

Article

Structural Equation Modeling-Based Multi-Group Analysis: Examining the Role of Gender in the Link between Entrepreneurship Orientation and Entrepreneurial Intention

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Abstract: This research examines the role of gender in the link between entrepreneurship orientation and entrepreneurial intention. More exactly, the research examines the differences between male and female senior students in relation to the effect of risk-taking, innovativeness, and pro-activeness on their entrepreneurial intention. For this purpose, a quantitative research method was conducted through a self-administered questionnaire to a sample of students at King Faisal University, Kingdom of Saudi Arabia. The results of structural equation modeling (SEM) by AMOS software showed a significant positive direct impact of risk-taking on entrepreneurial intention and a significant positive indirect impact through innovativeness and pro-activeness for the structural model of male and female. In the comparison between the two groups using multi-group analysis, the results showed that impacts of risk-taking and innovativeness on entrepreneurial intention were found to be positive and significant in the two groups and the differences in *p*-value were significant. This means that there are significant differences between males and females in relation to the impact of risk-taking and innovativeness on entrepreneurial intention. These differences were because males were found to be more risk-taking than females whereas females were found to be more innovative than males. On the other side, the results confirmed no significant differences between the two groups in relation to the effect of pro-activeness on entrepreneurial intention. The findings of the study have noble implications for scholars and policymakers, which we have discussed and elaborated on.

Keywords: multi-group analysis; gender; entrepreneurship orientation; risk-taking; innovativeness; pro-activeness; entrepreneurial intention; Kingdom of Saudi Arabia

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1. Introduction

Entrepreneurship is a major significant economic activity in many countries and a key factor toward sustainable development [1,2]. Hence, it gains great attention from scholars and decision-makers over the last few decades. Entrepreneurship makes numerous significant impacts, e.g., employment opportunities [3], society development [4], and enhancing competition and innovation [5,6]. According to Cho & Honorati [7], promoting entrepreneurship is regularly viewed as a critical policy priority to steadily increase jobs and reduce poverty. Furthermore, entrepreneurship is also considered key to the development of youth towards becoming self-reliant [8]. Furthermore, entrepreneurs are growth agents for local communities since they could contribute positively to their country's economy through new ventures and job creation [9–11]. Governments globally have

recognized the key role of entrepreneurship. Consequently, they are progressively promoting entrepreneurship activities to promote socio-economic development [12]. Governments attempt to make their societies more entrepreneur-friendly, accordingly, governments plan to invest more in programs that promote an entrepreneurial mindset [13–16].

The leadership of the Kingdom of Saudi Arabia (KSA) has prioritized entrepreneurship and added it to the national agenda. The government supports Saudi youth to be involved in entrepreneurship activities and encourages them to make entrepreneurship their career choice [17]. The government of KSA considered SMEs as one of the important economic engines and they are willing to increase the contribution of SMEs to Gross Domestic Product (GDP) from 20% to 35% by 2030 [18]. Therefore, the government established a particular authority called “Monsha’at” to support SME sectors by promoting a spirit of entrepreneurship and innovation. Entrepreneurship is one of the key factors to support the Saudi Vision 2030. The Saudi Vision 2030, which was inaugurated recently by the Crown Prince of KSA, aims to create a diversified economy with a strong and healthy bottom line, hence entrepreneurship has a crucial role in achieving this Vision [18]. The Saudi Vision 2030 plans to decrease unemployment to 7% [19]. The Vision promotes equality between men and women and ensures women’s empowerment politically, economically, socially, and psychologically.

Traditionally, KSA is classified as a gender-segregated country, which makes gender segregation a major characteristic of Saudi culture [20,21]. This means that there is no mixing between males and females. However, the Saudi Vision 2030 aims to empower women to participate in economic development. To support female entrepreneurship, the government has created a proper environment to empower businesswomen. According to Khalaf et al. [22], approximately 39% of SMEs in KSA are Saudi women entrepreneurs. This percentage is speedily edging toward 50%, given that their number of the economy is up 35% in the last 10 years [23]. On the other side, Khalaf et al. [22], indicated that 42% of Saudi women are in the process of be an entrepreneur. Having more female entrepreneurs in KSA will be translated into more job opportunities and diversify the Saudi economy.

There have been numerous efforts dedicated to gender and entrepreneurship studies (see for example, [24–27]). Entrepreneurship is closely connected to the character of an entrepreneur [28]. Previous studies (e.g., [27,28]) considered the “entrepreneur” as an individual with specific characteristics such as being innovative, risk-taking, and pro-activeness. It was also found that gender as a personal characteristic influences the entrepreneurs’ intentions [29,30]. A number of earlier studies (e.g., [31–35]) showed that entrepreneurial intention is higher among men than women. Furthermore, Alexandre-Leclair et al. [27] argued that females are less keen than males to choose entrepreneurship to make a living for some reasons like culture, risk aversion, financial issues, etc. Similarly, Kelley et al. [36] confirmed that males tend to be higher engaged in activities of entrepreneurial as compared with females. Kee and Abdul Rahman [37] noted that gender preferences might differ based on other factors such as countries, cultures, and certain entrepreneurial stages. However, Smith et al. [38] indicated that there is no difference in entrepreneurial intention between females and males.

Kumar et al. [39] argued that there is an apparent gap in the literature about the gender role in the relationship between dimensions of entrepreneurship orientation and entrepreneurial intention, particularly among graduates of higher education institutions. However, it is crucial to understand the role of gender in the link between entrepreneurship orientation and entrepreneurial intention. In that sense, literature on entrepreneurship has a limited investigation in relation to the aspects and decision processes that whether there are differences between two groups of gender, i.e., male and female, in pursuing (or not) entrepreneurship and becoming entrepreneurs [40,41]. Hence, understating the role of gender in the link between entrepreneurship orientation and entrepreneurial intention has become more important to ensure better engagement in entrepreneurship. Entrepreneurial intention is the main factor that promotes students or graduates to start-up his/her new ventures [42]. Additionally, entrepreneurship orientation is a behavioral and attitudinal

factor that is expected to increase a person's desire to become an entrepreneur [41]. Entrepreneurship orientation can be described as a tendency to explore new ventures [43]. Miller [44] stated that entrepreneurship orientation has three dimensions: risk-taking, innovativeness, and pro-activeness.

The purpose of the current study is to examine the influence of widely held gender, i.e., male and female stereotypes on the link between entrepreneurship orientation and their intent to be an entrepreneur. More especially, the current study examines the role of gender in the interrelationship between the dimensions of entrepreneurship orientation, i.e., risk-taking, pro-activeness and innovativeness, and entrepreneurial intention, particularly in the Saudi context. The main research question is; what is the impact of graduates' gender on the link between entrepreneurship orientation and entrepreneurial intention? The sub-research questions are: Are there significant differences between males and females in relation to entrepreneurship orientation and entrepreneurial intention? What is the role of gender in the direct influence of risk-taking on entrepreneurial intention? What is the role of gender in the direct influence of pro-activeness and innovativeness on entrepreneurial intention? What is the role of gender in the indirect influence of risk-taking on entrepreneurial intention? This research has four key objectives. First, this research examines the gender role in the relationship between the direct influences of risk-taking on entrepreneurial intention among Saudi university students. Second, the research tests the gender role in the direct impact of both pro-activeness and innovativeness on entrepreneurial intention among Saudi university students. Third, the study examines the gender role in the direct impact of risk-taking on pro-activeness and innovativeness among Saudi university students. Fourth, it investigates the role of gender in the indirect impact of risk-taking on entrepreneurial intention through pro-activeness and innovativeness. The current study establishes relevant implications for policymakers, and scholars, particularly in the Saudi context, on the promotion of entrepreneurial intention among higher education graduates of both gender to spread the culture of successful entrepreneurship practices; hence, advance the national agenda and the government vision.

For answering the research questions and fulfilling the objectives, the article started by introducing the research and highlighting the problem (Section 1). It then moved to present the theoretical framework and build the hypotheses (Section 2). The research methods, including data collection and analysis, are then discussed (Section 3). The results of the research are then presented with a comparison of the two models between male and female graduates (Section 4). The results are discussed, and major implications are highlighted (Section 5). The article is then concluded and limitations of the study as well as further research opportunities are presented (Section 6).

2. Literature Review

2.1. Defining the Study Constructs

The process of making a new venture by a person "entrepreneur" is identified as entrepreneurship [13]. This person has the desire to take risks, look for new opportunities, and continually seek out opportunities to add value. Entrepreneurship is a process of vision, change, and creation that need energy, and enthusiasm to develop, and execute new ideas and creative solutions [45]. While Al-Mamary et al., [46] described entrepreneurship as the process of planning, managing, and developing a new business for profit drives.

Overall, intent can be described as a desire to engage in a particular behavior [19]. Entrepreneurial intention is the Key variable used to predict entrepreneurial activity. Some researchers have argued that entrepreneurial intention does not constantly lead to entrepreneurial behavior [47]. However, a study conducted by Kautonen et al., [48,49] confirmed that entrepreneurial intention predicts entrepreneurial behavior. So et al. [50] stated that entrepreneurial intention reflected the actual individual behavior. Entrepreneurial intent has been linked to demographic parameters such as gender, age, experiences, and education. According to Goktan and Gupta [51], gender has an important role in entrepreneurial intention with low entrepreneurial intention among women. On the contrary,

Smith et al. [39] noted that there was no difference in entrepreneurial intention between males and females. Yet, it is unknown whether there is a significant difference in entrepreneurial intention among male and female students at higher education institutions.

The concept of entrepreneurship orientation was originally launched by Miller [44]. Rauch et al., [52] defined entrepreneurship orientation as “the strategy-making processes that provide businesses with a basis for entrepreneurial decisions and actions” (p. 762). Lumpkin and Dess’s [53] defined entrepreneurship orientation as the intents and activities of participants in dynamic generating processes for new venture creation. One of the most well-known measures of entrepreneurship orientation was firstly launched by Miller [44], who recognized three components of this concept namely: risk-taking; innovativeness, and pro-activeness. Later on, autonomy and competitive aggression were added to Miller’s constructs by Lumpkin and Dess [54]. Previous studies (e.g., [55,56]) noted that investigating entrepreneurship orientation for higher education students is important, particularly in evaluating their desires and attention to choose an entrepreneurial path after graduation.

Risk-taking is the tendency to invest a significant amount of resources in unproven and novel business ventures [57]. Edwards et al. [58] defined risk-taking as the tendency to engage bravely rather than cautiously. Risk-taking is described as the ability to take calculated yet bold actions, such as starting a new business, experimenting with new financial sources, and/or making important resource commitments to new ventures in the wake of uncertain environmental conditions [59]. Risk-taking and entrepreneurial spirit are closely related [19]. Innovativeness was originally defined by Miller [44] as the tendency to experiment and be creative through the development of new products or services. For example, Lumpkin and Dess [54] defined innovativeness as the tendency of a business “to engage in and support new ideas, novelty, experimentation, and creative processes that may result in new products, services, or technological processes” (p. 142). According to Robinson et al., [60] innovation is the capability to recognize and engage in business activities in creative and innovative ways. Therefore, innovativeness is a significant success aspect for a business start-up and practice by the entrepreneur [61]. Proactivity was defined as anticipating future market preferences and requirements. It is a forward-thinking, opportunity-seeking strategy characterized by the introduction of novel ideas, services, and products [62,63] argued that pro-activeness is strongly connected to entrepreneurial intention.

2.2. The Link between Risk-Taking and Innovativeness

Innovation is based on the exploration and implementation of a new and novel idea, which often requires risk-taking [64,65]. The tendency to take risks can be argued to be an innovation driver since it promotes the formation of novel and untested ideas and motivates the allocation of time, people, and resources for implementation [66,67]. Therefore, risk-taking behavior has been identified as a key element of innovation culture [68,69]. However, taking risks might lead to failure traps while exploring new ideas and higher costs when developing them [70]. According to Ling et al., [67], innovation has an important role to decrease risk-taking by entrepreneurs, where innovation might be a driver for adventure success in the future. Hence, risk-taking support uncertain action by entrepreneurs (e.g., becoming innovative) [44].

In the context of gender roles, Lim and Envick [26] emphasized that females are more likely to engage in a business that requires a high level of risk-taking. The same authors added that females are less likely and have lower degrees than males regarding engagement in innovation. Female entrepreneurs were found to keep their businesses limited, which decrease the necessity to be innovative [71]. Hence, females are less opposed to innovation as they are too high risk of a venture. Likewise, De vita et al. [72] noted that entrepreneur women are lower than entrepreneur males in the context of innovations. Thus, it could argue that:

Hypothesis 1 (H1). *Gender impacts the relationship between risk-taking and innovativeness among higher education students.*

2.3. The Link between Risk-Taking and Pro-Activeness

Pro-activeness depends on a prediction of the requirements of the market in the future to stay one step ahead of competitors [44]. Entrepreneurs should be proactive people and think outside the box to launch an innovative idea, service, and product into the market [46]. In the same context, it is argued that risk-taking is a key driver of proactivity, albeit this does not mean starting up new businesses with no clear vision. Genever [73] revealed that proactivity and innovativeness have an important role to reduce the level of risk-taking. Earlier research (e.g., [74,75]) confirmed that pro-activeness precedes innovativeness. Joshi et al., [76] examined the correlation among entrepreneurship orientation dimensions and indicated that higher levels of risk-taking and pro-activeness are connected with higher levels of innovativeness, on the other side, excessive levels of pro-activeness and risk-taking are connected with lower levels of innovativeness. Furthermore, Koe [77] revealed that innovativeness and pro-activeness are positive influencers of students' entrepreneurial intentions, while risk-taking as one of the entrepreneurship orientation dimensions does not impact a student's entrepreneurial intention. In this context, Kumar et al., [39] pro-activeness has a direct and positive impact on the entrepreneurial intention of students. In the contrast, scholars (e.g., [39,78]) asserted that the risk-taking behavior of students is significant but has negative support for the student's entrepreneurial intention.

Previous studies (e.g., [79–81]) established that female entrepreneurs are more proactive than males as they are more desiring to take bolder decisions to move into risky and untried ventures compared to male counterparts. To conclude, males are more likely to taking-risk compared to females, while females are more proactive than males. Based on these arguments, it could be proposed that:

Hypothesis 2 (H2). *Gender impacts the relationship between risk-taking and pro-activeness among higher education students.*

2.4. The Link between Risk-Taking and Entrepreneurial Intention

Al-Mamary and Alshallaqi [19] argued that there is a strong connection between risk-taking and entrepreneurial intention. To clarify, people with a higher risk-taking tendency are more likely to be successful entrepreneurs. Therefore, Al-Nashmi [82] indicated that successful entrepreneurs are more likely to take risks and work in uncertain circumstances. Entrepreneurs tend to take risks as their desire for success increases, which drives them to act rapidly in challenging situations even with incomplete knowledge. Earlier studies (e.g., [46,50,83]) emphasized that risk-taking is the main sub-dimensions of entrepreneurship orientation that impact entrepreneurs' intentions positively or negatively. On the other side, studies (e.g., [77,84,85]) noted that risk-taking was not a significant factor that affects entrepreneurial intention. In this context, Hamdan [86], stated that entrepreneurial intention is influenced by the willingness to accept risks entrepreneurs. Individuals with a high-risk taking are usually more motivated to engage in entrepreneurship in comparison to those with a low-risk taking [87]. According to Koe [77], the risk-taking ability does not impact a student's entrepreneurial intention compared to other sub-dimension of entrepreneurship orientation. Kumar et al., [39] confirmed that students' risk-taking attitude is significant but has a negative influence on the entrepreneurial intention of students because they want to take a calculated risk.

In the context of gender roles, Grilo and Irigoyen [88] argued that women are less likely to proceed in entrepreneurial procedures and risk aversion is the most significant factor for them than for male entrepreneurs. More specifically, males are more likely to seek external financial support compared to females [89,90]. Grilo and Irigoyen [88] also indicated that males are more likely to take the risk because women have a higher level of failure that might hinder their business activities. Similarly, Marlow and Carter [91], stated that females are more risk-averse than males. Female fear of failure has a negative impact on intention to start a new business [92]. Based on these arguments, it could be proposed that: Hence, it could be hypothesized that:

Hypothesis 3 (H3). *Gender impacts the relationship between risk-taking and entrepreneurial intention among higher education students.*

2.5. The Link between Innovativeness and Entrepreneurial Intention

Innovation reflects the ability to participate in and promote novel idea generation, development of processes and products in a better and more innovative way, or the enhancement of current services [44]. Furthermore, Salaman and Storey [93] stated that innovations are considered a mechanism for remaining on top of the competitive business market. Hence, innovation attitudes are a key factor in entrepreneurship intention [2]. Earlier studies (e.g., [94,95]) confirmed that innovativeness has a noteworthy and positive effect on an individual's intention to start a new business. Similarly, Mueller [96] and Wagner [97] noted that there is a positive relationship between innovativeness and entrepreneurial intention. On contrary, Al-Mamary et al. [46] and Zampetakis et al., [98] asserted that innovativeness has an impact on entrepreneurial intention, particularly if it is not accompanied by a pro-active approach.

Studies on gender differences in terms of innovation by Lim and Envic [26] reported that females have a lower level of innovativeness compared to males. De Vita, et al., [72] also indicated that males are more innovative compared to females. Contrariwise, Kumar et al. [39] showed that there is no difference between males and females in innovativeness. Overall, female entrepreneurs are not opposed to innovation, but they may not require the same level of innovation as their male counterparts due to the types of ventures they establish. Therefore, we propose the following hypothesis:

Hypothesis 4 (H4). *Gender impacts the relationship between Innovativeness and entrepreneurial intention among higher education students.*

2.6. The Link between Pro-Activeness and Entrepreneurial Intention

According to Al-Mamary et al. [46], proactivity can be described as capturing and exploiting investment opportunities while anticipating and meeting market requirements before they are discarded or fulfilled by possible competitors. Therefore, the ambition to be an entrepreneur is based on one's willingness to take risks, ability to think creatively, and ability to be proactive in dealing with market needs [86,87]. Furthermore, pro-activeness is preceding innovativeness [74,75]. Experimentally, a proactive attitude is linked to entrepreneurial intention [99]. Hence, Mustafa et al., [100] emphasized that proactive people are more likely to be business owners than less proactive people. Additionally, Prabhu et al., [63] declared that a proactive personality is strongly linked to entrepreneurial intent. According to Koe [77], the entrepreneurial intention of students is positively influenced by innovativeness. Furthermore, Kumar et al., [39] confirmed that pro-activeness has a direct and positive impact on students' entrepreneurial intention.

In the context of gender impact on pro-activeness, Koe [77] indicated entrepreneurial intentions were positively connected with a proactive attitude, while males had higher entrepreneurial intentions than women. On contrary, Taatila and Down [54] asserted that males outperform females in terms of pro-activeness and risk-taking, whereas females outperform males in terms of innovativeness. Similarly, Tan [81] showed that female entrepreneurs are more proactive than males because they are more likely to take risky and untested enterprises. Therefore, it can be stated that proactive students are more likely to show entrepreneurial intention in enterprise contexts while gender has an impact on the relationship between pro-activeness and students' intention to be an entrepreneur. Thus, we propose the following hypotheses:

Hypothesis 5 (H5). *Gender impacts the relationship between Pro-activeness and entrepreneurial intention among higher education students.*

2.7. The Mediating Effect of Innovativeness and Pro-Activeness in the Link between Risk-Taking and Entrepreneurial Intention

Previous studies (e.g., [46,77,101]) showed is a positive connection between entrepreneurship orientation and entrepreneurial intention. Scholars (e.g., [46,101]) asserted that risk-taking is a key factor that directly influences entrepreneurial intention. Koe [77] indicated that pro-activeness and innovativeness are positive influencers of students’ entrepreneurial intention. Mueller [96] and Wagner [97] emphasized that there is a direct relationship between innovativeness and entrepreneurial intention. Pro-activeness and risk-taking propensity have a curvilinear relationship with innovativeness [76].

In the context of gender roles, Grilo and Irigoyen [88] indicated that males are more likely to take risks because women have a higher level of failure that might hinder their business activities. Tan [81] noted that female entrepreneurs are more proactive than males. Taatila and Down [55] asserted that males outperform females in terms of pro-activeness, and risk-taking, whereas females outperform males in terms of innovativeness. There have been tremendous efforts dedicated to entrepreneurship and gender studies [24,26,102]. Yordanova and Alexandrova-Boshnakova [102] stated that there is little research has focused on gender differences, particularly in the relationship between entrepreneurship orientation and entrepreneurship orientation. Furthermore, Joshi et al., [76], asserted that most of the previous research treated the entrepreneurship orientation construct with its three dimensions (innovation, pro-activeness, and risk-taking) as an aggregated construct, whereas Rauch et al. [52] indicated that there is a need to study entrepreneurship orientation dimensions as unique entities. Therefore, research (e.g., [37,103,104]) called to investigate the gender role in the interrelationships between the three distinct entrepreneurship orientation dimensions. This study considers the first attempt to test the mediating effect of pro-activeness and innovations in the link between risk-taking and entrepreneurial intention. The theoretical model is shown in Figure 1. Hence, it could be hypothesized that:

Hypothesis 6 (H6). *Innovativeness has a mediating effect on the link between risk-taking and entrepreneurship orientation of students in higher education.*

Hypothesis 7 (H7). *Pro-activeness has a mediating effect on the link between risk-taking and entrepreneurial intention of students in higher education.*

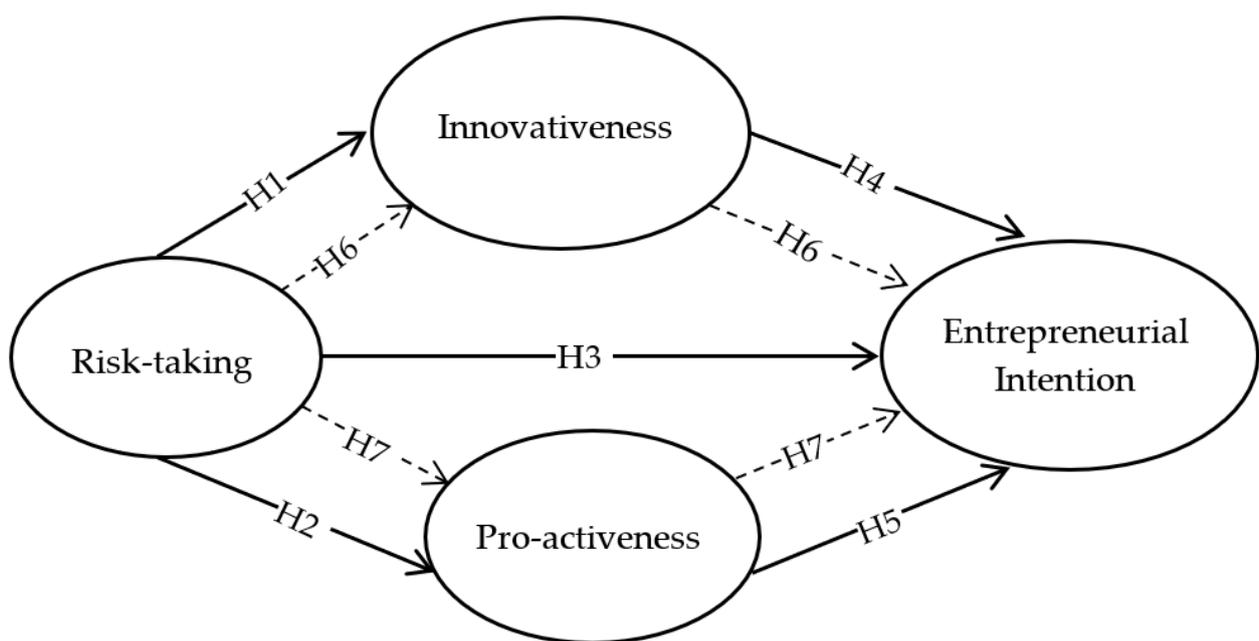


Figure 1. The theoretical model (straight line refers to direct effect; dotted line refers to indirect effect).

3. Methodology

3.1. Study Measures

All of the multi-item measurements that were utilized in this research were derived from an exhaustive analysis and review of earlier published empirical studies. This process resulted in the production of four factors, each of which had its own unique set of items that were adapted specifically to fit the current study context. The scale has been developed using a Likert scale with seven points, with one point representing “strongly disagree” and seven points representing “strongly agree”. Three dimensions derived from Satar and Natasha’s [105] research were used to measure participants’ entrepreneurial orientation. The first dimension includes three items that measure the graduate’s risk-taking capacity (risk-taking), such as the example item: “I am willing to invest a lot of time and/or money in something that might yield a high return”. The scale exhibited a good Cronbach alpha (α) reliability in both male and female sides of the gathered data ($\alpha = 0.951$, male; 0.961, female). While the second factor consists of four different variables and explains the innovativeness orientation of the graduate. Items used as examples: “In general, I prefer a strong emphasis in projects on unique, one-of-a-kind approaches rather than revisiting tried and true approaches used before”. The scale exhibited a good Cronbach alpha (α) reliability in both male and female sides of the gathered data ($\alpha = 0.927$, male; 0.935, female). The capability of the graduate to be proactive is explained by the third dimension of the entrepreneurial orientation measure. An example item: “I prefer to “step up” and get things going on projects rather than sit and wait for someone else to do it”. The scale displayed a good Cronbach alpha (α) reliability in both male and female sides as well ($\alpha = 0.901$, male; 0.911, female). Finally, six items derived from Chen et al., [31], and Liñán & Chen [106] were utilized to operationalize entrepreneurial intention. A sample item is as follows: “I have very seriously thought of starting a firm”. The measure exhibited a good Cronbach alpha (α) reliability in both male and female sides ($\alpha = 0.955$, male; 0.947, female).

Thirteen professors and eleven graduates piloted the scale to ensure its simplicity and consistency and no changes were made to the questionnaire. The data collected is guaranteed to be completely anonymous and kept in the strictest confidence, as stated in the questionnaire introduction. The fact that the research questionnaire uses self-reporting as its primary data collection method raises the possibility of there being a common method variance (CMV) [107]. In order to detect any potential CMV, Harman’s single-factor examination was carried out, and the value of all the extracted factors was set to 1.0 in an exploratory factor analysis (EFA) test. SPSS data analysis method was employed with no rotation method. The results indicated that CMV is not a cause for concern because there was only a single factor that was obtained and it only explained 39% of the variance (less than 50%) [108].

3.2. Data Collection

Potential graduates from the faculty of computer science & information technology, faculty of business administration, faculty of arts, and faculty of agriculture & food science at King Faisal University (KFU) were selected at random to form a sample of 600 heterosexual graduates (300 male and 300 female). KFU is located in Saudi Arabia’s eastern province. The targeted sample was instructed in a course entitled “Entrepreneurship Principles” and was enrolled in their final academic year. Graduates were asked to complete the survey because they frequently consider their future careers and may have an entrepreneurial orientation and intent. In February and March of 2022, the questionnaire was dropped and then collected from the targeted graduates. The research team has been able to distribute 620 questionnaires, of which 610 answers were handed back and 10 surveys were removed due to missing data, resulting in a 96% response rate and a total of 600 valid questionnaires (300 males and 300 females). Independent sample *t*-test compared early and late response means. No significant differences ($p > 0.05$) were found between the early and late response mean, indicating that non-response bias was not a concern in our study [107].

4. Data Analysis

The descriptive properties of the respondents were obtained using SPSS version 24, as was the independent sample *t*-test, and the reliability of the study dimensions was determined using Cronbach's alpha values. Due to the complexity of the study justified model, its structural properties were examined using CFA and SEM in AMOS v24. CV-SEM was selected over PLS-SEM given the current research has a large sample size ($N = 600$), confirmatory structure, graphical user interface, and ability to run and evaluate complex and multivariate models. While Smart PLS can be used for exploratory, small-sample studies with complex models.

4.1. Descriptive Statistics

The targeted sample was equally distributed between males (50%) and females (50%). The vast majority (90%) were between the age of 17 to 23 years. 30% of the targeted respondents were from the faculty of business administration, 25% were from computer science and information technology faculty, 20% were from arts faculty, and 25% were from agriculture and food science faculty.

Some descriptive data derived from the participants' responses to our research are presented in Table 1. In the male section of the survey, the mean values of the respondents ranged from 4.78 to 5.45, while the mean values of the respondents in the female section ranged from 3.12 to 5.07. The values of the standard deviation (S.D.) ranged from 0.84 to 1.45 in the male section, whereas the values of the standard deviation (S.D.) ranged from 0.78 to 1.40 in the female section, implying that the data was more scattered and less compressed around the mean value [109]. Table 2 also includes the values for skewness and kurtosis for both the female and male sections. There is no value in either section that is greater than -2 or $+2$, which indicates that the data follows a normal distribution curve [109–111].

Table 1. Descriptive statistics.

Abbrev.	Items	Male, N = 300				Female, N = 300			
		M	S. D	Skewness	Kurtosis	M	S. D	Skewness	Kurtosis
Risk-Taking (Satar & Natasha [105])		<i>(a = 0.951)</i>				<i>(a = 0.961)</i>			
Risk_1	“I like to take bold actions by venturing into the unknown”.	4.92	1.40	−0.26	−0.83	4.76	1.37	−0.07	−1.03
Risk_2	“I am willing to invest a lot of time and/or money in something that might yield a high return”.	4.89	1.38	−0.26	−0.79	4.75	1.33	−0.03	−1.09
Risk_3	“I tend to act “boldly” in situations where risk is involved”.	4.85	1.24	−0.14	−1.04	4.75	1.30	0.009	−1.20
Innovativeness (Satar & Natasha [105])		<i>(a = 0.927)</i>				<i>(a = 0.935)</i>			
Innov_1	“I often like to try new and unusual activities that are not typical but not necessarily risky”.	4.78	1.05	−0.77	2.76	3.12	0.78	−0.55	−0.26
Innov_2	“In general, I prefer a strong emphasis in projects on unique, one-of-a-kind approaches rather than revisiting tried and true approaches used before”.	4.75	1.01	−0.91	3.15	3.12	0.78	−0.55	−0.26
Innov_3	“I prefer to try my own unique way when learning new things rather than doing it as everyone else does”.	4.78	0.98	−0.71	2.88	3.12	0.78	−0.55	−0.26
Innov_4	“I favor experimentation and original approaches to problem-solving rather than using methods others generally use for solving their problems”.	4.82	0.84	0.67	−0.14	3.12	0.78	−0.55	−0.26
Pro-activeness (Satar & Natasha [105])		<i>(a = 0.901)</i>				<i>(a = 0.911)</i>			
Proact_1	“I usually act in anticipation of future problems, needs, or changes”.	5.44	1.34	1.20	1.233	5.06	1.39	−0.48	−0.32
Proact_2	“I tend to plan ahead on projects”.	5.45	1.25	1.21	1.64	5.07	1.34	−0.49	−0.20
Proact_3	“I prefer to “step up” and get things going on projects rather than sit and wait for someone else to do it”.	5.44	1.24	1.22	1.79	5.06	1.34	−0.48	−0.16
Entrepreneurship intention (Chen et al., [31]; Liñán & Chen [106])		<i>(a = 0.955)</i>				<i>(a = 0.947)</i>			
E._Inten._1	“I am ready to do anything to be an entrepreneur”.	4.98	1.44	−0.128	−0.94	4.86	1.40	−0.18	−0.96
E._Inten._2	“My professional goal is to become an entrepreneur”.	4.91	1.44	−0.18	−0.71	4.79	1.39	−0.25	−0.74
E._Inten._3	“I will make every effort to start and run my own firm”.	4.87	1.45	−0.17	−0.65	4.78	1.36	−0.10	−0.90
E._Inten._4	“I am determined to create a firm in the future”.	4.86	1.37	−0.06	−0.80	4.79	1.32	−0.16	−0.90
E._Inten._5	“I have very seriously thought of starting a firm”.	4.87	1.42	−0.04	−0.94	4.71	1.35	−0.11	−0.98
E._Inten._6	“I have the firm intention to start a firm someday”.	4.87	1.38	−0.04	−0.83	4.79	1.35	−0.16	−0.90

Table 2. Psychometric properties of the study scale.

Factors and Variables	Male CFA Model								Female CFA Model							
	Loading	CR	AVE	MSV	1	2	3	4	Loading	CR	AVE	MSV	1	2	3	4
1-Entrepreneurship intention		0.979	0.887	0.260	0.942					0.975	0.866	0.260	0.931			
E._Inten._1	0.968 ***								0.939 ***							
E._Inten._2	0.926 ***								0.909 ***							
E._Inten._3	0.923 ***								0.916 ***							
E._Inten._4	0.924 ***								0.917 ***							
E._Inten._5	0.937 ***								0.934 ***							
E._Inten._6	0.972 ***								0.967 ***							
2-Risk-Taking		0.962	0.893	0.303	0.51	0.945				0.951	0.867	0.123	0.25	0.931		
Risk_1	0.955 ***								0.958 ***							
Risk_2	0.968 ***								0.955 ***							
Risk_3	0.911 ***								0.878 ***							
3-Innovativeness		0.956	0.845	0.303	0.30	0.55	0.919			0.950	0.826	0.260	0.51	0.350	0.909	
Innov_1	0.853 ***								0.824 ***							
Innov_2	0.952 ***								0.949 ***							
Innov_3	0.938 ***								0.929 ***							
Innov_4	0.930 ***															
4-Pro-activeness		0.968	0.910	0.250	0.37	0.33	0.50	0.954		0.930	0.816	0.137	0.300	0.37	0.33	0.903
Proact_1	0.941 ***								0.908 ***							
Proact_2	0.959 ***								0.903 ***							
Proact_3	0.962 ***								0.899 ***							

Table 2. *Cont.*

Male Model Correlations			Estimates	Female Model Correlations			Estimates
Entrepreneur intention	<->	Innovativeness	0.30	Entrep. intention	<->	Innovativeness	0.51 ***
Innovativeness	<->	Risk-taking	0.55	Innovativeness	<->	Risk-taking	0.35 ***
Risk-taking	<->	Pro-activeness	0.50	Risk-taking	<->	Pro-activeness	0.33 ***
Entrepreneur intention	<->	Risk-taking	0.51	Entrep. intention	<->	Risk-taking	0.25 ***
Innovativeness	<->	Pro-activeness	0.33	Innovativeness	<->	Pro-activeness	0.37 ***
Entrepreneur intention	<->	Pro-activeness	0.37	Entrep. intention	<->	Pro-activeness	0.30 ***

“Note: CR: composite reliability; AVE: average variance extracted; MSV: maximum shared value; Bold diagonal values: the square root of AVE for each dimension; below diagonal values: inter-correlation between dimensions; *** significant level below 0.001”. Male CFA Model GoF: “(χ^2 (98, N = 300) = 459.326, $p < 0.001$, normed $\chi^2 = 4.687$, RMSEA = 0.068, SRMR = 0.0361, CFI = 0.924, TLI = 0.911, NFI = 0.914, PCFI = 0.757 and PNFI = 0.747)”. Female CFA Model GoF: “(χ^2 (98, N = 300) = 452.417, $p < 0.001$, normed $\chi^2 = 4.616$, RMSEA = 0.062, SRMR = 0.0298, CFI = 0.940, TLI = 0.927, NFI = 0.925, PCFI = 0.768 and PNFI = 0.755)”.

4.2. Results of Confirmatory Factor Analysis (CFA)

Independent and dependent measures, as well as their reflective associated variables, were submitted to first-order CFA with the “maximum likelihood estimation method” (MLE) in SEM and Amos graphics to evaluate the validity and reliability of the study scale. As emphasized by Hair et al., [107]; Bryman and Cramer [109]; Nunnally [110]; Fornell and Larcker [111]; Anderson, and Gerbing [112]; Kline [113]; and, To determine how well the model fits the data, several goodnesses of fit (GoF) metrics were used such as “Comparative Fit Index” (CFI), the chi-square scores divided by the degree of freedom (df) “normed chi-square”, “Tucker Lewis index” (TLI), and “root means square error approximation” (RMSEA). Models’ acceptable and adequate fit to data was demonstrated by the Goodness-of-Fit (GoF) criteria in both the Male and Female sections of the tested CFA models (Table 2 and Figure 2). Two techniques were used to evaluate the reliability of the scale: Statistics for internal consistency using Cronbach’s alpha (as previously described in the study measurement section) and the “composite reliability” (CR) index. According to Table 2, CR scores for the four used dimensions in bother models passed the threshold of 0.7 as suggested by Fornell and Larcker [111]: entrepreneurship intention (Male, 0.979; Female, 0.975), risk-taking (Male, 0.962; Female, 0.951), innovativeness (Male, 0.956; Female, 0.950), and pro-activeness (Male, 0.968; Female, 0.930), implying a high level of internal consistency in the data.

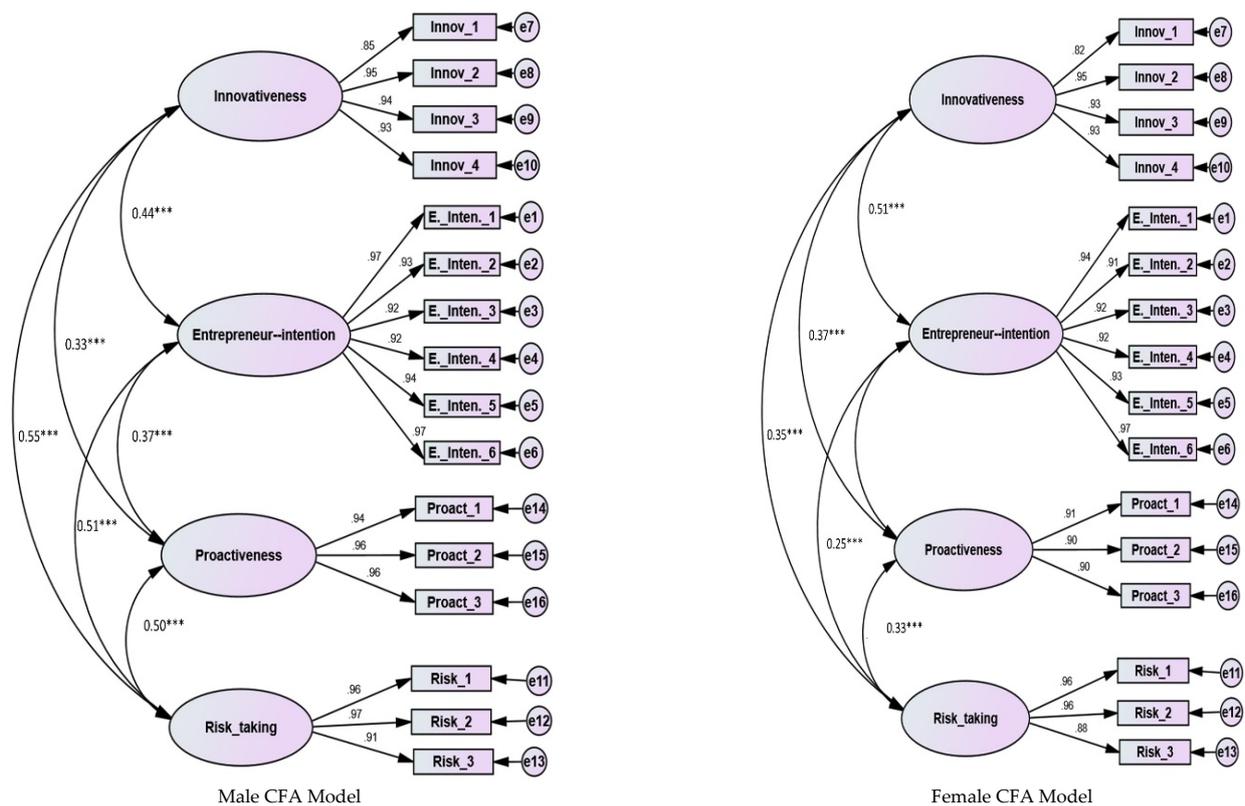


Figure 2. CFA Model, ***: significant level below 0.001.

As recommended by Haire et al., [107], two statistical pieces of evidence were uncovered by the CFA test that ensure the measure’s convergent validity: first, as can be seen in Table 2 and Figure 2, all of the loadings (in male and female models) were greater than 0.85 exceeding the cutoff value of 0.50 with a p-value greater than 0.001 Second, the “average variance extracted” (AVE) values: entrepreneurship intention (Male, 0.887; Female, 0.866), risk-taking (Male, 0.893; Female, 0.867), innovativeness (Male, 0.845; Female, 0.826), and pro-activeness (Male, 0.910; Female, 0.816), surpassed the cut-off point of 0.50, indicating adequate convergent validity (Kline, [113]).

Additionally, as proposed by Hair et al., [107], Bryman and Cramer [109]; Anderson, and Gerbing [112], the CFA outcomes provide two pieces of evidence that secure the discriminant validity of the employed measure. First, according to Table 2, the AVE values cannot be greater than the MSV values. Second, as shown in Table 2, the inter-correlation (data shown below the bold diagonal scores) must be smaller than the squared root scores of the AVE values for the four used measures in order to secure adequate discriminant validity.

4.3. Results of Structural Model

In the current research paper, we utilized a confirmatory approach that was broken up into two stages. After first conducting a thorough literature review to formulate the study’s conceptual model, the researchers moved on to stage two, collecting observational data to determine whether or not it corroborated the theoretical framework [112]. Approval of the theoretical research model was based on its ability to meet a model fit criterion (i.e., RMSEA, CFI, TLI, PCFI). The GoF criteria gives evidence that both (Male and Female) models perfectly fit the observed data: male model Gof, χ^2 (99, N = 300) = 493.119, $p < 0.001$, normed $\chi^2 = 4.981$, RMSEA = 0.08, SRMR = 0.0314, CFI = 0.927, TLI = 0.912, NFI = 0.914, PCFI = 0.765 and PNFI = 0.754. Female model GOF: χ^2 (99, N = 300) = 453.689, $p < 0.001$, normed $\chi^2 = 4.583$, RMSEA = 0.072, SRMR = 0.0255, CFI = 0.940, TLI = 0.927, NFI = 0.925, PCFI = 0.776 and PNFI = 0.763 (as showed in Table 3). Research hypotheses were reviewed and evaluated after the model’s fit to the data was established. Figure 3 is a graphical depiction of the hypotheses that were suggested in both the male and female sections, where each specific path represents a different hypothesis that has been tested.

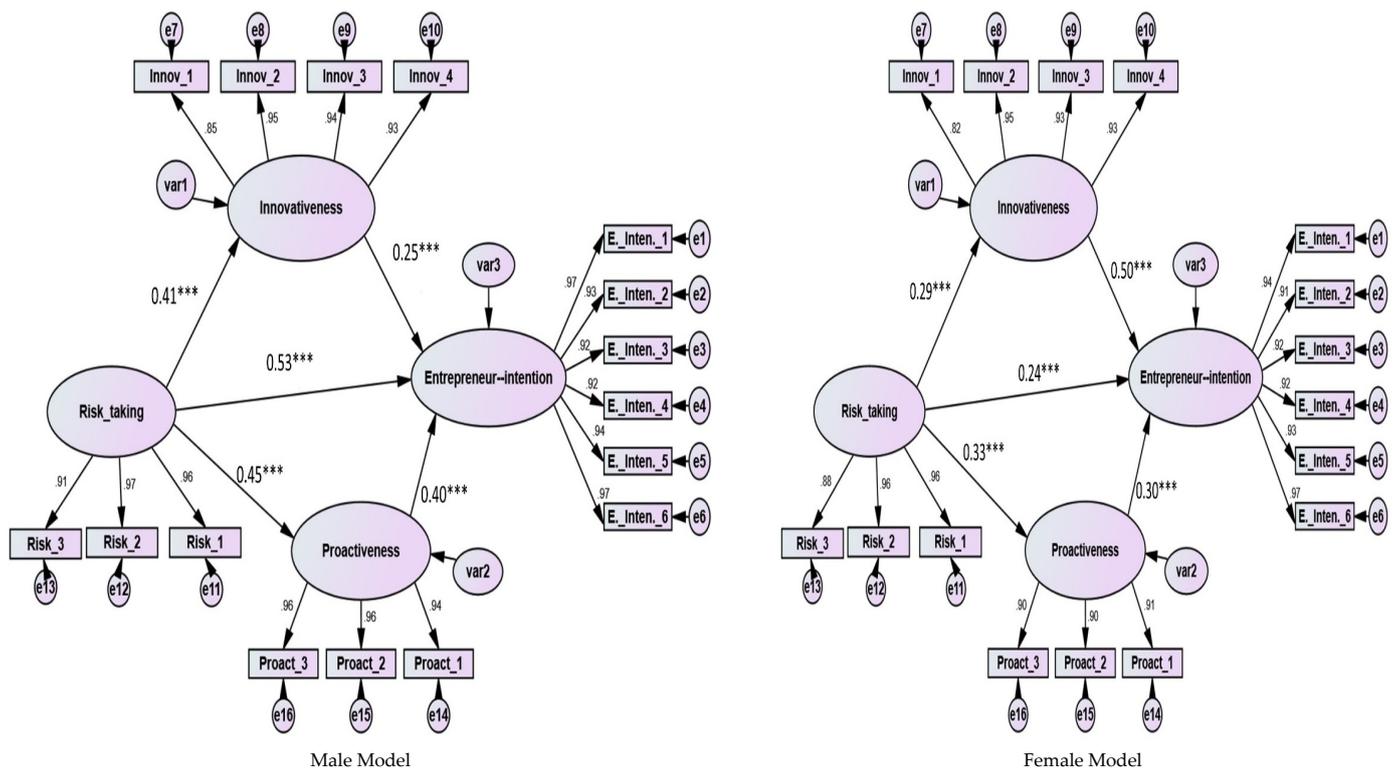


Figure 3. The male and female models in this study (***) = significant level less than 0.001).

Table 3. The structural model’s results.

			Male Model			Female Model		
	Hypotheses		Beta (β)	C-R (t-Value)	R ²	Beta (β)	C-R (t-Value)	R ²
H1	Risk-Taking	————→	Innovativeness	0.41 ***	11.224	0.29 ***	5.271	
H2	Risk-Taking	————→	Pro-activeness	0.45 ***	11.919	0.33 ***	7.212	
H3	Risk-Taking	————→	Entrepreneurship intention	0.53 ***	13.918	0.24 ***	4.772	
H4	Innovativeness	————→	Entrepreneurship intention	0.27 ***	5.771	0.50 ***	11.673	
H5	Pro-activeness	————→	Entrepreneurship intention	0.40 ***	8.621	0.30 ***	9.851	
H6	Risk-Taking	————→	Innovativeness	————→	Entrepreneurship intention	Path 1: β = 0.41 *** t-value = 11.224 Path 2: β = 0.27 *** t-value = 5.771	Path 1: β = 0.29 *** t-value = 5.271 Path 2: β = 0.50 *** t-value = 11.673	
H7	Risk-Taking	————→	Pro-activeness	————→	Entrepreneurship intention	Path 1: β = 0.45 *** t-value = 11.919 Path 2: β = 0.40 *** t-value = 8.621	Path 1: β = 0.33 *** t-value = 7.212 Path 2: β = 0.30 *** t-value = 9.851	
Entrepreneurship intention					0.51	0.40		

“Male Model GoF: χ^2 (99, N = 300) = 493.119, $p < 0.001$, normed $\chi^2 = 4.981$, RMSEA = 0.08, SRMR = 0.0314, CFI = 0.927, TLI = 0.912, NFI = 0.914, PCFI = 0.765 and PNFI = 0.754”. “Male Model GoF: χ^2 (99, N = 300) = 453.689, $p < 0.001$, normed $\chi^2 = 4.583$, RMSEA = 0.072, SRMR = 0.0255, CFI = 0.940, TLI = 0.927, NFI = 0.925, PCFI = 0.776 and PNFI = 0.763”. ***: significant level less than 0.001.”.

The research models (both male and female) came up with seven hypotheses for each part of the study. As shown in Table 3, five of the hypotheses are direct, while the other two are indirect. The results of the structural equation modeling showed that risk-taking has a significant and positive influences on entrepreneurship intention (Male, $\beta = 0.53$. t -value = 13.918, $p < 0.001$; Female, $\beta = 0.24$. t -value = 4.772, $p < 0.001$); innovativeness (Male, $\beta = 0.41$. t -value = 11.224, $p < 0.001$; Female, $\beta = 0.29$. t -value = 5.271, $p < 0.001$); and pro-activeness (Male, $\beta = 0.45$. t -value = 11.919, $p < 0.001$; Female, $\beta = 0.33$. t -value = 7.212, $p < 0.001$), hence, the three initial hypotheses H1, H2, and H3 were supported in both models. Likewise, the results of the SEM exhibited that innovativeness has a positive and significant effect on entrepreneurship intention (Male, $\beta = 0.27$. t -value = 5.771, $p < 0.001$; Female, $\beta = 0.50$. t -value = 11.673, $p < 0.001$), confirming hypothesis H4 in both models. Similarly, it was found that pro-activeness has a significant and positive effect on entrepreneurial intention (Male, $\beta = 0.40$. t -value = 8.621, $p < 0.001$; Female, $\beta = 0.30$. t -value = 9.851, $p < 0.001$), supporting hypothesis H5 in both models.

Finally, the findings of the SEM show that pro-activeness and innovativeness mediate the links between the intent to start a business and risk-taking. Hypotheses H6 and H7 can be accepted because all the directly and indirectly standardized path coefficients in the tested model, as depicted in Figure 3, were found to be significant and positive, in line with the recommendation of complementary mediation by Fornell and Larcker [111] and Zaho et al., [114]. More indicators supporting the mediation effect on innovativeness and pro-activeness in the associations between risk-taking and entrepreneurship intention were also revealed by the SEM output, as the direct impacts of risk-taking on entrepreneurship, the intention was improved from ($\beta = 0.53$ $p > 0.001$) to a total effect of 0.70 in male model and improved from ($\beta = 0.24$ $p > 0.001$) to a total effect of 0.33 in the female model [111]. Explanatory predictive power (R^2) of all paths ($R^2 = 0.60$) explains 51% of the variance in male entrepreneur intention and 40% of the variance in female entrepreneur intention, as shown in Table 3.

4.4. Results of Multi-Group Analysis

To test whether or not the gender of the participants (male, female) influenced the study hypotheses, SEM with Amos vs. 24 graphics and a multi-group analysis approach were conducted. Data were separated into male (300) and female (200) categories (300). The model paths of the two distinct groups were compared to identify any variations (i.e., Variant). A χ^2 difference test provides useful information regarding the variance between the entire structural models of the two groups under consideration (Male vs. Female). Comparing the χ^2 score of the baseline (unconstrained) configure the model to the χ^2 score of the constrained structural weights model reveals that there are statistically significant differences ($p > 0.001$) between the two groups under examination. As a result, the findings indicate that one or more of the regressions may not be equivalent between the two groups that were investigated. The χ^2 difference test, on the other hand, does not offer any evidence regarding the specific differences that exist between the path's regressions for each group [107]. Therefore, to test the variations in each route (hypothesis), two categories were formed in AMOS v.24 graphics for each form of sex: one group for males with a total of 300 participants and another group for females with a total of 312 participants. For the purpose of the test, a unique name was assigned to each regression. In the course of the analysis, bootstrapping was carried out, which ultimately provided the confidence interval between the two groups that were tested. As can be seen in Table 4, several noteworthy distinctions were highlighted for each group.

Table 4. SEM Multi-group analysis—(Male-Female).

Hypotheses		Model 1: Male Model Path Coefficient (β, p, t -Value)	Model 2: Female model Path Coefficient (β, p, t -Value)	Male-Female Significance Difference “ p -Value”	Hypothesis Results
H1	Risk-Taking \longrightarrow Entrepreneurship intention	$\beta = 0.51, p^{***}, t$ -value = 13.123	$\beta = 0.23, p^{***}, t$ -value = 4.324	$p = 0.021$	Supported
H2	Risk-Taking \longrightarrow Innovativeness	$\beta = 0.42, p^{**}, t$ -value = 10.989	$\beta = 0.28, p^{***}, t$ -value = 5.301	$p = 0.022$	Supported
H3	Risk-Taking \longrightarrow Pro-activeness	$\beta = 0.45, p^{***}, t$ -value = 11.01	$\beta = 0.33, p^{***}, t$ -value = 6.899	$p = 0.034$	Supported
H4	Innovativeness \longrightarrow Entrepreneurship intention	$\beta = 0.27, p^*, t$ -value = 4.88	$\beta = 0.51, p^{***}, t$ -value = 10.779	$p = 0.038$	Supported
H5	Pro-activeness \longrightarrow Entrepreneurship intention	$\beta = 0.40, p^{***}, t$ -value = 7.998	$\beta = 0.30, p^{***}, t$ -value = 6.897	$p = 0.179$	Not supported

Note: *: significant level less than 0.05; **: significant level less than 0.01; ***: significant level less than 0.001.

According to the findings of the multi-group analysis, the impact of pro-activeness on entrepreneurship intention was found to be positive and significant in both the male and female groups, with no significant differences in p -value being found between the two, as shown in Table 4. However, the impacts of risk-taking on innovativeness and pro-activeness were found to be positive and significant in the two groups of interest and the differences in p -value were significant.

5. Discussion and Implications

The current research examines the differences between males and females in relation to the influences of entrepreneurship orientation on entrepreneurial intention. The results of SEM analysis showed no significant differences between male and female responses in relation to the influences of entrepreneurial orientation on entrepreneurial intention. The results confirmed that risk-taking has a significant and positive influence on innovativeness, pro-activeness, and entrepreneurship intention for both males and females. Furthermore, innovativeness and pro-activeness have a positive and significant effect on entrepreneurship intention for both males and females. However, the results of the multi-group analysis showed that the impact of pro-activeness on entrepreneurship intention is positive and significant in both the male and female groups. This means that there are no differences between male and female

However, the impacts of risk-taking on innovativeness, pro-activeness and entrepreneurial intention were found to be positive and significant in the two groups of interest and the differences in p -value were significant. This means there are significant differences between males and females. These differences were because males were more risk-taking than females. The results support the work of Taatila and Down [55] who asserted that males outperform females in terms of risk-taking, which affects pro-activeness, innovativeness, and entrepreneurial intention. The results also showed differences between males and females in relation to the effect of innovativeness on entrepreneurial intention. Females were found to be more innovative than males. This finding does not support the work of Lim and Envic [26] reported that females have a lower level of innovativeness compared to males. De Vita, et al., [72] also indicated that males are more innovative compared to females. The results also do not support the work of Kumar et al. [39] who showed that there is no difference between males and females in innovativeness. Finally, the results confirmed no significant differences between the two groups in relation to the effect of pro-activeness on entrepreneurial intention. This is consistent with previous studies (e.g., [79–81]) which found that females are more proactive than males as they are more desiring to take bolder decisions to move into risky and untried ventures compared to male counterparts.

The current research provides some important implications for scholars that despite the results of SEM analysis showing that the three dimensions of entrepreneurship orientation significantly, positively, directly, and indirectly, impact the entrepreneurial intention of the two groups (male and female), the results of the multi-group analysis showed significant differences between the two groups in relation the effect of risk-taking on innovativeness, pro-activeness and entrepreneurial intention. It also showed no significant differences between the two groups in relation to the effect of innovativeness on entrepreneurial intention. However, there were no differences between the two groups in relation to the effect of pro-activeness on entrepreneurial intention. Additionally, the current study showed the mediation impact of innovativeness and proactivity in the link between risk-taking and entrepreneurial intention in both models of males and females.

The results have worthy implications for higher education policymakers who wish to promote an entrepreneurship culture among higher education students to progress the government agenda and enhance the national economy. The entrepreneurial education in KSA should put more emphasis on advancing risk-taking among students and graduates, especially female students, who may have little fear to take risks compared to their male counterparts. On the other side, they should promote innovativeness among students

and graduates, especially males who may have less innovative ability compared to their female counterparts. The emphasis on pro-activeness among students promotes their entrepreneurial intention, which will have an impact on the expansion of new ventures and ultimately on economic development as well as sustainable development.

6. Conclusions

This research examined the impact of gender on the link between entrepreneurship orientation and entrepreneurial intention. The results supported the research hypotheses and confirmed that the impacts of risk-taking and innovativeness on entrepreneurial intention were found to be positive and significant in the two groups of males and females and the differences in p -value were significant. This means that there are significant differences between males and females in relation to the impact of risk-taking and innovativeness on entrepreneurial intention. These differences were due to the fact that males were found to be more risk-taking than females, whereas females were found to be more innovative than males. On the other side, the results confirmed no significant differences between the two groups in relation to the effect of pro-activeness on entrepreneurial intention. These results confirm that more efforts are needed to encourage risk-taking behavior among female graduates and innovativeness among male graduates.

This study is a response to the call by other researchers [39,105,106] to examine the differences between male and female entrepreneurial intention. The study examined the differences between two groups (males and female) students in relation to the effect of the three dimensions of entrepreneurship orientation “i.e., risk-taking, innovativeness, and pro-activeness” on entrepreneurial intention using SEM and multi-group analysis. This study was conducted on senior students in different colleges at one university “KFU” in KSA. Therefore, the findings cannot be generalized to all graduates in KSA without further examination. Hence, the current study calls for further research with a wider research sample from different universities in different regions in KSA. Further research also could compare entrepreneurial intention based on other disciplines, i.e., social and humanities versus applied science [115,116].

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Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Data is available upon request from researchers who meet the eligibility criteria. Kindly contact the first author privately through e-mail.

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