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# Entrepreneurial ecosystem, entrepreneurial self-efficacy, and entrepreneurial intention in higher education: Evidence from Saudi Arabia

Moustafa Elnadi, Mohamed Hani Gheith\*

Department of Business Administration, Faculty of Commerce, Mansoura University, Mansoura, Egypt

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## ABSTRACT

This study aims to empirically examine the influence of students' perceptions of entrepreneurial ecosystem factors on their entrepreneurial intentions directly and indirectly through entrepreneurial self-efficacy and to investigate the moderating role of students' gender. The data used to test the hypotheses were obtained through online questionnaire sent to undergraduate business students enrolled at a public university in Saudi Arabia. The hypothesized relationships are tested with data collected from 259 respondents by using the partial least squares structural equation modelling technique (PLS-SEM). The results show that students' perceptions of the entrepreneurial ecosystem affect entrepreneurial intentions both directly and indirectly through entrepreneurial self-efficacy. The findings of multigroup analysis confirmed the significant differences between male and female students in the influence of entrepreneurial self-efficacy on students' entrepreneurial intention. The findings provide empirical evidence to policymakers in Saudi Arabia. They should focus on building an entrepreneurial ecosystem with adequate institutional infrastructure, support structures, and culture that supports and enhances students' self-efficacy and intention to become entrepreneurs. Moreover, the moderating effect of gender on self-efficacy and intention relationship suggests that policymakers should pay special attention to gender differences while they are developing their strategies and programs as tools that work with male students may not be suitable for females.

## 1. Introduction

Since Joseph Schumpeter introduced the concept of entrepreneurship in his book "Theory of Economic Development" (Nasip et al., 2017), it has become a notable phenomenon over time in many nations (Canever et al., 2017), and many researchers and policymakers have become increasingly aware of the significant role that entrepreneurship has in enhancing socio-economic evolution in both developed and developing countries (Adekiya & Ibrahim, 2016; T.; Ahmed et al., 2020; BarNir et al., 2011; Cui et al., 2019; Hultén & Tumunbayarova, 2020; Jaafar & Aziz, 2008). Entrepreneurship can provide more employment opportunities (T. Ahmed et al., 2020; Arshad et al., 2019; van Ewijk et al., 2020), accelerate innovation (Ahmed et al., 2020; Alammari et al., 2019; Obschonka et al., 2017; Setiawan, 2014), and flourish economy (Acs & Szerb, 2007; Arshad et al., 2019; Farooq et al., 2018; Miralles et al., 2017; Urbano et al., 2019).

\* Corresponding author.

E-mail address: [Mhani@mans.edu.eg](mailto:Mhani@mans.edu.eg) (M.H. Gheith).

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Therefore, governments in almost every country have increased investment in programs that accelerate entrepreneurship, promote an entrepreneurial mindset in societies, and make countries more entrepreneur-friendly (Ali et al., 2019; Bellò et al., 2018; Davey et al., 2011; González-Serrano et al., 2018), where entrepreneurship and entrepreneurs can be viewed as major elements of the society (Akinwale et al., 2019; Goel et al., 2007).

Bakar et al. (2017) mentioned that the practice of entrepreneurship arises from the recognition of entrepreneurial capabilities and the exploiting of entrepreneurial opportunities, leading to the creation of new business. Entrepreneurship can be defined as the process of discovering, evaluating identifying and exploring value-creating opportunities through innovation to produce goods and services (SHANE, 2012). It is a process of vision, change, and creation that need energy and enthusiasm to develop and execute new ideas and creative solutions (Kuratko, 2016). Simply, entrepreneurship can be considered as a venture creation process by a person (entrepreneur) who is willing to take risk, search for change, never satisfied with the existing condition and continually exploits opportunities to create value (Ali et al., 2019; Balan & Metcalfe, 2012).

It has been demonstrated in entrepreneurship literature that entrepreneurship is a long and challenging process that starts with entrepreneurial intention. Entrepreneurial intention is considered as the best predictor for entrepreneurial behaviour that translates into entrepreneurial action and without it, any further entrepreneurial steps will not exist (Akinwale et al., 2019; Liñán & Fayolle, 2015; Santos & Liguori, 2019). According to Thompson (2009) entrepreneurial intention can be defined as a “self-acknowledged conviction by a person who intends to set up a new business venture and consciously plan to do so at some point in the future”. Entrepreneurial intention reflects the person’s degree of willingness, desire, and readiness to pursue entrepreneurship as a career choice and to get involved in entrepreneurial activities (Alammari et al., 2019; Santos & Liguori, 2019). Hence, entrepreneurial intention has received a considerable attention from scholars to investigate the factors that can trigger a person’s intention to start an entrepreneurial venture (Ali et al., 2019; Farooq et al., 2018; Gutiérrez et al., 2019), and many factors have been examined.

One of the most important personal factors that have a great influence on entrepreneurial intention is entrepreneurial self-efficacy (Barakat et al., 2014; Bellò et al., 2018; Gutiérrez et al., 2019; Schmutzler et al., 2019; Zhao et al., 2005; Şahin et al., 2019). Entrepreneurial self-efficacy is defined as “an individual’s own belief in his/her skills and abilities linked to entrepreneurial activity” (Barakat et al., 2014). Entrepreneurial self-efficacy measures the degree of a person’s beliefs in his/her own capabilities to implement the required steps to start a business (Alammari et al., 2019).

Hassan et al. (2020) mentioned that entrepreneurial self-efficacy is one of the most crucial cognitive preceding elements of entrepreneurial intention. Entrepreneurial self-efficacy has been proposed to directly impact entrepreneurial intention, where individuals with high levels of entrepreneurial self-efficacy tend to successfully undertake the entrepreneurship process and face the challenging conditions associated with launching a new business.

Another factor that has been stated in entrepreneurship literature as a factor that can significantly influence entrepreneurial intention is entrepreneurial ecosystem. Audretsch et al. (2017) mentioned that entrepreneurial ecosystem can be considered as a group of interrelated factors (economic, social, and institutional) that stimulate the creation and the development of entrepreneurial opportunities. Creating a supportive entrepreneurial ecosystem that integrates programs, policies and institutions is important and beneficial for entrepreneurs’ success through providing them with the necessary conditions to develop and commercialise their entrepreneurial ventures (Audretsch et al., 2017; Meshram & Rawani, 2019; Purbasari et al., 2019; Stam, 2015; Stam & van de Ven, 2019).

While factors affecting entrepreneurial intention are extensively researched in the literature (Alammari et al., 2019), most of the previous studies have focused on exploring how entrepreneurs’ different traits and personalities can affect the formation of entrepreneurial intentions. But environmental factors represented by entrepreneurial ecosystem cannot be ignored, and entrepreneurial intention is properly studied when the interaction between individual and contextual factors is considered (Alammari et al., 2019; Schmutzler et al., 2019). Even though both individual and contextual factors are important in determining entrepreneurial intention, the interaction between them has only started to get explored (Schmutzler et al., 2019).

Moreover, most previous literature studies were performed in developed countries, with little attention to developing ones. For example, Sharahiley (2020) argued that despite the fact that entrepreneurial intention is a well-studied topic in the last three decades, only few studies have been conducted in developing countries in general and Arab world in particular. Also, Al-Mamary et al. (2020) affirmed Sharahiley’s (2020) argument and stated the lack of entrepreneurial intention studies conducted in developing countries and Arab world. Entrepreneurial intentions in developed countries may differ from those of developing countries (Bakar et al., 2017), which emphasises the importance of examining entrepreneurial intention in different contexts. Chohra (2019) mentioned that the socio-cultural and politico-institutional environments in developing countries have a significant influence on the development of entrepreneurship and the behaviour of entrepreneurs in these countries. Furthermore, Porras-Paez and Schmutzler (2019) indicated that there is a need to examine the factors that trigger the development of entrepreneurship in developing countries. According to Donaldson (2019), the context in which an entrepreneur operates plays an essential role in shaping entrepreneurial intentions. Moreover, Hueso et al. (2020) and Adekiya and Ibrahim (2016) stated that the prevailing cultural characteristic and values in a given society or nation have a great influence on individual’s entrepreneurial intention-formation process. Additionally, Thomas and Mueller (2000) argued that entrepreneurship research should be extended to international markets to examine the circumstances that foster entrepreneurial activities in different countries.

Thus, entrepreneurship needs to be explored in the sense of developing countries in general and Saudi Arabia in particular, due to the uncertainty surrounding the business environment that may seriously affect the entrepreneurial performance in these countries (Saiqal et al., 2019).

A part from the direct pivotal role that entrepreneurial self-efficacy and entrepreneurial ecosystem play in shaping entrepreneurial intention, Ali et al. (2019) suggested that more studies would integrate entrepreneurial self-efficacy as a mediator in the analysis of the

relationship between entrepreneurial ecosystem and entrepreneurial intention to better predict entrepreneurial intention. Consequently, this paper seeks to fill the gap in the literature by studying the direct effect of perceived entrepreneurial ecosystem factors and entrepreneurial self-efficacy on entrepreneurial intention as well as the mediating effect of entrepreneurial self-efficacy among university students in Saudi Arabia. The paper is structured as follows. In the next section, the theoretical background of the study variables is provided. In Section 3, the research model and related hypotheses are presented. Then the research methodology and data analysis are described in Sections 4 and 5. The discussion and conclusions of the study are covered in Section 6. Finally, the limitations and suggestions for future research are highlighted.

## 2. Theoretical background

### 2.1. Entrepreneurial intention (EI)

Entrepreneurship is a process and the first essential step in this process is entrepreneurial intention (Molino et al., 2018). Without it, any further entrepreneurial steps will not exist. Therefore, entrepreneurial intention has received considerable attention from scholars to understand how entrepreneurs are developed and why people get involved in venture creation (Alammari et al., 2019; Saiqal et al., 2019). Generally, as stated by Bird (1988) "Intentionality is a state of mind directing a person's attention (and therefore experience and action) toward a specific object (goal) or a path in order to achieve something (means)". Entrepreneurial intention can be described as the persistence, readiness, and desire to make the requisite efforts and actions to be involved in entrepreneurship (Alammari et al., 2019; Farooq et al., 2018).

Prior research on entrepreneurship have explored the application of different models and theories that can predict entrepreneurial behaviour (Liñán & Fayolle, 2015). The most commonly used models are "the theory of planned behaviour (TPB)" (Ajzen, 1991) and "the entrepreneurial event model (EEM)" (Shapero & Sokol, 1982).

In TPB, Ajzen (1991) argued that behaviour can be predicted via intention through three independent determinants namely: personal attitudes (measuring person's recognition of entrepreneurial behaviour attractiveness); subjective norms (SN) (measuring the realised social stress and acceptance of entrepreneurial behaviour); and finally perceived behavioural control (PBC) (assessing person's competencies and capabilities to take entrepreneurial behaviour) (Farooq et al., 2018; Liñán & Chen, 2009).

Based on TPB, Shapero and Sokol (1982) mentioned that there are three vital determinants of entrepreneurial intention. The first factor is the perceived desirability which is identified with the attractiveness of launching a new business. The second factor is perceived feasibility associated with a person's confidence to start a new business project. Finally, the third factor is the propensity to act considering available opportunities (Canever et al., 2017). In addition to the previous models, Bird (1988) developed the Implementing Entrepreneurial Ideas (IEI) model claiming that the formation of entrepreneurial intention is shaped by the interrelatedness between personal and contextual elements. Also, in the recent past, Lüthje and Franke (2003) presented a model that acknowledges the effect of both exogenous factors, as well as, personality factors in entrepreneurial intention (Molino et al., 2018).

In the literature, a noticeable amount of studies examined the impact of various factors such as personality, self-efficacy, self-fulfilment, previous experience, creativity, risk preferences, education, age and gender in developing entrepreneurial intentions (Arshad et al., 2019; Molino et al., 2018).

Along with the previous factors, further researchers concentrated on the impact of environmental factors on entrepreneurial intention (Ali et al., 2019; Molino et al., 2018; Schmutzler et al., 2019).

Thus, in this study, the researchers argue that it is significant to consider the effect of both personal and environmental factors on developing entrepreneurial intentions.

### 2.2. Entrepreneurial self-efficacy (ESE)

According to Bandura's Social Cognitive Theory, self-efficacy is defined as "people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives" (Bandura, 1997).

Self-efficacy reflects the confidence and beliefs that individuals have on their skills and capabilities to successfully complete the required tasks despite the challenges associated with these tasks. Studying self-efficacy is critical to understand individuals' behaviour as it can determine a person's persistence, resilience, and dedication when facing problems, as well as, the level of effort that the person will exert to complete a task (McGee et al., 2009; Memon et al., 2019). Thus, individuals with a high degree of self-efficacy have a preference for difficult tasks and succeed in overcoming obstacles and challenges relative to those with low self-efficacy (Bandura, 1997).

In the light of entrepreneurship research, entrepreneurial self-efficacy reveals the degree to which a person believes in his skills and abilities to successfully accomplish the required duties to start-up a new business venture (McGee et al., 2009; Zhao et al., 2005). Entrepreneurship contains not only creativity, risk, and initiative, but it is a long and challenging process that needs enthusiasm, commitment, and persistence (Newman et al., 2019). Hence, entrepreneurial self-efficacy is positively syndicated with entrepreneurial success (McGee & Peterson, 2019). A high degree of entrepreneurial self-efficacy indicates an individual's readiness and ability to face challenging conditions during the development of the new business and to pursue his goals (Memon et al., 2019).

According to McGee et al. (2009), researchers differ on whether a general self-efficacy or entrepreneurial self-efficacy is more appropriate to entrepreneurial research. Some researchers advocate the use of general self-efficacy, while others argued that self-efficacy varies according to the context and they recommend the use of entrepreneurial self-efficacy (McGee et al., 2009; Zhao et al., 2005). In this research, the authors will follow Bandura's approach, where entrepreneurial self-efficacy denotes the degree to

which an individual believes in his skills and abilities to successfully accomplish the required tasks to start-up a new business venture (McGee et al., 2009; Zhao et al., 2005).

### 2.3. Entrepreneurial ecosystem (EE)

Recently, many researchers have been drawing attention to the concept of entrepreneurial ecosystem (Meshram & Rawani, 2019; Stam & van de Ven, 2019).

Prior studies in entrepreneurship have concentrated mainly on the role of the individual's personality and traits, while insufficient attention has been paid to the influence of the context where entrepreneurs operate (Cavallo et al., 2019; Stam & van de Ven, 2019).

The term entrepreneurial ecosystem emerged in the 1980s and 1990s (Stam & van de Ven, 2019) have increasingly used by many scholars and practitioners to transfer the focus of entrepreneurship research from the narrow scope of personalities and traits towards a wider community perspective that investigates the capacity of a context in countries, regions, and cities to construct a system of factors encouraging the development of new business ideas (Nicotra et al., 2018; Stam & van de Ven, 2019).

Creating a supportive environment that integrates programs, policies, and institutions is important for entrepreneurs' success (Audretsch et al., 2017; Meshram & Rawani, 2019; Stam, 2015).

Until now, there is no single shared definition of the entrepreneurial ecosystem among researchers (Meshram & Rawani, 2019). Stam (2015) described it as a set of factors integrating together in a manner that promotes entrepreneurship activities within a particular territory. Moreover, Spigel (2017) interpreted it as a region's interacting social, economic, political, and cultural factors that facilitate the creation and development of innovative start-ups and encourage new business venture risk-taking.

According to Nicotra et al. (2018) and Cavallo et al. (2019) many scholars have proposed different frameworks that indicate the typical entrepreneurial ecosystem factors such as frameworks developed by Ven (1993), Neck et al. (2004), Cohen (2006), Isenberg (2011), and Spigel (2017).

Furthermore, some organizations like the World Economic Forum (WEF), the World Bank, and the Organisation for Economic Cooperation and Development (OECD) have presented frameworks for the main enablers of an entrepreneurial ecosystem (Nicotra et al., 2018).

However, the Global Entrepreneurship Monitor (GEM) framework, is increasingly used by research scholars and practitioners across the world (Ali et al., 2019). Based on GEM's framework, the main pillars of the entrepreneurial ecosystem are "availability of finance, supportive government policies and regulations, government programs for entrepreneurs, entrepreneurial education and training, supportive culture and social norms, and access to physical infrastructure" (Ali et al., 2019; Nicotra et al., 2018). Thus, this study uses GEM factors in identifying the effect of the students' perception of entrepreneurial ecosystem factors on entrepreneurial intention in Saudi Arabia.

### 2.4. Entrepreneurship in Saudi Arabia context

Saudi Arabia, the context of this study is considered one of the developing countries characterised by rapidly growing economy. According to World Bank's Doing Business report in 2020, Saudi Arabia is the most improved economy in Doing Business, and it takes the fourth rank among MENA countries in ease of doing business. Saudi Vision 2030 aims to modernise the economy by diversifying it away from oil toward other sectors and reduce the unemployment rate. As mentioned in Saudi Vision 2030, the unemployment rate has to be reduced from 12.9% to 7%, the share of SMEs to the GDP should be increased to reach 35%, and about six million jobs need to be generated by the year 2030 (Akinwale et al., 2019).

Thus, the country acknowledged the capacity of entrepreneurship in addressing these economic concerns (Alammari et al., 2019; Alwakid et al., 2020; Thompson, 2017). In Saudi Arabia, entrepreneurship is considered as an emerging field where the government has allocated significant resources to promote the culture of entrepreneurship. For instance, the government has created many public and private institutions that provide a variety of services and support for entrepreneurs to start-up their business (Elnadi et al., 2020; Syed et al., 2019).

Additionally, the government has assigned great investment in universities to promote entrepreneurial spirits among students and encourage them to get involved in entrepreneurship (Ahmed, 2019). All these mentioned initiatives are reflected in the 2019 GEM report, where about 76.3% of the adult population in Saudi Arabia admits that the government provides attractive opportunities to start a business (Alwakid et al., 2020).

Furthermore, the 2019 GEM report indicated that approximately more than 33% of the Saudi population declared their intention to initiate their business in the next three years. In addition, Saudi Arabi's Total Entrepreneurial Activity (TEA) rate is roughly consistent with the GEM average. The recent 2019 GEM report has shown an optimistic view about the future of entrepreneurship in Saudi Arabia.

Saudi Arabia is considered an optimal context to conduct this study for many reasons. First, after the oil boom of the 1970s, Saudi Arabia has undergone a significant shift in its cultural values. According to Alammari et al. (2019), this cultural shift has a notable impact on Saudis' preferences and priorities, where "years of plenty" have generated an obstructive entrepreneurial culture. Second, there is a stated government policy to promote entrepreneurship among Saudi youth as highlighted in Saudi Vision 2030 and the Ninth Development Plan of Saudi Arabia. Third, recently the education system in Saudi Arabia is directed toward enhancing entrepreneurship among university students to generate an entrepreneurial mindset and culture (Elnadi et al., 2020; Syed et al., 2019). Finally, only a handful of studies have examined the factors that can shape entrepreneurial intention in Saudi Arabia. For example, Alammari et al. (2019) examined the direct effect that post-materialistic values play in shaping entrepreneurial intention, as well as how can

desirability, feasibility, and entrepreneurial self-efficacy mediate the link between post-materialistic values and entrepreneurial intention using data from Saudi Arabia. [Aloulou \(2016\)](#) applied the theory of planned behaviour (TPB) to identify how attitude toward behaviour (ATB), subjective norms (SN), and perceived behavioural control (PBC) can influence entrepreneurial intentions of final year Saudi university business students. By using the constructs of the TPB, [Choukir et al., \(2019\)](#) investigated how ATB, SN, and PBC can mediate the relationship between role models and entrepreneurial intention, as well as how gender can moderate the relationship between role models and Saudi undergraduate university students' entrepreneurial intentions.

[Sharahiley \(2020\)](#) integrated the TPB and entrepreneurial event model (EEM) to investigate factors influencing entrepreneurial intentions and entrepreneurial behaviour among Saudi university students. Also, [Al-Mamary et al. \(2020\)](#) contributed to the entrepreneurship literature by exploring the factors that can shape Saudi university students' entrepreneurial intentions by integrating the TBP and the entrepreneurial orientation model (EO).

By collecting data from six Saudi universities, [Al-Kwafi et al. \(2020\)](#) identified the main challenges facing Saudi female students to start and get involved in entrepreneurial activities. Finally, [Ali et al., \(2019\)](#) conducted a study that explores how Saudi Arabia entrepreneurial ecosystem factors can impact entrepreneurial intentions among female university students, as well as [Elnadi et al. \(2020\)](#), investigated how university students' perception of Saudi Arabia entrepreneurial ecosystem factors can affect their entrepreneurial intentions.

### 3. Hypotheses development and research model

#### 3.1. Entrepreneurial ecosystem and entrepreneurial intention

The importance of the interaction between individuals' attributes and their surrounding environment has been increasingly recognised as this interaction widely affects different aspects of entrepreneurial development ([Cavallo et al., 2019](#)). As mentioned before, various researchers have stressed the requirement of exploring entrepreneurship from wider settings such as regional settings.

An entrepreneurial ecosystem significantly affects entrepreneurs' activities and plans. An individual's perception of the availability of finance, governmental and support, access to market, and social culture may promote or hinder the development of new businesses ([Audretsch et al., 2017](#); [Kumar & Das, 2019](#)).

According to [Stam \(2015\)](#) and [Ali et al. \(2019\)](#), entrepreneurial ecosystem plays a critical role in influencing entrepreneurial intention. Numerous studies have examined how entrepreneurial ecosystem factors can stimulate entrepreneurial intention. For example, [Ali et al. \(2019\)](#) investigated how entrepreneurial ecosystem factors can shape female students' entrepreneurial intentions in Saudi Arabia. They found that "government policies and regulations, government programs and support, social factors, and entrepreneurship education and training" significantly affect female students' entrepreneurial intention.

[Olutuase et al. \(2018\)](#) found that ease of accessing financial resources, state of infrastructure, and friendly economic policies play a critical in forming university graduates' entrepreneurial intention. Also, [Sesen \(2013\)](#) investigated the effect of access to capital, business information, social network, and university education on university students' entrepreneurial intentions. He concluded that university education has insignificant impact on their intention. Moreover, [Schwarz et al. \(2009\)](#) concluded that students' perception of the financial support and the bureaucratic procedure has no influence on entrepreneurial intention. [Ali et al. \(2011\)](#) mentioned a negative correlation between unsupportive culture and entrepreneurial intention among Pakistani university students. [Saiqal et al. \(2019\)](#) discovered that R&D transfer and market dynamics are vital to entrepreneurial performance. Finally, [Ghosh \(2017\)](#) examined the impact of regulations on entrepreneurial intention using data from 79 countries. He found that rigorous credit market regulation hurts entrepreneurial intention, but strict labor regulations reduce job availability and thereby motivate people to pursue entrepreneurship as a career choice.

Significant differences exist between developed and developing countries in terms of institutional infrastructures, which may influence entrepreneurship activities ([Audretsch et al., 2017](#)). Hence, the role of entrepreneurial ecosystem factors requires more consideration especially in emerging economies ([Kumar & Das, 2019](#)). Based on the previous discussion, we propose that the effect of perceived entrepreneurial ecosystem factors among university students play a critical role in developing their entrepreneurial intentions and we hypothesise that:

**H1.** A positive perception of entrepreneurial ecosystem factors among university students is positively associated with their entrepreneurial intentions.

#### 3.2. Entrepreneurial ecosystem and entrepreneurial self-efficacy

Variations in entrepreneurial self-efficacy levels among individuals can be attributed to differences in individuals' personalities and traits, demographic factors, and environmental factors ([Crespo et al., 2018](#)). Current entrepreneurial self-efficacy studies did not give enough consideration to the impact of the context where the entrepreneur operates. However, some studies have mentioned that environmental factors can affect entrepreneurial self-efficacy ([Newman et al., 2019](#); [Pushkarskaya et al., 2020](#); [Schmutzler et al., 2019](#)).

Entrepreneur's perception of his self-efficacy is affiliated with his perception of the surrounding environmental factors, where supportive environmental factors could boost the confidence in his ability to create a new business venture ([Brändle et al., 2018](#); [Pushkarskaya et al., 2020](#)). For example, [Luthans and Ibrayeva \(2006\)](#) found that environmental factors like dynamism and hostility are positively related to entrepreneurs' self-efficacy. [Hopp and Stephan \(2012\)](#) found that performance-based culture norms and

supportive institutions result in higher degrees of entrepreneurial self-efficacy. Also, Boukamcha (2015) argued that engagement in entrepreneurship training is positively linked with higher levels of entrepreneurial self-efficacy. Based on the above arguments, we hypothesise that:

**H2.** A positive perception of entrepreneurial ecosystem factors among university students is positively associated with their entrepreneurial self-efficacy levels.

### 3.3. *Entrepreneurial Self-Efficacy and entrepreneurial intention*

As claimed by Newman et al. (2019), most previous research considered entrepreneurial intention to be the key consequence of entrepreneurial self-efficacy, where entrepreneurial self-efficacy is significantly linked to entrepreneurial intention (Memon et al., 2019; Wilson et al., 2007; Zhao et al., 2005).

Individuals with higher entrepreneurial self-efficacy status are confident in their capabilities to succeed and are expected to achieve more positive outcomes compared with individuals with lower entrepreneurial self-efficacy status (Santos & Liguori, 2019). In general, the majority of the preceding studies that examined entrepreneurial self-efficacy have collected data from academic students either undergraduate or postgraduate students and significant positive relation was found between entrepreneurial self-efficacy and entrepreneurial intention (Newman et al., 2019). Additionally, in their literature review study, Newman et al. (2019) mentioned that the correlation between entrepreneurial self-efficacy and entrepreneurial intention may differ from developed to developing countries. Consequently, we hypothesise that:

**H3.** Students' perception of their entrepreneurial self-efficacy is positively associated with their entrepreneurial intentions.

### 3.4. *Mediating effects of entrepreneurial self-efficacy*

As mentioned before entrepreneurial self-efficacy and entrepreneurial ecosystem play a crucial role in shaping entrepreneurial intention, as well as supportive entrepreneurial ecosystem factors are positively associated with a higher level of entrepreneurial self-efficacy. Although entrepreneurial self-efficacy is often presented as a prognosticator for entrepreneurial intentions, it can also mediate the impact of other variables (Batool et al., 2015; Zhao et al., 2005). In this study's model we argue that the relationship between entrepreneurial ecosystem and entrepreneurial intention can be mediated via entrepreneurial self-efficacy. We assume that supportive entrepreneurial ecosystem factors boost students' confidence in their abilities, and this will increase their intentions to start a new business venture. Therefore, we hypothesise that:

**H4.** Entrepreneurial self-efficacy mediates the relation between entrepreneurial ecosystem and entrepreneurial intention.

### 3.5. *The moderating effect of students' gender*

Demographic factors particularly gender have been examined by many scholars (Murugesan & Jayavelu, 2017). Males are generally found to be more interested in entrepreneurship than females, as well as, males have a greater entrepreneurial intention to launch their new business than females in different geographical regions (Yordanova & Tarrazon, 2010; Zhao et al., 2005). Subsequently, the number of female entrepreneurs is smaller than that of men (Karimi et al., 2014). However, there is a group of studies mentioned that there is no difference between gender concerning their perspective toward entrepreneurship (Díaz-García et al., 2010; Gupta et al., 2009).

The effect of gender on entrepreneurial self-efficacy and consequently on entrepreneurial intention was highlighted in different studies, but the findings were contradictory. Some studies found that females are less frequently perceive themselves as entrepreneurs due to the lack of entrepreneurial self-efficacy (BarNir et al., 2011; Wilson et al., 2007). Other studies have mentioned that levels of entrepreneurial self-efficacy are not significantly related to differences in gender (Murugesan & Jayavelu, 2017).

The role of gender differences in shaping entrepreneurial behaviour is well documented in developing countries context and can be related to social, cultural, and other environmental factors that may frustrate females to involve in entrepreneurial activities (Saiqal et al., 2019). Bakar et al. (2017) mentioned that a country's unsupportive environmental factors can hinder a specific gender to start their business. As claimed by (Al-Kwafi et al., 2020), one of the main reasons that prevent women in the Middle East from becoming successful entrepreneurs is related to the "unequal status" of females with respect to men in comparison to females in the West. Females in the Middle East are encountered by many challenges compared with females in the West, some of these challenges include for example social discrimination issues in terms of gender stereotyping, traditional issues, cultural issues, and business system regime issues (Al-Kwafi et al., 2020; Choukir et al., 2019; House, 2005). In the West, males and females are treated equally, where laws prohibit any type of discrimination. But, in the Middle East, there is a kind of gender-based stereotyping, where females are not considered on an equal footing with males (Al-Kwafi et al., 2020).

Even though traditional Saudi norms may stand in the way of females who wish to be engaged in entrepreneurship activities, the Saudi government has lately offered many programs that promote females' participation in entrepreneurship (BASAFFAR et al., 2018). However, the portion of females that benefit from these programs is not sufficient as a result of some challenges that females may encounter (Ali et al., 2019). According to annual business statistics in KSA as stated by Al-Kwafi et al. (2020), "only 4% of the businesses are recorded under females' names, meaning thereby that the remaining 96% are registered by men. It will remain unfeasible for the females in KSA to prosper in business unless the government takes up the duty of ending this gender-based stereotyping that is

grounded on misguided policies”. Hence, it is proposed that:

**H5a.** Students’ gender moderates the relationship between students’ entrepreneurial self-efficacy and entrepreneurial intention.

**H5b.** Students’ gender moderates the relationship between students’ perception of entrepreneurial ecosystem factors and entrepreneurial intention.

Fig. 1 Illustrates the hypothesized relationships and the research model.

**4. Methodology**

*4.1. Sample and data collection*

The data used in this study collected from an online survey directed to undergraduate business students who have taken the entrepreneurial course at the College of Applied Studies and Community service, Imam Abdulrahman Bin Faisal University a public university in the eastern province of Saudi Arabia. The target population of the study was all undergraduate business students who attended or have taken the entrepreneurial course. The total number of students in the dataset is 346 with all of them being undergraduate business students. We limited our study to business students in order to have more homogenous sample and to control the differences that may result from taking different courses in different fields. Moreover, and as presented in the theoretical background section, most of the entrepreneurial intentions’ previous studies have used a sample of university students because university students are just about to make decisions regarding their future professional careers, and they are considered as potential entrepreneurs. Thus, this study has used data collected from university students from Saudi Arabia.

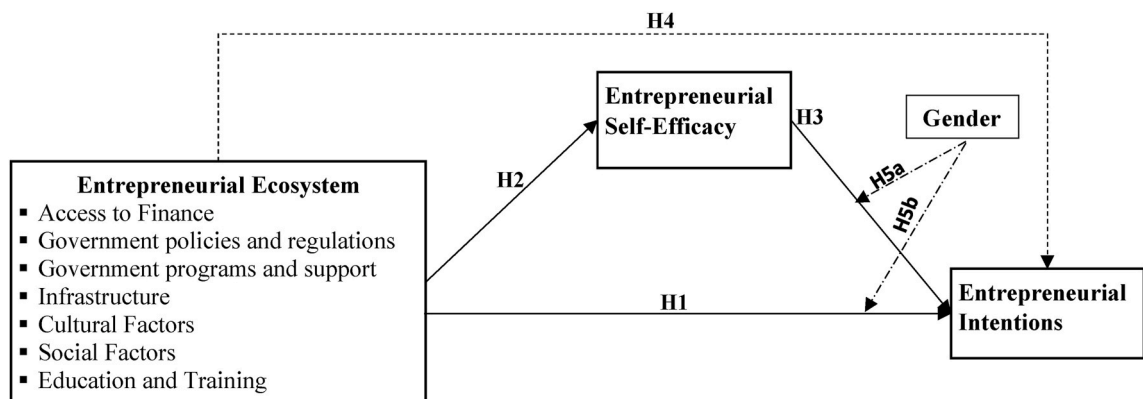
The researchers were very careful in designing the Arabic version of the questionnaire using the translation back-translation procedure (Saunders & Lewis, 2012). To confirm the reliability and validity of the questionnaire, a pilot study was carried out with fifteen students at the university. No problems were found as the wording of each question was clear and understandable to the sample used. The questionnaire contained also an introductory page explaining the purpose of the study as well as the voluntary and confidential nature of responses to the students.

A total of 259 valid responses were received (representing a response rate of 74.86%) with 133 (51.4%) males and 126 (48.6%) females regarding their perceptions of entrepreneurial ecosystem factors and their entrepreneurial self-efficacy and how their perceptions influence their entrepreneurial intentions for starting their own business.

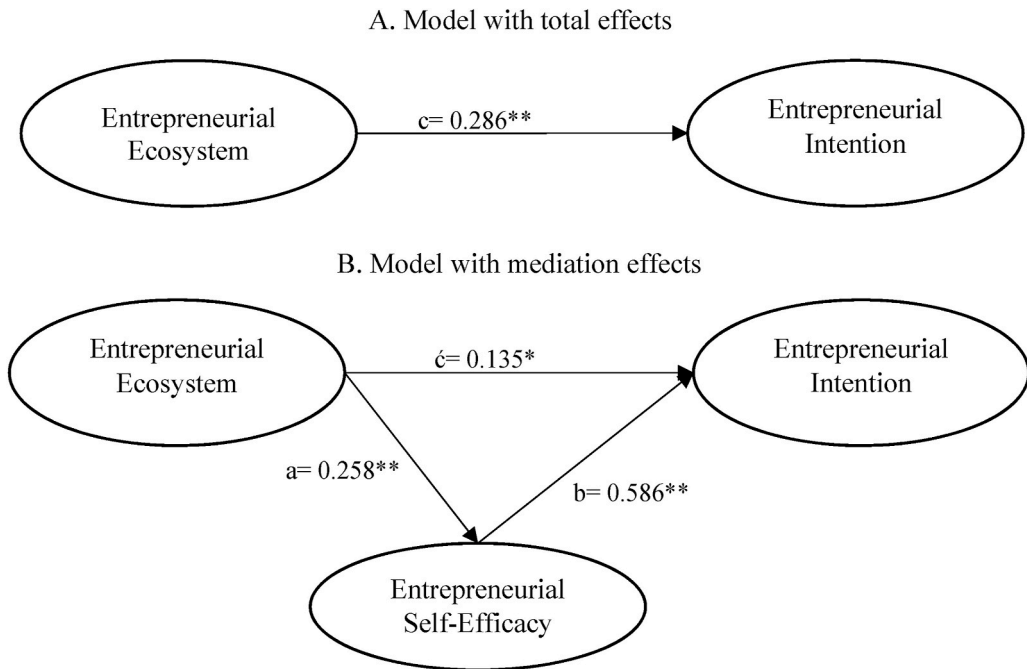
We assessed the common method bias using Harman, 1976 single-factor test. The first factor has been extracted using the principal axis factoring without rotation and it accounts for only 19.8% of the overall variance meaning that common method bias is not apparent in our data and will not have an effect in the subsequent data analysis.

*4.2. Measurement of variables*

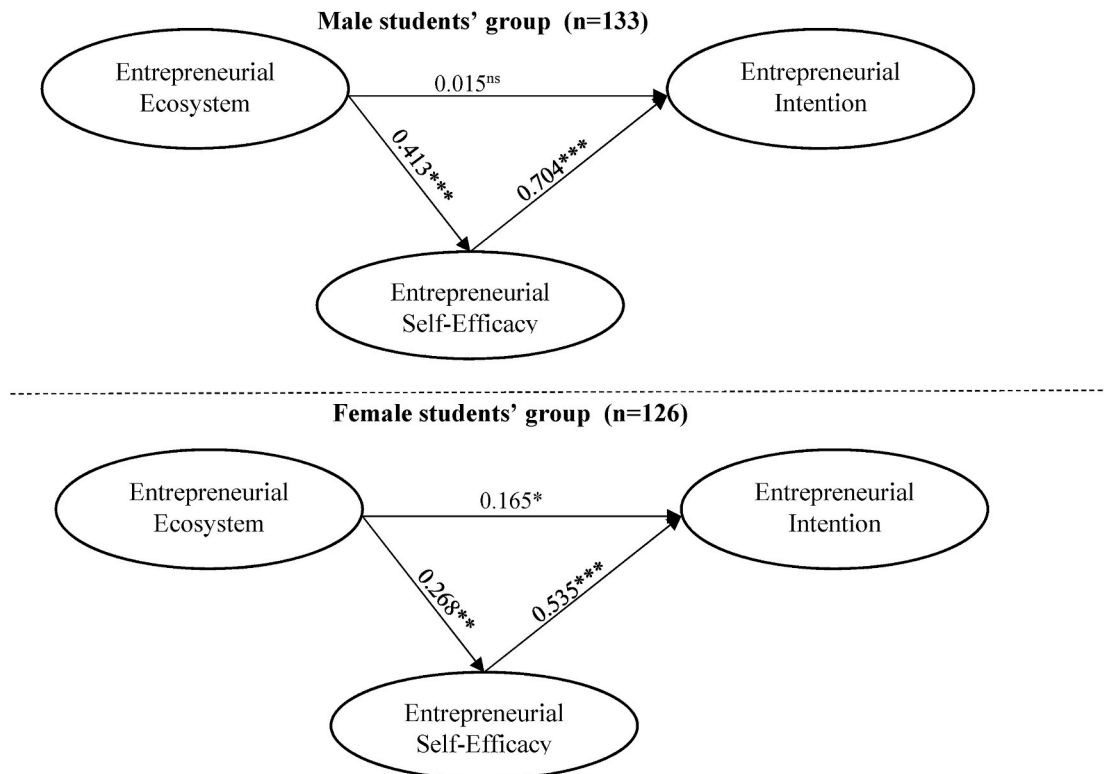
All the measures used in this study were extracted from scales previously validated. All the items were measured on a five-point Likert scale (1 = strongly disagree and 5 = strongly agree). Entrepreneurial intention, the dependent variable in this study, was measured by a six-item instrument adapted from Liñán and Chen (2009). This entrepreneurial intention measurement scale is the most commonly used instrument in previous studies. Examples of items are “I am ready to do anything to be an entrepreneur” and “My professional goal is to become an entrepreneur”. The scale for entrepreneurial self-efficacy includes a four-item scale developed by Zhao et al. (2005). A sample item is as follows: “How confident you are in successfully identifying new business opportunities”. Finally, and as mentioned before, entrepreneurial ecosystem factors were measured by GEM National Experts Survey (NES). This survey is the most reliable instrument for assessing environmental factors (Ali et al., 2019). Entrepreneurial ecosystem is considered as a



**Figure 1.** The Research Model  
 → Direct Path; - - - - -► Indirect Path; - · - · - ► Moderating Path



**Figure 2.** The Structural Model  
Notes: \*P<0.01; \*\*P<0.001



**Figure 3.** Structural model assessment results for the male and female student groups.  
Notes: \*p<0.05; \*\*P<0.01; \*\*\*P<0.001; ns=Not Significant



higher-order construct consisting of seven first-order constructs namely: “access to finance, government policies and regulations for new and growing firms, government programs and support for new and growing firms, access to physical infrastructure, cultural factors, social factors, and education and training factors”. Cultural factors as an example comprises 5-items. A sample items include “in my country, the national culture encourages entrepreneurial risk-taking”. The full-scale items of the study variables have been presented in Appendix A.

## 5. Data analysis

The Partial least squares structural equation modelling (PLS-SEM) approach has been implemented to assess the proposed model and test the proposed hypotheses, using Smart PLS software (v.3.2.8). We have chosen PLS because (1) The research model is complex according to the type of the relationships (direct, indirect, and moderation) and the levels of dimensionality (first- and second-order constructs); (2) In contrast to the Covariance Based Structural Equation Modelling (CB-SEM), PLS-SEM is a soft modelling technique that does not need a broad sample size and is not based on the assumption that data is normally distributed (Hair et al., 2019); (3) this study focuses on understanding the predictive relationships among the constructs, rather than theory confirmation or testing and PLS was considered more appropriate for this purpose of the analysis (Hair et al., 2019). Moreover, PLS is now a commonly used technique in many social science areas such as organizational management (Sosik et al., 2009), human resources management (Ringle et al., 2020) and, entrepreneurship as well (e.g., Esfandiari et al., 2019; Hernández-Perlines et al., 2016). The analysis followed a two-stage process, which includes separate evaluations of the outer (measurement) model and inner (structural) model (Hair et al., 2019).

### 5.1. The measurement model

In the first stage, the evaluation of the measurement model was conducted by following the hints of Hair et al. (2016) to confirm reliability and validity of the outer model (Constructs and their dimensions). All indicators (42 items) were initially included in the model in order to have a preliminary test on the measurement model. Using the guidelines of Hair et al. (2013), we improved the model by deleting the indicators that have loadings below 0.6 (Chin, 1998; Henseler et al., 2009) and that their removal will improve average

**Table 1**  
Validity and reliability evidence.

Constructs	Items	Loading	CR <sup>b</sup>	Alpha	AVE
<b>Entrepreneurial Ecosystem (EE)<sup>a</sup></b>			0.881	0.859	0.511
Access to Finance (ATF)	ATF1	0.638	0.816	0.699	0.528
	ATF2	0.805			
	ATF3	0.712			
	ATF4	0.740			
Government Policies and Regulations (GPR)	GPR1	0.678	0.830	0.727	0.551
	GPR2	0.717			
	GPR3	0.843			
	GPR4	0.721			
Government Programs and Support (GPS)	GPS2	0.739	0.837	0.741	0.564
	GPS3	0.827			
	GPS4	0.772			
	GPS6	0.653			
Infrastructure (INF)	INF2	0.667	0.846	0.732	0.649
	INF3	0.875			
	INF4	0.859			
Cultural Factors (CF)	CF1	0.817	0.889	0.834	0.667
	CF2	0.780			
	CF3	0.846			
	CF4	0.823			
Social Factors (SF)	SF3	0.827	0.822	0.675	0.608
	SF4	0.706			
	SF5	0.801			
Education and Training (ET)	ET1	0.781	0.878	0.825	0.593
	ET2	0.905			
	ET3	0.741			
	ET5	0.669			
	ET6	0.734			
<b>Entrepreneurial Self-Efficacy (ESE)</b>	ESE1	0.804	0.838	0.718	0.633
	ESE3	0.818			
	ESE4	0.764			
<b>Entrepreneurial Intention (EI)</b>	EI2	0.867	0.838	0.718	0.633
	EI3	0.911			
	EI4	0.905			
	EI5	0.847			

<sup>a</sup> Higher Order Construct.

<sup>b</sup> Values were computed after deleting indicators with low loadings.

variance extracted (AVE) and composite reliability (CR). This process leads to deleting eight items and including 34 items in the final model. Table 1 designates that all factor loadings are more than the suggested value of 0.60. Likewise, the AVE and CR of all the constructs are equal to or surpass the suggested values of 0.50 and 0.70, respectively. Therefore, convergent validity and reliability are developed.

Additionally, as presented in Table 2, discriminant validity is also approved according to Fornell-Larcker criterion “i.e., the square root of AVE for each construct should be higher than its highest correlation with the other constructs” and Heterotrait-Monotrait (HTMT) criterion “i.e., Values are less than 0.85 threshold”. The cross-loading results also confirmed the previous results (See appendix B). Therefore, we conclude that discriminant validity has been established.

5.2. The structural model

We first assessed the multicollinearity by analyzing the collinearity among the constructs using the variance inflation factor values (VIF) and they are below the recommended threshold 3.3 (Hair et al., 2017) indicating that there are no multicollinearity issues.

Secondly, we used the coefficient of determination R<sup>2</sup> values to measure the predictive accuracy of the model. As shown in Table 3, the two exogenous variables (EE and ESE) explain 40% of entrepreneurial intention which surpassed the 0.26 values recommended by Cohen (2013), demonstrating reliable predictive relevance of the model. These findings are supported by Stone-Geisser (Q<sup>2</sup>) tests. Q<sup>2</sup> values of the endogenous constructs were calculated with the blindfolding procedure and were all superior to zero, demonstrating the predictive relevance of PLS path model.

Afterward, we applied the bootstrapping procedure with 5000 resamples to test the statistical significance of the paths’ coefficients by generating the standard errors, t-statistics, and confidence intervals (CI) using the percentile approach which has the advantage of being distribution-free (Chin, 2010, pp. 655–690). The results show that the three direct path coefficients are significant supporting the first three hypotheses of the study (see Table 3).

5.3. Mediation analysis

We assessed the total and the direct effect of entrepreneurial ecosystem construct on entrepreneurial intention and the indirect effects via the mediator entrepreneurial self-efficacy. To test the mediating effects, we followed the bootstrapping approach (based on 5000 iterations) recommended by Preacher and Hayes (2008).

Confidence intervals (95%), using the percentile bootstrap for a mediating effect, have been calculated. If zero is included in the CI, mediation doesn’t occur. describes the total effects of entrepreneurial ecosystem (c) and entrepreneurial self-efficacy (b) on entrepreneurial intention. For instance, graphically describes how the total effect of entrepreneurial ecosystem (c) on intention can be the sum of the direct (ĉ) and indirect effects (a\*b). Accordingly, c = ĉ + (a\*b). We included in the analysis the relationships c and ĉ in order to test whether we have full or partial mediation. The results of the test of the mediating effect are displayed in Table 4.

The entrepreneurial ecosystem variable has a significant total effect on intention (c = 0.286; t-value = 3.642) (Fig. 1a). On introducing the entrepreneurial self-efficacy as a mediator, then the entrepreneurial ecosystem strongly reduces its direct effect on intention, with a lower significance level (ĉ = 0.135; t-value = 2.375), while the indirect effect via the entrepreneurial self-efficacy

Table 2  
Discriminant validity.

Fornell-Larcker Criterion									
	1	2	3	4	5	6	7	8	9
1. Access to Finance	0.73								
2. Government Policies and Regulations	0.37	<b>0.74</b>							
3. Government Programs and Support	0.49	0.57	<b>0.75</b>						
4. Infrastructure	0.19	0.01	0.23	<b>0.81</b>					
5. Cultural Factors	0.27	0.25	0.41	0.11	<b>0.82</b>				
6. Social Factors	0.22	0.20	0.43	0.15	0.27	<b>0.78</b>			
7. Education and Training	0.38	0.24	0.51	0.16	0.40	0.38	<b>0.77</b>		
8. Entrepreneurial Self-Efficacy	0.08	0.15	0.19	0.18	0.20	0.19	0.10	<b>0.80</b>	
9. Entrepreneurial Intention	0.18	0.10	0.23	0.20	0.14	0.33	0.14	0.62	<b>0.88</b>
Heterotrait-Monotrait Ratio (HTMT)									
	1	2	3	4	5	6	7	8	9
1. Access to Finance									
2. Government Policies and Regulations	0.52								
3. Government Programs and Support	0.67	0.78							
4. Infrastructure	0.25	0.16	0.30						
5. Cultural Factors	0.34	0.30	0.51	0.15					
6. Social Factors	0.31	0.27	0.60	0.20	0.35				
7. Education and Training	0.49	0.30	0.63	0.22	0.48	0.50			
8. Entrepreneurial Self-Efficacy	0.16	0.26	0.27	0.27	0.27	0.27	0.15		
9. Entrepreneurial Intention	0.23	0.14	0.28	0.25	0.16	0.42	0.15	0.73	

Note: The diagonal in bold is the square root of average variance extracted (AVE).

**Table 3**  
Structural model assessment.

	PLS Criteria		VIF		
	R <sup>2</sup>	Q <sup>2</sup>	EE	ESE	EI
	EE				1.000
ESE	7%	0.05			1.071
EI	40.2%	0.294			
<b>Hypothesized Paths</b>	<b>β</b>	<b>t-statistic</b>	<b>Percentile 95% CI</b>		<b>Support</b>
H1: EE- > EI	0.135*	2.375	[0.05; 0.227]		Yes
H2: EE- > ESE	0.258**	3.386	[0.131; 0.380]		Yes
H3: ESE- > EI	0.586**	14.522	[0.519; 0.651]		Yes

Notes: \*P < 0.01; \*\*P < 0.001.

**Table 4**  
Mediating effect tests.

Total effect of:		Direct effect of:		Indirect effect of EE on EI				
EE → EI (c)		EE → EI (H1 = ĉ)						
Coefficient	t-value	Coefficient	t-value	Point estimate	Percentile bootstrap 95% confidence interval		Mediation	
					Lower	Upper		
0.286**	3.642	0.135*	2.375	H4 = ab (via ESE)	0.151	0.075	0.225	Yes

achieves a point estimate of 0.151 (a\*b) (Table 4). Since its CI contains no zero, the indirect effect is significant. Because both direct and indirect effects are significant, we can conclude that there is a partial mediation of entrepreneurial self-efficacy in the entrepreneurial ecosystem-entrepreneurial intention relationships. In addition, VAF has been computed to determine the size of the indirect effect in relation to the total effect. As the value of VAF is between 20% and 80% (52.7% in our case), we conclude that we have a partial mediation (Hair et al., 1998). This test reinforces the argument that entrepreneurial self-efficacy partially mediates the relationship between entrepreneurial ecosystem and entrepreneurial intention.

5.4. Moderation analysis

We divided the sample into two groups based on gender (133 male students and 126 female students) in order to evaluate the hypothesized moderation relationship (H5<sub>a,b</sub>). Shows the results of the structural model assessment for every group. In order to test the difference of the path coefficient between the two groups, we followed the partial least squares-multi group (PLS-MGA) procedure (Henseler, 2010).

As presented in Table 5, the effects from ESE to EI and from EE to ESE were statistically significant and greater for male students (β = 0.704, p < 0.001 and β = 0.413, p < 0.001) in comparison to female students (β = 0.534, p < 0.001 and β = 0.268, p < 0.01). Regarding the significant difference between the two groups, the results showed that there is a significant difference between male and female students in one path, the path from ESE to EI (H5<sub>a</sub>), thus H5<sub>a</sub> is supported while H5<sub>b</sub> is not supported.

6. Discussion and conclusion

This study aims to explore the relationship between university students' entrepreneurial ecosystem perceptions, entrepreneurship self-efficacy, and entrepreneurial intention and the mediating impact of self-efficacy on the relationship between the variables as proposed recently by Ali et al. (2019). Within that aim, a further goal was to explore how gender can moderate the relationship between entrepreneurial ecosystem, entrepreneurial self-efficacy, and intention. Our findings provided empirical evidence for the hypothesized relationships between entrepreneurial ecosystem, entrepreneurial self-efficacy, and entrepreneurial intention. More specifically, the study has confirmed that students' perception of entrepreneurial ecosystem is positively related to their

**Table 5**  
Moderation analysis.

Paths	Gender						Difference	
	Male (N = 133)			Female (N = 126)			Δβ	p-values
	β	t-statistic	p-value	β	t-statistic	p-value		
H5a: ESE- > EI	0.704	15.780	0.000	0.535	9.954	0.000	0.169	0.008
H5b: EE- > EI	0.015	0.218	0.414	0.165	2.240	0.013	0.150	0.931
EE- > ESE	0.413	4.344	0.000	0.268	2.709	0.003	0.145	0.144

entrepreneurial intention (Ali et al., 2019). According to this result, it can be argued that students who have a positive perception of the entrepreneurial ecosystem factors have also high entrepreneurial intentions. Moreover, the findings indicate that the most significant factors for stimulating students' entrepreneurial intentions are government programs and support, education and training, and cultural factors, respectively. Thus, students are affected by evolving and encouraging governmental support in Saudi Arabia and decide to pursue entrepreneurship as a career path in future. Recently in the last few years, Saudi Arabia has emerged as a source for growth of entrepreneurial start-ups in different sectors of business. The government is supporting entrepreneurship and start-ups by creating public and private institutions that provide a variety of services and support for entrepreneurs (Elnadi et al., 2020; Syed et al., 2019).

Furthermore, the results revealed that self-efficacy is the most significant factor in shaping students' entrepreneurial intention because of its strong direct and indirect associations with intention. This result highlights self-efficacy as the strongest factor influencing students' selection as an entrepreneur, which is in line with several related studies (Bagheri & Pihie, 2014; Carr & Sequeira, 2007; Zhao et al., 2005) indicating that students with higher self-efficacy status are more confident in their capabilities to start their own businesses and to overcome difficulties during their entrepreneurship process compared to individuals with lower entrepreneurial self-efficacy.

Moreover, the analysis of the path structure between the constructs indicated that entrepreneurial self-efficacy partially mediates the relationship between entrepreneurial ecosystem and entrepreneurial intention. In other words, the results suggest that the students' positive perception of the environmental and contextual factors will enhance the students' self-efficacy to start a new business (Brändle et al., 2018; Pushkarskaya et al., 2020) which in turn will increase their entrepreneurial intention. This result is similar to other studies that demonstrate that individual or environmental variables alone do not sufficiently explain the dynamic nature of entrepreneurial intention (Lee et al., 2011; Mustafa et al., 2016). Accordingly, it can be concluded that students' positive perceptions of their environmental factors can raise their ESE thereby influencing their EIs. That is to say, the value of self-efficacy regarding entrepreneurial intention may not be totally intrinsic, but rather is realised and enhanced via students' perception toward the ecosystem or environmental factors.

Finally, the results indicate that gender had a critical moderating effect on the relationship between entrepreneurial self-efficacy and entrepreneurial intention as males' ESE had a stronger contribution to become entrepreneurs confirming the results of Bagheri and Pihie (2014), Yordanova and Tarrazon (2010), and Wilson et al. (2007). However, it contradicts with research findings indicating that entrepreneurial self-efficacy and intention are not significantly associated with differences in gender (Murugesan & Jayavelu, 2017; Wilson et al., 2004; Zhao et al., 2005).

The higher contribution of males' ESE to their intentions demonstrates their higher belief in their capabilities and skills to carry out the required entrepreneurial tasks as well as their higher anticipations of success in creating their own businesses. This indicates the tendency of males to prefer entrepreneurship as their career goal and to create their own business (Bagheri & Pihie, 2014). In contrast, females' lower ESE indicates that their beliefs in their capabilities to carry out the main tasks for running their own business has a limited contribution to their intention. Females' lower ESE can be related to societal and cultural factors implying the pressures and strains that society may charge them and the stereotypes that relate entrepreneurship to more masculine characteristics (Carr & Sequeira, 2007; Gupta et al., 2009). In addition, it may be due to the fact that females perceive more economic obstacles and administrative difficulties in starting their own businesses than males (Verheul et al., 2012).

Lastly, the findings of our research have many implications for academic institutions, policymakers, and entrepreneurial stakeholders. First, the strong effect of self-efficacy on entrepreneurial intention suggests that governments and academic institutions should stimulate youth to become entrepreneurs by improving their self-efficacy. Governments can improve self-efficacy by implementing policy tools (such as entrepreneurial activity funds and tools) and by encouraging the sharing of experiences of actual entrepreneurs with various experiences and expertise. Academic institutions and universities can also improve self-efficacy by providing entrepreneurial education and training programs to improve students' abilities and skills in performing different tasks and roles of an entrepreneur. By doing training, students will have the opportunity to learn through the experiential learning activities (such as role modelling, case studies, simulation) rather than relying solely on the traditional and theoretical methods of teaching entrepreneurship.

Second, the study has demonstrated that entrepreneurial ecosystem elements are crucial to enhance both self-efficacy and intention. This associative and complementary relationship between entrepreneurial ecosystem and entrepreneurial self-efficacy may help policymakers to use this synergy in order to develop and enhance students' entrepreneurial intention. Policymakers and stakeholders should focus on building a supporting entrepreneurial ecosystem with adequate institutional infrastructure, support structures (such as public and private organizations designed to provide resources and counselling services for entrepreneurs), and culture that promote entrepreneurship. Moreover, governments should design a public policy programs that stimulate entrepreneurial behaviour by lowering barriers in order to increase the chances of success along the entrepreneurial process and by improving the business environment. Those policies could foster awareness about entrepreneurship as a career option which could have an impact on the cognitive process of the individuals and their beliefs in becoming entrepreneurs.

Finally, the moderating effect of gender on ESE-Intention relationship suggests that policymakers should pay special attention to gender differences while they are developing their strategies and programs as tools that work with male students may not be suitable for females. Policymakers and educators should not assume that identical pedagogical methods would raise self-efficacy for students across gender. The lower effect between ESE and EI among female students in our study could raise some concerns regarding the pedagogical methods. For instance, reconsidering course content to expose female students to cases focused on the important role of female entrepreneurs in improving the economic conditions by inviting female entrepreneurs as guest speakers, or presenting female role models might help in improving females' ESE. Career counselling can also be useful in enhancing females' entrepreneurial capabilities and strengthening their entrepreneurial competences.

## 7. Limitations and future research

The findings of this study should be considered in the light of a variety of some limitations that lead to possible avenues for future studies. The findings generated from data collected from undergraduate business students in one university in Saudi Arabia. Future research could adopt a wider perspective by scanning students from other cities and countries in order to compare the applicability of this framework cross-culturally and to improve the generalisability of the findings. Since the sample is confined to undergraduate business students, assessing the model through a more varied sample population from students with different academic background (e. g. science, humanities, accounting) can be an opportunity for further research. Moreover, a cross-sectional survey was employed in this research, which is useful in identifying the directional relationships among variables, but it limits the ability to emphasise the causal inferences. Upcoming studies can apply a longitudinal design to explore the causal linkage among variables and detect students' perceptions regarding entrepreneurial ecosystem, entrepreneurial self-efficacy, and entrepreneurial intention over time.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ijme.2021.100458>.

## Authorship contributions

**Conception and Design of study:** The conception and design of the study has been developed by the two authors (Gheith, M. and Elnadi, M.)

**Acquisition of Data:** Data have been collected empirically by Elnadi, M.

**Analysis and Interpretation of Data:** Analysis of data has been made by Gheith, M. and the interpretation has been written by the two authors (Elnadi, M. and Gheith, M.)

**Drafting the manuscript:** The draft has been developed by the two authors (Elnadi, M. and Gheith, M.)

**Critical Revision:** The revision has been made by the two authors (Elnadi, M. and Gheith, M.)

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