). Firstly, personality traits and their influence on the composition of related are considered unexplored in developing countries such as Saudi Arabia (Graham et al., 2020; Dan et al., 2021; Novikova et al., 2021). Second, previous research on the determinants of digital entrepreneurship intention appears to lack the quantification of attitudes and personality traits with items related to their composition; personality traits were measured using the Big Five (Grncharovska et al., 2016; Kelsen and Flowers, 2018; Bunker et al., 2021; Đokić et al., 2021; Zhong et al., 2021), whereas attitudes were measured using items other than behavioral component, cognitive component, and affective component. Noteworthy is that the majority of research on the Saudi setting focused on the effect of women on entrepreneurial intent and TBA aspects (Ostrovik et al., 2020; Krelová et al., 2021; Štemberger and Konrad, 2021). In spite of concentrating on the assessment of the theory of planned behavior (Mohammed et al., 2022a), we have decided to explore the determinants of digital entrepreneurship intention from a different perspective, the perspective of personality traits whereby attitudes-related components function as moderator variables of digital entrepreneurship intention.

### 2.6. Hypothesis development

Previous studies have found that attitudes have no impact on digital entrepreneurship intention (Dutot and Van Horne, 2015; Younis et al., 2020). The reason could be that attitudes toward particular behaviors are dependent on perceptions of the expected results of the behavior, even though most individuals participate in behaviors toward which they have a positive attitude and avoid those toward which they have a negative attitude. On the other hand, findings demonstrate that students' attitudes toward digital entrepreneurship are not linked to their tendency for taking risks and locus of control (Krelová et al., 2021; Štemberger and Konrad, 2021).

Indeed, young students tend to have different perceptions between self-employment and working for others, this perception is strongly related to the composition of their attitudes. Therefore, we are hypothesizing that:

**H1:** Attitudes-related composition significantly and positively related to digital entrepreneurship intention

**H1a:** Digital-entrepreneurial Intention is strongly influenced by the Behavioral Component (BC) of attitude.

**H2b:** Digital-entrepreneurial Intention is strongly influenced by the Cognitive Component (CC) of attitude.

**H3c:** Digital-entrepreneurial Intention is strongly influenced by the Affective Component (AC) of attitude.

Drawing from the extensive body of literature concerning personality traits, the application of the "Big Five Trait Taxonomy theory" has garnered significant attention in entrepreneurship intention research. As per this theory, prospective entrepreneurs are likely to exhibit elevated scores in openness to experience, conscientiousness, and extraversion, while displaying lower scores in agreeableness and neuroticism (Bazkiaei et al., 2020; Awwad and Al-Aseer, 2021; Kusumawijaya and Astuti, 2021; Ahmed et al., 2022). Moreover, the direct impact of personality traits on digital entrepreneurship is currently being investigated, as existing findings do not offer sufficient evidence to establish a definitive relationship between the variables. Consequently, we hypothesize that personality traits exert a significant and positive influence on digital entrepreneurship intention.

**H2:** Personality traits are significantly and positively related to digital entrepreneurship intention

**H2a:** Locus of control and digital entrepreneurial intention.

**H2b:** Need for achievements and digital entrepreneurial intention.

**H2c:** Risk tolerance and digital entrepreneurial intention.

Previous studies have empirically found that digital entrepreneurs are different from traditional entrepreneurs, particularly in their personal characteristics; digital entrepreneurs are less worried about the future than traditional business owners and use "neuroticism" to their advantage. The big five and narrow qualities have been associated with an entrepreneurial mindset and entrepreneurial success. When individuals anticipate being exposed to an activity, they participate in a cognitive process to evaluate their ability to deal with it by modifying their attitudes, depending on a group's specific personality qualities (Mohammed et al., 2022b); the effects of attitudes on behavioral intentions vary. In order to fully explain the development of people's intentions toward digital

entrepreneurship, Lüthje and Franke (2003), Sun et al. (2018), and Duong (2022) extended TPB to include external elements. They proposed that the big five personality traits-extroversion, agreeableness, openness to experience, conscientiousness, and neuroticism-have an impact on attitude toward digital entrepreneurship, which in turn impacts students' intentions to become digital entrepreneurs. Consequently, the following hypotheses are put forward:

**H1:** Personality traits significantly and positively are related to attitudes related to composition.

**H1a:** Personality traits are related to the Behavioral Component (BC) of attitude.

**H2b:** Personality traits are related to the Cognitive Component (CC) of attitude.

**H3c:** Personality traits are related to the Affective Component (AC) of attitude.

### 3. The study model

We have charted the intention to be a digital entrepreneur as a dependent variable whose results depend on how attitudes and personality traits change. Attitudes are constituted of behavioral, cognitive, and affective dimensions. Also, we have shown that personality traits are a distinctive variable from attitudes. We think that attitudes will moderate the relationship between personality traits and the intention to initiate a digital business (Fig. 1).

### 4. Methodology

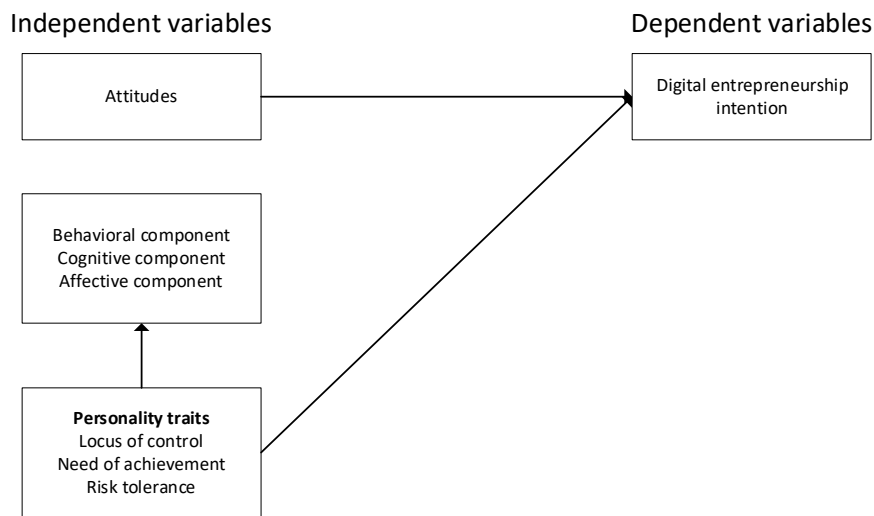
A questionnaire is constructed and distributed to business school students at the College of Business Administration at the University of Ha'il, Saudi Arabia, via a Google surveyed form link. The questionnaire comprises items corresponding to personality traits, attitudes relevant composition, and digital entrepreneurship intention. The questions employ Likert scale responses. The data are sorted and analyzed using the SMART PLS program; we commenced our investigation by evaluating the measurement model, then the structural model.

#### 4.1. Measures

The ambition of an individual to establish an online company is referred to as their digital entrepreneurial intention, and five assessment items were derived from Solesvik et al. (2013). Items were assessed on a five-point Likert scale, with 1 signifying "strongly disagree" and 5 signifying "strongly agree." The behavioral component, cognitive component, and affective component of attitudes were represented by 19 items that were created based on information gathered from Miralles et al. (2016). The personality traits scale items used in this research were generated from the "NEO Five-

Factor Inventory" (NEO–FFI). [Teng \(2008\)](#) suggested that a simplified version of the Big Five Personality Scale may minimize research costs, increase the

number of participants, and make survey administration more convenient.



**Fig. 1:** Proposed variables, dimensions, and relationships

## 4.2. Data analysis procedures

A Google form is used to collect information from students in the College of Business Administration at both the Men's and Women's Campuses. Excel CSV files are downloaded and imported into SMARTPLS 4. The measurement model's fitness was evaluated by examining standardized factor loadings from latent variables to indicator variables and fit indices. Standardized factor loadings have to be higher than (0.5) ([Peterson, 2000](#)). Thus, we removed items whose factor loading is less than 0.5. Furthermore, we're making sure that the software's variable measurement features are working as expected, and then we did a supplementary analysis to double-check the model's internals for consistency. Both of these checks are being performed in SMART PLS 4.

### 4.2.1. Assessment of measurement model (Outer model)

In this phase, the evaluation of the measurement model involved confirming the appropriateness of the factors used to measure the intended objectives and their ability to produce the desired outcomes. This assessment comprised two key steps: convergent validity and discriminant validity.

Firstly, convergent validity necessitated ensuring that the reliability of individual items and composite reliability were both above 0.70%, while the average variance extracted was above 0.50%. The model successfully met these criteria for all dimensions, thereby enabling further analysis. [Table 1](#) presents the factor loadings, individual items reliability, composite reliability, and average variance extracted for each dimension.

Secondly, discriminant validity was examined using the Fornell-Larcker criterion to ensure that each main dimension had higher loadings with itself compared to its loadings with other dimensions. This

condition was satisfied for all dimensions, indicating distinctiveness among the constructs.

In conclusion, the measurement model demonstrated its appropriateness for facilitating the intended analysis of the study.

### 4.2.2. Assessment of structural model

In this stage, the assessment of the structural model involves validating the appropriateness of various analyses, including path coefficient analysis, coefficient of determination, effect on size, predictive relevance, and goodness of fit ([Abdi et al., 2015](#)).

The results of the path coefficient analysis indicate that a few hypotheses are supported. Specifically, the attitude-related components, namely affective, behavioral, and cognitive factors, exhibit a significant and positive relationship with digital entrepreneurship intention. The affective component demonstrates a significant association at the 10% significance level, while the behavioral and cognitive components exhibit significant associations at the 5% significance level. This suggests that enhancing these attitude-related components plays a crucial role in shaping individuals' intentions toward digital entrepreneurship.

Moreover, the personality traits represented by the need for achievement and risk tolerance are also found to have positive and significant relationships with digital entrepreneurship intention. Additionally, the path coefficient analysis reveals that personality traits can be further enhanced by reinforcing the role of attitude-related components in shaping digital entrepreneurship intention.

Consequently, the findings indicate that attitude-related components act as moderators in the relationship between personality traits and digital entrepreneurship intention. The affective component exhibits a moderating effect at the 10%

significance level, while the behavioral and cognitive components demonstrate this effect at the 5%

significance level (Table 2).

**Table 1: Result of measurement model-convergent validity**

Item-Question-Dimension	Loading	AVE	CR
LC10- Locus of control	0.965	0.953	0.910
LC11- Locus of control	0.943		
NA13 - Need for achievement	0.715	0.853	0.961
NA16 - Need for achievement	0.863		
NA17 - Need for achievement	0.853		
RT18 - Risk tolerance	1.000		
AC1 - Affective component	0.749	0.864	0.614
AC2 - Affective component	0.814		
AC3 - Affective component	0.763		
AC4 - Affective component	0.806		
BC1 - Behavioral component	0.737	0.851	0.588
BC2 - Behavioral component	0.775		
BC3 - Behavioral component	0.766		
BC6 - Behavioral component	0.789		
CC2 - Cognitive component	0.797	0.906	0.658
CC3 - Cognitive component	0.823		
CC4 - Cognitive component	0.798		
CC7 - Cognitive component	0.824		
CC8 - Cognitive component	0.814		
INT1 - Digital entrepreneurship intention	0.781	0.890	0.617
INT2 - Digital entrepreneurship intention	0.817		
INT3 - Digital entrepreneurship intention	0.801		
INT4 - Digital entrepreneurship intention	0.768		
INT5 - Digital entrepreneurship intention	0.760		

**Table 2: Result of measurement model-path coefficient**

Hypothesis	P-value	Decision
<b>Hypothesis 1: Attitudes to digital entrepreneurship intention</b>		
Affective component > Digital entrepreneurship intention	0.060**	Supported
Behavioral component > Digital entrepreneurship intention	0.000*	Supported
Cognitive component > Digital entrepreneurship intention	0.000*	Supported
<b>Hypothesis 2: Personality traits of digital entrepreneurship intention</b>		
Need for achievement > Digital entrepreneurship intention	0.008*	Supported
Risk tolerance > Digital entrepreneurship intention	0.069**	Supported
<b>Hypothesis 3: Moderating effect personality traits-attitudes and digital entrepreneurship intention</b>		
Affective component > Locus of control > Digital entrepreneurship intention	0.064**	Supported
Cognitive component > Need for achievement > Digital entrepreneurship intention	0.037*	Supported
Behavioral component > Risk tolerance > Digital entrepreneurship intention	0.025*	Supported
Cognitive component > Risk tolerance > Digital entrepreneurship intention	0.015*	Supported

\*\* : 10% significance level; \* : 5% significance level, unsupported hypothesis is not mentioned

The findings of our study indicate that the R-square values for both digital entrepreneurship intentions and attitudes exceeded 63%, which is considered moderately satisfactory. Notably, it is advisable to achieve a minimum R-square level of 10% to ensure the certification of the structural model. We further observed that the effect size for attitudes toward digital entrepreneurship surpassed Cohen's threshold of 0.35, signifying a substantial impact. As for intentions, the effect size fell within the range of 0.15 to 0.35, indicating a moderate effect. Additionally, the Q-square for predictive value yielded a value greater than zero, and the goodness of fit exceeded 0.36. These results provide evidence supporting the appropriateness of our structural model in examining the determinants of digital entrepreneurship intentions.

In conclusion, our structural model demonstrates adequate fitness for investigating the factors influencing digital entrepreneurship intentions.

**5. Result**

In this research, we investigated the factors influencing digital entrepreneurship intention by exploring the impact of personality traits on such intentions. Additionally, we delved into the

moderating role of attitudes in mediating the relationship between personality traits and digital entrepreneurship intention. The study specifically targeted undergraduate students enrolled in the College of Business Administration at the University of Ha'il.

A total of 241 students participated in the study, providing their responses from both the male and female campuses. Among the respondents, 43% were from the female campus, while the remaining 57% were from the male campus (Table 3).

**Table 3: Demographic profiles**

		Frequency	Percent
		Gender	Male
	Female	104	43%
	MIS	56	23.2%
Programs	Management	83	32.3%
	Accounting	47	34.4%
	Finance	55	23%

Diverging from prior research, the present study incorporates a novel measurement approach by considering attitudes-related components, namely the behavioral component, cognitive component, and affective component. The investigation involved a three-fold process.

Firstly, we explored the influence of personality traits on digital entrepreneurship intention,

revealing positive and significant relationships exclusively with "need for achievement" and "risk tolerance" traits.

Secondly, we examined the effects of attitudes-related components, including the behavioral, cognitive, and affective components, on digital entrepreneurship intention. The findings demonstrated positive and significant relationships with all aspects of attitudes under consideration.

Thirdly, we investigated the moderating role of attitudes in the association between personality traits and digital entrepreneurship intention. The results indicate that personality traits enhance this relationship under specific conditions: when utilizing "locus of control" in relation to the affective component of attitudes, "need for achievement" concerning the cognitive component of attitudes, and "risk tolerance" with regard to the behavioral and cognitive components of attitudes.

To conclude, attitudes were found to partially moderate the relationship between personality traits and digital entrepreneurship intention.

## 6. Discussion

A systematic and exploratory approach becomes essential for comprehending the strategic advantages that contribute to the growth and development of cities, such as Ha'il. The city of Ha'il, situated in the northern region of Saudi Arabia, actively competes in achieving its 2030 vision, digital transformation plans, and expansion of digital businesses. In this regard, the present study seeks to investigate the determinants that influence individuals' inclination to establish a digital presence, considering contemporary perspectives and contextual factors.

To explore the relationship between personality traits and the intention to engage in digital entrepreneurship, distinct from traditional entrepreneurship intention, the study adopted SMARTPLS 4 as the analytical tool. The findings of the study unveiled a new component related to attitudes, which appears to augment the connection between personality traits and the desire to partake in digital entrepreneurship.

Given the focus of undergraduate students on business-related coursework, the research approach was tailored to accommodate their particular context. Remarkably, the findings align with the hypothesized relationships we posited, as detailed below.

### 6.1. Personality traits and digital entrepreneurship intention

This study found a significant relationship between a person's desire for achievement and his level of risk tolerance and their intention to participate in digital entrepreneurship, this result is consistent with previous studies by Akhtar et al. (2020), Agustina and Fauzia (2021), and Uysal et al. (2022). With regard to other research, the results

demonstrated that locus of control is not a direct predictor of the intent to participate in digital entrepreneurship (Ndofirepi, 2020; Tentama and Abdussalam, 2020); this could have been explained by the contrast between digital entrepreneurship intention and classical entrepreneurship intention. Another explanation for the difference in results are the measurement of personality traits in this study which is different from other studies; other studies mostly used openness, conscientiousness, extraversion, agreeableness, and neuroticism as indicators representing personality traits. To conclude, personality traits are partially associated with and important to digital entrepreneurship intention.

### 6.2. Attitudes as a moderator

This study reveals that when employing attitudes-related components, namely behavioral, affirmative, and cognitive aspects, to explore the link between personality traits and digital entrepreneurship intention, the relationship is strengthened through locus of control, need for achievement, and risk tolerance. The findings indicate that attitudes partially, positively, and significantly moderate this relationship. Consequently, it is suggested that education policy makers in Saudi Arabia should consider enhancing training courses that focus on attitudes, as this may lead to improvements in individuals' personality characteristics concerning digital online business intention.

This result diverges from the findings of Lai and To (2020), who contended that attitudes had no significant impact on digital entrepreneurship. However, Lai and To (2020) proposed that environmental factors could be a potential reason for influencing attitudes toward digital entrepreneurship intention, indicating the role of the environment in shaping such attitudes.

## 7. Conclusion

The city of Ha'il in Saudi Arabia holds the potential to attain a strategic advantage over other cities in the country by capitalizing on its electronic commerce industry. This potential can be further amplified to attract substantial foreign direct investment, thereby securing a significant and enduring role in the international market. To achieve this, it becomes essential to comprehend the underlying motivational factors influencing individuals' decisions to engage in online commerce, particularly within the context of Saudi Arabia.

To address this objective, we conducted a survey among undergraduate business administration students at the University of Ha'il. The survey aimed to explore the relationship between personality traits, measured by locus of control, need for achievement, risk tolerance, and digital entrepreneurship intention. Our findings revealed that students exhibiting characteristics associated

with a need for achievement and risk tolerance displayed a positive inclination toward digital entrepreneurship intention. Furthermore, we expanded our investigation beyond a sole focus on personality traits. Instead, we discovered that enhancing attitude-related components, specifically behavioral, affirmative, and cognitive aspects, can lead to improvements in personality traits, consequently positively influencing digital entrepreneurship intention. The results of this study hold valuable implications for education policymakers and those concerned about employment prospects in Saudi Arabia. The findings shed light on the factors that can bolster individuals' intentions toward digital entrepreneurship and, consequently, support strategic decisions that foster economic growth and development in the country.

## 8. Limitation

Despite employing the sophisticated analytical capabilities of SMART PLS 4, our examination of the factors loading revealed reduced confidence in numerous items, necessitating the removal of several from the analysis. The diverse nature of potential entrepreneurs poses challenges in comprehensively examining their qualities. It is important to acknowledge that the choice of sample can significantly impact the outcomes, particularly when dealing with limited sample sizes, which may introduce some level of volatility. Furthermore, it is crucial to note that the survey results were solely collected through online Google forms. To enhance the precision of future findings, we recommend considering the adoption of an interviewing method in data collection. Prior studies have predominantly relied on the theory of planned behavior, underscoring the need for future research to explore alternative theories that can enrich and support their models. Moreover, investigating the barriers that hinder women's inclination to engage in digital entrepreneurship in Saudi Arabia could provide valuable insights into the contextual and cultural factors influencing this intention. Such research would contribute to a deeper understanding of the broader socio-cultural dynamics at play in shaping entrepreneurial aspirations and opportunities for women in the country.

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## Compliance with ethical standards

## Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## References

- Abdi M, Yasavoli HM, and Yasavoli MM (2015). Assessment of structural model to explain life satisfaction and academic achievement based on parenting styles. *Procedia-Social and Behavioral Sciences*, 182: 668-672.  
<https://doi.org/10.1016/j.sbspro.2015.04.806>
- Aboelmaged M (2021). E-waste recycling behaviour: An integration of recycling habits into the theory of planned behaviour. *Journal of Cleaner Production*, 278: 124182.  
<https://doi.org/10.1016/j.jclepro.2020.124182>
- Agustina TS and Fauzia DS (2021). The need for achievement, risk-taking propensity, and entrepreneurial intention of the generation z. *Risenologi*, 6(1): 96-106.  
<https://doi.org/10.47028/j.risenologi.2021.61.161>
- Ahmed MA, Khattak MS, and Anwar M (2022). Personality traits and entrepreneurial intention: The mediating role of risk aversion. *Journal of Public Affairs*, 22(1): e2275.  
<https://doi.org/10.1002/pa.2275>
- Ajzen I (2011). The theory of planned behaviour: Reactions and reflections. *Psychology and Health*, 26(9): 1113-1127.  
<https://doi.org/10.1080/08870446.2011.613995>  
**PMid:21929476**
- Ajzen I (2020). The theory of planned behavior: Frequently asked questions. *Human Behavior and Emerging Technologies*, 2(4): 314-324. <https://doi.org/10.1002/hbe2.195>
- Akhtar S, Hongyuan T, Iqbal S, and Ankamah FYN (2020). Impact of need for achievement on entrepreneurial intentions; Mediating role of self-efficacy. *Journal of Asian Business Strategy*, 10(1): 114-121.  
<https://doi.org/10.18488/journal.1006.2020.101.114.121>
- Al-Khateeb BAA (2021). The conceptual framework for the examination of a successful digital entrepreneurship in 21<sup>st</sup> century. In: I. Management Association (Ed.), *Research anthology on digital transformation, organizational change, and the impact of remote work*: 263-278. IGI Global, Pennsylvania, USA.  
<https://doi.org/10.4018/978-1-7998-7297-9.ch015>
- Alqahtani NN, Al Rawashdeh AZ, Al Arab AR, and Aldoy MI (2020). A sociological study for the fact of womens creativity in Arab society: Saudi women as a model. *Journal of Statistics Applications and Probability*, 9(S1): 621-661.  
<https://doi.org/10.18576/jsap/09S101>
- Awwad MS and Al-Aseer RMN (2021). Big five personality traits impact on entrepreneurial intention: The mediating role of entrepreneurial alertness. *Asia Pacific Journal of Innovation and Entrepreneurship*, 15(1): 87-100.  
<https://doi.org/10.1108/APJIE-09-2020-0136>
- Bandera C and Passerini K (2020). Personality traits and the digital entrepreneur: Much of the same thing or a new breed? *Journal of the International Council for Small Business*, 1(2): 81-105. <https://doi.org/10.1080/26437015.2020.1724838>
- Bazkiaei HA, Heng LH, Khan NU, Saufi RBA, and Kasim RSR (2020). Do entrepreneurial education and big-five personality traits predict entrepreneurial intention among universities students? *Cogent Business and Management*, 7(1): 1801217.  
<https://doi.org/10.1080/23311975.2020.1801217>
- Bhatt K (2022). Adoption of online streaming services: Moderating role of personality traits. *International Journal of Retail and Distribution Management*, 50(4): 437-457.  
<https://doi.org/10.1108/IJRDM-08-2020-0310>
- Bosnjak M, Ajzen I, and Schmidt P (2020). The theory of planned behavior: Selected recent advances and applications. *Europe's Journal of Psychology*, 16(3): 352-356.  
<https://doi.org/10.5964/ejop.v16i3.3107>  
**PMid:33680187 PMCID:PMC7909498**
- Bunker CJ, Saysavanh SE, and Kwan VS (2021). Are gender differences in the big five the same on social media as offline?



- Computers in Human Behavior Reports, 3: 100085.  
<https://doi.org/10.1016/j.chbr.2021.100085>
- Chae B and Goh G (2020). Digital entrepreneurs in artificial intelligence and data analytics: Who are they? *Journal of Open Innovation: Technology, Market, and Complexity*, 6(3): 56.  
<https://doi.org/10.3390/joitmc6030056>
- Dalvi-Esfahani M, Alaedini Z, Nilashi M, Samad S, Asadi S, and Mohammadi M (2020). Students' green information technology behavior: Beliefs and personality traits. *Journal of Cleaner Production*, 257: 120406.  
<https://doi.org/10.1016/j.jclepro.2020.120406>
- Dan Y, Ahmed AAA, Chupradit S, Chupradit PW, Nassani AA, and Haffar M (2021). The nexus between the big five personality traits model of the digital economy and blockchain technology influencing organization psychology. *Frontiers in Psychology*, 12: 780527.  
<https://doi.org/10.3389/fpsyg.2021.780527>  
**PMid:34899530 PMCID:PMC8654730**
- Danish AY and Smith HL (2012). Female entrepreneurship in Saudi Arabia: Opportunities and challenges. *International Journal of Gender and Entrepreneurship*, 4(3): 216-235.  
<https://doi.org/10.1108/17566261211264136>
- Đokić I, Miličević N, and Đokić N (2021). Personality traits and choice of studying digital marketing. *Marketing*, 52(2): 75-82.  
<https://doi.org/10.5937/mkng2102075Q>
- Duong CD (2022). Big five personality traits and green consumption: Bridging the attitude-intention-behavior gap. *Asia Pacific Journal of Marketing and Logistics*, 34(6): 1123-1144.  
<https://doi.org/10.1108/APJML-04-2021-0276>
- Dutot V and Van Horne C (2015). Digital entrepreneurship intention in a developed vs. emerging country: An exploratory study in France and the UAE. *Transnational Corporations Review*, 7(1): 79-96.  
<https://doi.org/10.5148/tncr.2015.7105>
- Fahmi FZ and Savira M (2023). Digitalization and rural entrepreneurial attitude in Indonesia: A capability approach. *Journal of Enterprising Communities: People and Places in the Global Economy*, 17(2): 454-478.  
<https://doi.org/10.1108/JEC-06-2021-0082>
- Gontareva I, Chorna M, Pawliszczy D, Barna M, Dorokhov O, and Osinska O (2018). Features of the entrepreneurship development in digital economy. *Technology, Education, Management, Informatics Journal (TEM Journal)*, 7(4): 813-822.
- Graham EK, Weston SJ, Gerstorff D, Yoneda TB, Booth T, Beam CR, Petkus AJ, Drewelies J, Hall AN, Bastarache ED, and Estabrook R (2020). Trajectories of big five personality traits: A coordinated analysis of 16 longitudinal samples. *European Journal of Personality*, 34(3): 301-321.  
<https://doi.org/10.1002/per.2259>  
**PMid:33564207 PMCID:PMC7869960**
- Grncharovska SP, Osmani F, Stankovska G, Murati R, and Taneska A (2016). The impact of the students' gender and high school type on the level of digital competency development for lifelong learning. *Journal of Education and Practice*, 7(24): 108-114.
- Gustavsson M and Ljungberg J (2018). Entrepreneurship in the digital society. In the 39<sup>th</sup> International Conference on Information Systems, San Francisco, USA.
- Hamid NA, Kurniasari F, Taib HAM, Saheh NHM, and Embong TFT (2018). A comparative study of Malaysian and Indonesian students' entrepreneurial characteristics and career choices resulting from the digital economy. *International Journal of Supply Chain Management*, 7(5): 250-258.
- Ibáñez MJ, Guerrero M, Yáñez-Valdés C, and Barros-Celume S (2022). Digital social entrepreneurship: The N-Helix response to stakeholders' COVID-19 needs. *The Journal of Technology Transfer*, 47(2): 556-579.  
<https://doi.org/10.1007/s10961-021-09855-4>  
**PMid:33814697 PMCID:PMC8007451**
- Jawad M, Naz M, and Maroof Z (2021). Era of digital revolution: Digital entrepreneurship and digital transformation in emerging economies. *Business Strategy and Development*, 4(3): 220-228.  
<https://doi.org/10.1002/bsd2.145>
- Kelsen B and Flowers S (2018). Personality, collaboration, motivation and engagement in a cross-border online exchange. *International Journal on E-learning*, 17(2): 175-198.
- Krelová KK, Berková K, Krpálek P, and Kubisová A (2021). Attitudes of czech college students toward digital literacy and their technical aids in times of COVID-19. *International Journal of Engineering Pedagogy*, 11(4): 130-147.  
<https://doi.org/10.3991/ijep.v11i4.20821>
- Kusumawijaya IK and Astuti PD (2021). Mediating role of entrepreneurial competencies: Influence of personality traits on entrepreneurial intention. *Problems and Perspectives in Management*, 19(3): 211-220.  
[https://doi.org/10.21511/ppm.19\(3\).2021.18](https://doi.org/10.21511/ppm.19(3).2021.18)
- Lai LS and To WM (2020). E-entrepreneurial intention among young Chinese adults. *Asian Journal of Technology Innovation*, 28(1): 119-137.  
<https://doi.org/10.1080/19761597.2020.1713832>
- Leung WF (2018). *Digital entrepreneurship, gender and intersectionality: An East Asian perspective*. Springer, Berlin, Germany.  
<https://doi.org/10.1007/978-3-319-97523-8>
- Li K, Kim DJ, Lang KR, Kauffman RJ, and Naldi M (2020). How should we understand the digital economy in Asia? Critical assessment and research agenda. *Electronic Commerce Research and Applications*, 44: 101004.  
<https://doi.org/10.1016/j.elerap.2020.101004>  
**PMid:32922241 PMCID:PMC7480531**
- Luo Y and Chan RC (2021). Gendered digital entrepreneurship in gendered coworking spaces: Evidence from Shenzhen, China. *Cities*, 119: 103411.  
<https://doi.org/10.1016/j.cities.2021.103411>
- Lüthje C and Franke N (2003). The 'making' of an entrepreneur: Testing a model of entrepreneurial intent among engineering students at MIT. *R&D Management*, 33(2): 135-147.  
<https://doi.org/10.1111/1467-9310.00288>
- Mahmud M (2020). Impact analysis of digital transformations on entrepreneurial ecosystem in the eastern province of Saudi Arabia. *Journal of Entrepreneurship Education*, 23(1): 1-15.
- Manea DI, Istudor N, Dinu V, and Paraschiv DM (2021). Circular economy and innovative entrepreneurship, prerequisites for social progress. *Journal of Business Economics and Management*, 22(5): 1342-1359.  
<https://doi.org/10.3846/jbem.2021.15547>
- McAdam M, Crowley C, and Harrison RT (2019). "To boldly go where no [man] has gone before"-Institutional voids and the development of women's digital entrepreneurship. *Technological Forecasting and Social Change*, 146: 912-922.  
<https://doi.org/10.1016/j.techfore.2018.07.051>
- Millman C, Wong WC, Li Z, and Matlay H (2009). Educating students for e-entrepreneurship in the UK, the USA and China. *Industry and Higher Education*, 23(3): 243-252.  
<https://doi.org/10.5367/000000009788640224>
- Miralles F, Giones F, and Riverola C (2016). Evaluating the impact of prior experience in entrepreneurial intention. *International Entrepreneurship and Management Journal*, 12: 791-813.  
<https://doi.org/10.1007/s11365-015-0365-4>
- Modgil S, Dwivedi YK, Rana NP, Gupta S, and Kamble S (2022). Has COVID-19 accelerated opportunities for digital entrepreneurship? An Indian perspective. *Technological Forecasting and Social Change*, 175: 121415.  
<https://doi.org/10.1016/j.techfore.2021.121415>  
**PMid:36536802 PMCID:PMC9754074**
- Mohammed SA, Abdullah S, Alqatan A, Alqaadan F, and Gauanmeh F (2020a). Applying the theory of planned behavior among students at preparatory level to explore the determinants of

- students' intention, is there a difference? *International Journal of Management*, 11(10): 419-432.
- Mohammed SA, Abdullah S, Ghawanmeh D, and Alqaadan D (2020b). Theory of planned behavior, human capital theory, and social learning theory towards entrepreneurial intention: The role of Islamic perspective entrepreneurship, an attempt towards discussion: A general-review paper. *International Journal of Management*, 11(11): 864-871.
- Mohammed SAS (2022). The impact of the economic condition on entrepreneurial development in the Kingdom of Saudi Arabia. *Pacific Business Review (International)*, 14(8): 83-94. <http://doi.org/10.5281/zenodo.6717855>
- Mohammed SASA, Grada M, Muneer S, Akhtar T, Khan H, and Zaid SZ (2022a). Entrepreneurship research perspective: The influence of gender differences and the mediating role of subjective norms: The case of university students at preparatory level in University of Hai'l, Saudi. *Pacific Business Review (International)*, 14(9): 64-74.
- Mohammed SASA, Qataan AMA, Ghawanmeh F, and Alqaadan F (2021). Personality traits, self-efficacy, and students' entrepreneurial intention towards entrepreneurship-is there a contextual difference. *SMART Journal of Business Management Studies*, 17(1): 66-79. <https://doi.org/10.5958/2321-2012.2021.00007.5>
- Mohammed SASA, Saree A, Cherni F, Grada M, and Muneer S (2022b). Determinants of attitudes towards COVID-19 donations: The moderating role of ethics in financial fundraising: The case study of Saudi Arabia. *SMART Journal of Business Management Studies*, 18(2): 41-50. <https://doi.org/10.5958/2321-2012.2022.00015.X>
- Ndofirepi TM (2020). Relationship between entrepreneurship education and entrepreneurial goal intentions: Psychological traits as mediators. *Journal of Innovation and Entrepreneurship*, 9: 2. <https://doi.org/10.1186/s13731-020-0115-x>
- Novikova I, Bychkova P, and Zamaldinova G (2021). Personality traits and attitude towards digital educational technologies in Russian university students. In the 15<sup>th</sup> International Technology, Education and Development Conference (INTED2021 Proceedings), IATED, Online Conference: 9999-10005. <https://doi.org/10.21125/inted.2021.2087>
- Ostrovik MO, Kaveshnikov AV, and Serebryakova VN (2020). Awareness and attitude of student youth to digital medicine. *Siberian Journal of Clinical and Experimental Medicine*, 35(3): 141-150. <https://doi.org/10.29001/2073-8552-2020-35-3-141-150>
- Peterson RA (2000). A meta-analysis of variance accounted for and factor loadings in exploratory factor analysis. *Marketing Letters*, 11: 261-275. <https://doi.org/10.1023/A:1008191211004>
- Ramadani V, Jashari F, Gërguri-Rashiti S, and Palalić R (2021). Digital entrepreneurship intentions: Evidence from Kosovo. *International Journal of Technology Transfer and Commercialisation*, 18(4): 399-417. <https://doi.org/10.1504/IJTTC.2021.10043844>
- Rogers A and Hewson E (2016). Development of an early on-set innovation culture in Australia. *Small Enterprise Research*, 23(2): 182-189. <https://doi.org/10.1080/13215906.2016.1230073>
- Schiuma G, Schettini E, Santarsiero F, and Carlucci D (2022). The transformative leadership compass: Six competencies for digital transformation entrepreneurship. *International Journal of Entrepreneurial Behavior and Research*, 28(5): 1273-1291. <https://doi.org/10.1108/IJEBR-01-2021-0087>
- Secundo G, Gioconda MELE, Del Vecchio P, Gianluca ELIA, Margherita A, and Valentina NDOU (2021). Threat or opportunity? A case study of digital-enabled redesign of entrepreneurship education in the COVID-19 emergency. *Technological Forecasting and Social Change*, 166: 120565. <https://doi.org/10.1016/j.techfore.2020.120565>  
**PMid:33518821 PMCID:PMC7826121**
- Si H, Shi JG, Tang D, Wen S, Miao W, and Duan K (2019). Application of the theory of planned behavior in environmental science: A comprehensive bibliometric analysis. *International Journal of Environmental Research and Public Health*, 16(15): 2788. <https://doi.org/10.3390/ijerph16152788>  
**PMid:31382712 PMCID:PMC6695987**
- Sinno N (2019). The effect of digital transformation on innovation and entrepreneurship in the tourism sector: The case of Lebanese tourism services providers. In the 4<sup>th</sup> International Conference Digital Economy: Emerging Technologies and Business Innovation, Springer International Publishing, Beirut, Lebanon: 29-39. [https://doi.org/10.1007/978-3-030-30874-2\\_3](https://doi.org/10.1007/978-3-030-30874-2_3)
- Skivko M (2021). Digital technologies, social entrepreneurship and governance for sustainable development. *Research in Social Change*, 13(1): 165-173. <https://doi.org/10.2478/rsc-2021-0016>
- Sok J, Borges JR, Schmidt P, and Ajzen I (2021). Farmer behaviour as reasoned action: A critical review of research with the theory of planned behaviour. *Journal of Agricultural Economics*, 72(2): 388-412. <https://doi.org/10.1111/1477-9552.12408>
- Solesvik MZ, Westhead P, Matlay H, and Parsyak NV (2013). Entrepreneurial assets and mindsets: Benefit from university entrepreneurship education investment. *Education+Training*, 55(8/9): 748-762. <https://doi.org/10.1108/ET-06-2013-0075>
- Soliman M (2021). Extending the theory of planned behavior to predict tourism destination revisit intention. *International Journal of Hospitality and Tourism Administration*, 22(5): 524-549. <https://doi.org/10.1080/15256480.2019.1692755>
- Srivastava SC, Chandra S, and Shirish A (2015). Technostress creators and job outcomes: Theorising the moderating influence of personality traits. *Information Systems Journal*, 25(4): 355-401. <https://doi.org/10.1111/isj.12067>
- Štemberger T and Konrad SČ (2021). Attitudes towards using digital technologies in education as an important factor in developing digital competence: The case of Slovenian student teachers. *International Journal of Emerging Technologies in Learning (IJET)*, 16(14): 83-98. <https://doi.org/10.3991/ijet.v16i14.22649>
- Sukumar A, Jafari-Sadeghi V, and Xu Z (2021). The influences of social media on Chinese start-up stage entrepreneurship. *World Review of Entrepreneurship, Management and Sustainable Development*, 17(5): 559-578. <https://doi.org/10.1504/WREMSD.2021.10040052>
- Sun Y, Wang S, Gao L, and Li J (2018). Unearthing the effects of personality traits on consumer's attitude and intention to buy green products. *Natural Hazards*, 93: 299-314. <https://doi.org/10.1007/s11069-018-3301-4>
- Suparno S, Saptono A, Wibowo A, and Shandy B (2020). Factors influencing students' intention to establish a digital business (Start-up). *International Journal of Innovation, Creativity and Change*, 12(8): 73-91.
- Suseno Y and Abbott L (2021). Women entrepreneurs' digital social innovation: Linking gender, entrepreneurship, social innovation and information systems. *Information Systems Journal*, 31(5): 717-744. <https://doi.org/10.1111/isj.12327>
- Sussman R and Gifford R (2019). Causality in the theory of planned behavior. *Personality and Social Psychology Bulletin*, 45(6): 920-933. <https://doi.org/10.1177/0146167218801363>  
**PMid:30264655**
- Teng CC (2008). The effects of personality traits and attitudes on student uptake in hospitality employment. *International*

- Journal of Hospitality Management, 27(1): 76-86.  
<https://doi.org/10.1016/j.ijhm.2007.07.007>
- Tentama F and Abdussalam F (2020). Internal locus of control and entrepreneurial intention: A study on vocational high school students. *Journal of Education and Learning (EduLearn)*, 14(1): 97-102.  
<https://doi.org/10.11591/edulearn.v14i1.13999>
- Tommasetti A, Singer P, Troisi O, and Maione G (2018). Extended theory of planned behavior (ETPB): Investigating customers' perception of restaurants' sustainability by testing a structural equation model. *Sustainability*, 10(7): 2580.  
<https://doi.org/10.3390/su10072580>
- Tomy S and Pardede E (2020). An entrepreneurial intention model focussing on higher education. *International Journal of Entrepreneurial Behavior and Research*, 26(7): 1423-1447.  
<https://doi.org/10.1108/IJEBR-06-2019-0370>
- Ughetto E, Rossi M, Audretsch D, and Lehmann EE (2020). Female entrepreneurship in the digital era. *Small Business Economics*, 55: 305-312. <https://doi.org/10.1007/s11187-019-00298-8>
- Upadhyay N, Upadhyay S, and Dwivedi YK (2022). Theorizing artificial intelligence acceptance and digital entrepreneurship model. *International Journal of Entrepreneurial Behavior and Research*, 28(5): 1138-1166.  
<https://doi.org/10.1108/IJEBR-01-2021-0052>
- Uysal ŞK, Karadağ H, Tuncer B, and Şahin F (2022). Locus of control, need for achievement, and entrepreneurial intention: A moderated mediation model. *The International Journal of Management Education*, 20(2): 100560.  
<https://doi.org/10.1016/j.ijme.2021.100560>
- Valencia-Arias A and Restrepo LAM (2020). Entrepreneurial intentions among engineering students: Applying a theory of planned behavior perspective. *Periodica Polytechnica Social and Management Sciences*, 28(1): 59-69.  
<https://doi.org/10.3311/PPso.12731>
- Venkateswaran V, Gunasekar S, and Gupta D (2017). Study of essential personality characteristics for the young Indian millennial: A tobit analysis. In the *International Conference on Advances in Computing, Communications and Informatics, IEEE, Udupi, India: 1882-1887.*  
<https://doi.org/10.1109/ICACCI.2017.8126119>
- von Arnim L and Mrozewski M (2020). Entrepreneurship in an increasingly digital and global world: Evaluating the role of digital capabilities on international entrepreneurial intention. *Sustainability*, 12(19): 7984.  
<https://doi.org/10.3390/su12197984>
- Wang Q (2022). Digital entrepreneurship, gender and intersectionality: An East Asian perspective. *Gender, Place and Culture: A Journal of Feminist Geography*, 29(12): 1820-1823.  
<https://doi.org/10.1080/0966369X.2021.2006922>
- Watjatrakul B (2020). Intention to adopt online learning: The effects of perceived value and moderating roles of personality traits. *The International Journal of Information and Learning Technology*, 37(1/2): 46-65.  
<https://doi.org/10.1108/IJILT-03-2019-0040>
- Younis H, Katsioloudes M, and Al Bakri A (2020). Digital entrepreneurship intentions of Qatar University students motivational factors identification: Digital entrepreneurship intentions. *International Journal of E-Entrepreneurship and Innovation*, 10(1): 56-74.  
<https://doi.org/10.4018/IJEEI.2020010105>
- Yu H and Cui L (2019). China's e-commerce: Empowering rural women? *The China Quarterly*, 238: 418-437.  
<https://doi.org/10.1017/S0305741018001819>
- Zhao D, Tian F, Sun X, and Zhang D (2021). The effects of entrepreneurship on the enterprises' sustainable innovation capability in the digital era: The role of organizational commitment, person-organization value fit, and perceived organizational support. *Sustainability*, 13(11): 6156.  
<https://doi.org/10.3390/su13116156>
- Zhong J, Zheng Y, Huang X, Mo D, Gong J, Li M, and Huang J (2021). Study of the influencing factors of cyberbullying among Chinese college students incorporated with digital citizenship: From the perspective of individual students. *Frontiers in Psychology*, 12: 621418.  
<https://doi.org/10.3389/fpsyg.2021.621418>  
**PMid:33762997 PMCID:PMC7982852**