Female Entrepreneurship in the start-up Ecosystem of Saudi Arabia

Abstract

Purpose – To date, few studies have incorporated female entrepreneurship into the context of a country that relies heavily on natural resources and still has a wide gender gap due to historically established cultural norms. This study investigates the impact of entrepreneurial ecosystem factors on women's ability and desire to become entrepreneurs in Saudi Arabia.

Design/methodology/approach – The study applied a quantitative method using secondary data from the Adult Population Survey conducted by Global Entrepreneurship Monitor and built upon the recently proposed "Entrepreneurial Ecosystem Approach," which has three levels: institutional, organisational and individual.

Findings – The findings demonstrate the significant roles that different entrepreneurial ecosystem dimensions can play in determining female entrepreneurial activity. Relationships were found among the variables of the three dimensions, indicating that broader institutional conditions can impact women becoming entrepreneurs.

Research limitations/implications – Since the country data from one year limited the research to conditions in that time frame, multi year analysis could not be performed.

Originality/value – The findings advance entrepreneurial research by empirically examining the influencers' factors on women to become entrepreneurs in a fast-growing emerging economy and collectivist society, and non-European and non-North American institutional environment. The research tested a framework that gives more insight into the diverse factors affecting women in entrepreneurship at different levels.

Keywords: Gender; Institution Economics; Women entrepreneurship; Entrepreneurial ecosystem; Saudi Arabia.

Introduction

The research appears to be a continuing interest in how an ecosystem plays a role in increasing female contribution to economic growth and development globally. Some studies have focused on how the role of gender in the assessment and establishment of ecosystems within countries (Almuzel & Anderson, 2020, 2021; Alshebami & Alzain, 2022; Aminova et al., 2020; Audretsch & Belitski, 2017a), others focused on how factors are significant to each gender within ecosystems such as education (Berger & Kuckertz, 2016a; Brush, 2014), family firm embeddedness (Bichler et al., 2022), policy (Stam & Spigel, 2016), start-up strategies (Sperber & Linder, 2019), and even leadership (Harper-Anderson, 2018). Overall, a few studies have investigated how factors within the ecosystem affect women entrepreneurs in the context of Middle Eastern countries (Alhammad et al., 2021; Aljarodi et al., 2022; Alshebami & Alzain, 2022; Khan, 2017, 2017). In a country such as Saudi Arabia that invest heavily to promote entrepreneurial ecosystem what are the factors that encourage female entrepreneurial activity?

This paper focuses on the Saudi Arabian context for several reasons. The latest report of Global Entrepreneurship Monitor (GEM) noted that among people in the Middle East and North Africa (MENA), Saudi Arabian citizens have the most positive views regarding the ease of starting a business and potential opportunities (GEM, 2020). Also, the MENA had the highest rates of entrepreneurial activity globally in 2020; an average of more than one in ten adults in these countries are involved in the early stages of entrepreneurship (GEM, 2020). In addition, the MENA is male-dominated, and there is a glaring lack of women's participation in entrepreneurship (GEM, 2020). For example, 42.24% of the Saudi population is female, and only 20% of females are in the Saudi workforce (World Bank Data, 2021). Only a few studies from the Gulf region have focused on the role of women in entrepreneurship (Aljarodi et al., 2022b, 2022a; Alshebami & Alzain, 2022; M. R. Khan, 2017). Studies have called for further analyses of more contextualised research (Aljarodi et al., 2020; Bichler et al., 2022; Welter et al., 2020) and more evidence of the conditions affecting women entrepreneurs in societies with significant gender inequality, such as Saudi Arabia (Aljarodi et al., 2022b).

This study aims to analyse the effects of entrepreneurial ecosystem factors on women's ability and motivation to become entrepreneurs in Saudi Arabia. This study uses the entrepreneurial ecosystem as the main framework to assess the effect of its various elements on female entrepreneurship (Brush et al., 2019). Specifically, the study considers institutions within the entrepreneurial ecosystem. The entrepreneurial ecosystem approach was adopted in the present work for three reasons. First, women experience disadvantage in the entrepreneurial ecosystem. The women preference rate is higher than men toward entrepreneurship when the entrepreneurial ecosystem features low barriers toward business creation in terms of government barriers, minimum commercial and legal infostructure, and normative culture (Hechavarría and Ingram, 2019). The second reason is the different attributes that gender encompasses. Within the entrepreneurial ecosystem, women network is limited by access to sufficient economic and social capital, which impact their ability to establish credibility in the field (McAdam et al., 2019). Sperber & Linder (2019) noticed that the expectation of the entrepreneurial ecosystem in start-up strategies differs among each gender. Following the same authors, women tend to mobilize more resources than men to overcome support constraints, but men are more confident of their capabilities. Within the cultural attributes of the entrepreneurial ecosystem, women are more likely to be affected negatively by the public stigma of business failure, while men are more likely to be impacted by fear of failure (Simmons et al., 2019). Lastly, there is an increasing body of research investigating

female entrepreneurship using this approach (Brush et al., 2019; Hechavarría & Ingram, 2019; Simmons et al., 2019).

Following this introduction, we discuss female entrepreneurship in the context of Saudi Arabia. We then present the literature review and followed by a discussion of the hypotheses' development. Next, the methodology section describe the data used and justify the choice of quantitative analysis. Then, we report the results of the analyses. In the following section, we discuss the subject and the implications of the findings. Finally, we offer the conclusion, suggestions for future research, and the limitations of the study.

Women Entrepreneurship in the Context of Saudi Arabia

Since the 1990s, Saudi Arabia has been one of the world's largest oil producers and has relied heavily on oil production. The abundance of oil in the country is the main reason for its rapid economic growth and development, as almost 43% of its GDP relies on oil (Burton, 2016, p.3). In 2016, the government recognised the inherent instability of an economy that relies on natural resources and large corporations (SCEDA, 2016). Consequently, the government introduced Vision 2030, a new strategy that aims to decrease Saudi Arabia dependency on natural resources and create an entrepreneurial environment for small and medium enterprise (Alwakid et al., 2020; SCEDA, 2016).

Saudi Arabia has taken many steps to boost its entrepreneurial ecosystem and trigger economic growth. Since 2016, the government has invested US$19.2 billion into developing friendly entrepreneurial ecosystems. These ecosystems are designed to encourage entrepreneurial activity by boosting the private sector and developing programs and initiatives that support the small and medium enterprise sector (Ashri, 2019; Elnadi et al., 2020). In addition, more than 50 governmental agencies and institutions provide support to start-ups (Elnadi et al., 2020). By late 2030, this ambitious strategy expected to reduce the country's unemployment rate by creating six million jobs and expanding the contribution of small and medium enterprise to the country GDP by 15% (Akinwale et al., 2019; Elnadi et al., 2020; Mahmud et al., 2019). Among the central premises of Saudi's Vision 2030 is providing strong environmental support to women who wish to become entrepreneurs (SCEDA, 2016).

Women joining entrepreneurship in Saudi Arabia shows a significant cultural shift and is based on two factors. First, in 2013, women Islamic scholars were elected to the Consultative Assembly of Saudi Arabia (Majlis Ash-Shura), which is the formal advisory body to the country's King, further reducing the traditional and organisational barriers. The number of women in the Assembly has increased over the years, reaching 20% of the available seats in 2017 (Alotaibi et al., 2017). Second, in 2016, Vision 2030 was introduced, providing specific strategies to remove barriers from formal institutions. Examples include allowing women to drive and travel, gain full access to the job market, establish businesses without male guardianship, and entrepreneurship support programs (Aljarodi et al., 2022). These policies and programmes for empowering women have helped create a more inclusive and diverse economy in Saudi Arabia and break down some of cultural barriers, creating an awareness among the general population in the vital role of women participation to economic development (Aljarodi et al., 2022). As result, more women have established firms in traditionally male-dominated fields such as engineering and law. These developments to promote entrepreneurship represent a positive step to enhance the role of women as an active participant in the workforce and can result in entrepreneurial ecosystems that are more friendly toward Saudi Arabian women.

According to a report issued by the General Authority for Small and Medium Enterprises (Monsha'at) on August 28, 2022, 45% of Saudi start-ups are owned by women, which is double the percentage achieved in 2017. The Kingdom's Ministry of Communications and Information Technology reported a 112 percent increase in commercial registrations issued for women entrepreneurs in six years from 2015. According to this report, the number of commercial registrations held in the name of Saudi businesswomen reached 139,754 in July 2021. Saudi Arabia has the third-highest percentage of women holding entrepreneurial roles among 43 nations (GEM, 2021). Saudi women account for 17.7% of the total number of entrepreneurs in the Kingdom compared to 17% of Saudi men according to the same report.

Since over 50 percent of university graduates in Saudi Arabia are women, there is great potential to capitalize on this human capital to enhance entrepreneurship. In 2020, labor force participation for Saudi women rose from 25.9 percent in the first quarter to 31.4 percent in the second quarter. During the last four years, female unemployment fell by 13.9 percent. Since September 14, 2020, women cannot be discriminated based on their gender regarding private sector pay.

Theoretical background

The concept of the entrepreneurship ecosystem was created to develop policies and programs that promote entrepreneurial activity and motivate individuals to start businesses (Isenberg, 2014; Rocha et al., 2021). The entrepreneurial ecosystem framework explains the factors surrounding entrepreneurial activity (Stam & van de Ven, 2019; Torres & Godinho, 2022). These factors can be institutional, organisational, social, cultural, or economical (Brush et al., 2019; Stam & van de Ven, 2019). Positive reflections of these factors are required to promote entrepreneurship activity within a region or a context.

From an institutional standpoint, the global increase in entrepreneurial activity has generated improvements in the institutional environment in several countries (Aljarodi et al., 2022a; Bichler et al., 2022). Policymakers and scholars recognise how different factors affect the development of a country's system in ways that influence individuals' attitudes, abilities and aspirations so they become engaged in entrepreneurial activity (Audretsch & Belitski, 2017b; Brush et al., 2019). Sperber and Linder (2019) reported that the entrepreneurial ecosystem strongly affects potential entrepreneurs' decisions and that environmental influences can provide conditions that encourage entrepreneurial actions by helping people believe in they can be successful. However, environmental conditions can also hinder entrepreneurial action if they fail to provide the required supports for entrepreneurial activity (Aljarodi et al., 2022b; Shabir & Ali, 2022). Berger and Kuckertz (2016) stated that individual entrepreneurial actions often require a complex system of factors, including institutional and other actors, that need to be considered when starting a business. Based on the literature, the creation and growth of a new venture is a result of a vibrant entrepreneurial ecosystem, comprised of interactions between entrepreneurs characteristics and the external environment (Audretsch & Belitski, 2017b).

The GEM (2017) analysed 74 countries and demonstrated that women are significantly less likely than men to start a new business in all countries that were studied. Furthermore, only 20% of women launch their venture based on necessity rather than opportunity. According to Brush et al. (2019), the lower proportion of women entrepreneurs is due to characteristics in the ecosystems such as institutions, the economy, policies and programs. For example, receiving economic support for childcare might motivate women to engage in entrepreneurial activity. Other studies provide

evidence that women are not treated equally as men when they require debt financing, which in turn lead to smaller loan sizes and higher collateral requirements than for men (Coleman & Robb, 2012; Treichel & Scott, 2006). Such discrepancies cannot be resolved without an efficient entrepreneurial ecosystem containing the elements necessary to support women entrepreneurs (Auerswald, 2015; . Brush et al., 2019).

Several scholars and practitioners have attempted to develop an entrepreneurial ecosystem framework to define the components of entrepreneurial ecosystems (e.g. Brush et al., 2019; Isenberg, 2011; Rocha et al., 2021; Spigel, 2017; Stam & Spigel, 2016; Torres & Godinho, 2022). For example, Spigel (2017) defined entrepreneurial ecosystem as "combinations of social, political, economic, and cultural elements within a region that support the development and growth of innovative start-ups and encourage nascent entrepreneurs and other actors to take the risks of starting, funding, and otherwise assisting high-risk ventures"(p. 2). Audretsch and Belitski (2017) pointed out that new ventures are created as a result of establishing vibrant ecosystems for business start-ups in a local country context, which requires understanding individual entrepreneurial actions and contextual factors. Brush et al., (2019) presented three major dimensions for measuring the vibrancy of a local entrepreneurial ecosystem: individual, organisational, and institutional. These dimensions can be used to examine the entrepreneurial activity within a given context, including with respect to women (Brush et al., 2019; D. J. Isenberg, 2016). Studies mentioned above show that entrepreneurial ecosystems are multidimensional and dynamic and can either encourage or discourage entrepreneurship activity.

Hypotheses development

Using the above-discussed entrepreneurial ecosystem framework enables us to examine the complex relationships among the factors related to female entrepreneurship within different components of entrepreneurial ecosystems. Linking female entrepreneurship and the entrepreneurial ecosystem helps policymakers stimulate female entrepreneurship on a national level. Also, it represents the possibility of analysing different levels to generate a comprehensive view of the condition of women's entrepreneurial activity in a country focused on business creation among young people, particularly women (Alshebami, 2022; Khan, 2017; SCEDA, 2016). According to Brush et al. (2019), there are three major dimensions through which an entrepreneurial ecosystem can be measured: individual, organisational and institutional.

Individual dimension

Various studies have shown that individual factors are vital to women's decisions to engage in entrepreneurial activity (Brush et al., 2019; Isenberg, 2010; Gallant et al., 2010; Mehtap et al., 2017). According to the World Economic Forum (WEF) (2013), the entrepreneurial education of venture owners is the most crucial factor in the growth of early-stage ventures, while entrepreneurial skills improve one's ability to start and run a business. Isenberg's (2011) model also endorses that individual factors in the entrepreneurship ecosystem encourage or prevent business formation and development. Based on the literature, two primary factors affect entrepreneurship: i) education and ii) skills, knowledge, and experience.

Education is a primary factor that drives women toward entrepreneurship, thus resulting in economic growth (Danish & Smith, 2012). Precisely, Westhead and Solesvik (2016) explored the influence of entrepreneurial education among Ukrainian women entrepreneurs in comparison to men and discovered that education has a positive effect

on skills development for both genders. Regarding risk, their study found that educated women entrepreneurs are more realistic and less willing to take risks than men entrepreneurs. Unger et al. (2011), Autio & Acs (2010), and Hechavarría & Ingram (2019) found a positive relationship between education and entrepreneurial success, stating that higher education can increase an entrepreneur's ability to recognise opportunities.

Entrepreneurial education is also one of the two major factors of the individual level of the entrepreneurial ecosystem (Isenberg, 2011; WEF, 2013). Parker (2018) and Doms et al, 2010) showed that educated individuals are more likely than uneducated individuals to survive and expand their businesses. Thus, the level of entrepreneurship education establishes core individuals within an entrepreneurial ecosystem by allowing them to quickly adapt to changes in market conditions and gain the knowledge needed to start and run a business. The correlations between education and entrepreneurship may help to explain how women's access to entrepreneurship education impacts their ability to lunch businesses.

Since Vison 2030 was announced, entrepreneurship education has become the most popular course within the education curriculum, especially at the secondary education level and higher (SCEDA, 2016). The Saudi General Authority for Statistics (2019) stated that 12% more women than men complete their university education. A recent study on different entrepreneurial ecosystem factors that encourage females from the Gulf region to become entrepreneurs found that entrepreneurship education is imperative in this regard, and leads to a high number of entrepreneurial start-ups (Ali et al., 2019). Entrepreneurial education has a positive effect on women's ability to recognize opportunity, gain financial support and increase business networking (Almuzel & Anderson, 2021; Elnadi et al., 2020; SCEDA, 2016).

The second part of human development at the individual level comprises the skills, knowledge, and experience that women gain over their lifespan. Alexandre and Kharabsheh (2019) identified skills, knowledge, and experience as crucial elements in women's entrepreneurial activity, and noting that the development of such skills improve women's abilities to recognise business opportunities. Danish and Smith (2012) demonstrated that Saudi women entrepreneurs found their administration skills a greater obstacle than acquiring funds. However, women with fewer skills were less likely to acquire financing, thus reducing their chances of starting a business. Similarly, Welsh et al. (2017) reported that an individual's belief that, they have the skills needed to run a business is important to their self-confidence.

A WEF report (2013) emphasises that recognising the skills needed to start a new venture is one of the most important aspects of the entrepreneurial ecosystem. Aljarodi et al., (2022b) proposed that the skills needed to start a venture provide entrepreneurs with the abilities needed to discover opportunities. Ecosystems provide entrepreneurs with skills and resources (Korosteleva & Belitski, 2017), as there is a direct link between entrepreneurs and the behaviour created by the environment or "ecosystem" (Brush et al., 2019). Following Isenberg's (2011) model, human skills are an important part of self-sustaining entrepreneurship. Thus, women who have obtained skills and experience are more likely than others to start high-growth ventures (Brush et al., 2019).

As shown above, the Arab region, including Saudi Arabia, has been investing in entrepreneurship education; specifically, it incorporated entrepreneurship education in secondary education and programmes to improve women's skills to support female entrepreneurship. Recognizing that these components define the core of individuals at this level of the entrepreneurial ecosystem, we propose the following hypotheses:

Hypothesis 1a: *In the individual dimension of the entrepreneurial ecosystem, obtaining higher education is positively related to the likelihood of female participation in entrepreneurial activity.*

Hypothesis 1b. *In the individual dimension of the entrepreneurial ecosystem, having entrepreneurial skills is positively related to the likelihood of female participation in entrepreneurial activity.*

Organisational dimension

The organisational level of the entrepreneurial ecosystem highlights the effects of different practices and environments on gendered experiences within organisations, thus affecting the women's choice of the business size and the sectors they work in (Brush et al., 2019). Organisations can present values within an entrepreneurial ecosystem by providing the training programmes and support needed for new ventures (Feld, 2020; Stam & Spigel, 2016). Although such resources demonstrate the importance of the dynamics of the entrepreneurial ecosystem, gender plays a subtle role in organisations, as it might benefit or harm one gender (Mueller & Dato-On, 2008). The literature show that this role of gender within organisations can be demonstrated in three ways: i) by the predominance of one gender to be in specific organisations and occupations (Acker, 1990), ii) by descriptions of organisations that express exclusivity for men or women (Kanter, 2006), and iii) by distinguished management practices within organisations for each gender (Britton, 2000). These practices affect women within certain sectors, creating an inherent gender bias in the entrepreneurship ecosystem (Brush et al., 2019).

Within an entrepreneurship ecosystem, small business and service sectors from organisational level present initial elements that attract further entrepreneurial ventures (Akinwale et al., 2019; Feld, 2020; Isenberg, 2010; Stam & Spigel, 2016). Alexandre and Kharabsheh (2019) noted that the Saudi government has established dedicated business centres and incubators in order to serve women exclusively. Ashri (2019), who is the founder of the Saudi Entrepreneurial Ecosystem Lab (SEE Lab) stated that US$19.2 billion has been added to accelerate private sectors. More than 50 governmental institutions and non-profit organisations have been created to support entrepreneurs. These institutions and non-profit organisations provide several services, including incubation, networking, accelerating, training, marketing, and financial support (Ahmed, 2019; Elnadi et al., 2020). In addition, six economic cities have been developed (Alhowaish, 2015), and several partnerships with well-known international companies have been forged to boost entrepreneurial activity (Elnadi et al., 2020; Syed et al., 2019). Brush et al. (2019) argued that these horizontal or vertical divisions affect women in some sectors and create an inherent gender bias in entrepreneurship. Tlaiss (2015) showed that women are more focused on the service sector than men. According to Garga and Bagga (2009), the growth of the service sector in India is largely responsible for the country's rapid economic development. Traditionally, however, the economy of Saudi Arabia has been driven by a few large firms in the petroleum and gas industry (Burton, 2016, p.3). By establishing a beneficial ecosystem, Saudi Arabia could grow and target more women entrepreneurs.

At the organisational level of the entrepreneurial ecosystem, we note that the Saudi government has created several initiatives and made investments to support small enterprises and the service sector to foster female entrepreneurship, leading us to suggest the following hypotheses:

Hypothesis 2a. *In the organisational dimension of the entrepreneurial ecosystem, the small firm size is positively related to the development of the likelihood of female participation in entrepreneurial activity.*

Hypothesis 2b. *In the organisational dimension of the entrepreneurial ecosystem, the service sector is positively related to the likelihood of female participation in entrepreneurial activity.*

Institutional dimension

Institutions are essential to creating an atmosphere that encourage entrepreneurial activity while allowing free market movement and competition (Aljarodi et al., 2022b; Aloulou, 2021). Overall, an appropriate balance will work as enabling forces to "reduce the cost of transactions, uncertainty, and risks of individuals behavior" (Brush et al., 2019, p.397). According to Urbano et al. (2019), institutions generate ecosystem that attracts entrepreneurial activity while remaining explicit to fully understand its effects on entrepreneurship. Institutions can encourage or discourage individuals from seeking opportunities in the market, as emerging new ventures and growth depend heavily on institutions (Aljarodi et al., 2022a; Aloulou, 2021).

Following Brush et al. (2019), the institutional component of the entrepreneurial ecosystem framework is divided into three categories: regulative, normative, and cognitive. Based on the literature, these categories encompass two elements: regulative (or "formal institutions") and normative and cognitive institutions (or "informal institutions") (North, 1990). Accordingly, North (1990) describes institutions as "the *rules of the game* in society" and divides the concept into two aspects: formal institutions (such as written constitutions that set boundaries for the market), and informal institutions (such as unwritten "codes of conduct, or norms of behaviours" enforced by individual behaviours). Brush et al. (2019) highlighted gender roles in the entrepreneurial ecosystem as an example of the impact of informal institutions. They noted that an inherent bias in society to view entrepreneurship as a male-oriented job can discourage women from starting businesses and reduce their ability to recognise opportunities.

Gender plays a hidden role in various factors within informal institutions (Brush et al. 2019). Hechavarría and Ingram (2019) and Ali et al., (2019) elaborated on the role of the media in entrepreneurship ecosystems as a source of social support for women. Urbano and Alvarez (2014) found that the media can increase awareness of institutional reform in Latin American nations, thus enhancing individuals' attraction to entrepreneurship. Similarly, Al-Dajani and Marlow (2010) showed that female entrepreneurial activity in Jordan has been increasing due to media attention campaigns.

Eddleston and Powell (2008) and Danish and Smith (2012) showed that the media is a vital factor within informal institutions in entrepreneurial ecosystems, as it accelerates the spread of information and generates business ideas that result in more innovative ventures.

Second, studies have shown the fundamental role of formal institutions in establishing boundaries for individuals in the market (Faisal et al., 2017; Stephen et al., 2005; Urbano et al., 2019). In developed countries entrepreneurial-oriented rules and policies for registering businesses increase the dynamics of entrepreneurial activity (Ram et al., 2017). Earlier findings suggest that liberal policies for business creation accelerate entrepreneurial activity by motivating individuals to start their own businesses, usually resulting in increased employment opportunities and accelerated economic development (Stephen et al., 2005; Urbano et al., 2019).

In Saudi Arabia, the difficulty of starting a business was one of the biggest challenges facing female entrepreneurs because women were required to be present in person at different governmental offices to obtain a business licence (Welsh et al., 2014).

As discussed in the extant literature, favourable media is a pivotal independent actor under the hand of the government in causing changes within any given area (Hechavarría

& Ingram, 2019) while removing barriers to make it easier to start a business (Stephen et al., 2005; Urbano et al., 2019).

Based on the above discussion, we propose that institutions can drive environmental change by creating a positive and favourable entrepreneurial ecosystem environment and making it easier to start a business. When these changes are explicitly presented through the proper channels, they motivate women to start their own ventures. Consequently, we propose the following hypotheses:

Hypothesis 3a. *In the institutional dimension of the entrepreneurial ecosystem, favourable media attention is positively related to the likelihood of female participation in entrepreneurial activity.*

Hypothesis 3b. *In the institutional dimension of the entrepreneurial ecosystem, the ease of starting a business is positively related to the likelihood of female participation in entrepreneurial activity.*

Data and Methods

We used the Saudi Adult Population Survey (APS), obtained from the GEM, the largest worldwide study of entrepreneurial dynamics worldwide (see GEM, 2017; Reynolds et al., 2005). Since its inception in 1999, the project has conducted more than 200,000 interviews per year and has helped develop a picture of entrepreneurial activity around the world, providing more than 300 academic and research institutions with statistical information (GEM, 2017). The GEM's popularity is partly due to its yearly annual assessments of entrepreneurial behaviour and attitudes of individuals. The GEM also provides the national contexts of more than a hundred economies and explains how context affects entrepreneurship.

Data from the GEM project is suitable for this study because it provides clear-cut measure of female entrepreneurial activity within the context of Saudi Arabia. Furthermore, the use of GEM data is consistent with previous entrepreneurial literature (e.g. Hechavarría & Ingram, 2019; Welsh, 2016).

In the current study, data surveyed by the GEM in Saudi Arabia were used because such data are accessible and can be used straightforwardly to test the proposed hypotheses while offering ideal measures for empirical analysis. Specifically, the proposed hypotheses related to Saudi women entrepreneurial activity were tested using the Adult Population Survey - Saudi dataset, conducted in 2016 with a sample of 1,564 observations. Only the female sample was considered due to the unequal numbers of male and female respondents after cleaning the data. The APS consists of the collection of a questionnaire from a minimum of 2000 adults in each country that participates in the GEM. These collected questions provide information about respondents' attitudes and aspirations related to entrepreneurial activity. The main variables included in this study are presented in Table 1.

Variables

The dependent variable is women entrepreneurship, which has a value of 1 if a woman entrepreneur is an adult who is in the process of setting up a business that they will (partly) own, who currently owning and manages a business, or who is operating a young business (up to 3.5 years old as shown in Table 1). This variable is the main indicator of the GEM project and is identified as "Total Entrepreneurial Activity" (GEM, 2017; Reynolds et al., 2005). The measurement is commonly used in entrepreneurial studies that focus on individuals in the early stages of starting a business at the country level (Aljarodi et al., 2022b; Gimenez-Jimenez et al., 2020; Noguera et al., 2015).

Based on the GEM dataset we identified two independent variables at each level: higher education and skills (individual level), firm size and firm sector (organisational level), and ease of starting a business and media attention (institutional level) (see Figure 1). These variables are frequently used to measure the effect of each proposed level (e.g. Aidis et al., 2008; Alexandre & Kharabsheh, 2019; Brush et al., 2019; Isenberg, 2010; Robinson & Sexton, 1994; Unger et al., 2011; Urbano & Alvarez, 2014; Westhead & Solesvik, 2016).

Since the study focuses on three dimensions – individual, organisational and institutional – several other variables, including age, work status, and family size were selected for control to enhance the robustness of the study. In the GEM, these variables were collected as follows:

- Age: Prior empirical evidence demonstrates the positive relationship between young age and entrepreneurial activity, implying that young people are more likely to become entrepreneurs (Aljarodi et al., 2022b). Therefore, the respondents were asked to provide age information which ranged from18 to 64 years.
- Work status: Empirical findings show that employed women are more likely than unemployed women to gain self-employment (Klyver et al., 2013). Thus, the respondents were asked to identify their current job status (full time or part-time job only) and zero otherwise.
- Family size: Aldrich and Cliff (2003) reached three conclusions about the impact of family size on business creation: first, they found that having a small family can help individuals decide to start a venture, as extended families involve long discussion networks (such as cousins, uncles, in-laws, and so on). Second, the study recognised that individuals with small families might be more proactive when starting his/her venture. This is because it is less risky to give up their salary since they have fewer responsibilities than individuals with large families. Third, women who have children may be less likely to return to the workforce, in the interest of work-life balance.

[Figure 1 near here]

Table 2 reports a summary description of the demographic variables employed in this study where the targeted sample is female entrepreneurs in their early stages of entrepreneurial activity. Table 2 shows that the women in our targeted sample are present 11% and are likely to be at the early age around 35 years old. 43% of them have at least a bachelor's degree, 79% have full-time or part-time jobs and have small families with five members or higher.

Data analysis and models

This paper implements a binary logistic regression technique to analyse the proposed hypotheses. Binary logistic regression was chosen due to dichotomous the nature of the dependent variable. While this technique is similar to regression analysis models designed for binary responses are better at treating binary dependent variables (Mitchell & Chen, 2005). Models designed for binary responses are known as probability

models because they quantify the 'odds' that an event will occur (Buis, 2010). Accordingly, the study assesses the influences of individual factors (higher education and skills), organisational factors (firm size and sector), institutional factors (ease of starting businesses and media attention), and sociodemographic variables on the probability that females will become entrepreneurs. In model 1, we examine the dependent variable (with all control variables) to analyse the main effect of socio-economic factors on our dependent variable. In models 2, 3 and 4, we introduce the individual, organisational and institutional dimensions, as well as the control variables. Model 5 is the full model, which includes the three dimensions, exploratory variables, and control variables.

Validity and reliability tests were performed to ensure the accuracy of our results. For validity, a previous study suggested comparing models' predictions and coefficients (Urbano & Alvarez, 2014). Meanwhile, a collinearity test was performed for reliability (Neter et al., 1996). We calculate the correlation matrix test to ensure that multicollinearity has been avoided and that each dimension of the independent variable is independent of all others in terms of correlation values.

Table 2 presents the correlation matrix between all independent variables. The highest correlation is between family members and work status (r.37), indicating no risk of multicollinearity. We calculated variance inflation factors to substantiate this claim. The results show no major multicollinearity issue; all variance inflation factors are below 1.5 (Neter et al., 1996). We also estimated robust standard errors to avoid the possibility of heteroskedasticity and autocorrelation between observations (White, 1980).

Results

The results presented in Table 2 show a positive correlation between female entrepreneurs and skills, r (1,562) = .19, $p < .01$, in the individual dimension. There was also a positive correlation between female entrepreneurs and firm size, r (1,562) = .52, $p < .01$, and firm sector r (1,562) =.12, $p < .01$, in the organisational dimension. Finally, institutional dimension factors presented correlations with female entrepreneurs at r (1,562) =.14, $p < .01$ (in terms of the media) and r (1,562) =.14, $p < .01$ (in terms of the ease of starting a business). Higher education, however, showed no correlations with female entrepreneurship.

[Table 2 near here]

We were thus interested in analysing the conditioning factors that affect women's ability and desire to become entrepreneurs in Saudi Arabian context based on the entrepreneurial ecosystem model. As the dependent variable is binary by default, we utilised results from different levels by using the binary logistic regression model as an analysis technique. Furthermore, we calculated robust standard errors to detect any biases and inconsistencies due to heteroscedasticity (King & Roberts, 2015) and found that it was not a problem in our dataset.

Table 3 reports the results of the five models concerning the proposed hypotheses. The predictability values of the models range between 88.55% and 91.88%, indicating that they are acceptable.

[Table 3 near here]

Model 1 includes only the control variables. Following Urbano and Alvarez (2014), we added women's sociodemographic characteristics such as age, work status, and family size. The model is significant ($p < .01$) with a Pseudo R-squared value of 0.0675 and a likelihood of -518.78. The model correctly predicts responses at a rate of 88.55%. Thus, the result is consistent with the existing literature on the importance of sociodemographic characteristics of family size and work status in predicting the likelihood that a woman will become an entrepreneurs (Aldrich & Cliff, 2003; Klyver et

al., 2013). The model also presents a positive correlation between holding a job and becoming an entrepreneur and a negative correlation between family size and becoming an entrepreneur. Finally, no correlation was found between age and the likelihood of entrepreneurship. This last finding is perhaps due to the different age categories of women entering the market, such as wives with children (who are relatively old) and single women (who are relatively young).

Model 2 includes variables encompassing the individual dimension factors (higher education and skills) and the control variables. The model shows a highly significant ($p < .01$) relationship, with higher the Pseudo R-squared 0.1280 and lower log-likelihood at -485.13. Similar to model 1, it predicts responses with 88.55% accuracy. In model 2, the control variables show no change. Higher education, however, is statistically significantly negatively related to entrepreneurship ($p <.10$); skills knowledge and experience show highly statistically significant and positive relationships with female entrepreneurs ($p <.01$).

In model 3, we follow the same process as in model 2. We considered variables encompassing the organisational dimension (firm size and firm sector) and the control variables. Like models 1 and 2, model 3 presents significant relationships but with a higher prediction accuracy (91.88%) and Pseudo R-squared value (0.2690). The coefficients of the control variables of age and work status remain unchanged, while that of family size decreases to -.11 ($p <.10$). Thus, the organisational domination variables of firm size and firm have highly statistically significant positive relationships with female entrepreneurs ($p <.01$).

Similarly, to explain the effect of the institutional dimensions, we included two variables (ease of starting a business and media), as well as the control variables in model 4. The model yields a higher Pseudo R- squared than model 1 but lower than models 2 and 3 when used to explain the likelihood of women becoming entrepreneurs. The model correctly predicts responses at a rate of 88.55%, with a log-likelihood of -490.23, indicating that the model is fairly accurate. The results of model 4 show that all variables of the institutional dimension have significant positive relationships with entrepreneurship ($p <.01$), as expected. We noticed that the coefficients of age and work status remained unchanged, while that of family size increased such that it was higher than in models 1 and 3 but lower than in model 2.

Model 5 is the full model containing all the direct effects of the different dimensions and control variables, together with all the significant variables. This model was employed to test the probability with which women choose to become entrepreneurs. The model has a p-value of 0.000 and has a higher Pseudo R-squared value (0.3096) than the previous models. It also shares the most accurate prediction response rate with model 3 (91.88%). As a result, the control variables in terms of age remain unchanged; however, the coefficient of work status and family size decreased in comparison to all other models. Therefore, this model expresses that woman who have small families and who work (either full- or part-time) are more likely than other women to become entrepreneurs.

As stated earlier in the paper, the following two hypotheses were proposed to measure the influence of individual dimension factors of the entrepreneurial ecosystem on the likelihood of women becoming entrepreneurs: H1a: In the individual dimension of the entrepreneurial ecosystem, obtaining higher education is positively related to the likelihood of female participation in entrepreneurial activity. H1b: In the individual dimension of the entrepreneurial ecosystem, having entrepreneurial skills is positively related to the likelihood of female participation in entrepreneurial activity. As shown in model 5, skills, knowledge and experience are strongly positively related to entrepreneurship ($p < .01$), while higher education is not significantly related to

entrepreneurship (p >.10). Thus, hypothesis 1a is rejected, while hypothesis 1b is supported. In line with Hattab (2014), who with a sample from Egypt noticed that, education may not lead to an increase in the probability of becoming entrepreneurs because of a deficiency in the design of the curriculum. Our theoretical framework suggests that this factor could be considered a contextual factor across regions. Therefore, the impact of the individual factors of the entrepreneurial ecosystem on women's entrepreneurship is partially supported.

At the organisational level, as stated earlier, two more hypotheses were proposed: Hypothesis 2a: In the organisational dimension of the entrepreneurial ecosystem, small firm size is positively related to the likelihood of female participation in entrepreneurial activity. Hypothesis 2b: In the organisational dimension of the entrepreneurial ecosystem, the service sector is positively related to the likelihood of female participation in entrepreneurial activity. The results present positive and significant relationships for the predictor variables (p < .01). Accordingly, hypotheses 2a and 2b are strongly supported. Current research (Al-Kwifi et al., 2020) suggests that there is an increasing number of Saudi women establishing small and medium enterprises, particularly in the service sector, "the typical of the female gender in the region" and regardless of institutional and societal barriers.

Lastly, two other hypotheses were considered when measuring the impact of the institution level factors on women's entrepreneurship: Hypothesis 3a: In the institutional dimension of the entrepreneurial ecosystem, favourable media attention is positively related to the likelihood of female participation in entrepreneurial activity. Hypothesis 3b: In the institutional dimension of the entrepreneurial ecosystem, the ease of starting a business is positively related to the likelihood of female participation in entrepreneurial activity. As shown in Table 3, the variables considered for this level are all statistically significant. Consequently, hypotheses 3a and 3b are supported. According to existing literatures from Saudi Arabia (Aljarodi et al., 2022b; Alkhaldi et al., 2018; Almuzel & Anderson, 2021; Aloulou, 2018), institutional factors are important mechanisms to provide entrepreneurial opportunities; therefore, they increase women probability of becoming entrepreneurs. In this respect, the government should consider that less attention to these elements harms the entrepreneurial ecosystem. Overall, the empirical findings support hypotheses 1b, 2a, 2b, 3a, and 3b.

Discussion

This study addresses the impact of entrepreneurial ecosystem factors on women's ability and desire to become entrepreneurs in Saudi Arabia, thus partially filling a gap in the literature. Most studies on entrepreneurial ecosystem factors and frameworks (Alshebami & Alzain, 2022; Audretsch & Belitski, 2017; Neumeyer et al., 2019; Torres & Godinho, 2022), while addressing the role of the entrepreneurial ecosystem affecting women entrepreneurs from a Saudi context is a topic that literature is not often discussed (Aljarodi et al., 2022). The study examines the most effective factors represented by individual, organisational and institutional dimensions of entrepreneurial ecosystems on women entrepreneurship. The study is conducted in the context of a country that relies heavily on natural resources and large corporations, has historically a wide gender gap due to established cultural norms, and invests currently to promote an entrepreneurial ecosystem, specifically female entrepreneurship, Saudi Arabia. The entrepreneurial ecosystem is used as an overarching theoretical framework enhanced with an additional lens offered for female entrepreneurship (Brush et al., 2019). The findings showed that female entrepreneurship is affected by different factors at different levels of the

entrepreneurial ecosystem. Thus, the study find three different interactions of factors within each level.

First, the results showed the direct effects of three different dimensions. However, one of the analysed individual dimension factors (higher education) showed no effect on female entrepreneurship. We noted that entrepreneurship higher education is a fundamental factor (Neumeyer et al., 2019), though a higher level of education in general did not appear to impact female entrepreneurship. Leischnig et al. (2016) reported that the absence of entrepreneurship education yields low levels of entrepreneurial activity. While the Saudi strategic plan 2030 highlighted the importance of incorporating entrepreneurial education in secondary education and higher education (SCEDA, 2016), our results suggest that it needs to be an improvement in the design of the entrepreneurial education curriculum in order to find the relevant topics to increase women entrepreneurial skills.

Second, variables such as organizing and other necessary competencies/skills, support for small firm size and certain sectors, the ease of starting a business, and media attention significantly predict female entrepreneurship in Saudi Arabia. Given the nature of the country cultural context, Saudi Arabian women present higher response to these variables related to each level of entrepreneurial ecosystem. In this regard, first of all, Al-Kwifi et al., (2020) noted the importance of individual factors in defining market opportunities, assembling all required resources, and deciding when to enter and how to move forward. Second, Alshebami & Seraj (2022) noted the critical role of the SME sector in Saudi Arabia, which account of 99.6% of all private sector ventures. In this regard, Al-Kwifi et al., (2020) have suggested that there are differences between women and men entrepreneurs regarding the types and size of an organization owned due to the support structure available to each one of them and how they are perceived. Lastly, Aljarodi et al., (2022) emphasized that the role institutions play for fostering entrepreneurial activity among Saudi females depends upon if there are fewer barriers from society and government. Therefore, we urge policy makers to consider the multidimensional factors examined in this study to formulate and customise policies and programs to potentiate a favourable entrepreneurial ecosystem that will increase the likelihood that women will become entrepreneurs.

Lastly, this study is among the first to examine three dimensions of the entrepreneurial ecosystem at different levels using the framework proposed by Brush et al. (2019) to understand the effect of entrepreneurial ecosystems on female entrepreneurship. Previous studies have used specific samples before the changes in the institutional environment of Saudi Arabia introduced by Vision 2030 (Welsh et al., 2014; Danish & Smith, 2012; Zamberi, 2011), or they have focused on specific small samples (Welsh et al., 2014; Danish & Smith, 2012; Zamberi, 2011). However, the framework presented in this study considers women as a crucial part of the entrepreneurial ecosystem and determines the role of women at each level of the entrepreneurial ecosystem. As a result, we captured recent changes and provided recommendations for developing entrepreneurial ecosystems such that conditions are made favourable for Saudi Arabian women entrepreneurs.

Implications

Our findings have several implications related to the individual, organisational, and institutional dimensions of entrepreneurial ecosystems, especially regarding female entrepreneurship. Although the actors within the entrepreneurial ecosystem in the individual or organisational dimensions are essential to female entrepreneurship, the institutional dimension may have a more profound impact on a country's entrepreneurial

activity, social development, and economic growth. Based on our findings, policymakers should increase investing in social media content to cover stories of female entrepreneurs who have successfully established firms and adopt media policies highlighting the services offered by different government agencies and their efforts to improve business creation registration and procedures. Our results suggest that such media coverage will motivate women to become entrepreneurs, as it will challenge the stereotype of entrepreneurship being mainly for men and the limited role of women as homemakers in Saudi Arabia.

The result of the individual dimension reports a positive relationship between skills required to start a business and the probability of female entrepreneurship. At the same time, higher education did not show any sign of a relationship to the probability of female entrepreneurship. This finding explained the vital role of entrepreneurship skills. Therefore, policymakers should invest in developing the skills of women in society. This can be done by increasing training entrepreneurial skill development programs at various levels of the education system, as this gives women the confidence needed to engage in the workforce and develop business skills.

This paper also illuminates the organisational dimension effects of entrepreneurial ecosystems. While Saudi policy makers focus on small firms and the service sector by creating a favorable regulations and probable opportunities to individual, particularly women, our finding report a positive response for increasing female to become entrepreneurs. Our research provides empirical evidence supporting such claims from a country that is shifting away from large manufacturing corporations to support small firms and service sectors. If policymakers continue to invest in new business-friendly policies, women are more likely to be attracted to business creation.

In short, our research support the relevant of three levels for understating entrepreneurship. Since the evidence presented in this study was derived from a framework that highlights women as a key element in entrepreneurial ecosystems (Brush et al., 2019), using this framework can lead to a condition that encourages female entrepreneurs and provides avenues for improvement within the country's entrepreneurial ecosystems.

Conclusion

The findings of this study provide a clear overview of the different factors within various dimensions that affect the likelihood that women will become entrepreneurs in Saudi Arabia. The research used the entrepreneurial ecosystem as an umbrella to apply and understand the interaction on multiple levels. The findings advance entrepreneurial research by empirically examining factors that influence women's entrepreneurship in the context of a fast-growing economy, which is Saudi Arabia. Further, the findings presented here demonstrate how the actors within entrepreneurial ecosystems can determine women's entrepreneurial activity and their corresponding implications on the entrepreneurial ecosystem to further develop a favorable environment that will encourage women to pursue entrepreneurship. In turn, the government and policymakers investing in encouraging women's entrepreneurial activity will significantly affect unemployment and aid in supporting their families.

Limitations and future research

Although the present study addressed previous technical problems to examine the different levels of dimensions that have been noted, some limitations must be noted. First, the framework of the entrepreneurial ecosystem contained several dimensions, each of which had several elements; however, due to a lack of reliable information, the study

contained only three dimensions. The complexity of the relationship between elements in this framework was noticed (Audretsch & Belitski, 2017; Autio et al., 2014). Future studies should investigate different dimensions using different statistical techniques, such as structural equation modelling, to gain a deeper understanding of the complex interactions and relationships between the elements of the entrepreneurial ecosystem at a national level.

In addition, our findings encourage scholars to conduct deeper investigations of the different elements at three examined dimension to determine more contextual factors associated with female entrepreneurs. These elements should associate with female entrepreneurs from similar emerging economies. The measurements need to fit the context within the nation as the practice of each nation is different and cannot be straightforwardly generalised to others. More importantly, increased awareness of related factors within these dimensions may reflect in increased women entrepreneurship, thereby developing entrepreneurial ecosystems in emerging economies such as Saudi Arabia.

Second, this research examines different levels but only for women samples due to the unequal numbers of male and female respondents. Including men in the sample might provide a more comprehensive picture of the proportion of women who are attracted to entrepreneurial activity compared to men.

Third, since we depended on the statistical data reported by the GEM about the country, a multi-year analysis could not be performed since Saudi Arabia did not submit numbers to the GEM in some years. Future researchers should check for a database that can provide data over multiple years (panel data) for the same country when measuring the evolution of female entrepreneurs across years.

Finally, since the data were collected from secondary sources, we were limited to using quantitative data. Future research should consider supplementing this with primary qualitative data which would enable a deeper understanding of factors that cannot be measured quantitatively. For example, in the individual dimension, the study found a link between human development factors and the likelihood of women becoming entrepreneurs. Among these, the higher education factor is a dummy variable but shows no link to female entrepreneurship. A qualitative study, however, may expand this finding by examining respondents' thoughts and feelings concerning how their education contributed to (or prevented) their entrepreneurship. This might expand our insights regarding the circumstances under which entrepreneurial education is significant and insignificant.

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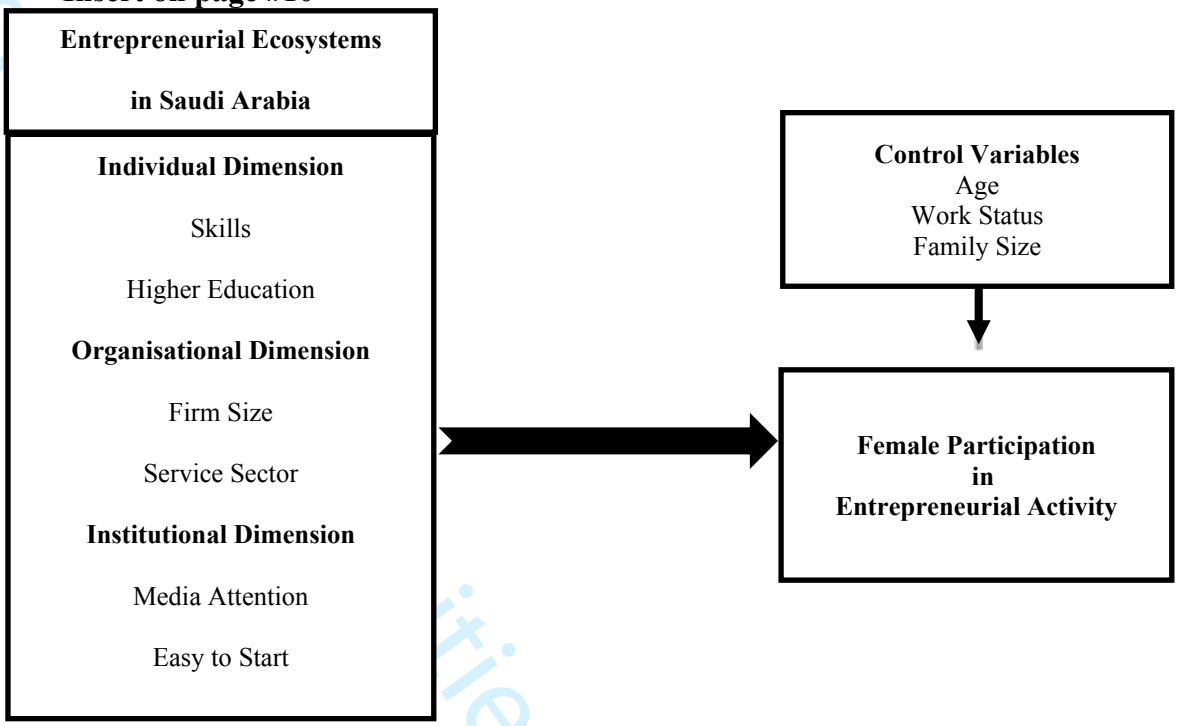

Figure 1. Conceptual model of the three dimensions and factors of entrepreneurial ecosystems

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Table 1. Dependent, independent and control variables discerption

Variable	Description	Possible values
Dependent variables		
Female Entrepreneur	A dummy variable is one if a female entrepreneur is an adult in the process of setting up a business they will (partly) own and/or currently owning and managing or operating a young business (up to 3.5 years old); it is zero otherwise. "TEA-Female"	1. Female entrepreneur 0. Otherwise
Independent variables		
Individual dimension		
Higher education	The respondents are asked to identify the highest educational obtained:	1. Secondary education and higher 0. Otherwise
skills	The respondents are asked the following question: "You have the knowledge, skill, and experience required to start a new business."	1. Yes 0. No
Organizational dimension		
Firm size	The respondents are asked, "how many employees in the organization you work for, not include the owners? The answer harmonized into a dummy variable.	1. Small enterprise within 25 employees 0. Otherwise
Firm sector	The respondents are asked to identify in TEA which sector they are in?	1. Service sector 0. Otherwise
Institutional dimension		
Media attention	The respondents are asked the following question:" In your country, you will often see stories in the public media about successful new businesses."	1. Yes 0. No
Easy to start	The respondents are asked the following question: "In my country, it is easy to start a business."	1. Yes 0. No
Control variables		
Age	The current age of the respondents	18 to 64 years old
Work status	The respondents are asked to identify their current Job?	1. Full-time, part-time work only 0. Otherwise
Family size	The respondents are asked the following question: "How many members make up your permanent household, including you?"	

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Table 2. Descriptive Statistic and Correlation Matrix

Variable	Mean	SD	1	2	3	4	5	6	7	8	9	10
Female Entrepreneur	.11	.32	1									
Higher education	.43	.49	-.02	1								
Skills	.65	.48	.19***	-.02	1							
Firm size	.05	.22	.52***	-.01	.14***	1						
Firm sector	.03	.16	.12***	.06**	.09***	-.02	1					
Media attention	.72	.45	.14***	.04*	.25***	.10***	.07***	1				
Easy to start	.74	.44	.14***	-.06*	.28***	.11***	.01	.23***	1			
Age	34.95	10.14	-.05*	.03	-.02	-.02	.02	.01	-.06*	1		
Work status	.79	.40	.17***	.16***	.08**	.11***	.08***	.11***	-.04*	-.09***	1	
Family size	5.38	1.49	-.09***	-.04*	.02	-.09***	.01	-.05**	.01	.37***	-.12***	1

***significant at $p \leq 0.01$; **significant at $p \leq 0.05$; *significant at $p \leq 0.10$.

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Table 3. Logit Results

Variables	Model 1		Model 2		Model 3		Model 4		Model 5	
	Coefficient	Robust SE	Coefficient	Robust SE	Coefficient	Robust SE	Coefficient	Robust SE	Coefficient	Robust SE
Individual										
Higher education			-0.27*	0.17					-0.23	0.19
Skills			1.71***	0.26					1.09***	0.25
Organizational										
Firm size					3.79***	0.29			3.47***	0.32
Firm sector					1.69***	0.35			1.48***	0.38
Institutional										
Media attention							0.87***	0.25	0.42*	0.27
Easy to start							1.36***	0.28	0.84***	0.28
Control variables										
Age	-0.02	0.01	-0.02	0.01	-0.01	0.01	-0.02	0.01	-0.01	0.01
Work status	2.80***	0.59	2.79***	0.59	2.36***	0.62	2.79***	0.59	2.41***	0.64
Family size	-0.17***	0.06	-0.20***	0.06	-0.11*	0.07	-0.18***	0.07	-0.12*	0.07
Number of obs.	1,564		1,564		1,564		1,564		1,564	
Pseudo *R2*	0.0675		0.1280		0.2690		0.1188		0.3096	
Log-likelihood	-518.78		-485.13		-406.70		-490.23		-384.09	
Wald chi2	40.16		84.45		207.71		74.98		208.97	
Percent correctly predicted	88.55%		88.55%		91.88%		88.55%		91.88%	

Note 1: ***significant at $p \leq 0.01$; **significant at $p \leq 0.05$; *significant at $p \leq 0.10$.
Note 2: Robust standard errors in the parentheses (heteroscedasticity-corrected)