Journal of Global Entrepreneurship Research (2025) 15:10
https://doi.org/10.1007/s40497-025-00427-6

RESEARCH

Exploring link between skills, attitudes, and intentions in information technology industry: a study on entrepreneurial mindset

Muhammad Salman Shabbir[1]

Received: 2 August 2024 / Accepted: 28 February 2025

Abstract

The study seeks to determine the relationship among entrepreneurial skills, attitude towards behaviour (ATB), and the entrepreneurial goals of IT professionals. With implications for comprehending entrepreneurship in a service-oriented business, this study explores how ATB connects abilities and intents using the theory of planned behaviour. With an emphasis on technology-driven niches, the study develops theoretical models and improves theory on how attitudes and skills interact to impact entrepreneurial intentions by incorporating ATB as a moderating variable of interest. Simple random sampling was used to pick the sample from a cross-sectional survey of 376 IT professionals, and partial least squares structural equation modelling (PLS-SEM) was used to investigate the hypothesized association between the variables. According to the results, ATB moderates the link between skills and intentions, suggesting that fostering both skill and intention development will support the growth of entrepreneurial ability. This realization has significant ramifications for politicians, educators, and practitioners in terms of establishing favourable environments, developing logical skill-building exercises, and encouraging optimistic entrepreneurial attitudes. According to identified factors, stakeholders have the ability to improve the climate for entrepreneurship and support economic growth. This study advances the theoretical understanding of entrepreneurship, particularly as it relates to the creation of intent in the technology sector.

Keywords Entrepreneurial intentions · Attitude towards behavior · Entrepreneurship skills · Information technology

JEL Classification C83 · L26 · L29

Introduction

Modern entrepreneurship is recognized as one of the key driving forces within global economic growth and social development (Saberi & Hamdan, 2019; Bullough et al., 2022; The World Bank, 2018). In recent years, as countries attempt to deal with issues arising from advanced technological systems, global and economic uncertainty, and change, entrepreneurship has emerged as a potential avenue for creating employment, economic growth, and development (Baller et al., 2016; Sutrisno et al., 2023; Zhang et al., 2021). In developing economies, more specifically, entrepreneurship is perceived as a double-edged sword, decreasing high unemployment rates, reducing economic inequality, and motivating youth in productive actions that lead to positive changes in society (Kelley et al., 2012; The World Bank, 2018).

In the context of Pakistan, entrepreneurship is an effective way to address problems including young unemployment, stagnation, and the need for innovation. Given that Pakistan's digital environment is growing quickly and that around 66% of its population is under 30, encouraging entrepreneurial activity would help the nation achieve favourable socioeconomic results. However, there are still obstacles to entrepreneurial success in Pakistan, including a culture that does not value venture capital, inadequate institutional support, and heightened governmental oversight. These and a few other elements demonstrate how urgently an entrepreneurial environment that is appropriate for Pakistan's socioeconomic and cultural contexts must be established.

Entrepreneurial ambitions are highly important in Pakistan, particularly in the information technology (IT) industry, which has a lot of room to grow and create jobs. Pakistan's

✉ Muhammad Salman Shabbir
m.shabbir@yorksj.ac.uk

[1] Department of Business Studies, York St John University, London Campus, London, UK

Published online: 15 March 2025

high unemployment rates and lack of economic diversification may be addressed by encouraging entrepreneurship in industries like information technology, according to the Global Entrepreneurship Monitor (GEM). Emerging nations take steps to foster entrepreneurial ecosystems that increase young participation in economic reconstruction while uplifting society (Nakpodia et al., 2024; De Villiers et al., 2021; Global Entrepreneurship Research Association, 2021).

Entrepreneurship is commonly examined from two main perspectives: The analysis includes two primary theoretical orientations: the first section explores macroeconomic effects coupled with social implications of entrepreneurship (Dutta et al., 2021; Gregori et al., 2021; Roundy & Lyons, 2023) alongside the second segment that concentrates on individual behavioural aspects of cognitive functions and mood responses and conduct (Dutta et al., 2021; Gregori et al., 2021; Roundy & Lyons, 2023). Entrepreneurs at the micro level modify resources while detecting operational dynamics and adaptive possibilities to create new ventures that drive economic expansion (Lucas, 2014). In the IT sector, such individual-level efforts to innovate and build new ventures are particularly valuable as they contribute directly to technological advancement and economic resilience. Entrepreneurial self-employment is a deliberate and purposeful process that is guided by cognitive and motivational components; personal intentions suggest entrepreneurial readiness and motivation to engage in entrepreneurial activities (Masenya, 2021; Rengiah & Sentosa, 2014; Solymossy, 1998). Because they can indicate a person's willingness to pursue particular goals and build an entrepreneurial career, entrepreneurial intentions are therefore considered essential factors in explaining entrepreneurial behaviour, particularly when entrepreneurial actions are contingent or sporadic (Audretsch, 2016; Meoli et al., 2020). This study explores these goals in Pakistan's IT industry, where fostering entrepreneurial growth requires an awareness of how personal objectives, abilities, and attitudes interact.

In order to fill these gaps, this study acknowledges the value of entrepreneurship in bringing about constructive socioeconomic change while also acknowledging that there has been enough research done on the barriers that hinder the transformation of intentions into operational realities in Pakistan's IT industry. Being a promising sector in terms of new ideas and opportunities, this sector is troubled with the problematic relationship between declared intentions and actual actions owing to various barriers including insufficient funding, limited institutional support, and unfavourable policies. Filling this gap is important and demands an understanding of person-level factors—mindset and capabilities to be an entrepreneur, as well as the external factors that shape the ways and contexts through which an individual can go into or engage in any kind of entrepreneurial activity. The purpose of this study is to bridge this gap by outlining how these elements interact and providing helpful suggestions.

The main goals of the study are threefold: (1) investigate the relationship between entrepreneurial skills and the aspirations of IT professionals in Pakistan to start their own business; (2) investigate the mediating role of attitudes towards behaviour (ATB) in the relationship between these skills and aspirations; and (3) determine the opportunities and threats in the IT sector that either facilitate or hinder the aspirations of IT professionals to start their own business.

Even though entrepreneurship is acknowledged to be important for job creation and economic progress, especially in Pakistan's IT industry, there is a significant gap between what entrepreneurs intend to do and what they actually do (Altaf, 2023; Haque, 2007). While 27.9% of Pakistanis express interest in starting a business, only 3.65% engage in early-stage entrepreneurship according to a Global Entrepreneurship Monitor report, highlighting substantial barriers such as inadequate funding, weak institutional support, and regulatory constraints. Existing research focuses largely on macroeconomic factors, with limited attention given to individual-level determinants, such as entrepreneurial skills, attitudes, and perceived feasibility, which influence entrepreneurial decision-making (Farhangmehr et al., 2016; Noor et al., 2023; Shabbir et al., 2016). This study aims to bridge this gap by examining how entrepreneurial skills and attitudes shape entrepreneurial intentions among IT professionals in Pakistan, addressing the broader challenge of translating intentions into actions.

The Pakistani government has introduced several initiatives which provide both monetary encouragement and training resources and regulatory adaptions to support new business creation. The combination of current initiatives fails to address the significant discrepancy researchers such as Irfan et al. (2023) and Rachmawan et al. (2015) have detected between planned entrepreneurship and actual entrepreneurial pursuit. The Global Entrepreneurship Monitor highlights an imbalance: Surviving entrepreneurial plans exist within cultural and policy models at a basic level but substantial persistent boundaries block the development of a sustainable entrepreneurial culture. This necessitates examining individual-level elements that might impact the conversion of entrepreneurial intentions into action in Pakistan, such as entrepreneurial skills, ATB, and perceived feasibility. When combined with an encouraging environment, these elements may help close the gap between intention and action that is seen among Pakistani business owners.

Literature has long focused on studying how social context and economy and resource factors shape startup practices yet lacks analysis about internal determinants particularly in Pakistan's rapidly expanding information technology sector (Bilén et al., 2005; Leitch & Harrison,

1999; Mitchelmore & Rowley, 2010). Research into entrepreneurial intentions in the IT sector becomes promising due to its high growth rates combined with specialized problems and opportunities. Furthermore, previous studies have examined intentions, attitudes, and behaviours in entrepreneurship broadly but have not sufficiently explored how these elements interact within Pakistan's IT sector. This study addresses this gap by investigating attitudes as a mediating factor between entrepreneurial skills and intentions, thus offering new insights into entrepreneurial intention formation in this sector.

Research question: "How do entrepreneurial skills and attitudes influence the formation of entrepreneurial intentions among IT professionals in Pakistan?" This investigation seeks to connect the knowledge of global entrepreneurial ideas with Pakistan's distinct economic and cultural setting, particularly as it pertains to the expanding IT sector. Therefore, the purpose of this study is to close this gap by evaluating the association between Pakistani IT professionals' ambition to start their own business and their entrepreneurial abilities, attitude, and sense of feasibility.

By analyzing individual-level factors, this study helps advance our understanding of entrepreneurial intent formation and yields policy suggestions for Pakistan together with additional implications for education and industry adoption applicable to emerging economies. This study's findings could inform more targeted strategies, focusing on entrepreneurial skills development, attitude shifts, and supportive frameworks to assist individuals in bridging the gap between intent and action, especially within high-potential sectors like IT. Additionally, these results might be used to develop more effective intervention programs that would enable people who want to start their own business bridge the gap and become active, prosperous business owners in high-potential industries like information technology. Lastly, in order to promote a more resilient economy, this effort aims to upgrade Pakistan's entrepreneurial environment's structural framework and entrepreneurship principles.

Literature review

Entrepreneurial skills

What is entrepreneurship? Can we think of entrepreneurship as a natural behavioural response activated by unique traits (Ajzen, 1991; Dhir et al., 2021; Schumpeter, 1991; Sahrah et al., 2023)? Experts challenge this claim through evidence indicating both entrepreneurship traits remain innate yet skills needed in entrepreneurship can be developed through learning (Lichtenstein & Lyons, 2001; Shefsky et al., 2017). According to this definition, extreme entrepreneurship demonstrates itself as an innate quality that requires no training due inherently to be unalterable personal characteristics. Despite this perspective, research indicates that learned entrepreneurial skills are essential for effective business practices and can be particularly relevant in sectors such as IT, where technology and innovation demand unique competencies. Such a shift of perspective reaffirms the need for entrepreneurial skills development, which will help to encourage entrepreneurial intentions in individuals lacking inherent attributes, although they might be capable of acquiring the relevant skills (Lichtenstein & Lyons, 2001).

The abilities required for opportunity discovery and generating enduring business profits define entrepreneurial skills in this situation. The skills encompass both industrial and economic characteristics that meet business competition requirements coupled with proper financial support (Argade et al., 2021; Wickham, 2006). Having advanced opportunity sensing skills enables entrepreneurs to develop stronger entrepreneurial intent to manage organizational affairs and navigate challenges (Chell, 2013; Shahzad et al., 2021; Sim, 2005). However, the feasibility and attractiveness of entrepreneurial intents depend not just on abilities but also on how those talents combine with attitudes towards the behaviour. This serves as the foundation for the study's assumptions and focusses especially on attitude and skill as a way of achieving entrepreneurial aim.

According to the ATB framework, entrepreneurial success demonstrates better divisions through skill categories because antecedent conditions towards business ventures alongside skill factors can generate high levels of entrepreneurial intention (Asad et al., 2008; Lichtenstein & Lyons, 2001). In the IT sector, such skills not only enhance opportunity recognition but also aid professionals in navigating industry-specific challenges, positioning them as valuable assets in forming entrepreneurial intentions.

However, research in this area is still quite limited and does not examine how the two ideas interact in a technology-oriented setting like the IT industry, even if the influence of entrepreneurial abilities on intents has been explored. This study aims to close this gap by investigating how ATB-mediated entrepreneurial skills positively impact entrepreneurial inclinations among Pakistani IT workers. The difference in the findings of previous literature is the current envisioning of skills and attitudes as two sides of the same coin that cumulatively facilitate entrepreneurial intentions.

While many studies highlight the positive impact of entrepreneurial skills, they often overlook the specific demands of industries such as IT, where the rapid pace of technological advancement necessitates a unique skill set (Munawar et al., 2023; Liguori et al., 2020. Prior research has primarily focused on generic skills and intentions, with limited insights into how these elements interact specifically within the IT sector, thus creating a research gap this study seeks to address. Research shows that particular entrepreneurial

competencies exceed traditional academic preparation and work experience in aiding decision-making processes because they both train individuals for business challenges while developing networks essential for startup success (Munawar et al., 2023; Liguori et al., 2020; Galvão et al., 2020; Khedhaouria et al., 2015). Combining self-employment skills with other pertinent skills, like as leadership, improves one's capacity to handle startup challenges. With a focus on IT workers, this study intends to examine how these entrepreneurial abilities especially enhance ambitions within a technology-focused, high-growth business in Pakistan. In light of the above discussion, the following hypotheses are put forth:

H1: Information technology professionals' entrepreneurial inclinations are significantly positively impacted by entrepreneurial personal skills.
H2: Information technology professionals' ATB is significantly improved by entrepreneurial personal skills.

Attitude towards behaviour

A person's fundamental assessment of behaviour characteristics, such as their opinion on launching an entrepreneurial endeavour, is known as their ATB (Ajzen 2001). According to Krueger et al. (2000), the theory of planned behaviour (TPB) states that people's emotional position towards something—ATB—sits between their own goal intentions and outside circumstances when determining what actions to take. The aspects of ATB include attitude towards competitiveness, change, and financial risk, which are key factors in the IT sector, where the pace of technological advancements requires adaptability and a proactive approach to new opportunities (Jadmiko, 2021; Autio, 1997).

The empirical relationship between ATB and behavioural intentions shows that positive attitudes increase the likelihood of behaviour intention, according to a meta-analysis done by Kim and Hunter (1993) to support this claim. Because the entrepreneurial performance of IT professionals is determined by their view of risk-taking, adaptability, and creativity, this relationship becomes more significant. ATB not only raises the degree of entrepreneurial intention but also facilitates the development of the cognitive connection between action plans and competences, which mediates the relationship between intents and skills.

In the present study among entrepreneurs, a positive ATB regarding risk-taking and innovation corresponds to a higher intention of engaging in entrepreneurial activities. This is especially relevant for IT professionals, as they often operate under conditions requiring rapid adaptation to change, making ATB a strong predictor of entrepreneurial intentions within this sector. This research aims to build upon recent findings that suggest ATB's critical role in driving entrepreneurial actions in high-tech environments, as indicated by studies such as Jena (2020) and Wang et al. (2023). However, focusing on the interaction between ATB and entrepreneurial skills, this work demonstrates that entrepreneurial attitudes strengthen the impact of skills on ATB for the creation of new ventures in the IT field. Therefore, this study seeks to establish the mediating effect of ATB on the relationship between entrepreneurial skills and intention towards entrepreneurship, proposing that a positive ATB among persons with strong entrepreneurial skills will enhance the probability of the individual to take up entrepreneurship.

H3: Information technology workers' entrepreneurial inclinations are significantly impacted by their ATB.
H4: The association between information technology professionals' entrepreneurial personal abilities and ambitions is positively mediated by ATB.

Entrepreneurial intentions

Business founders purposefully plan to take control of enterprise management through new venture or self-employment creation (Martins et al., 2023; Al-Mamary & Alshallaqi, 2022; Zhao et al., 2005). Predicatively, in this study, entrepreneurial intentions are taken as the intended decision to engage in self-employment, in line with the TPB model which defines intention as the constituent variable of planned behaviour (Ajzen, 1991). However, previous studies have frequently examined entrepreneurial intents in a general sense without looking at industry-specific variations, which has left a gap on how IT sector professionals, with their unique skill needs and operational problems, generate entrepreneurial intentions. The current study goes beyond the TPB by recognizing that entrepreneurial intents are not distinct entities but rather are greatly influenced by the interplay between ATB and entrepreneurial abilities. The reason intentions are so important in entrepreneurship is because they show a person's willingness to start a firm in spite of obstacles, which suggests a strong sense of determination and a readiness to take risks (Krueger et al., 2000).

Before starting market research and business planning, people must first decide what they want to achieve, according to TPB theory (Jena, 2020). Higher test results for entrepreneurial intentions show the psychometric pattern that leads individuals to take actions resulting in new business formation. Personal goals reveal essential characteristics about prospective business owners who confront difficult entrepreneurial situations (Gubik, 2021; Hoda et al., 2020; Lüthje & Franke, 2003). By examining how skills and ATB interact to produce entrepreneurial intentions in the context of Pakistan's IT sector and highlighting the significance of

both in tackling industry-specific challenges, this study tries to close this gap in the literature.

With the potential to make a substantial impact on Pakistan's economy and innovation landscape, this study aims to close the knowledge gap on the impact of entrepreneurial skills and attitudes specifically within the country's IT sector. While many studies, both domestic and international, have looked at the factors that influence people's intentions to start their own business, little is known about how skills affect intentions in developing nations like Pakistan (Haque, 2007; Zafar et al., 2013).

This study seeks to enhance existing knowledge linking entrepreneurial skills and intentions through ATB in the information technology sector of Pakistan despite limited prior research in this area. The research model underscores ATB as an explanatory link that connects entrepreneurial skills and intentions while providing fresh insights into personal traits effecting entrepreneurial behaviour in emerging economies.

Underpinning theory

Ajzen (1985) developed the TPB, an integrated conceptual model that offers a comprehensive way to explain and forecast human behaviour. The theory of reasoned action, which includes attitudes, subjective norms, and perceived behavioural control as the primary factors influencing intentions to engage in a behaviour, is expanded upon by TPB (Ajzen, 1991). According to the TPB model, perceived behavioural control relates to one's self-efficacy to carry out the behaviour, whereas attitude towards behaviour refers to the affective appraisal of behaviours, including their costs and rewards (Ajzen, 1991; Armitage & Conner, 2001).

That is why TPB remains relevant to studying entrepreneurship as it focuses on capturing the mental processes associated with the intent to act as an entrepreneur. In extending TPB in this manner, this research promotes ATB to mediate the relation between entrepreneurial skills and positive attitudes towards organized skills, which, in the IT field has a direct impact on intentions.

According to research, ATB and entrepreneurial skills are powerful predictors of entrepreneurial intentions. When these two factors are combined, there is a high probability that entrepreneurial intention will rise (Al-Mamary et al., 2020; Rehman et al., 2023). The role of ATB and skills on the intention of entrepreneurship will be explored with the aid of TPB, especially in the context of Pakistan's IT industry, where entrepreneurial opportunities and threats are different. Recent studies, like those by Reyad et al. (2021), have reinforced the relevance of TPB in examining intentions within technology-driven sectors, where both skills and attitudes play critical roles.

On this theoretical background and previous literature review, the following conceptual model (Fig. 1) has been developed to represent the interconnection of entrepreneurial skills, ATB, and intentions.

Methodology

Sample and data collection

The use of quantitative methodology formed the basis for this research's data collection and analysis phase. The study collected primary data about participant thoughts and feelings towards entrepreneurship by using surveys which follow Fisher's (2010) recommendation for understanding subject opinions through quantitative measurements. The research focused on information technology professionals at listed companies throughout Pakistan. Using a cross-sectional approach, this research analyzed data through quantitative methods.

Because it enables objective representation and is appropriate for extrapolating results across Pakistan's heterogeneous IT industry, random sampling was used for this study. Assuring their direct relevance to the study's emphasis on entrepreneurial impulses within the IT industry, the participants were selected based on their employment at IT-related firms registered with the Securities and Exchange Commission of Pakistan (SECP). The selection

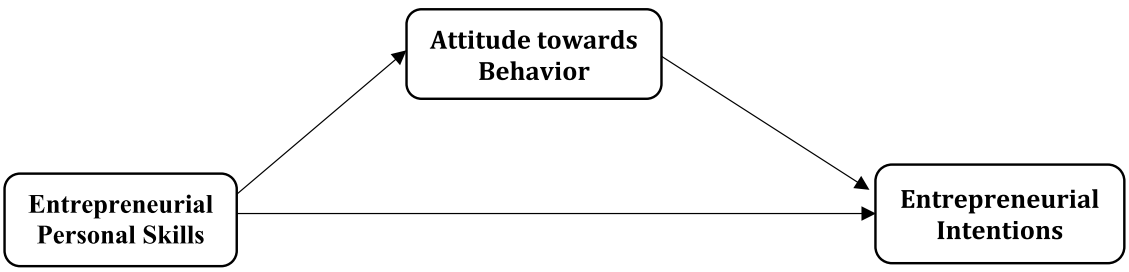

Fig. 1 Conceptual model

criteria were IT experts with at least 1 year of professional experience, indicating a possible exposure to entrepreneurial prospects. Individuals in non-technical jobs or sectors other than IT were excluded since their circumstances were not in line with the study's aims.

A list of IT companies registered with the SECP was included of the sample frame, offering a thorough foundation for contacting specialists from various IT companies. There are several reasons why IT professionals were chosen for this research. First, IT is one of the most rapidly expanding sectors of the Pakistani economy that has embodied the process of its transformation and creation of new jobs. The sample's demographic characteristics showed that 30% of participants were female and 70% of participants were male, with ages ranging from 22 to 50. A wide range of perspectives were ensured by their diverse professional backgrounds, which included early-career professionals, mid-career workers, and senior specialists.

While, according to the government of Pakistan, this IT industry has contributed $3.5 billion to the exports of Pakistan. It also led to the rapid growth of the number of employees; this increases the pool of participants offering a diverse population convenient when measuring entrepreneurial intentions. Second, there are innate reasons as technology industry's professionals are inclined towards entrepreneurship by the nature of their profession. Compared to many other industries, working in the IT segment means being a part of innovation and potentially disruptive solutions—this environment is perfect for nurturing entrepreneurial thinking and actions. Third, studies found that ideas and flexible work models are widespread in the technology-oriented industries. Therefore, it seems that the exposure to new ideas and networking opportunities will lead the IT employees to become self-employed. The fourth reason is the characteristics of IT as a problem-solving industry, which ensures that it complements the entrepreneurial competencies, hence, making IT professionals a suitable population for studying the intentions for entrepreneurship. These reasons justify the extent that the characteristics of the IT sector professionals co-relate with the goals of this research.

Additionally, our sample covers a broad age group that represents different levels of experience among IT professionals. Thus, this study guarantees broader insights into entrepreneurial intentions across the enlisted IT employees, with a heterogeneous background and varying levels of experience among participants. This diversity enriches the data and makes it possible to gain insights related to participants ranging from new entrants in the job market to more experienced individuals.

While the cross-sectional data provides a snapshot of current attitudes and intentions, it is limited in capturing changes over time, which may influence entrepreneurial intentions as professionals gain experience or face new challenges. This limitation could potentially impact the findings, as longitudinal data might better capture shifts in entrepreneurial intentions and attitudes.

Calculating the sample size, the formula used belongs to Mendenhall (1993), and according to it, 372 respondents would be needed in this study. Thus, the final total of the participants from two surveys equaled 376, which is appropriate for PLS-SEM analysis according to the suggestion by Lei and Lomax (2005). PLS-SEM was selected due to its suitability for predictive modelling and its ability to analyze complex relationships within the dataset, especially in studies with multiple constructs and hypotheses. The IT firms and their employees' data were collected from SECP. In using PLS-SEM, this study assumes that the relationships between variables are non-linear and that PLS-SEM can better handle small-to-medium sample sizes while still providing robust results for predictive research.

Measurement of constructs

The study measured three key constructs: entrepreneurial intentions, ATB, and entrepreneurial personal skills using single-dimensional scales used in previous studies. A six-item scale that was taken from Liñán (2008) and was intended to gauge participants' commitment to launching and operating a business was used to gauge their entrepreneurial intentions. Kolvereid's scale and the theory of planned behaviour (Ajzen, 1991) were the sources of the five-item Likert-scale measure used to evaluate the mediating variable, ATB, which gauges the perceived viability and appeal of entrepreneurial endeavours. Using a 14-item scale taken from Smith et al. (2007), which included key entrepreneurial competencies, the independent variable, entrepreneurial personal skills, was assessed.

A 7-point Likert scale, with 1 denoting "strongly disagree," was used to measure each response. Two is slightly disagree, 3 is disagree, 4 is neutral, 5 is somewhat agreeable, 6 is agreeable, and 7 is quite agreeable. The reliability of these scales was examined using Cronbach's alpha, and all of the constructs had values greater than 0.7. Average variance extracted (AVE) and the composite reliability metric provided additional evidence of validity.

To provide further transparency and clarity, a comprehensive table (Appendix) listing all questionnaire items, their corresponding constructs, and supporting references has been included in the Appendix. This survey was conducted in English; the preliminary version of the survey was pilot tested on a convenient sample of IT professionals in order to check for the suitability of overall language and content in the Pakistani context. These steps were taken to guarantee the aspect of reliability and relevance of the constructs as used in the study.

The main advantage of our study rests in analyzing the data collected from IT professionals yet we must acknowledge the study's restricted ability to apply its findings to the general population. Further research needs to expand this information base through testing more extensive population samples representing various occupations in organizations to verify these findings. A total of 398 questionnaires were retrieved from the 700 IT employees resulting in 376 valid responses which produced a usable response rate of 53.71%. The respondents' profiles, described in Table 1, are also quite diverse in age, experience, and background.

Results and discussion

A partial least squares (PLS-SEM) method to structural equation modelling (SEM) was employed in this study to investigate the suggested link between the antecedents of entrepreneurial personal abilities, ATB, and entrepreneurial intention. A number of important considerations influenced the choice to use PLS-SEM rather than covariance-based SEM (COV-SEM). First, the dataset's features—such as its modest sample size ($n = 376$) and non-normal distribution—made PLS-SEM more appropriate choice because of its capacity to manage such complexities. Furthermore, PLS-SEM is very useful for investigating complicated, hierarchical relationships and predictive modelling, which fits perfectly with the exploratory nature of our work. Potential PLS-SEM biases were identified, including its reliance on sample-specific characteristics and its inability to provide global model fit indices that are on par with COV-SEM. These limitations were lessened by rigorous reliability and validity testing, including Cronbach's alpha, composite reliability, AVE, and discriminant validity assessments.

A comparative evaluation further revealed that while COV-SEM excels in confirmatory analysis and robust model fit assessment, its reliance on stringent data assumptions (e.g., multivariate normality) and its challenges in handling smaller sample sizes rendered it less practical for this study. Additionally, the flexibility of PLS-SEM in handling formative and reflective constructs provided a distinct advantage, particularly given the study's focus on developing and testing an exploratory model. Specific characteristics of the sample, including its diversity in professional roles, varying levels of experience, and its representation of a dynamic IT sector, further justified the preference for PLS-SEM. These characteristics required an analytical approach capable of capturing latent constructs and complex relationships across heterogeneous data.

The validity of findings and the interpretation of results are both affected by the use of PLS-SEM. Although the approach makes it easier to comprehend indirect effects and mediation in a more sophisticated way, the lack of global fit indices calls for cautious interpretation. Robust methodological controls were used to address this, guaranteeing that the results are both theoretically and statistically significant. This study offers a fair and methodologically sound approach for examining entrepreneurial constructs in the IT industry by utilizing PLS-SEM and explicitly recognizing its limitations.

In the context of earlier research, the following findings are examined and addressed.

Data analysis and model evaluation

The validity and reliability of the measurement model were examined. Internal consistency was proved by the composite reliability and Cronbach's alpha scores of all the constructions being above 0.7. According to Table 2, the study's convergent validity was confirmed by AVE values exceeding 0.5, which is consistent with the findings of Fornell and Larcker (1981). As shown in Tables 2 and 3, discriminant validity was ensured in this study since the AVE square root for each construct was greater than the coefficients indicating the correlations between a particular construct and the other constructs.

As suggested by Henseler et al. (2015), the heterotrait-monotrait (HTMT) ratio was also calculated to verify discriminant validity (Table 4). The HTMT approach measures the level of construct convergence by means of between-construct correlations (heterotrait correlations) divided by within-construct correlations (monotrait correlations). A second-order estimate HTMT value less than 0.85 represents adequate discriminant validity. The findings of this study indicated that all HTMT values were less than 0.85, which justified that the constructs were unique from the other.

The employment of both statistical and procedural approaches helped to allay concerns about common method bias (CMB). CMB is unlikely to have a considerable impact on the results, as the greatest component only explained 34% of the entire variation, much below the 50% criterion, according to Harman's single-factor test. Additionally, the common latent factor (CLF) approach was used in the structural model to further confirm the absence of CMB. By comparing the path coefficients estimated with the CLF and the path coefficients estimated without the CLF, it was found that the differences were marginal (< 0.2) supporting the robustness of the model. The results suggest that random sampling methodology and the data to be analyzed are credible and accurate. The results of the measurement model are shown in Fig. 2.

While testing the structural model, path coefficients (β values) were also computed in order to determine impact and significance of each relationship between the constructs. The strength and direction of the proposed associations are confirmed by these coefficients and their t-statistics, which

Table 1 Demographic characteristics of respondents

Item	Frequency	Percent	Item	Frequency	Percent	Item	Frequency	Percent	Item	Frequency	Percent
Orders of birth			Educational background			Work experience			Sole proprietorship	8	20
Eldest	14	35	Doctoral degree	2	5	1 year	9	22.5	Partnership	12	30
Youngest	14	35	MCS	10	25	2 years	4	10	Joint venture	1	2.5
Only child	2	5	MIT	2	5	3 years	2	5	Limited company	11	27.5
None of above	9	22.5	Master degree others	7	17.5	4 years	6	15	Joint stock corporation	2	5
Father's working status			Bachelor degree (4 years)	15	37.5	5 years or more	19	47.5	Others	5	12.5
Business	9	22.5	Diploma or equivalent	1	2.5	**Location of your company**			**Years of operations**		
Full-time	10	25	Others	2	5	Rawalpindi	29	72.5	Less than 5 years	12	30
Part time	4	10	**No. of employees**			Lahore	5	12.5	6–10 years	15	37.5
Not working	7	17.5	Less than 10	4	10	Faisalabad	1	2.5	11–20 years	6	15
Deceased	10	25	11–20	14	35	Gujranwala	5	12.5	More than 20 years	5	12.5
Family history of entrepreneurship			21–50	7	17.5	**Position**			**Age**		
Parents	10	25	51–100	7	17.5	Director	3	7.5	Up to 25 years	19	47.5
Sibling	3	7.5	101–150	2	5	Manager	6	15	26–30 years	9	22.5
Relatives	5	12.5	250 above	4	10	Team lead	3	7.5	31–35 years	3	7.5
None	21	52.5	**Ownership**			Developer	19	47.5	36–40 years	3	7.5
Gender			51–55 years	1	2.5	Others	7	17.5	41–45 years	3	7.5
Male	28	70	56–60 years	1	2.5						
Female	12	30									

Table 2 Items loading and measures of internal consistency

Constructs	Items	Loadings	Cronbach's alpha	Composite reliability	AVE
Attitude towards behaviour	Q.01ATB	0.76			
	Q.02ATB	0.88			
	Q.03ATB	0.86	0.91	0.93	0.74
	Q.04ATB	0.91			
	Q.05ATB	0.87			
Entrepreneurial intentions	Q.01EI	0.86			
	Q.02EI	0.86			
	Q.03EI	0.84			
	Q.04EI	0.88	0.95	0.95	0.69
	Q.05EI	0.85			
	Q.06EI	0.86			
Entrepreneurial personal skills	Q.01EPS	0.83			
	Q.02EPS	0.85			
	Q.03EPS	0.84			
	Q.04EPS	0.87			
	Q.05EPS	0.88			
	Q.06EPS	0.91	0.95	0.95	0.71
	Q.07EPS	0.86			
	Q.08EPS	0.87			
	Q.09EPS	0.84			
	Q.10EPS	0.84			
	Q.11EPS	0.81			
	Q.12EPS	0.80			
	Q.13EPS	0.82			
	Q.14EPS	0.79			

Table 3 Discriminant validity

	ATB	EPS	Ent-Int
Attitude towards behaviour	**0.86**		
Entrepreneurial personal skills	0.59	**0.84**	
Entrepreneurial intentions	0.59	0.57	**0.83**

Table 4 HTMT ratio

	ATB	EPS	Ent-Int
ATB	**0.81**		
EPS	0.497	**0.759**	
Ent-Int	0.312	0.47	**0.763**

are obtained by bootstrapping processes. Figure 3 shows the specifics of the structural model together with the relevant coefficients.

Hypothesis testing and interpretation

Hair et al. (2013) examined the explanatory power of the structural model using route coefficients, coefficient of determination (R^2), effect size measure (f^2), and predictive relevance measure (Q^2). A detailed examination of findings appears in subsequent sections regarding their connection to existing literature.

Hypothesis 1 (H1): ATB positively influences entrepreneurial intentions

The results supported H1 (Table 5) by showing that ATB had a favourable effect on entrepreneurial ambition ($\beta = 0.426$, $t = 7.267$, $p < 0.000$). This finding supports the TPB, as attitude towards behaviour is one of the key predictors of intentions (Ajzen, 1991). A positive attitude towards entrepreneurship tends to capture the anticipated gains from self-employment and entrepreneurial activities, combined with control, creative work, and economic incentives (Krueger et al., 2000). This finding aligns with previous researches (Amofah & Saladrigues, 2022; Jena, 2020; Liñán and Chen, 2009; Sampene et al., 2023), which suggest that those with a positive attitude towards entrepreneurship are more likely to engage in it. In Pakistan's IT sector, where creativity and innovation are valued, these attitudes likely reinforce

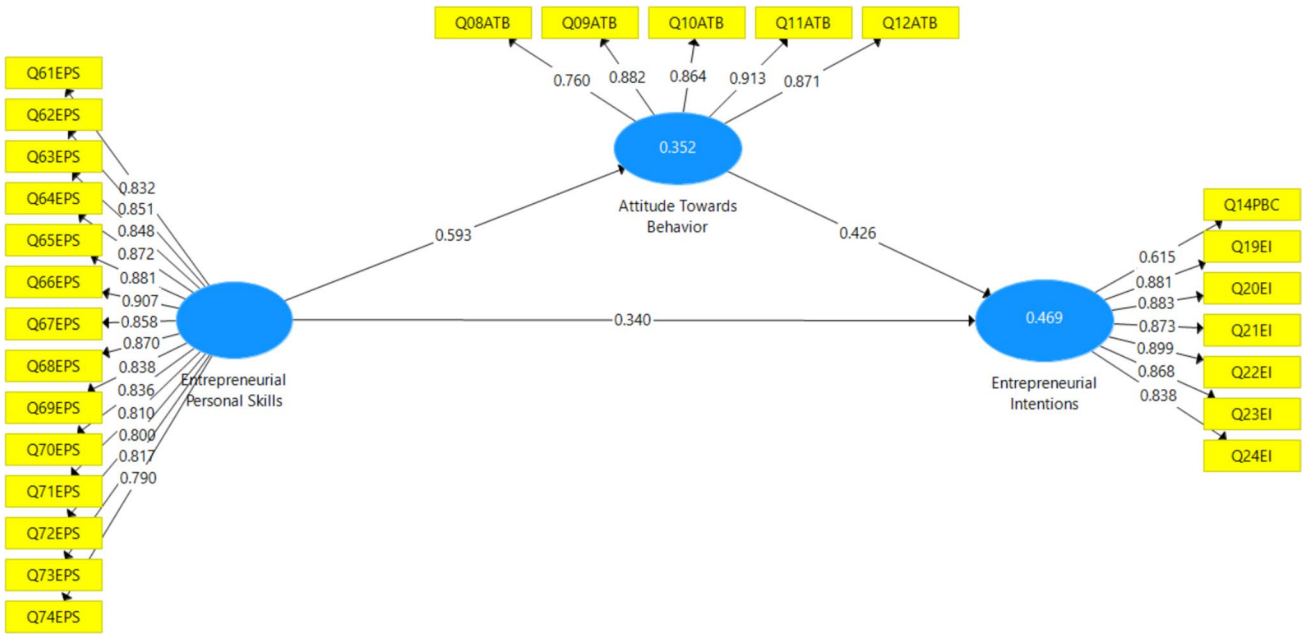

Fig. 2 PLS-SEM measurement model

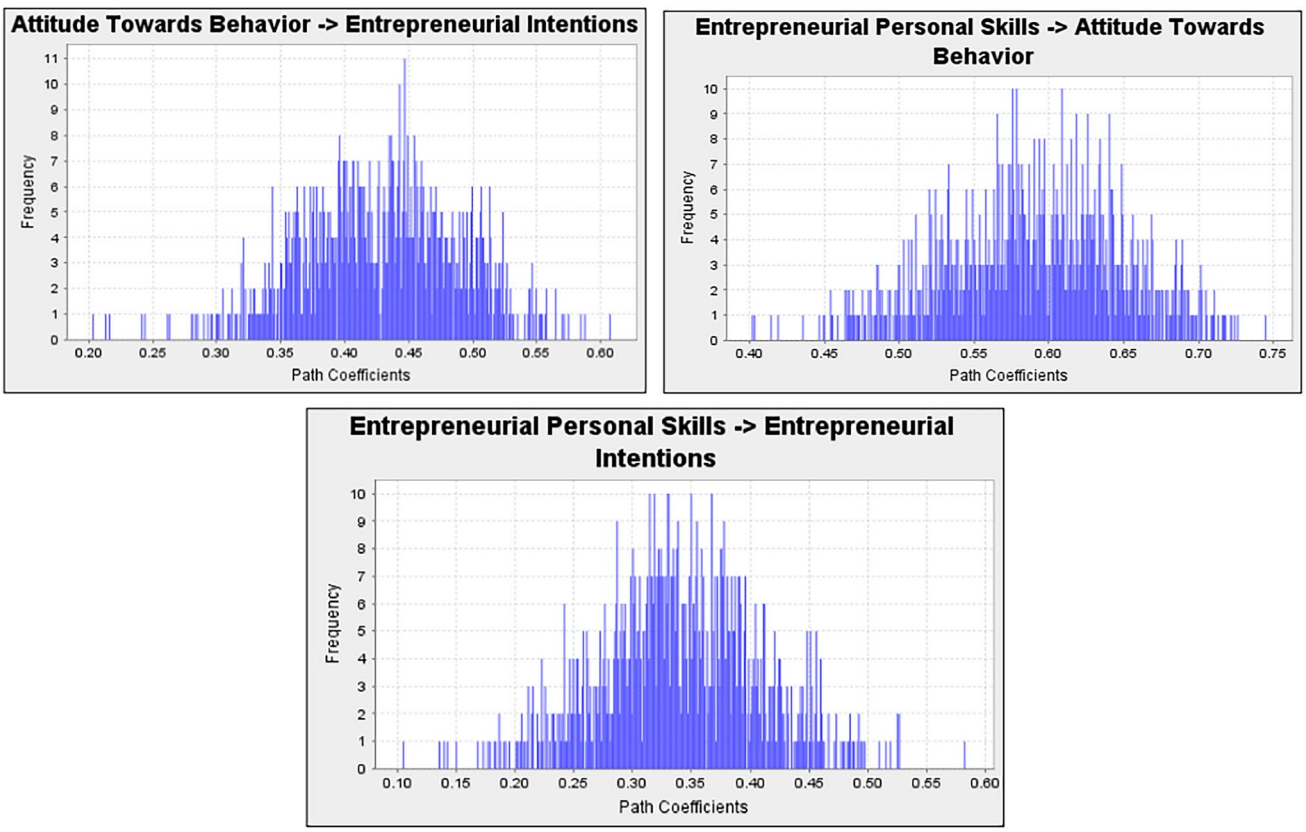

Fig. 3 Graphical representation of path coefficients

Table 5 Results of direct and mediating tests

	Hypothesized Path	Path coefficient	Standard error (STERR)	*t*-value	*p*-value	Decision
H1	ATB—> Ent-Int	0.426	0.059	7.267	0.000	Supported
H2	EPS—> ATB	0.593	0.058	10.195	0.000	Supported
H3	EPS—> Ent-Int	0.340	0.062	5.476	0.000	Supported
H4	EPS—> ATB—> EI-INT	0.253	0.041	6.169	0.000	Supported

a desire to explore entrepreneurial opportunities, reflecting the unique potential of IT professionals to innovate in entrepreneurial ventures.

Hypothesis 2 (H2): entrepreneurial personal skills positively influence ATB

The second hypothesis proposed that entrepreneurial personal skills would positively affect ATB, and this was confirmed by the results ($\beta = 0.593$, $t = 10.195$, $p < 0.000$), supporting H2 (shown in Table 5). This aligns with previous research studies (Amofah & Saladrigues, 2022; Shapero and Sokol, 2002; Shahzad et al., 2021; Vamvaka et al., 2020) claiming that possessing entrepreneurial skills enhances one's confidence and positive attitude towards entrepreneurship. In the context of IT, these skills provide professionals with an enhanced capacity to adapt to industry changes and pursue innovative projects, further bolstering their positive attitude towards entrepreneurship.

Hypothesis 3 (H3): entrepreneurial personal skills positively influence entrepreneurial intentions

The results also confirmed H3, which proposed a direct and positive relationship between entrepreneurial personal skills and entrepreneurial intention ($\beta = 0.340$, $t = 5.476$, $p < 0.000$) (shown in Table 5). This hypothesis is reinforced by previous research (Martins et al., 2023; Shahzad et al., 2021; Tomy & Pardede, 2020) that confirms the role of skill exposure in shaping intentions towards entrepreneurship, as skills prepare individuals to tackle challenges associated with business ventures. Given the rapid technological changes in Pakistan's IT sector, possessing entrepreneurial skills may be particularly impactful, enabling professionals to capitalize on emerging opportunities.

Hypothesis 4 (H4): ATB mediates the relationship between entrepreneurial personal skills (EPS) and entrepreneurial intentions (EI)

ATB fully mediates the association between entrepreneurial personal qualities and entrepreneurial ambitions ($\beta = 0.253$, $t = 6.169$, $p < 0.000$), according to the results, which supported H4 (Table 5). This is confirmed by the previous researches (Aga, 2023; Taneja et al., 2024) that while skills influence intentions, the influence is mediated by a positive attitude towards entrepreneurship. For instance, an IT professional in Pakistan who has developed high entrepreneurial skills is more likely to pursue entrepreneurship if they view it as fulfilling and valuable. This demonstrates the significance of cultivating optimistic attitudes inside the industry in order to convert skills into entrepreneurial initiatives.

Table 6 Effect size (f^2)

Exogenous constructs	Effect size	Total effect
EPS-EI-Int	0.54	Strong
EPS-ATB	0.22	Moderate

Table 7 Predictive relevance (Q^2)

Total	SSO	SSE	1-SSE/SSO)
Attitude towards behaviour	1820.00	1396.13	0.233
Entrepreneurial intentions	2548.00	1780.27	0.301

Additional model assessment metrics

Coefficient of determination (R^2) Entrepreneurial personal skills explained 35.2% of the variance in ATB ($R^2 = 0.352$), and ATB and personal skills collectively explained 46.9% of the variance in entrepreneurial intentions ($R^2 = 0.469$). The TPB paradigm, which holds that intention is directly influenced by perceived talents and attitudes, is consistent with this great explanatory power (Ajzen, 1991).

Effect size (f^2) The effect size of entrepreneurial personal skills was moderate for ATB ($f^2 = 0.22$) and strong for entrepreneurial intentions ($f^2 = 0.54$) (shown in Table 6). This suggests that the degree of skill significantly influences attitudes and intentions, corroborating findings from prior research by Shane and Venkataraman (2000).

Predictive relevance (Q^2) The Q^2 values (0.233 for ATB and 0.301 for entrepreneurial intentions) (shown in Table 7) suggest the model has significant predictive relevance,

supporting its use in forecasting entrepreneurial behaviour in similar environments (Henseler et al., 2009). The predictive relevance values provide additional validation of the model's robustness in capturing entrepreneurial intent within Pakistan's IT sector.

Research and practical implications

This research provides insights into strategies that can help aspiring entrepreneurs, particularly in the IT field, by clarifying the factors that impact their level of entrepreneurial intentions. Specifically, for Pakistan's IT industry, targeted skill-building programs and attitude-shaping initiatives can play a transformative role in fostering entrepreneurial potential. These programs could include intensive training workshops in entrepreneurial skills, sector-specific support for IT entrepreneurs, and mentorship initiatives that connect aspiring entrepreneurs with seasoned professionals in the industry. The present work also raises awareness about the significance of skill and attitude development as key components influencing entrepreneurial intentions. Thus, the relationship between these factors may help those considering entrepreneurship to better understand the obstacles in new venture creation processes. It can only be stated, though, that this endeavour is not exclusively an individualistic responsibility: for example, the financial capital necessary for new venture creation is similarly crucial for fulfilling entrepreneurial potential. In developing countries such as Pakistan, where the unemployment rate has become a critical issue, learning about entrepreneurship can enhance economic stability and create employment opportunities (Naudé, 2011). Providing an enabling environment is particularly essential in Pakistan's fast-evolving IT sector, where resources and industry-specific support systems—such as access to financing and networks of IT professionals—can drive more sustainable entrepreneurial outcomes. In practice, when practitioners assist people in moving from intention to action, they are strategically positioned to help build an ecosystem that focuses not only on individual skill sets but also on creating structural support to encourage enterprise creation (Stam, 2015).

Theoretical implications

The extension of the TPB to the setting of entrepreneurial ambitions is where this study's theoretical implications lie. Given the influence of entrepreneurial self-efficacy, passion, and perseverance on business intentions, this study strengthens TPB's claim that self-attitude is one of the most significant indicators of intention (Ajzen, 1991; Krueger et al., 2000). This study offers a distinctive viewpoint on how attitudes mediate the relationship between skills and entrepreneurial intentions by applying TPB specifically to Pakistan's IT sector. It also highlights the critical role that a positive attitude plays in transforming skills into entrepreneurial action. Focusing on attitudes with regard to skills, this research indicates that attitudes are not only antecedents but also moderators that bridge the gap between skills and intentions within the TPB framework. Finally, the study supports the view that an entrepreneurial personality combines attitudes and skills, forming a mindset that is dynamic and can develop through education, experience, and proper networks (Shane & Venkataraman, 2000; Fayolle & Gailly, 2015). Each construct—skills, attitudes, and intentions—uniquely contributes to the entrepreneurial process, particularly in the IT sector, where the capacity to adapt, innovate, and navigate a fast-paced environment is paramount. Drawing on mindset development as a key stage in the creation of entrepreneurial capabilities, this study underscores the importance of both formal and informal education in forming entrepreneurial intentions, especially in technology-related industries (Isenberg, 2010).

Policy implications

The study offers a number of policy recommendations for creating entrepreneurial ecosystems, some of which are especially pertinent to the IT sector. In order to improve skills, especially IT skills, in underserved areas, more policies should be put in place first. Policymakers may address this by creating scholarships, internships, and vocational training programs that prepare IT professionals for entrepreneurship. Policymakers should also start awareness efforts to emphasize the advantages of entrepreneurship in addition to developing apprenticeship programs, since a good attitude towards entrepreneurship has been shown to be crucial for encouraging entrepreneurial activity. Sector-specific initiatives, such as IT-focused startup incubators or entrepreneurship boot camps, would encourage more IT professionals to consider entrepreneurial careers. Organizing events that bring together young entrepreneurs with established business leaders (Audretsch et al., 2007) can cultivate a favourable perception of entrepreneurship within the IT sector, encouraging more people to enter the industry.

Additionally, the study suggests regulations that can enhance the IT industry's business climate. The business

environment should be made more accessible by lowering taxes, providing loans at reasonable rates, and simplifying registration procedures (Stam, 2015). To lessen the financial difficulties faced by emerging IT firms, governments should also offer tax credits, grants, and concessional capital to early-stage businesses that support IT development objectives. Additionally, creating dedicated funds to support IT-based startups and easing regulations around venture capital investments could significantly enhance entrepreneurial activity within the sector. The study also highlights the gender gap in IT, suggesting policies focused on gender inclusion. Governments can encourage gender diversity by supporting scholarships for women, creating training programs, and establishing mentorship opportunities that promote equity in entrepreneurial chances (Naudé, 2011). Ensuring women have equal access to entrepreneurial resources not only enhances individual opportunities but also contributes to overall economic growth by maximizing human capital potential. Through these policy measures, governments can build an environment that responds to the unique demands of the evolving economy, supporting startups and fostering a robust entrepreneurial culture (Isenberg, 2010; Shane & Venkataraman, 2000).

Limitations and future directions

This research includes several constraints that researchers should build from in upcoming studies. The primary drawback in this research springs from its exclusive usage of self-reported data which potentially faces bias challenges. Social desirability bias among respondents has the potential to result in overestimated findings concerning participant skills and attitudes and intentions. Post-study investigations should incorporate performance-based testing coupled with behavioural observations together with self-reports. Research limitations emerge because the investigators performed their analysis in one specific area which might not translate across different geographic locations and international territories. More studies should explore if the detected relationship patterns between IT industry skills and attitudes and intentions exist across various geographic sectors across the world.

This analysis limits itself to studying skills and attitudes and intentions as factors influencing entrepreneurial behaviours without exploring social pressure and resource accessibility and facility provisions. Research investigation should proceed to determine which factors contribute to entrepreneurial development among IT professionals. The research omitted any investigation into the connected nature of study variables particularly how entrepreneurial behaviours relate to business success and profitability outcomes. Future investigations will need to establish precisely how entrepreneurial success in the IT sector relates to skill sets and attitudes as well as intentions.

Conclusion

The moderating effect of ATB on the association between Pakistani IT workers' entrepreneurial abilities and ambitions was evaluated in this study. The study's findings showed a favourable relationship between the degree of personal entrepreneurial traits and the degree of intentions towards entrepreneurship. These results imply that the degree of an individual's innate entrepreneurial abilities determines the degree of their entrepreneurial goals. Additionally, the study discovered that EPS had a good effect on ATB, and that ATB had a considerable influence on entrepreneurial goals. Furthermore, the PLS-SEM results showed that the association between entrepreneurial abilities and entrepreneurial intention was partially mediated by the high degree of perceived attractiveness to launch a business. Furthermore, prior research demonstrating a favourable correlation between entrepreneurial goals and entrepreneurship abilities supports these findings (Zafar et al., 2013; Denanyoh et al., 2015; Esfandiar et al., 2019; Meoli et al., 2020; Nabi et al., 2018).

The following research suggestion is offered to improve the situation in light of the study's findings: It is necessary to take action to enhance IT workers' entrepreneurial abilities. Since the IT sector is one of the most important in the world, IT workers ought to be inspired to cultivate an entrepreneurial mindset. This is particularly pertinent as the IT workforce's individual skill set has a significant impact on their ability to innovate. Furthermore, it is advised that Pakistan's pertinent government agencies start seminars and programs aimed at teaching IT workers entrepreneurial abilities. In order to increase Pakistan's entrepreneurial ability, this study suggests that the HEC of Pakistan and other relevant higher education institutions provide required courses on entrepreneurship and associated skills.

Appendix

Table 8 Measurement instruments

Construct	Items	Number of items	Source
Attitude towards behaviour	1. Being an entrepreneur implies more advantages than disadvantages to me 2. A career as an entrepreneur is attractive for me 3. If I had the opportunity and resources, I would like to start a business 4. Being an entrepreneur would entail great satisfactions for me 5. Among various options, l would rather be an entrepreneur	5	Kolvereid (1996)
Entrepreneurial personal skills	1. I accept and easily adapt to change 2. I respond to change with flexibility 3. I can easily absorb and adapt ideas and information 4. I continually show interest in new developments and in keeping up to date 5. My knowledge adds value to the work that I do 6. I am quick to foresee difficult situations and come up with alternative solutions 7. I inspire enthusiasm in the people that I work with 8. I effectively present my ideas with a sound belief 9. I am experienced in leading and motivating people 10. I put a lot of effort in meeting set goals 11. I come up with continual good results under pressure 12. I can maintain or even increase effort under stressful situations 13. I remain composed in stressful conditions 14. I can control stressful situations	14	Smith et al. (2007)
Entrepreneurial intentions	1. My professional goal is becoming an entrepreneur 2. To start my own company would probably be the best way for me to take advantage of my education 3. I will make every effort to start and run my own firm 4. I am determined to create a firm in the future 5. I personally consider entrepreneurship (to start my own company) to be a highly desirable career alternative for people with my education 6. I would rather found a new company than be the manager of an existing one	6	Liñán (2008)

Author contribution The author MSS confirms being the sole contributor to this work and approves it for publication.

Data availability Data will be made available on the request.

Code availability Not applicable.

Declarations

Competing interests The author declares no competing interests.

References

Aga, M. K. (2023). The mediating role of perceived behavioral control in the relationship between entrepreneurship education and entrepreneurial intentions of university students in Ethiopia. *Journal of Innovation and Entrepreneurship, 12*(1), 32.

Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In *Action control: From cognition to behavior* (pp. 11–39). Springer Berlin Heidelberg.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-T

Ajzen, I. (2001). Nature and operation of attitudes. *Annual review of psychology, 52*(1), 27–58.

Al-Mamary, Y. H., & Alshallaqi, M. (2022). Impact of autonomy, innovativeness, risk-taking, proactiveness, and competitive aggressiveness on students' intention to start a new venture. *Journal of Innovation & Knowledge, 7*(4), 100239.

Al-Mamary, Y. H. S., Abdulrab, M., Alwaheeb, M. A., & Alshammari, N. G. M. (2020). Factors impacting entrepreneurial intentions among university students in Saudi Arabia: Testing an integrated model of TPB and EO. *Education + Training, 62*(7/8), 779–803.

Altaf, Z. (2023). *Entrepreneurship in the third world: Risk and uncertainty in industry in Pakistan*. Routledge.

Armitage, C. J., & Conner, M. (2001). Efficacy of the theory of planned behaviour: A meta-analytic review. *British Journal of Social Psychology, 40*(4), 471–499.

Amofah, K., & Saladrigues, R. (2022). Impact of attitude towards entrepreneurship education and role models on entrepreneurial intention. *Journal of Innovation and Entrepreneurship, 11*(1), 36.

Argade, P., Salignac, F., & Barkemeyer, R. (2021). Opportunity identification for sustainable entrepreneurship: Exploring the interplay of individual and context level factors in India. *Business Strategy and the Environment, 30*(8), 3528–3551.

Asad, M., Shabbir, M. S., Salman, R., Hussain Haider, S., & Ahmad, I. (2008). Do entrepreneurial orientation and size of enterprise influence the performance of micro and small enterprises? A study on mediating role of innovation. *Management Science Letters, 8*(10), 1015–1026.

Audretsch, D. B., Grilo, I., & Thurik, A. R. (Eds.). (2007). *Handbook of research on entrepreneurship policy*. Edward Elgar Publishing.

Audretsch, D. B., Kuratko, D. F., & Link, A. N. (2016). Dynamic entrepreneurship and technology-based innovation. *Journal of evolutionary economics, 26*, 603–620.

Autio, E. (1997). New, technology-based firms in innovation networks symplectic and generative impacts. *Research Policy, 26*(3), 263–281.

Baller, S., Dutta, S., & Lanvin, B. (2016). *Global information technology report 2016*. Ouranos.

Bilén, S. G., Kisenwether, E. C., Rzasa, S. E., & Wise, J. C. (2005). Developing and assessing students' entrepreneurial skills and mind-set. *Journal of Engineering Education*. https://doi.org/10.1002/j.2168-9830.2005.tb00844.x

Bullough, A., Guelich, U., Manolova, T. S., & Schjoedt, L. (2022). Women's entrepreneurship and culture: Gender role expectations and identities, societal culture, and the entrepreneurial environment. *Small Business Economics, 58*(2), 985–996.

Chell, E. (2013). Review of skill and the entrepreneurial process. *International Journal of Entrepreneurial Behavior & Research, 19*(1), 6–31.

De Villiers, C., Kuruppu, S., & Dissanayake, D. (2021). A (new) role for business–Promoting the United Nations' Sustainable Development Goals through the Internet-of-Things and blockchain technology. *Journal of Business Research, 131*, 598–609.

Denanyoh, R., Adjei, K., & Nyemekye, G. E. (2015). Factors that impact on entrepreneurial intention of tertiary students in Ghana, *5*(3), 19–29

Dhir, A., Talwar, S., Sadiq, M., Sakashita, M., & Kaur, P. (2021). Green apparel buying behaviour: A Stimulus–Organism–Behaviour–Consequence (SOBC) perspective on sustainability-oriented consumption in Japan. *Business Strategy and the Environment, 30*(8), 3589–3605.

Dutta, S., Parahoo, S. K., Afzal, M. N. I., & Harvey, H. L. (2021). A conceptual understanding of entrepreneurial motivation, employment creation, and supporting factors on micro-, meso- and macro-level entrepreneurship. *World Review of Entrepreneurship, Management and Sustainable Development, 17*(1), 56–76.

Esfandiar, K., Sharifi-Tehrani, M., Pratt, S., & Altinay, L. (2019). Understanding entrepreneurial intentions: A developed integrated structural model approach. *Journal of Business Research, 94*, 172–182.

Farhangmehr, M., Gonçalves, P., & Sarmento, M. (2016). Predicting entrepreneurial motivation among university students: The role of entrepreneurship education. *Education + Training, 58*(7/8), 861–881.

Fayolle, A., & Gailly, B. (2015). The impact of entrepreneurship education on entrepreneurial attitudes and intention: Hysteresis and persistence. *Journal of small business management, 53*(1), 75–93.

Fisher, C. D. (2010). Happiness at work. *International Journal of Management Reviews, 12*(4), 384–412.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of marketing research, 18*(1), 39–50.

Galvão, A., Marques, C., & Ferreira, J. J. (2020). The role of entrepreneurship education and training programmes in advancing entrepreneurial skills and new ventures. *European Journal of Training and Development, 44*(6/7), 595–614.

Global Entrepreneurship Research Association. (2021). *GEM Global Entrepreneurship Monitor*.

Gregori, P., Holzmann, P., & Schwarz, E. J. (2021). My future entrepreneurial self: Antecedents of entrepreneurial identity aspiration. *Education + Training, 63*(7/8), 1175–1194.

Gubik, A. S. (2021). Entrepreneurial career: Factors influencing the decision of Hungarian students. *Entrepreneurial Business and Economics Review, 9*(3), 43–58.

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2013). Partial least squares structural equation modeling: Rigorous applications, better results and higher acceptance. *Long range planning, 46*(1-2), 1–12.

Haque, N. U. (2007). *Entrepreneurship in Pakistan* (No. 22190). East Asian Bureau of Economic Research.

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science, 43*, 115–135.

Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing. In *New challenges to international marketing* (vol. 20, pp. 277–319). Emerald Group Publishing Limited.

Hoda, N., Ahmad, N., Ahmad, M., Kinsara, A., Mushtaq, A. T., Hakeem, M., & Al-Hakami, M. (2020). Validating the entrepreneurial intention model on the university students in Saudi Arabia. *The Journal of Asian Finance, Economics and Business, 7*(11), 469–477.

Irfan, M., Ahmad, A., Shah, S. M. A., & Ishaque, A. (2023). Social entrepreneurship: An exploration of formal and informal institution factors in Pakistan. *Russian Law Journal, 11*(5S), 529–541.

Isenberg, D. J. (2010). How to start an entrepreneurial revolution. *Harvard business review, 88*(6), 40–50.

Jadmiko, P. (2021). Perceived social support as moderator variable between the attitude of becoming a social entrepreneur (ATB) on social entrepreneurial intention. *Journal of Islamic Economic and Business Research, 1*(1), 86–99.

Jena, R. K. (2020). Measuring the impact of business management student's attitude towards entrepreneurship education on entrepreneurial intention: A case study. *Computers in Human Behavior, 107*, 106275.

Kelley, D. J., Singer, S., & Herrington, M. (2012). The global entrepreneurship monitor. *2011 Global Report, GEM 2011, 7*, 2–38.

Khedhaouria, A., Gurău, C., & Torrès, O. (2015). Creativity, self-efficacy, and small-firm performance: The mediating role of entrepreneurial orientation. *Small Business Economics, 44*, 485–504.

Kim, M. S., & Hunter, J. E. (1993). Relationships among attitudes, behavioral intentions, and behavior: A meta-analysis of past research, part 2. *Communication Research, 20*(3), 331–364.

Kolvereid, L. (1996). Prediction of employment status choice intentions. *Entrepreneurship Theory and practice, 21*(1), 47–58.

Krueger, N. F., Jr., Reilly, M. D., & Carsrud, A. L. (2000). Competing models of entrepreneurial intentions. *Journal of Business Venturing, 15*(5–6), 411–432.

Lei, M., & Lomax, R. G. (2005). The effect of varying degrees of nonnormality in structural equation modeling. *Structural equation modeling, 12*(1), 1–27.

Leitch, C. M., & Harrison, R. T. (1999). A process model for entrepreneurship education and development. *International Journal of Entrepreneurial Behavior & Research, 5*(3), 83–109.

Lichtenstein, G. A., & Lyons, T. S. (2001). The entrepreneurial development system: Transforming business talent and community economies. *Economic Development Quarterly, 15*(1), 3–20.

Liguori, E., Winkler, C., Vanevenhoven, J., Winkel, D., & James, M. (2020). Entrepreneurship as a career choice: Intentions, attitudes, and outcome expectations. *Journal of Small Business & Entrepreneurship, 32*(4), 311–331.

Linan, F. (2008). Skill and value perceptions: How do they affect entrepreneurial intentions? *International Entrepreneurship and Management Journal, 4*, 257–272.

Liñán, F., & Chen, Y. W. (2009). Development and cross–cultural application of a specific instrument to measure entrepreneurial intentions. *Entrepreneurship theory and practice, 33*(3), 593–617.

Lucas, W. A. (2014). Theories of entrepreneurial intention and the role of necessity William.

Lüthje, C., & 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.

Martins, J. M., Shahzad, M. F., & Xu, S. (2023). Factors influencing entrepreneurial intention to initiate new ventures: Evidence from university students. *Journal of Innovation and Entrepreneurship, 12*(1), 63.

Masenya, T. M. (2021). Technopreneurship development: Digital strategy for youth self-employment in the digital economy. In *Handbook of research on management and strategies for digital enterprise transformation* (pp. 196–218). IGI Global.

Mendenhall, M. D. (1993). An inhibitor of p34 CDC28 protein kinase activity from Saccharomyces cerevisiae. *Science, 259*(5092), 216–219.

Meoli, A., Fini, R., Sobrero, M., & Wiklund, J. (2020). How entrepreneurial intentions influence entrepreneurial career choices: The moderating influence of social context. *Journal of Business Venturing, 35*(3), 105982.

Mitchelmore, S., & Rowley, J. (2010). Entrepreneurial competencies: A literature review and development agenda. *International Journal of Entrepreneurial Behavior & Research, 16*(2), 92–111.

Munawar, S., Yousaf, H. Q., Ahmed, M., & Rehman, S. (2023). The influence of online entrepreneurial education on entrepreneurial success: An empirical study in Pakistan. *The International Journal of Management Education, 21*(1), 100752.

Nabi, G., Walmsley, A., Liñán, F., Akhtar, I., & Neame, C. (2018). Does entrepreneurship education in the first year of higher education develop entrepreneurial intentions? The role of learning and inspiration. *Studies in Higher Education, 43*(3), 452–467.

Nakpodia, F., Ashiru, F., You, J. J., & Oni, O. (2024). Digital technologies, social entrepreneurship and resilience during crisis in developing countries: Evidence from Nigeria. *International Journal of Entrepreneurial Behavior & Research, 30*(2/3), 342–368.

Naudé, W. (2011). Entrepreneurship is not a binding constraint on growth and development in the poorest countries. *World development, 39*(1), 33–44.

Noor, A., Shopovski, J., Murtaz, K., & Onyeka, U. O. (2023). Obstacles to entrepreneurship in Pakistan. *ESI Preprints, 18*, 327–327.

Rachmawan, A., Lizar, A. A., & Mangundjaya, W. L. (2015). The role of parent's influence and self-efficacy on entrepreneurial intention. *The Journal of Developing Areas, 49*, 417–430.

Rehman, W., Yosra, A., Khattak, M. S., & Fatima, G. (2023). Antecedents and boundary conditions of entrepreneurial intentions: Perspective of theory of planned behaviour. *Asia Pacific Journal of Innovation and Entrepreneurship, 17*(1), 46–63.

Rengiah, P., & Sentosa, I. (2014). A conceptual development of entrepreneurship education and entrepreneurial intentions among Malaysian university students. *Journal of Business and Management, 16*(11), 68–74.

Reyad, A. A., Plaha, K., Girgis, E., & Mishriky, R. (2021). Fluoxetine in the management of major depressive disorder in children and adolescents: a meta-analysis of randomized controlled trials. *Hospital Pharmacy, 56*(5), 525–531.

Roundy, P. T., & Lyons, T. S. (2023). Where are the entrepreneurs? A call to theorize the micro-foundations and strategic organization of entrepreneurial ecosystems. *Strategic Organization, 21*(2), 447–459.

Saberi, M., & Hamdan, A. (2019). The moderating role of governmental support in the relationship between entrepreneurship and economic growth: A study on the GCC countries. *Journal of Entrepreneurship in Emerging Economies, 11*(2), 200–216.

Sahrah, A., Guritno, P., Rengganis, R., Dewi, R., Saufi, R., & Permarupan, Y. (2023). Personality traits, individual resilience, openness to experience and young digital entrepreneurship intention. *International Journal of Data and Network Science, 7*(3), 1193–1204.

Sampene, A. K., Li, C., Khan, A., Agyeman, F. O., & Opoku, R. K. (2023). Yes! I want to be an entrepreneur: A study on university students' entrepreneurship intentions through the theory of planned behavior. *Current Psychology, 42*(25), 21578–21596.

Schumpeter, J. A. (1991). *The economics and sociology of capitalism.* Princeton University Press.

Shabbir, M. S., Shariff, M. N. M., & Shahzad, A. (2016). Determinants of entrepreneurial skills set in Pakistan: A pilot study. *International Journal of Academic Research in Accounting, Finance and Management Sciences, 6*(2), 62–74.

Shahzad, M. F., Khan, K. I., Saleem, S., & Rashid, T. (2021). What factors affect the entrepreneurial intention to start-ups? The role of entrepreneurial skills, propensity to take risks, and innovativeness in open business models. *Journal of Open Innovation: Technology, Market, and Complexity, 7*(3), 173.

Shane, S., & Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. *Academy of management review, 25*(1), 217–226.

Shapero, A., & Sokol, L. (2002). Some social dimensions of entrepreneurship. *Entrepreneurship: Critical perspectives on business and management, 4*, 83–111.

Shefsky, L., Barnett, B., & Whitaker, S. T. (2017). Wild Oats: Sowing vs. Reaping. *Kellogg School of Management Cases,* 1–7.

Sim, H. C. M. (2005). *Key entrepreneurial skills and their acquisition: exploratory study of successful male Chinese founder entrepreneurs in Singapore* (Doctoral dissertation).

Smith, E. R., Seger, C. R., & Mackie, D. M. (2007). Can emotions be truly group level? Evidence regarding four conceptual criteria. *Journal of personality and social psychology, 93*(3), 431.

Solymossy, E. (1998). *Entrepreneurial dimensions: The relationship of individual, venture, and environmental factors to success*. Case Western Reserve University.

Stam, E. (2015). Entrepreneurial ecosystems and regional policy: a sympathetic critique. *European planning studies, 23*(9), 1759–1769.

Sutrisno, S., Kuraesin, A. D., Siminto, S., Irawansyah, I., & Ausat, A. M. A. (2023). The role of information technology in driving innovation and entrepreneurial business growth. *Jurnal Minfo Polgan, 12*(1), 586–597.

Taneja, M., Kiran, R., & Bose, S. C. (2024). Assessing entrepreneurial intentions through experiential learning, entrepreneurial self-efficacy, and entrepreneurial attitude. *Studies in Higher Education, 49*(1), 98–118.

The World Bank. (2018). Doing business 2018-Reforming to create jobs, 1–312. https://doi.org/10.1596/978-1-4648-0351-2

Tomy, S., & Pardede, E. (2020). An entrepreneurial intention model focussing on higher education. *International Journal of Entrepreneurial Behavior & Research, 26*(7), 1423–1447.

Vamvaka, V., Stoforos, C., Palaskas, T., & Botsaris, C. (2020). Attitude toward entrepreneurship, perceived behavioral control, and entrepreneurial intention: Dimensionality, structural relationships, and gender differences. *Journal of Innovation and Entrepreneurship, 9*, 1–26.

Wang, J., Chitsaz, F., Derbyshire, M. K., Gonzales, N. R., Gwadz, M., Lu, S., ... & Marchler-Bauer, A. (2023). The conserved domain database in 2023. *Nucleic acids research, 51*(D1), D384–D388.

Wickham, P. A. (2006). *Strategic entrepreneurship*. Pearson education.

Zafar, F., Ahmad, S., Zafar, M. A., & Sheikh, S. (2013). Integrating strategies of entrepreneurship-Gourmet Pakistan: Case study from Pakistan. *European Journal of Business, Economics and Accountancy*, *1*(1).

Zhang, W., Zhao, S., Wan, X., & Yao, Y. (2021). Study on the effect of digital economy on high-quality economic development in China. *PLoS ONE, 16*(9), e0257365.

Zhao, H., Seibert, S. E., & Hills, G. E. (2005). The mediating role of self-efficacy in the development of entrepreneurial intentions. *Journal of applied psychology, 90*(6), 1265.