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PROMINENT EDUCATION PREDICTORS OF WOMEN'S INTENTION TO ENTREPRENEURSHIP IN SAUDI ARABIA

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Abstract. In an era where entrepreneurship is a key driver of economic growth, understanding the role of education in shaping entrepreneurial intentions is crucial—especially for women. This study explores the multi-dimensional impact of education on female entrepreneurship by categorizing educational factors into three dimensions: educational background, education level, and entrepreneurial education. Grounded in education theories and the theory of planned behavior, we analyze a sample of potential women entrepreneurs. Surprisingly, our findings reveal that having a business-related educational background does not significantly affect entrepreneurial intentions. However, education level is decisive in shaping attitudes and subjective norms toward entrepreneurship, though it does not influence perceived behavioral control. Notably, women who have received entrepreneurial training demonstrate stronger attitudes and perceptions of control, highlighting the power of targeted education. These insights provide valuable guidance for policymakers and stakeholders to foster digital entrepreneurship among Saudi women, bridging the gap between education and economic empowerment.

Keywords: women empowerment; sustainable development; women entrepreneurs; entrepreneurship; gender; entrepreneurship education

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1. Introduction

Women's entrepreneurship is not just an economic issue but a matter of social progress and economic resilience. Yet, despite their immense potential, women entrepreneurs remain underrepresented in many economies, including Saudi Arabia. Entrepreneurship has long been recognized as a key driver of economic growth, contributing to job creation and the sustainable development of individuals and nations. The role of women in entrepreneurship is gaining increasing significance across various global contexts (Dereň & Skonieczny, 2025; Rodríguez-Vera et al., 2025; Tükel et al., 2025).

Entrepreneurship not only promotes women's economic empowerment but also fosters the broader economic advancement of the country. As the entrepreneurial landscape continues to evolve, it becomes evident that women's participation in entrepreneurial activities is essential for achieving inclusive and sustainable economic development.

Since the 1970s, development policies have progressively shifted toward addressing the needs and aspirations of all individuals within society. Including women in all social, economic, and environmental sectors is now seen as indispensable to achieving sustainable development goals. This perspective is particularly relevant in Saudi Arabia, where Vision 2030 underscores the pivotal role of women in the Kingdom's development strategy. Over the past decade, Saudi women have increasingly assumed leadership positions and the government has introduced several reforms that are aimed at advancing gender equality and empowering women. These initiatives seek to create an institutional and regulatory environment that enables women to realize their entrepreneurial potential, thereby contributing to the nation's economic growth and diversification.

Despite these efforts, women exhibit lower entrepreneurial intentions than men, particularly in traditional and emerging economies. Studies indicate that women face significant barriers to entrepreneurship, including socio-cultural, psychological, and institutional constraints. However, some research challenges this notion, suggesting that gender differences in entrepreneurial intentions may not be as pronounced. Smith et al. (2016) and Chaudhary (2017) found no significant disparities between men and women in entrepreneurial intentions, emphasizing that factors such as education and societal norms play a crucial role in shaping entrepreneurial behavior.

The role of education in shaping entrepreneurial intentions has been widely explored in the literature. Hutasuhut (2018) emphasized the importance of understanding the personal and institutional factors that drive entrepreneurial behavior, with education often being a central component. Kelley et al. (2017) argued that women are less likely than men to launch businesses and that the entrepreneurial gender gap tends to widen in economies at more advanced stages of development. However, women with higher educational attainment, particularly in efficiency- and innovation-driven economies, are more likely to pursue entrepreneurship. This raises a critical question: does education similarly influence the entrepreneurial intentions of women and men? And if not, how does education shape the entrepreneurial paths of women differently?

This study seeks to contribute to this body of knowledge by exploring the impact of education and other personal characteristics on women's entrepreneurial intentions in Saudi Arabia. Unlike previous research that examines education as a broad variable, this study dissects its sub-dimensions—level of education, field of study, and entrepreneurial training—to uncover their distinct effects on women's entrepreneurial aspirations. While existing literature acknowledges the role of education in entrepreneurship, the specific ways educational factors influence women's entrepreneurial intentions remain underexplored. By examining these dimensions, this study aims to provide a nuanced understanding of how personal characteristics shape women's entrepreneurial aspirations and to identify the institutional and societal mechanisms that either facilitate or hinder their entrepreneurial endeavors.

Specifically, this paper aims to determine whether education predicts entrepreneurial intention for women and how different educational backgrounds and training experiences influence their entrepreneurial behavior. Furthermore, it seeks to assess the extent to which educational qualifications, both general and entrepreneurship-specific, impact the realization of entrepreneurial success for women. By addressing these questions, this study contributes to the growing field of entrepreneurship research, offering valuable insights for policymakers, educators, and institutions working to foster women's entrepreneurship.

Beyond filling a gap in the literature, this study seeks to present actionable recommendations for institutional reforms that can empower women entrepreneurs. By better understanding the relationship between education, entrepreneurial intention, and institutional support, this paper aims to offer a comprehensive view of how to create an enabling environment for women to pursue and succeed in entrepreneurial ventures. Through these contributions, this research aligns with the broader goals of Vision 2030 and the international movement

toward achieving gender equality in entrepreneurship, providing theoretical and practical insights into fostering women's entrepreneurship in Saudi Arabia and beyond.

2. Theoretical background

2.1. The context of the study

Entrepreneurial competencies are not exclusive to business students, and the impact of entrepreneurship education continues to spark debate, often showing limited or inconsistent outcomes (Bae et al., 2014; Mabungela & Davids, 2024). Nevertheless, exposure to relevant knowledge, behaviors, and transferable skills during educational experiences can positively influence students, even those not formally enrolled in entrepreneurship programs or lacking clear entrepreneurial ambitions. A common characteristic observed among entrepreneurs is a relatively high educational attainment (Ward et al., 2019; Cabagnols et al., 2022). Despite growing scholarly interest, the intersection between gender and entrepreneurial intention remains relatively underexplored, particularly in Saudi Arabia (Choukir et al., 2019). Nevertheless, research on women's entrepreneurship is gradually expanding (Soria-Barreto et al., 2017; Miralam et al., 2025).

Moreover, in innovation-driven economies, the gender gap in perceived entrepreneurial capabilities tends to be more pronounced (Kelley et al., 2017). However, Ward et al. (2019) reported no significant difference in entrepreneurial intentions between male and female students. Higher education may act as a levelling force across genders by indirectly fostering entrepreneurial skills. Bae et al. (2014) noted that entrepreneurship education does not substantially influence women more than men.

Recent investigations have delved deeper into the role of education in shaping women's entrepreneurship. Pérez-Varela and Cárdenas-Rodríguez (2024) conducted a systematic qualitative review, concluding that while education and several other factors can support women's entrepreneurship, they can also act as barriers. In Uganda, Namasembe and Manzanera Ruiz (2021) found that universal formal education programs, rather than encouraging continued schooling, often push female students toward early school dropout and necessity-driven entrepreneurship to address immediate financial needs. They concluded that the educational level many women entrepreneurs attain remains insufficient to guarantee entrepreneurial success. Ahmadov et al. (2021) corroborated these findings, showing that in Azerbaijan, women with higher educational levels exhibited greater self-confidence and were more proactive in launching social business initiatives.

Paiva et al. (2024) emphasized that while a gender gap persists, the teaching-learning process could be critical in enhancing female students' self-awareness and self-value. They suggested that higher education programs must evolve toward more inclusive practices to foster an entrepreneurial mindset among female students, reinforcing the broader case for entrepreneurial education. Ballesteros et al. (2024) also observed that extrinsic motivation, family environment, innovation, and intrinsic motivation are significant predictors of entrepreneurial attitudes. However, they highlighted that educational programs are key to enhancing entrepreneurial aspirations among women in Colombia.

Mashapure et al. (2022) investigated the challenges confronting women entrepreneurs in rural areas of Manicaland Province, Zimbabwe. They identified barriers such as limited market information, lack of knowledge and skills, and insufficient government support. Their study recommended comprehensive entrepreneurship education and training programs as critical solutions to these challenges.

In a related study, Becsky-Nagy and Fazekas (2025) explored the role of educational background among male and female entrepreneurs. Their analysis of students' perceptions revealed that a lower proportion of female students engage in entrepreneurial activities than their male counterparts. Moreover, women expressed a greater need for university support in building networks and enhancing entrepreneurial skills, suggesting that targeted educational programs for women could be highly beneficial.

Similarly, Zhou et al. (2021) demonstrated that university graduates positively influence entrepreneurship education outcomes. Exposure to entrepreneurial knowledge and skill development during higher education

increases the likelihood of new business creation. In China, entrepreneurship education was also found to boost entrepreneurial intentions significantly.

Supporting these findings, Maziriri et al. (2022) revealed that entrepreneurial education positively and significantly impacts women's entrepreneurial success. Furthermore, entrepreneurial education substantially moderates the relationship between women's need for achievement and their entrepreneurial outcomes.

Regarding women's empowerment through entrepreneurship, the Middle East notably reports the highest growth expectations among female entrepreneurs (37%) and the highest degree of gender parity globally. Women's growth expectations in this region are approximately 80% of men's. In Saudi Arabia, women demonstrate greater entrepreneurial aspirations than their male counterparts (Kelley et al., 2017). Scholars such as Saeed et al. (2014) have emphasized that environmental factors—especially perceived organizational support through educational and business development initiatives—are crucial to entrepreneurial intentions. These factors influence individuals' perceptions of their socio-economic environments and their roles.

2.2. Entrepreneurship theoretical research background based on the theory of planned behavior

The Theory of Planned Behavior (TPB) has become a widely recognized framework for examining entrepreneurial intentions. Its adaptability has made it particularly suitable for entrepreneurship research, as numerous studies have validated its relevance in predicting individuals' planned behaviors in this context (Lortie & Castogiovanni, 2015; Naskar & Lindahl, 2025).

Originally introduced by Ajzen (1991), the TPB posits that behavioral intention is shaped by three key components: attitude toward the behavior, subjective norms, and perceived behavioral control. Attitude reflects an individual's positive or negative evaluation of the behavior in question. Subjective norms involve perceived social pressures to engage in or refrain from a behavior. In contrast, perceived behavioral control refers to an individual's belief in their ability to successfully perform the behavior (Gird & Bagraim, 2008; Naskar & Lindahl, 2025).

Nonetheless, evidence suggests that the model is highly applicable in such contexts. For example, Choukir et al. (2019) applied the TPB to analyze entrepreneurial intention among Saudi university students and found significant gender-based differences. Specifically, subjective norms and perceived behavioral control more strongly influenced women's intentions than men's. However, perceived behavioral control emerged as a significant factor for both genders.

In their review of TPB applications in entrepreneurship, Lortie and Castogiovanni (2015) advocated adopting a MESO-level approach, which integrates at least two levels of analysis (e.g., individual and organizational). This perspective helps address limitations found in single-level research, offering a more comprehensive understanding of entrepreneurial intentions. By bridging micro-level personal factors—such as education or gender—with broader contextual influences, researchers can better capture the complexity of entrepreneurial decision-making. Interestingly, only a handful of studies have fully implemented the TPB framework in entrepreneurship research.

2.3. Conceptual model formulation

Attitudes

Studies on entrepreneurship and attitudes toward entrepreneurial behavior emphasize the critical role of attitude as a psychological factor influencing human actions. A more positive attitude toward entrepreneurial activities is likely to enhance the performance of entrepreneurial intentions (Soria-Barreto et al., 2017). According to Solesvik (2013), an individual's attitude influences the connection between perceived entrepreneurial motivation and entrepreneurial intentions.

H1: women's attitudes toward entrepreneurs positively affect their intention to be entrepreneurs.

Subjective norms (social norms)

Subjective norms refer to individuals' perceptions regarding the influence of important others, such as family and close friends, on their behavior (Ajzen, 1991). These referents, including peers, family members, and society, play a significant role in shaping an individual's decisions and actions, especially in entrepreneurship (Quan, 2012). Social norms, therefore, have a profound impact on entrepreneurial behaviors. Entrepreneurship is often seen as the outcome of interactions between personal characteristics and the surrounding environment. Furthermore, an individual's perception of their cultural environment is linked to entrepreneurial intentions, with subjective norms mediating entrepreneurial motivation and intentions (Solesvik, 2013).

H2: women's subjective norms of entrepreneurship positively affect their intention to be entrepreneurs.

Perceived behavioral control

For this study, we focus on Perceived Behavioral Control in the context of entrepreneurship, as it aligns better with our objectives and allows for a deeper exploration of how individuals perceive their ability to engage in entrepreneurial activities. This concept is beneficial because it encompasses perceived controllability and efficacy, integral to understanding entrepreneurial behavior. Perceived behavioral control is individuals' expectations about their ability to carry out a specific behavior (Ward et al., 2019). In the realm of entrepreneurship, Solesvik (2013) found that the link between entrepreneurial motivation and intentions is influenced by perceived behavioral control.

H3: women's perceived behavioral control of entrepreneurs positively affects their intention to be entrepreneurs.

Entrepreneurial intentions

A central element of the Theory of Planned Behavior (TPB) is the intention to carry out a specific action (Karimi et al., 2016). Several entrepreneurial intention models have incorporated the TPB, evolving into recognized theoretical frameworks that have proven relevant across various contexts.

Education background

Hutasuhut (2018) suggested that an individual's education significantly influences the knowledge and skills they acquire, affecting their future career choices. In his study of economics students, he found no clear link between educational background and entrepreneurial intention. Bae et al. (2014) argued that entrepreneurial skills are not exclusive to business students. Ward et al. (2019) further emphasized that exposure to relevant knowledge, behaviors, and skills is beneficial even for students without explicit entrepreneurial intentions or a business-focused education. Consequently, this study hypothesizes that women with a background in business education are more likely to have a positive attitude toward entrepreneurship and perceive it as more achievable.

H4a: women with a business educational background positively moderate the effect of their attitudes toward entrepreneurs on their intention to be entrepreneurs.

H4b: women with a business educational background positively moderate the effect of their perceived behavioral control of entrepreneurs on their intention to be entrepreneurs.

H4c: women with a business educational background positively moderate the effect of their subjective norms of entrepreneurship on their intention to be entrepreneurs.

Education level

As economic development increases, the overall rates of entrepreneurial activity typically decrease while the proportion of entrepreneurs with a college degree or higher rises. This trend reflects the broader population. For example, only a small proportion of female entrepreneurs (14%) in factor-driven economies have a college degree or higher. In comparison, the majority (61%) in innovation-driven economies possess this level of education. The gap in educational attainment between male and female entrepreneurs narrows with economic development. In factor-driven economies, female entrepreneurs are about two-thirds as likely as their male counterparts to have a post-secondary degree. However, in economies at the efficiency-driven stage and beyond, women entrepreneurs are either as likely or more likely than men to hold at least a post-secondary education (Kelley et al., 2017).

Wu and Wu (2008) suggested that educational attainment affects entrepreneurial intentions by shaping individual attitudes. Solesvik (2013) supported this, showing that individuals with higher levels of education are more likely to pursue entrepreneurship. Hutasuht (2018) proposed that entrepreneurship may be less appealing to postgraduate students than to those with a diploma or bachelor's degree. He identified two possible reasons: first, diploma and bachelor's degree holders are often more enthusiastic about starting businesses; second, postgraduate students may weigh the high opportunity cost and long time required to achieve a stable income.

Entrepreneurship may be a particularly attractive career option for women with lower education levels. In contrast, women with higher educational qualifications may have more career options but may still choose entrepreneurship due to its opportunities. A negative correlation between education and entrepreneurship rates among women suggests that, especially in the early stages of economic development, entrepreneurship is a key income-generating avenue for women with lower levels of education (Kelley et al., 2017).

As education levels increase, women entrepreneurs tend to shift their motives from necessity to opportunity. Among women with some secondary education but no high school diploma, 35% started their businesses because they had no other employment options. In comparison, only 18% of those with education beyond a bachelor's degree cited necessity as their primary motive. This shows that entrepreneurship is an essential option for women with limited education and job opportunities, and a viable career path for women with higher educational qualifications (Kelley et al., 2017). This raises the question: do women with higher educational levels place more importance on the expectations of significant referents, such as family and friends when considering entrepreneurial behavior in their environment?

H5a: women's education level positively moderates the effect of their attitudes toward entrepreneurs on their intention to be entrepreneurs.

H5b: women's education level positively moderates the effect of their perceived behavioral control of entrepreneurs on their intention to be entrepreneurs.

H5c: women's education level positively moderates the effect of their subjective norms of entrepreneurship on their intention to be entrepreneurs.

Entrepreneurial education

Higher education institutions play a crucial role in fostering entrepreneurial behaviors among future entrepreneurs. As a result, universities face the challenge of evolving into more entrepreneurial environments. These institutions aim to expand their entrepreneurship programs and contribute effectively to the broader entrepreneurial ecosystem (Soria-Barreto et al., 2017).

Researchers have identified various forms of entrepreneurship education, each designed for specific audiences. For instance, awareness-oriented entrepreneurship education targets students who lack prior business experience. This education aims to enhance students' entrepreneurial skills (Bae et al., 2014). Entrepreneurship education is fundamental in increasing entrepreneurial intentions (Nowiski et al., 2017). These findings highlight the importance of entrepreneurship education, which not only imparts essential knowledge but also has the potential to shape students' attitudes. Barba-Sánchez & Atienza-Sahuquillo (2017) found that training programs effectively increased the entrepreneurial intentions of students, particularly those in industrial and computer engineering fields. Similar results were reported by Utamin (2017) in Indonesia and Solesvik (2013) in Ukraine.

Despite these positive findings, prior research has shown inconsistent results concerning the influence of entrepreneurship education on entrepreneurial intentions, particularly concerning gender. Haus et al. (2013) found that women are less likely than men to translate their entrepreneurial intentions into action. They concluded that entrepreneurship education has a more significant effect on women's entrepreneurial intentions. Zhang et al. (2014) argued that entrepreneurship education has a greater impact on the entrepreneurial intentions of men than on women, pointing to possible differences in how women perceive their ability to control entrepreneurial behavior.

Soria-Barreto et al. (2017) suggested that entrepreneurial education can enhance perceived behavioral control. Additionally, gender is important in shaping effective entrepreneurial education programs to reduce gender disparities in new venture creation. Soria-Barreto et al. (2017) further noted that gender moderates the relationship between perceived behavioral control and entrepreneurial intentions. This highlights the need to further explore these relationships, especially for women, to generate meaningful insights.

The literature on entrepreneurial education has yielded mixed results (Walter & Block, 2016). Research on entrepreneurial intentions suggests that the Theory of Planned Behavior (TPB) is an appropriate framework for evaluating the effectiveness of entrepreneurship education. For example, a study on the entrepreneurial intentions of Iranian students across six universities found significant positive impacts on students' subjective norms and perceived behavioral control after taking entrepreneurship courses (Karimi et al., 2016). However, empirical research on the relationship between entrepreneurial education and intentions remains limited, particularly in developing countries.

H6a: women's entrepreneurial education positively moderates the effect of their attitudes toward entrepreneurs on their intention to be entrepreneurs.

H6c: women's entrepreneurial education positively moderates the effect of their perceived behavioral control of entrepreneurs on their intention to be entrepreneurs.

H6b: women's entrepreneurial education positively moderates the effect of their subjective norms of entrepreneurship on their intention to be entrepreneurs.

The above-formulated hypotheses are represented in Figure 1 below:

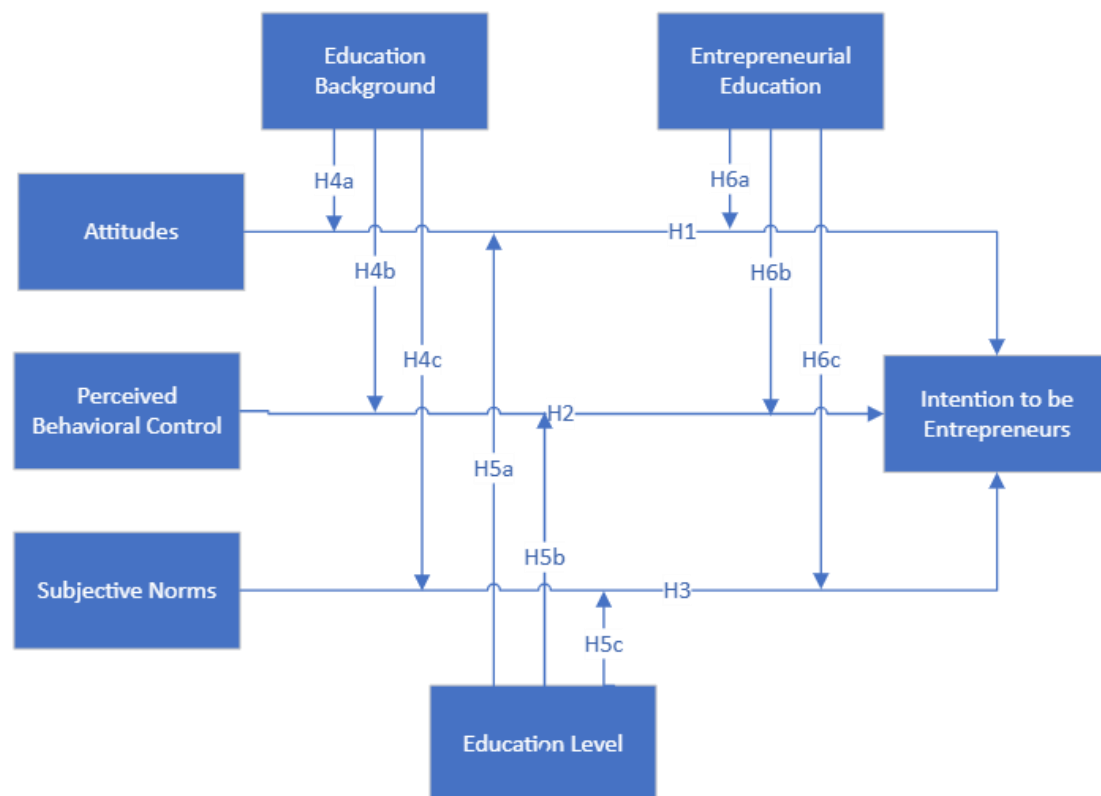


Figure 1. The theoretical framework

3. Research objective and methodology

This study adopted a quantitative research design to examine a sample of potential female entrepreneurs residing across various regions in Saudi Arabia. A structured survey consisting of closed-ended questions was developed and administered to gather data. This approach was selected to ensure that respondents could easily comprehend the questions, thereby improving the accuracy and consistency of their answers (Sekaran & Bougie, 2016). The purpose of the survey was to empirically test the hypotheses formulated within the study's conceptual framework. The targeted participants were educated Saudi women deemed capable of managing entrepreneurial ventures. Specifically, the study focused on Saudi women who hold university degrees and are considered qualified to initiate and operate small to medium-sized enterprises. A cross-sectional design was employed using stratified random sampling. To maximize participation and accessibility, the questionnaire was distributed online, aiming to collect at least 250 valid responses.

To enhance the reliability and validity of the measurement instrument, the study utilized scales previously validated in the literature. The constructs of attitude, perceived behavioral control, and entrepreneurial intention were measured using the instrument developed by Do et al. (2011), while the construct of subjective norms was assessed using the scale, which includes a minimum of five items. A 5-point Likert scale was employed to evaluate all constructs, where 1 represented "strongly disagree" and 5 represented "strongly agree." Before launching the full survey, a pilot study was conducted to test the questionnaire items' clarity, reliability, and validity. This pre-test also helped confirm the appropriateness of using these instruments within the Saudi socio-cultural context, as they were originally developed in different cultural environments. A total of 366 responses were successfully collected through random sampling. For data analysis, SPSS was used to conduct descriptive statistics and confirmatory factor analysis (CFA) to validate the measurement model. In parallel, Smart-PLS was employed to examine the moderating role of educational dimensions on the relationships between the key constructs. The structural equation modelling (SEM) approach was applied to explore complex relationships, including moderation, composite mediation, and partial mediation, in accordance with the analytical framework suggested by Radu and Redien-Collot (2008).

4 Results and discussion

4.1 Characteristics of demographics

The study first established that most respondents were young (79.5%), aged between 18 and 30 years, middle-aged respondents represented 19.1%, and only 1.4% were over 41 years old. Furthermore, the study established that respondents were equally distributed regarding educational background, as 48.1% had a business educational background, whereas 51.9% were non-business educated. Regarding education level, almost half of the respondents have a bachelor's degree level of education, 33.1% have a diploma, and 15% have a master's degree. Concerning respondents' entrepreneurial education, most respondents (78.1%) had not obtained entrepreneurial training, whereas only 21.9% attended entrepreneurial training. The demographic information obtained is illustrated in Table 1 below.

Table 1. Participant profile

Item	Frequency	Per cent
Age	18 to 30 Years	291
	31 to 40 Years	70
	41 to 50 Years	5
Education Background	Business	176
	Non-business	190
Education Level	Diploma	121
	Bachelor	190
	Master	55
Entrepreneurial Education	Trained	80
	Not Trained	286

This demographic distribution provides critical context for the study. The predominance of younger respondents aligns with the findings of Kelley et al. (2017), which suggest that younger populations,

particularly in innovation-driven economies, show higher entrepreneurial activity. The relatively low participation in entrepreneurial training aligns with prior observations by Barba-Sánchez, Atienza-Sahuquillo (2017), who emphasized the need for enhanced entrepreneurial education to develop skills and motivation.

As depicted in Table 2, the study provides information on each construct's mean and standard deviation. A five-point Likert scale with equal-sized categories was employed in this investigation. To facilitate interpretation, scores falling between 1.00 and 2.33 are categorized as low, scores ranging from 2.34 to 3.66 are considered moderate, and scores falling within the range of 3.67 to 5.00 are regarded as high. Overall, the mean data was categorized between moderate and high scores. The data suggests that respondents tend to rate factors related to entrepreneurial intention and attitude relatively high, as evidenced by higher mean scores; factors related to perceived behavioral control and subjective norms are relatively middling, as evidenced by moderate mean scores.

On the other hand, standard deviations ranged between 1.05 and 1.37, revealing more variability, as indicated by higher standard deviations. These results are consistent with the Theory of Planned Behavior (Ajzen 1991), which identifies attitudes as a critical determinant of intention. The variability in standard deviations (ranging from 1.05 to 1.37) suggests diverse respondent perceptions, echoing findings by Gird and Bagraim (2008) regarding the importance of contextual influences on entrepreneurial intentions

Table 2. Descriptive analysis

	Mean	Standard deviation	Implementation Level
AT1	3.86	1.05	high
AT2	3.96	1.16	high
AT3	3.99	1.16	high
AT4	3.82	1.33	high
AT5	3.72	1.18	high
EI1	3.89	1.21	high
EI2	3.84	1.23	high
EI3	3.84	1.07	high
EI4	3.60	1.13	moderate
EI5	3.82	1.08	high
PBC1	3.15	1.18	moderate
PBC2	3.23	1.12	moderate
PBC3	2.82	1.22	high
PBC4	3.00	1.28	moderate
SN1	2.59	1.37	moderate
SN2	2.66	1.17	moderate
SN3	2.49	1.37	moderate
SN4	2.66	1.28	moderate
SN5	2.74	1.30	moderate

4.2 Results of the measurement model

Under measurement model assessment, the data reliability and validity were measured by examining items in latent variables (Hair et al., 2011).

4.3 CFA for the measurement model

The reliability of each measurement item construct was also examined in which loading with more than 0.4 value is generally considered acceptable (Hair et al., 2006). Loading values ranged between 0.78 to .94; thus, no internal consistency problems, except the PBC5 item, were found with low loading (0.11) and eliminated from further analysis. Meanwhile, internal consistency was used to test whether the scale used could measure the concept that should be measured or otherwise.

Table 3 below displays key reliability and validity measures, including Cronbach's alpha, composite reliability, and Average Variance Extracted (AVE), for various latent constructs in the measurement model. The high values of Cronbach's alpha, ranging from 0.80 to 0.95, indicate strong internal consistency within each construct, surpassing the conventional threshold of 0.70. Composite reliability values, ranging from 0.93

to 0.99, also affirm the reliability of the constructs. Additionally, the AVE values, ranging from 0.61 to 0.84, exceed the recommended threshold of 0.50, indicating substantial convergent validity. These findings collectively suggest that the measurement model demonstrates robust reliability and convergent validity, supporting the consistency and accuracy of the items in measuring each latent variable (Hair et al., 2017). Table 3 summarizes the CFA results for the measurement model.

Table 3. Results of CFA for the measurement model

Variable	Items	Loadings	Cronbach's alpha	Composite reliability	AVE
Attitudes Toward (AT)	AT1	0.86	0.95	0.95	0.83
	AT2	0.93			
	AT3	0.94			
	AT4	0.91			
	AT5	0.91			
Entrepreneurial intention (EI)	EI1	0.92	0.95	0.96	0.84
	EI2	0.92			
	EI3	0.94			
	EI4	0.88			
	EI5	0.92			
Perceived Behavioral Control (PBC)	PBC1	0.87	0.80	0.93	0.61
	PBC2	0.89			
	PBC3	0.84			
	PBC4	0.90			
	PBC5	0.11			
Subjective Norms (SN)	SN1	0.88	0.92	0.99	0.75
	SN2	0.91			
	SN3	0.86			
	SN4	0.78			
	SN5	0.88			

4.4 Discriminant validity

Discriminant validity shows the extent to which constructs differ from each other by examining the correlations between potentially overlapping constructs using the Heterotrait-monotrait ratio (HTMT) – Matrix. Generally, values below a threshold (commonly 0.85) indicate acceptable discriminant validity, implying that the constructs are distinct (Henseler, 2015). In the matrix presented below in Table 4, the values below the diagonal represent the HTMT ratios. The HTMT values obtained ranged from 0.20 to 0.75, not exceeding the more liberal HTMT level of 0.85. Hence, based on the heuristic rules, the HTMT values proved to have discriminant validity and were submitted for further analysis.

Table 4. Heterotrait-monotrait ratio (HTMT) – Matrix

	AT	EI	PBC
AT			
EI	0.75		
PBC	0.62	0.39	
SN	0.23	0.20	0.46

The F2 test results reflect the effect size of each latent construct on its indicators, indicating the amount of variance in the indicators explained by the latent constructs: the Higher F2 values, the stronger the impact. F-Square is the change in R-Square when an exogenous variable is removed from the model. Following Cohen (1988), F-square is effect size (≥ 0.02 is small; ≥ 0.15 is medium; ≥ 0.35 is large). Table 5 below represents that removing SN and PBC has a small effect size (0.2) in change R2, with a large effect size for AT.

Table 5. F-square results

	EI
AT	0.86
PBC	0.02
SN	0.02

4.5 Construct validity

Construct validity should be run as if there is a high correlation between a set of constructs in a study; multicollinearity problems can arise within the model (Henseler et al., 2009). Table 6 shows that correlation values ranged between 0.20 and 0.72. Thus, the results indicate no multicollinearity problems were found, and the measurement constructs were ultimately valid.

Table 6. Construct validity (Correlations matrix)

	AT	EI	PBC	SN
AT	1.00			
EI	0.72	1.00		
PBC	0.57	0.36	1.00	
SN	0.20	0.21	0.41	1.00

4.6 Structural model result

The second phase of the analysis was adjusted to measure the structural model used for hypothesis testing. In this phase, the relationship of the constructs was examined by assessing the path coefficient (β), t-statistics, and p values. Table 7 presents the results of the direct hypotheses test. Meanwhile, the results of the coefficient path analysis for the general model (without groups) are revealed in Figure 2.

As expected, the H1 is supported by reflecting that women's attitudes toward entrepreneurs have a significantly strong positive effect ($\beta=0.77$, $p=0.00$) on their intention to be entrepreneurs. In addition, women's subjective norms of entrepreneurship leave a positive effect ($\beta=0.10$, $p=0.00$) on their intention to be entrepreneurs, even a weak effect. Therefore, H3 was supported. Surprisingly, H2 was rejected, as the results reported that women's perceived behavioral control of entrepreneurs harms ($\beta=-0.11$, $p=0.03$) their intention to be entrepreneurs. This emerging need to discover the reasons behind the opposing effect found in H2, as a means of how multi-group differences prove the unexpected adverse effect.

Table 7. Results of path coefficients

H #	Hypothesized path	β	STDEV	T- value	P values	Hypothesis result
H1	AT $\rightarrow$ EI	0.77	0.03	22.18	0.00	supported
H2	PBC $\rightarrow$ EI	-0.11	0.05	2.14	0.03	rejected
H3	SN $\rightarrow$ EI	0.10	0.03	2.93	0.00	supported

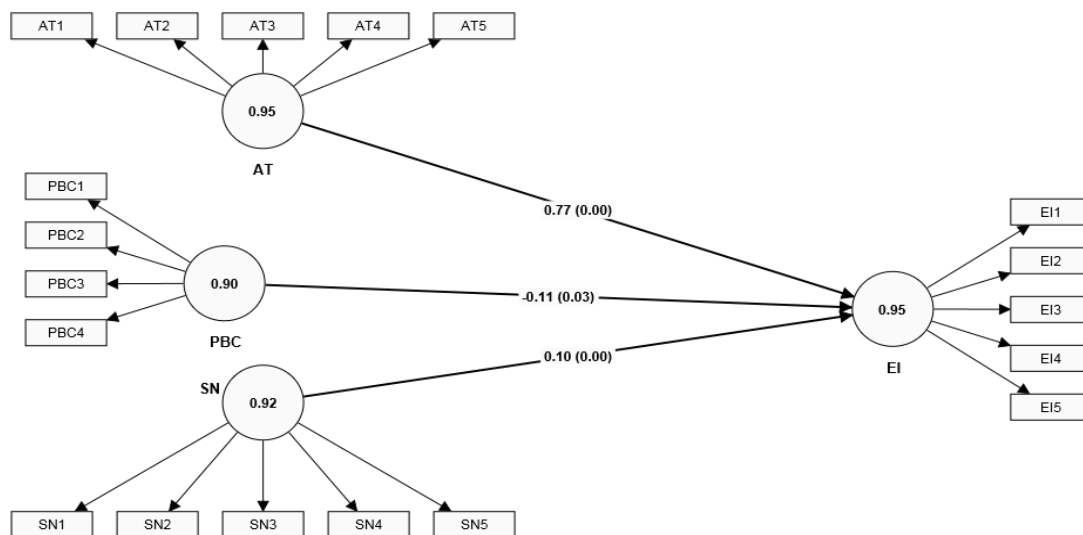


Figure 2. General model path coefficients and Cronbach Alpha

The business group and non-business group differences

Although the results in Table 8 show a positive significant effect for the women business and non-business educational background group ($\beta = 0.83$, $p=0.00$), ($\beta = 0.72$, $p=0.00$) respectively; with different positive effects ($\beta = 0.11$) to moderate the impact of their attitudes toward entrepreneurs on their intention to be entrepreneurs. The p-value of the difference between the multi-groups is insignificant ($p=0.00$). Therefore, the

H4a is rejected. For H4b, there is no significant effect of women with a business educational background positively moderating the effect of their perceived behavioral control of entrepreneurs on their intention to be entrepreneurs. For H4c, women with a business educational background can increase ($\beta = 0.14$, $p = 0.00$) their subjective norms of entrepreneurs on their intention to become entrepreneurs. Whereas a non-significant ($P > 0.05$) effect of business educational background women on such relationship. Thus, H4c is not supported.

Table 8. Path coefficients and Multi-group analysis (MGA) results for educational background

	H4a	H4b	H4c
Hypothesized path	AT -> EI	PBC -> EI	SN -> EI
β (Business)	0.83	-0.15	0.10
β (Non-Business)	0.72	-0.10	0.14
STDEV (Business)	0.04	0.09	0.10
STDEV (Non-Business)	0.06	0.07	0.05
t value (Business)	18.61	1.61	1.03
t value (Non-Business)	12.19	1.58	2.90
p-value (Business)	0.00	0.11	0.30
p-value (Non-Business)	0.00	0.11	0.00
Difference (Business - Non-Business)	0.11	-0.05	-0.04
p-value (Business vs Non-Business)	0.11	0.70	0.73

The diploma, bachelor and master educational level groups' differences

As shown in Table 9, there is a positive significant effect for the women's educational diploma and bachelor level groups ($\beta = 0.88$, $p = 0.00$), ($\beta = 0.65$, $p = 0.00$) respectively, with different significant negative effects ($\beta = -0.23$, $p = 0.00$) to moderate the impact of their attitudes toward entrepreneurs on their intention to be entrepreneurs, but not master educated. The diploma group is more affected than the bachelor group. Therefore, the H5a is supported. For H5b, unexpected results that there is a significant negative effect for the women's educational master level group ($\beta = -0.48$, $p = 0.01$), but not for diploma and bachelor groups. Such results reflect that highly educated women (Master's Degree) inhibit their perception of behavioral control of entrepreneurs on their intention to be entrepreneurs.

Therefore, H5b is rejected. H5c is supported as women's educational diploma and master degree level groups ($\beta = 0.11$, $p = 0.01$), ($\beta = 0.48$, $p = 0.00$), respectively. The more educated women are, the more affected they are by their subjective norms of entrepreneurship and their intention to be entrepreneurs. The difference between the diploma versus master groups is strong and significant ($\beta = -0.73$, $p = 0.01$), as shown in Table 10 below.

Table 9. Path coefficient results for educational level

	H5a	H5b	H5c
Hypothesized path	AT -> EI	PBC -> EI	SN -> EI
β (Diploma)	0.88	0.03	0.11
β (Bachelor)	0.65	-0.15	-0.12
β (Master)	0.31	-0.48	0.84
STDEV (Diploma)	0.03	0.05	0.04
STDEV (Bachelor)	0.08	0.09	0.09
STDEV (Master)	0.34	0.19	0.27
t value (Diploma)	29.07	0.65	2.67
t value (Bachelor)	8.21	1.73	1.33
t value (Master)	0.91	2.49	3.17
p-value (Diploma)	0.00	0.52	0.01
p-value (Bachelor)	0.00	0.08	0.18
p-value (Master)	0.36	0.01	0.00

Table 10. Results of multi-group analysis (MGA) for educational level

	H5a	H5b	H5c
Hypothesized path	AT -> EI	PBC -> EI	SN -> EI
Difference (Bachelor - Diploma)	-0.23	-0.18	-0.23
Difference (Bachelor - Master)	0.35	0.33	-0.96
Difference (Diploma - Master)	0.58	0.51	-0.73
p-value (Bachelor vs Diploma)	0.00	0.07	0.05
p-value (Bachelor vs Master)	0.38	0.13	0.00
p-value (Diploma vs Master)	0.06	0.04	0.01

The entrepreneurial-educated and non-entrepreneurial-educated groups' differences

Table 11 shows a positive significant effect for the trained entrepreneurial women and non-trained groups ($\beta = 0.89$, $p=0.00$), ($\beta = 0.66$, $p=0.00$), respectively, with considerable difference effects ($\beta = 0.23$, $p=0.00$) to moderate the effect of their attitudes toward entrepreneurs on their intention to be entrepreneurs. This reflects that trained entrepreneurial women have higher attitudes toward becoming entrepreneurs. Therefore, H6a is supported. For H6b, as expected, there is a significant negative effect for the non-trained entrepreneurial group ($\beta = 0.20$, $p=0.00$), and a positive effect ($\beta = 0.14$, $p=0.00$). This reflects that more entrepreneur-trained entrepreneurs have a higher perception of behavioral control of entrepreneurs based on their intention to be entrepreneurs. The significant statistical difference ($\beta = 0.34$, $p=0.00$) proves the H6b is supported. The results show that the non-trained entrepreneurial group is positively affected ($\beta = 0.19$, $p=0.00$) by their subjective norms of entrepreneurship on their intention to be entrepreneurs, but not the trained entrepreneurial group ($p=0.20$). Thus, the H6c is rejected.

Table 11. Path coefficients and multi-group analysis (MGA) results for entrepreneurial education

	H6a	H6b	H6c
Hypothesized path	AT -> EI	PBC -> EI	SN -> EI
β (Not-Trained)	0.66	-0.20	0.19
β (Trained)	0.89	0.14	-0.03
STDEV (Not-Trained)	0.05	0.07	0.06
STDEV (Trained)	0.03	0.04	0.02
t value (Not-Trained)	13.00	3.02	3.22
t value (Trained)	27.43	3.71	1.27
p-value (Not-Trained)	0.00	0.00	0.00
p-value (Trained)	0.00	0.00	0.20
Difference (Trained - Not-Trained)	0.23	0.34	-0.22
p-value (Trained vs Not-Trained)	0.00	0.00	0.01

5 Findings and discussion

5.1. Descriptive analysis

This study employed a five-point Likert scale to gauge attitudes (AT), entrepreneurial intention (EI), perceived behavioral control (PBC), and subjective norms (SN). Results indicate high mean scores for AT (e.g., AT1 = 3.86, AT3 = 3.99), reflecting favourable attitudes toward entrepreneurship. EI also exhibited high scores (e.g., EI1 = 3.89, EI5 = 3.82), suggesting a strong inclination toward entrepreneurial activities among respondents. Conversely, PBC and SN recorded moderate scores, such as PBC1 (3.15) and SN3 (2.49), indicating less confidence and perceived support for entrepreneurial endeavours.

5.2. Measurement model reliability and validity

The confirmatory factor analysis (CFA) results demonstrated robust reliability and validity. All constructs exceeded the recommended thresholds for Cronbach's alpha (e.g., AT = 0.95, EI = 0.95), composite reliability (e.g., AT = 0.95, EI = 0.96), and average variance extracted (AVE) (e.g., AT = 0.83, EI = 0.84). Discriminant validity was confirmed using the Heterotrait-Monotrait ratio (HTMT), with values ranging from 0.20 to 0.75, well below the 0.85 threshold. These findings align with prior studies, such as Solesvik (2013), which highlight the role of validated models in understanding entrepreneurial behaviors. The high internal consistency further supports the robustness of the constructs in explaining entrepreneurial intentions.

5.3. Structural model results

The structural model analysis highlights significant relationships between constructs:

- H1: Attitudes toward entrepreneurship (AT) have a strong positive effect on entrepreneurial intention (EI), consistent with findings by Soria-Barreto et al. (2017).
- H2: Perceived behavioral control (PBC) negatively influences EI, contrary to expectations. This finding aligns with Choukir et al. (2019), who noted the influence of external barriers and cultural norms on perceived control.
- H3: Subjective norms (SN) have a weak but positive effect on EI, supporting Quan (2012) and Solesvik (2013), who emphasized the role of social pressures and cultural settings.

These results underscore the central role of attitudes in shaping entrepreneurial intentions, consistent with the TPB framework (Ajzen, 1991). For group differences in educational background, it's noted that both business and non-business groups demonstrated significant positive effects of AT on EI, with business-educated respondents showing a slightly stronger relationship. These findings corroborate Ward et al. (2019), who highlighted the broader utility of entrepreneurial skills beyond specific fields of study.

- Educational Level: Respondents with diplomas exhibited the strongest positive relationship between AT and EI, followed by those with bachelor's degrees. Interestingly, master's degree holders showed a negative effect of PBC on EI, reflecting findings by Hutasuht (2018) that postgraduate students may perceive higher opportunity costs or risk aversion.
- Entrepreneurial Education: Trained respondents exhibited significantly higher AT effects on EI compared to non-trained respondents. Barba-Sánchez & Atienza-Sahuquillo (2017), who found that entrepreneurial education significantly enhances intentions and attitudes.

Implications and recommendations

1. Enhancing Entrepreneurial Education: The findings underscore the importance of targeted entrepreneurial training programs to strengthen attitudes and perceived behavioral control, consistent with recommendations by Nowiski et al. (2017).
2. Addressing Perceived Barriers: The negative influence of PBC suggests a need to identify and mitigate external constraints, such as financial, cultural, or policy-related barriers, as emphasized by Kelley et al. (2017).
3. Tailored Interventions: Different educational backgrounds and levels require customized strategies. For instance, highly educated individuals may benefit from advanced risk management training to enhance perceived control, echoing Hutasuht (2018).
4. Supportive Ecosystems: Strengthening subjective norms through mentorship programs, peer networks, and societal support systems could encourage entrepreneurial pursuits, as suggested by Quan (2012).

These insights provide a comprehensive understanding of the determinants of entrepreneurial intention among women, offering actionable strategies for policymakers, educators, and practitioners to foster entrepreneurship.

Conclusions

Entrepreneurship is a cornerstone of economic growth and social development, and understanding the factors that influence entrepreneurial intentions is crucial for fostering a vibrant and inclusive entrepreneurial ecosystem. This study specifically examines the role of socio-demographic characteristics, including educational background and level, in shaping entrepreneurial aspirations among women in Saudi Arabia. Through this lens, the research provides valuable insights into the complex dynamics that drive women's entrepreneurial intentions and the underlying factors that promote or hinder these aspirations.

The findings of this study underscore the centrality of attitudes toward entrepreneurship, which emerge as the most significant predictor of entrepreneurial intentions. While subjective norms also contribute to shaping entrepreneurial behaviors, their influence is relatively weaker than those attitudes. Notably, the research

highlights the unexpected negative impact of perceived behavioral control on entrepreneurial intentions, suggesting the presence of external or internal barriers that women perceive in the entrepreneurial process despite their level of education. This counterintuitive result calls for further investigation into the obstacles faced by women, particularly in overcoming the psychological and societal barriers that may restrict their entrepreneurial potential.

A particularly striking observation is the variation in entrepreneurial intentions based on educational background. Women with business-related educational qualifications exhibit stronger entrepreneurial intentions, indicating the positive influence of specialized knowledge and training. However, women with higher education levels, such as master's degrees, report lower perceptions of behavioral control, signalling a potential misalignment between their academic achievements and their perceived ability to succeed in entrepreneurship. This suggests that highly educated women face unique barriers that hinder their entrepreneurial ambitions, including a mismatch between their skills and the resources required to translate these skills into entrepreneurial ventures.

Furthermore, the study highlights that educational background plays a nuanced role in shaping entrepreneurial intentions. The varying influence of entrepreneurial attitudes, perceived behavioral control, and subjective norms across different educational groups emphasize the need for tailored policies and initiatives. Education systems and policy frameworks should consider the diverse needs of women entrepreneurs, offering targeted interventions that address specific challenges depending on their level and type of education.

In summary, this research significantly contributes to the growing body of knowledge on women's entrepreneurship by offering empirical evidence on the role of education and socio-demographic factors in shaping entrepreneurial intentions. The study provides actionable insights for policymakers, educators, and development stakeholders working to promote gender-inclusive entrepreneurship and close the gender gap in entrepreneurial activities. By acknowledging the complexities and variations in entrepreneurial intentions, this research highlights the importance of creating a supportive environment that nurtures and empowers women entrepreneurs at all stages of their educational and professional lives.

Building on the valuable findings of this study, several promising avenues for future research are identified:

1. *Psychological and Cultural Factors:* Future studies should explore the psychological barriers (e.g., fear of failure, lack of self-confidence) and cultural expectations that may constrain entrepreneurial intentions, particularly among highly educated women. Additionally, the role of work-life balance and societal pressures in shaping entrepreneurial aspirations should be considered.
2. *Longitudinal Studies:* Longitudinal studies are recommended to gain deeper insights into how entrepreneurial intentions evolve and how interventions affect women's entrepreneurial behaviors. These studies could track the progression of entrepreneurial intentions from education to actual entrepreneurial activity.
3. *Sector-Specific Analysis:* Future research could focus on sector-specific entrepreneurial intentions, identifying industries where women are more likely to thrive as entrepreneurs and uncovering the reasons behind their success or challenges in specific sectors.
4. *Impact of Policy Interventions:* A critical area for future research would be assessing the impact of recent policy reforms and initiatives, such as those under Saudi Vision 2030, on women's entrepreneurial activities. Evaluating the effectiveness of these policies will help identify which reforms are most conducive to promoting women's entrepreneurship.
5. *Entrepreneurial Training:* Investigating the role of structured entrepreneurial training programs in enhancing women's entrepreneurial attitudes, perceived behavioral control, and subjective norms could lead to more effective training initiatives to reduce the gender gap in entrepreneurship.
6. *Comparative Studies:* Comparative analyses across different countries or regions, especially those with distinct socio-economic and cultural contexts, could offer a broader understanding of the global factors influencing women's entrepreneurial intentions. These studies would also provide insights into women's challenges in diverse environments.

7. *Technology and Digital Entrepreneurship*: Given the increasing importance of digital transformation, future research could explore how technology enables women's entrepreneurship, especially in emerging fields such as digital and innovation-driven industries. This could shed light on new opportunities for women in entrepreneurship, particularly in a post-pandemic digital economy.

By addressing these research directions, future studies can expand the understanding of women's entrepreneurship and contribute to formulating effective, evidence-based policies and strategies to foster inclusive and sustainable economic growth. Such efforts will enhance women's entrepreneurial engagement and contribute to broader social and economic development goals.

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