



Entrepreneurial Ecosystem and Women: Does Gender Moderate the Relationship between Entrepreneurial Ecosystem and Entrepreneurial Intention

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Abstract

Despite the limited knowledge available on the effects of gender on entrepreneurial ecosystems, it is reasonable to expect that such systems often suffer from gender imbalance. Hence, the present study aimed to investigate the perception of female and male Iranian students of agriculture regarding the availability of the entrepreneurial ecosystem components in Iran using the Isenberg's model. We also examined the moderating effect of gender on the relationship between perception of the entrepreneurial ecosystem components and start-up launching intention. Data collected from 416 Iranian students of agriculture were examined based on the partial least squares structural equation modeling. Our results revealed that female students believed the components of the entrepreneurial ecosystem to be in poor conditions. Also, the start-up launching intention was weaker among female students compared to males. Perception of the entrepreneurial ecosystem components (policy, culture, human capital, support, market, and financial capital) had a significant impact on start-up launching intention among students of agriculture. Perception of the financial and human capital had a greater impact on start-up launching intention among the students. In addition, gender exhibited a moderating role on the effect of perception of the financial and human capital components. The study offers recommendations for universities and higher education institutions of agriculture to further improve and develop the entrepreneurial ecosystem via entrepreneurial programs, workshops and events. We also recommend that the necessary measures be taken to increase students' access to loans and financial resources in order to boost start-up launching intention.

KEYWORDS

Entrepreneurial ecosystem, Isenberg's model, gender, female students, start-up launching intention.

Highlights

- Entrepreneurial intention was integrated with other constructs to steer research in this field into a new direction.
- Perception of the entrepreneurial ecosystem components had an effect on start-up launching intention.
- According to female students, components of the entrepreneurial ecosystem were not in good condition.
- Start-up intention was weaker among female students compared to males.
- Gender had a moderating role on the effect of financial capital on start-up launching intention in female students.

Abbreviations:

Global Entrepreneurship Monitor (GEM), Total Early-stage Entrepreneurial Activity (TEA), Global Entrepreneurship Index (GEI), Organization for Economic Cooperation and Development (OECD), World Economic Forum (WEF), Structural Equation Modeling (SEM), Partial Least Squares (PLS), Confirmatory Factor Analysis (CFA), Composite Reliability (CR), Average Variance Extracted (AVE), Entrepreneurship Education (EE), Research and Development (R&D).

Introduction:

The number of universities and institutions of higher education in Iran has increased significantly over the last 30 years. In terms of human resources, the number of students and professors has also increased significantly. The development of science and technology parks and incubators has also been particularly noteworthy as they play an important role in encouraging and stimulating technology-based and knowledge-based businesses, leading to regional/national economic development. These centers can help bridge the existing gaps between industry and academia. In fact, they facilitate the flow of technology and knowledge between academic centers, private firms, institutes of development and research, and the market, and effectively contribute to the cycle of wealth production in society.

This is while unemployment of university graduates has created dire conditions. According to the labor force census conducted in the spring of 2018, 40.3% of Iran's unemployed population consists of graduates of the Iranian higher education system, with women having a larger share than men. One of the most obvious ways to eliminate gender discrimination and strive for the growth, prosperity, and empowerment of women is to open up education to women, especially higher education. Women with higher education are able to play a more active role in various social and economic fields, but the important point here is that inequalities in employment still exist despite women having attained higher education. Women's participation and entry into the labor market has been increasing globally in recent decades, and is considered the most important outcome of the revolution regarding women's gender roles. Therefore, two questions can be posed here: 1. Has the weakness of the Iranian higher education system caused unemployment of students and graduates in general and female students and graduates in particular? 2. Is the lack of a dynamic and thriving entrepreneurial ecosystem the reason behind unemployment?

According to the 2017 report by the Global Entrepreneurship Monitor (GEM), Iran ranks 31st among 67 countries in total early-stage entrepreneurial activity (TEA), which indicates emerging and new entrepreneurial activities among the adult population (ages 18 to 64). The country ranks 27th in the index of perceived entrepreneurial opportunities, which indicates awareness of opportunities in the environment in the next six months. Iran ranks 41st with respect to the entrepreneurial intention among the 67 countries surveyed. Moreover, Iran ranks 72nd among the 130 countries surveyed in a report by the global entrepreneurship index (GEI; Acs et al. 2018). Therefore, it is vital that higher education in Iran adopts the necessary changes and takes on new responsibilities. Along with their first and second missions (i.e., education and research), universities should prioritize entrepreneurship as their third mission in order to improve the entrepreneurial environment and contribute to start-up development (Czarnitzki 2016).

Entrepreneurial ecosystem and universities

In recent years, universities are increasingly required to prioritize a third mission, namely entrepreneurship, along with their traditional missions of education and research (Compagnucci and Spigarelli 2020). Adopting an approach emphasizing entrepreneurial ecosystems by universities can considerably contribute to this mission (Toledano and Urbano 2008) as universities are the second most important factor in entrepreneurial ecosystems, behind entrepreneurs. Consequently, much of the research has been focused on universities as the hub in such ecosystems (Kingma 2014; Rice et al. 2014; O'Connor and Reed 2015;

Fernandez Fernandez et al. 2015; Schaeffer and Matt 2016). Campanella et al. (2013) highlight the essential role of universities in producing entrepreneurs as university graduates have a greater ability and broader insights to become entrepreneurs. Given this significance, Mack and Mayer (2016) state that the ability to foster an entrepreneurial ecosystem is a crucial requirement for universities. In this research, we seek to examine whether Iranian universities have been successful at creating and promoting the entrepreneurial ecosystem for male and female students.

Entrepreneurial Ecosystem

Although entrepreneurial ecosystems have been gaining popularity, the concept of the entrepreneurial ecosystem still lacks a clear definition (Stam and van de Ven 2021). Stam (2015) proposed a broad definition for entrepreneurial ecosystems as a coordinated collection of factors and actors operating in an interdependent manner, making productive entrepreneurship possible within a particular region. Mason and Brown (2014) proposed a more comprehensive definition for this concept as the collection of actors, organizations, institutions, and processes involved in entrepreneurship which come together through both formal and informal structures to link, mediate, and manage the activities within an entrepreneurial environment. This definition focuses on the dynamic and systematic nature of this concept by highlighting the role of various elements such as actors, organizations, and processes (Brown and Mason 2017). Nicotra et al. (2018) define the entrepreneurial ecosystem as the set of economic, social, political, and cultural factors that promote the creation and expansion of innovation-based start-ups in a region and motivate individuals to get involved in high-risk activities such as starting and funding businesses.

The necessary environmental factors for a successful entrepreneurial ecosystem have been defined by organizations such as the Organization for Economic Cooperation and Development (OECD), the World Economic Forum (WEF), and the World Bank. The definition put forward by the OECD encompasses the theoretical framework, culture, access to financial capital, market conditions, entrepreneurial capabilities, R&D and technology. According to the Asset Mapping Roadmap, the entrepreneurial ecosystem is influenced by eight environmental factors: financial capital, human capital, R&D institutions and related organizations, physical infrastructure, legal and regulatory environment, quality of life, and industrial base (Nicotra et al. 2018). The Babson College Entrepreneurial Ecosystem Project defines six domains for an entrepreneurial ecosystem: policy (governmental regulations and support for entrepreneurship), culture (social norms and the prevalence of successful entrepreneurship), human capital (competent higher education

and skill level of the work force), support (infrastructure, non-governmental entities, and availability of professionals including legal and financial experts such as investment bankers, accountants, lawyers), market (entrepreneurial networks and the existence of primary customers), and financial capital (access to financial resources for entrepreneurs). In July of 2010, Daniel Isenberg, a professor at Babson College, there was someone who proposed a comprehensive model for studying entrepreneurial ecosystems. According to Isenberg, entrepreneurial ecosystems include six main domains, which will be explained in what follows.

Isenberg's entrepreneurial ecosystem model

Isenberg's entrepreneurial ecosystem model is most popular among policymakers (Stam and Spigel 2016) as indicated by the fact that this model is more commonly cited compared to other similar models (Maleci 2018). Moreover, the Isenberg's model is the base model for studying the concept of ecosystems, which comprises hundreds of elements that can be categorized into the six main areas of policy, culture, human capital, support, market and financial capital.

Policy refers to the laws and regulations in a country that are concerned with starting a business. Policy and legal factors are a key part of the economic and political context in which entrepreneurship takes place (Isenberg 2010). Culture refers to people's beliefs and attitudes towards entrepreneurship. The two main components of the cultural domain in an entrepreneurial ecosystem are cultural attitudes and the history of entrepreneurship in a culture (Spigel 2015). Human capital refers to the skilled work force needed for entering an entrepreneurial ecosystem. Universities contribute to entrepreneurial ecosystems in two ways: Spigel (2015), citing Wolfe (2005), believes that universities help develop human capital in a region while simultaneously promoting an entrepreneurial mindset among students and encouraging them to start businesses. Support refers to the support provided by organizations and institutions in a socio-economic system for entrepreneurship; non-governmental institutions, trade organizations, and infrastructure are important components of support. According to Zhang and Li (2010), providing support services through different types of mediators can significantly lower the barriers to entry for entrepreneurship and reduce the time needed to enter the innovation market (Stam 2015). Market consists of customers and networks. Access to markets is a crucial requirement of providing opportunities within entrepreneurial ecosystems. Financial capital is among the necessary components to start a business. Bank loans are the most common source of external financial capital for many businesses and entrepreneurs who often rely on direct debt (OECD 2014). Access to financial capital is crucial for investment in long-term entrepreneurial projects (Stam 2015).

Therefore, Isenberg' entrepreneurial ecosystem model has been chosen as the basis for this research to evaluate the perceptions of students of agriculture regarding the availability of components of Iran's entrepreneurial ecosystem (policy, culture, human capital, support, market, financial capital). Moreover, we seek to examine whether there are differences between male and female students with respect to their perceptions of components of the entrepreneurial ecosystem according to the Isenberg's model. Also, we investigate the extent to which gender differences in perceptions are rooted in students' capabilities and their perceptions of the structure of the entrepreneurial ecosystem.

Entrepreneurial intention and intention to start-up

Entrepreneurship research commonly uses entrepreneurial intent as an indicator of entrepreneurial behavior (Carsrud and Brannback 2010). Intention refers to the motivational factors shaping an individual's behavior. Intentions also represent the determination intensity or effort for a particular behavior (Drnovsek and Erikson 2005).

In this research, the focus is start-up launching intention among students of agriculture in Iran. Recent decades have seen an increase in the number of start-ups along with the economic flourishing of such businesses (Shaikh 2019). Founding a start-up is an individual's choice that correlates with certain demographic and perceptual factors (Arenius and Minniti 2005). Thus, understanding these factors and perceptual variables is essential for policymakers and academicians (Arafat and Saleem 2017). However, Fayolle and Linan (2014) call for a reconsideration of research on entrepreneurial intention given the importance of start-up development for employment and economic growth. Hence, they advocate for the integration of entrepreneurial intention with other constructs through the framework of different theories to steer research in this area into a new direction. Therefore, in this study, the effect of perceptions of components of the entrepreneurial ecosystem according to Isenberg's model (2011) on start-up launching intention was studied among students of agriculture in Iran. In other words, we aimed to identify the perceptual factors affecting male and female students' start-up launching intention according to the Isenberg's model, a dimension that has so far received less attention.

Gender

It has been widely acknowledged that entrepreneurship is important for regional performance and

development (Nicolae et al. 2016; Audretsch et al. 2008; European Commission 2009). At the same time, diversity of economic actors is a crucial contributor to economic growth at the national and local levels (Broda and Weinstein 2006). Nevertheless, research has revealed a gender bias in the contextual structures within which entrepreneurial activities take place. There are reports of gender bias in innovation systems (Lindberg et al. 2014), policies oriented towards innovation and entrepreneurship (Pettersson 2007), and support infrastructure such as technology transfer mechanisms (Kochenkova et al. 2015) and incubators (Marlow and McAdam 2012). Also, according to Social feminist theory female fundamentally differs from males in their entrepreneurial attitude and hence their business performance (Wube and Atwal 2023).

It is also worth noting that different actors are involved in entrepreneurial ecosystems, including individuals, corporations, institutes of higher education, incubators, and financial organizations. These actors operate within a web of interactions where their impact on the growth and development of a start-up is reinforced. In this concept, entrepreneurship is not viewed merely as an outcome of the system; rather, entrepreneurs are central to the creation, growth, and continued existence of the ecosystem (Stam 2015). Despite the limited knowledge available on the effects of gender on entrepreneurial ecosystems, it stands to reason that the majority of such ecosystems suffer from gender imbalance as more men are involved in entrepreneurship than women (Kelley et al. 2015). In addition, Maes et al. (2014) highlight the gender-based differences in entrepreneurial intention.

Thus, we also aim to understand how gender moderates the relationship between perceptions of the availability of the components of Iran's entrepreneurial ecosystem and start-up launching intention among male and female students of agriculture using the Isenberg's model.

Hypothesis development

One of the objectives being pursued in this study is to evaluate students' willingness to launching a business, and to examine whether there are differences between male and female students with respect to the willingness to starting a business. We also investigate how the perceptions of male and female students of the components of the entrepreneurial ecosystem based on the Isenberg's model influence the intention to launch a business. Our hypotheses are proposed below:

H_{a1}: The perception of the availability of the policy component has an effect on start-up launching intention among students of agriculture.

H_{a2}: The perception of the availability of the culture component has an effect on start-up launching intention among students of agriculture.

H_{a3}: The perception of the availability of the human capital component has an effect on start-up launching intention among students of agriculture.

H_{a4}: The perception of the availability of the support component has an effect on start-up launching intention among students of agriculture.

H_{a5}: The perception of the availability of the market component has an effect on start-up launching intention among students of agriculture.

H_{a6}: The perception of the availability of the financial capital component has an effect on start-up launching intention among students of agriculture.

As mentioned earlier, there is gender inequality in the entrepreneurial ecosystem, with men being more active than women. Given the rising wave of educated women and girls in Iran, it appears that they can now play an important role in social changes, yet the question is whether educated women and female university graduates in Iran will be able to enter the economic and market sectors, or will they be overshadowed by men due to the influence of factors such as culture? Therefore, in this study the effect of gender has also been studied as a moderator between the perception of the availability of the components of an entrepreneurial ecosystem and start-up launching intention, the following hypotheses were also proposed:

H_{b1}: Gender moderates the effect of the perception of the policy component on start-up launching intention among students of agriculture.

H_{b2}: Gender moderates the effect of the perception of the culture component on start-up launching intention among students of agriculture.

H_{b3}: Gender moderates the effect of the perception of the human capital component on start-up launching intention among students of agriculture.

H_{b4}: Gender moderates the effect of the perception of the support component on start-up launching intention among students of agriculture.

H_{b5}: Gender moderates the effect of the perception of the market component on start-up launching intention among students of agriculture.

H_{b6}: Gender moderates the effect of the perception of the financial capital component on start-up launching

intention among students of agriculture.

The research model was developed based on these hypotheses. Figure 1 represents the research model.

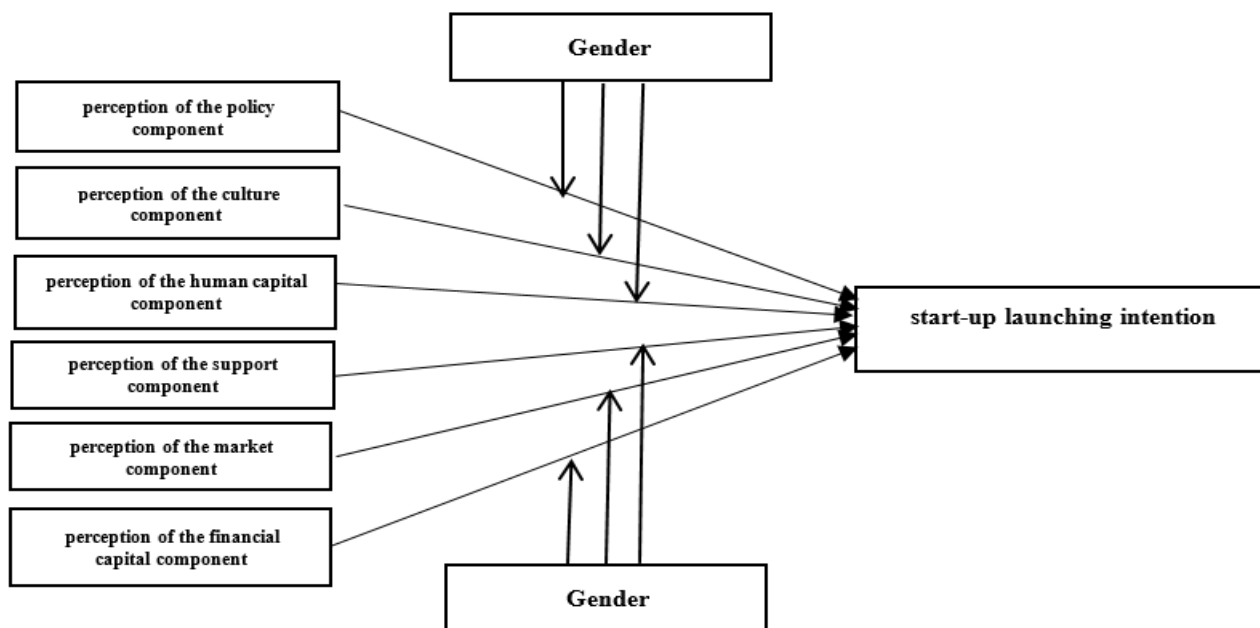


Figure 1. Research model

Methods

This study is an applied research as it is designed to apply scientific approaches in order to increase the willingness to launch a start-up among male and female students of agriculture. This research is also a causal study as it identifies the factors affecting start-up launching intention among male and female students of agriculture in Iran. Further details regarding data and sample collection are provided in the following sections.

Sample and data collection

Students of agricultural majors in Iran formed the study population. Iran is a climatically diverse country with four seasons and is the second largest country in the Middle East, encompassing an area of more than 1.64 million square kilometers. Iranian universities were divided into five regions according to the

classification by Iran's Ministry of Science, Research and Technology. Then, among the universities with a faculty of agriculture, one faculty was randomly selected in each region.

The selected faculties of agriculture included: College of Agriculture and Natural Resources at University of Tehran (from the first region), Faculty of Agriculture at Birjand University (from the second region), Faculty of Agriculture at University of Mohaghegh Ardabili (from the third region), Faculty of Agriculture at Ilam University (from the fourth region), and Faculty of Agriculture at Shiraz University (from the fifth region). According to the Institute for Research and Planning in Higher Education, the five faculties host a total of 3781 students (bachelor's, master's and doctoral degree students) of agriculture affiliated to the Ministry of Science, Research and Technology. Cochran's formula was used to determine sample size, which was estimated to be 416 individuals (112 students from the first region, 74 students from the second region, 87 students from the third region, 79 students from the fourth region, and 64 students from the fifth region).

An online questionnaire was designed in Avalform software, an Iranian platform for the design and distribution of questionnaires. The questionnaire was then shared via email and social networks with the target populations. In total, we received 450 responses, of which 34 were removed due to incomplete information in the initial review. A final set of 416 responses was used in the analyses. More than half of the respondents (52%) were female, aged 26-37 (39.7%).

Research instrument

The research instrument was a close-ended questionnaire designed based on the entrepreneurial ecosystem toolkit developed by the Aspen Institute (Aspen Network of Development Entrepreneurs 2013) and interviews with experts and authorities in the field of entrepreneurship and start-ups. Indicators of the six components of entrepreneurial ecosystem were determined based on the Isenberg's model. Also, indicator variables for start-up launching intention were identified and used to prepare the questionnaire. In the pre-test stage, questionnaire items with a Cronbach's alpha of less than 0.7 were discarded and the final questionnaire was prepared and entered into the field stage of the research. The perception of the components of the entrepreneurial ecosystem (policy, culture, human capital, support, market, and financial capital) and start-up launching intention were measured in the form of a 5-point Likert scale (very low = 1 to very high = 5).

Results

Descriptive statistics

As shown in Table 1, the statistical distribution of the latent variable was assumed to be normal based on the values of kurtosis and skewness for the perception of the entrepreneurial ecosystem components and start-up launching intention (between 2 and -2).

Table 1. Descriptive statistics for the latent variables

Constructs	Skewness		Kurtosis	
	Statistic	SD	Statistic	SD
perception of the policy component	0.37	0.24	-1.35	0.48
perception of the culture component	0.31	0.28	-1.23	0.55
perception of the human capital component	0.64	0.43	-1.13	0.84
perception of the support component	1.37	0.33	0.99	0.65
perception of the market component	0.46	0.26	-1.25	0.51
perception of the financial capital component	0.18	0.12	0.71	0.23
start-up launching intention	0.38	0.12	0.22	0.23

Furthermore, the comparison of means obtained from random samples is an important method of performing statistical testing. In this method, samples are randomly selected from two different populations (regardless of whether the number of samples is equal), and the means for the two populations are compared. In this section, male and female students' perceptions of the availability of the entrepreneurial ecosystem components based on the Isenberg's model are compared.

According to the results presented in Table 2, perception of the availability of the policy component is 1.32 and 1.16 for male and female students, respectively. Levene's test for equality of variances confirms the equality of variance between the two groups (Sig = 0.69). In other words, the variance in the perception of the availability of the policy component is equal between male and female students. Male students' perception of the status of the culture component is 1.51 and female students' perception is 1.35. The results of the Levene's test confirms the assumption of equality of variances (Sig = 0.1), meaning that the variance in male and female students' perception of the availability of the culture component is equal. Male students' perception of the status of the human capital component is 1.54 and female students' perception is 1.38.

According to the results of the Levene's test (Sig = 0.7), the assumption of equality of variances is confirmed, meaning that the variance of male and female students' perceptions of the availability of the human capital component is equal. Male students' perception of the status of the support component is 1.51 and female students' perception is 1.31. The comparison of variances confirmed the equality of variances; i.e., the variance in male and female students' perception of the availability of the support component is equal. Male students' perception of the availability of the market component is 1.54 and female students' perception is 1.25. The Levene's test showed a value of Sig equal to 0.002, rejecting the assumption of equality variances between male and female students' perception of the availability of the market component. Male students' perception of the availability of the financial capital component is 1.51 and female students' perception is 1.32. The assumption of equality of variances is rejected according to the results of the Levene's test (Sig = 0.000); in other words, the variance of male and female students' perception of the availability of the financial capital component is not equal. Mean start-up launching intention is 1.50 among male students and 1.31 among female students. The Levene's test rejected the equality of variances (Sig = 0.02). In other words, start-up launching intention is not equal among male and female students.

Table 2. Comparison of male and female students' perception of the availability of the components of entrepreneurial ecosystems

Component	Gender	Frequency	Mean	Standard deviation	Mean Deviation	F	Sig
Policy	Male	201	1.32	0.76	0.05	0.15	0.69
	Female	215	1.61	0.77	0.05		
Culture	Male	201	1.15	0.75	0.05	2.7	0.1
	Female	215	1.35	0.82	0.05		
Human capital	Male	201	1.54	0.68	0.04	0.14	0.7
	Female	215	1.38	0.66	0.04		
Support	Male	201	1.51	0.67	0.04	0.73	0.39
	Female	215	1.31	0.70	0.04		
Market	Male	201	1.54	0.58	0.04	9.29	0.002
	Female	215	1.25	0.69	0.04		
Financial capital	Male	201	1.51	0.53	0.03	13.6	0.000
	Female	215	1.32	0.70	0.04		
Start-up launching intention	Male	201	1.50	0.62	0.04	4.85	0.02
	Female	215	1.31	0.69	0.04		

Analysis of data

Given the aim of this study (i.e. evaluating start-up launching intention among male and female students of agriculture in Iran), we tested the hypotheses using structural equation modeling (SEM) based on partial least squares (PLS) in SmartPLS3. SEM offers a powerful approach to testing complex linear relationships between dependent and independent latent variables. Hypothesis testing in SEM is carried out within the structure of the research model, and determinant coefficients, path coefficients and t-values are used to evaluate the research model and hypotheses. PLS was utilized as it is a more fitting approach for studies with complex research models. SEM contains a measurement model as well as a structural model at the same time and the PLS analysis generates results for both the structural and the measurement models. By evaluating the measurement model, the reliability and validity of the structures can be evaluated. Also, the structural model evaluation was employed to evaluate research hypotheses (Hair et al. 2017). We further utilized a multi-group analysis to evaluate the moderating effect of gender on the relationship between perception of the entrepreneurial ecosystem components according to the Isenberg's model and start-up launching intention.

Evaluating the measurement model

Confirmatory factor analysis (CFA) was carried out to assess the measurement model and determine the reliability and validity of the latent variables in the research model.

Unidimensionality

All indicators had standardized factor loadings greater than 0.5 (Table 3) and were also statistically significant at the 1% confidence level ($P < 0.01$). The findings support the unidimensionality of the selected indicators under each structure, confirming the correct selection of the indicators and their fitness for further analyses.

Table 3. Results of the measurement model evaluation

Latent variables	Indicator	Mean (SD)	t-value	α	CR	AVE
Policy	P1	1.39 (1.12)	14.23 ^a	0.88	0.92	0.73
	P2	1.26 (1.002)	85.57 ^a			
	P3	1.10 (0.90)	43.57 ^a			
	P4	1.31 (1.03)	60.97 ^a			
Culture	C1	1.32 (0.96)	72.25 ^a	0.89	0.92	0.75
	C2	1.34 (0.99)	84.23 ^a			
	C3	1.29 (0.89)	57.97 ^a			
	C4	1.36 (0.91)	39.22 ^a			
Human capital	H1	1.41 (0.83)	77.31 ^a	0.90	0.93	0.76
	H2	1.41 (0.87)	63.84 ^a			
	H3	1.48 (0.84)	60.32 ^a			
	H4	1.44 (0.85)	32.79 ^a			
Support	S1	1.31 (0.89)	44.31 ^a	0.88	0.92	0.74
	S2	1.52 (0.93)	48.84 ^a			
	S3	1.48 (0.86)	85.94 ^a			
	S4	1.55 (0.90)	65.94 ^a			
Market	M1	1.42 (0.84)	61.37 ^a	0.87	0.92	0.80
	M2	1.42 (0.80)	90.03 ^a			
	M3	1.33 (0.77)	74.19 ^a			
Financial capital	F1	1.48 (0.85)	41.82 ^a	0.80	0.88	0.71
	F2	1.37 (0.76)	77.04 ^a			
	F3	1.46 (0.80)	16.71 ^a			
Start-up launching intention	In1	1.49 (0.94)	42.88 ^a	0.84	0.88	0.56
	In2	1.38 (0.86)	45.49 ^a			
	In3	1.43 (0.80)	34.51 ^a			
	In4	1.45 (0.83)	38.77 ^a			

^a Significant at the 1% level.

Composite reliability (CR)

As shown in Table 4, the composite reliability of the latent variables in the study is greater than 88% (larger than the critical value of 70%), and the values of Cronbach's alpha ranged from 80% to 90%. These results confirm the composite reliability of the latent variables and demonstrate that all research construct measures are highly reliable and internally consistent.

Convergent validity

The average variance extracted (AVE) for the research constructs is larger than 0.50, indicating appropriate convergent validity for all latent variables (Table 3).

Discriminant validity

For all research constructs, AVE is greater than the square of correlation coefficient with other constructs, which indicates diagnostic validity. As shown in Table 4, each construct has an AVE that is larger than the square of the correlation coefficient between the constructs ($0.75 < AVE < 0.89$ vs. $0.51 < r < 0.80$), which indicates that the indicators selected under each construct in the measurement model share a high percentage of the common variance of that construct compared to other constructs, supporting the diagnostic validity of the constructs in the model.

Table 4. Correlations for the square roots of AVE

Constructs	1	2	3	4	5	6	7
Culture	0.87^a						
Financial capital	0.56 ^b	0.84^a					
Human capital	0.61 ^b	0.54 ^b	0.87^a				
Start-up launching intention	0.77 ^b	0.75 ^b	0.75 ^b	0.75^a			
Market	0.58 ^b	0.64 ^b	0.53 ^b	0.63 ^b	0.89^a		
Policy	0.80 ^b	0.52 ^b	0.51 ^b	0.72 ^b	0.57 ^b	0.86^a	
Support	0.70 ^b	0.60 ^b	0.70 ^b	0.71 ^b	0.68 ^b	0.64 ^b	0.86^a

^a Square roots of AVE estimate.

^b Correlation is significant at the <0.01 level.

Evaluating the structural model

A structural model was employed to examine the hypotheses as conceptual framework of the research. Figures 2 and 3 highlight the β and t-values for the models, respectively.

Path coefficients (β)

The perception of the policy, culture, human capital, support, market, and financial capital components have a positive and significant effect on start-up launching intention among Iranian male and female students of agriculture ($P < 0.01$). Therefore, hypotheses $H_{a1,2,3,4,5,6}$ are confirmed. The perception of the financial capital component has the greatest effect ($\beta = 0.32$) on start-up launching intention, followed by perception of the human capital ($\beta = 0.24$), support ($\beta = 0.16$), market ($\beta = 0.16$), policy ($\beta = 0.15$), and culture ($\beta = 0.13$).

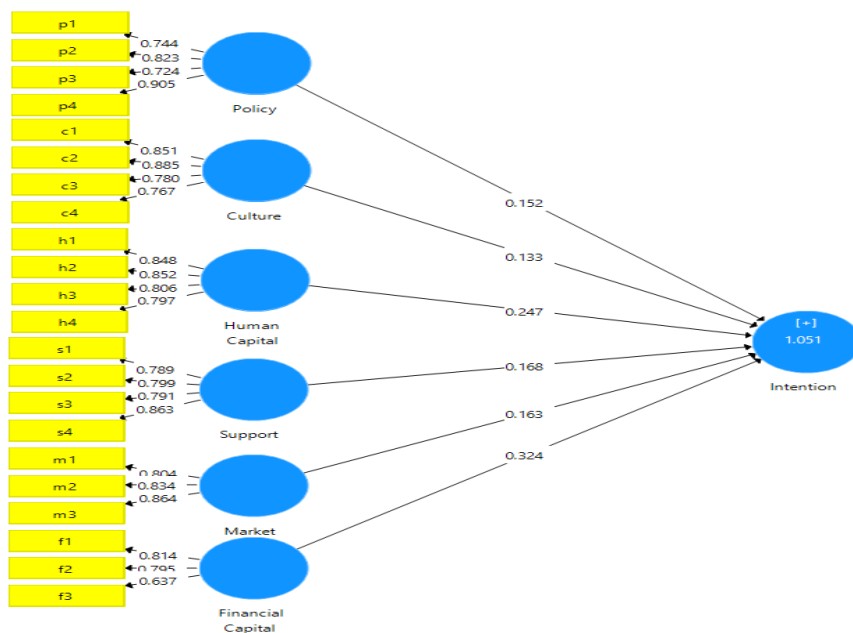


Figure 2. Path model with standardized factor loadings

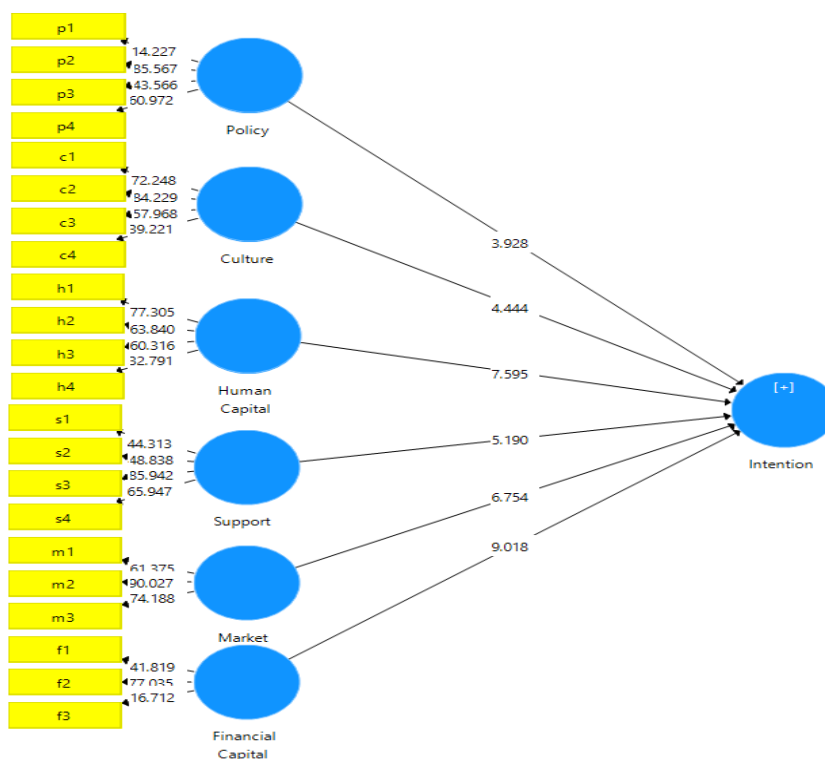


Figure 3. Path model with t-values

Moderating effects

We hypothesized that gender would moderate the relationship between start-up launching intention among Iranian students of agriculture and the perception of the entrepreneurial ecosystem components. The PLS was used to create two groups of variables based on gender. Therefore, respondents were divided and grouped according to their gender using the grouping variable menu in SmartPLS (215 females and 201 males). Additionally, we performed bootstrapping for the results of the multi-group analysis (Table 5).

Table 5. Results of the moderating effect of gender.

Structural path	β (t)		$\Delta\beta$	t-value	Sig.
	Female	Male			
Policy \rightarrow Intention	0.17 (3.26 ^a)	0.10 (1.85)	0.07	0.95	0.34
Culture \rightarrow Intention	0.15 (2.92 ^a)	0.15 (3.07 ^a)	0.00	0.01	0.99
Human capital \rightarrow Intention	0.19 (5.08 ^a)	0.32 (6.47 ^a)	0.13	2.10	0.04
Support \rightarrow Intention	0.14 (2.76 ^a)	0.21 (4.34 ^a)	0.07	1.04	0.30
Market \rightarrow Intention	0.19 (4.92 ^a)	0.19 (4.46 ^a)	0.00	0.05	0.96
Financial capital \rightarrow Intention	0.29 (8.19 ^a)	0.15 (3.74 ^a)	0.15	2.78	0.01

^a Significant at the <0.01 level.

^b Significant at the <0.05 level.

Table 5. shows that among female students, perception of all entrepreneurial ecosystem components (policy, culture, human capital, support, market, and financial capital) has a positive and significant effect on start-up launching intention. Similarly, among male students, perception of all components with the exception of policy has a positive and significant effect on start-up launching intention.

Overall, the results of the multi-group analysis indicate that gender does not moderate the relationship between start-up launching intention and the latent variables of perception of the policy, culture, support, and market. In contrast, the relationship between perception of the human and financial capital components and start-up launching intention is moderated by gender; the positive effect of perception of the human capital on start-up launching intention is greater among male students ($\beta = 0.32$, $t = 6.47$) than female students. On the other hand, the positive effect of the perception of the financial capital component on start-up launching intention is greater among female students ($\beta = 0.29$, $t = 8.19$) than male students.

Discussion

In recent years, the concept of entrepreneurial ecosystems has been receiving increasing attention (Audretsch and Belitski 2021; Novotny et al. 2020; Spigel 2020). However, substantial gaps remain about this concept, as highlighted by Hakala et al. (2020) and Wurth et al. (2022). One of the gaps in the literature on entrepreneurial ecosystem is the effect of gender. Therefore, we investigated the effect of gender as a moderating variable on the relationship between perception of the entrepreneurial ecosystem components and start-up launching intention among Iranian students of agriculture.

It should be noted that there was a move towards increased post-graduate education among Iranian women in the 1990s, closing the gap between men and women, resulting in women overtaking men in more recent years. However, there is still a gap in Iranian women's entry into the economy and markets. This is while in some countries, women are less involved in entrepreneurship than men (Kauffman Foundation 2021). This lower rate has been attributed mainly to women's lower confidence in business skills as well as limited access to financial resources and networks (Doshi 2022; Korreck 2019). However, other reasons have also been proposed for gender bias in entrepreneurial ecosystems. Economic systems are often path-dependent and inert and are therefore constructed and maintained based on previous choices made by male actors. Gender inequalities limit women's abilities and options within entrepreneurial ecosystems (Gray and James, 2007). Overall, exclusion of women from entrepreneurial ecosystems and gender bias in processes and interactions within the system limit value creation and adversely impact innovation (Blake and Hanson 2005).

Considering that the Isenberg's model examines the entrepreneurial ecosystem more comprehensively, we first examined the perceptions of students regarding the availability of entrepreneurial ecosystem components in Iran. Then, the effects of these components on start-up launching intention among students of agriculture were investigated. Finally, we studied the effect of gender as a moderating variable on the relationship between the perception of the entrepreneurial ecosystem components and start-up launching intention among the target population. The practical and theoretical implications of the findings are outlined below.

Theoretical implications

The findings indicate that Iranian male and female students of agriculture have very little to little perception of the entrepreneurial ecosystem components (policy, culture, human capital, support, market, and financial

capital).

Female students had lower perceptions of the availability of the components of the entrepreneurial ecosystem compared to male students, and evaluated the status of these components as being lower in Iranian universities, which could be attributed to the failure of Iranian universities to actively get involved in the entrepreneurial ecosystem. This is despite the fact that universities play a dynamic and active role in the entrepreneurial ecosystem even in regions that are not viewed as hubs of entrepreneurship (Motoyama and Knowlton 2017).

It should be noted that the entrepreneurial ecosystem may be formed at the university, regional or national levels (Fetters et al. 2010; Morris et al. 2017). Therefore, universities are connected with the entrepreneurial ecosystem on two levels: first, at the regional entrepreneurial ecosystem and second, at the university entrepreneurial ecosystem (Isenberg 2010; WEF 2014; Miller and Acs, 2017). With regard to the university entrepreneurial ecosystem, factors including favorable educational atmosphere, management and leadership approaches, and suitable infrastructure such as training courses can play a vital role in nurturing potential entrepreneurial students (Miller and Acs 2017). Hence, universities have made significant investments in this field (Sieger et al. 2014). Consequently, it is essential for Iran's higher education system to make the necessary investments in the entrepreneurial ecosystem.

Furthermore, start-up launching intention was very low to low among female and male Iranian students of agriculture. Therefore, it could be concluded that universities have not successfully fulfilled their role in creating and fostering the entrepreneurial ecosystem in higher education centers, nurturing entrepreneurial students, and increasing students' willingness for entrepreneurship. Start-up launching intention was weaker among female students, which could indicate their belief that the components of the entrepreneurial ecosystem are in poor conditions and also the failure of Iranian universities to create the required conditions for strengthening the components of the entrepreneurial ecosystem in order to foster the activity and participation of female students.

Based on our findings, all components of the entrepreneurial ecosystem had a positive and significant effect on start-up launching intention among students. The perception of the financial capital component had the greatest and the perception of the culture component had the smallest effect on start-up launching intention. In other words, Iranian female and male students of agriculture believe that access to financial and economic resources can play a significant role in motivating them to launch a start-up. Male respondents believed that the policy component does not affect start-up launching intention. They believe that laws, regulations and

policies in the country have no effect on the creation of start-ups.

In addition, gender did not moderate the relationship between the variables of perception of the policy, culture, support, and market among the respondents, while we observed a moderating effect for gender on the relationship between perception of the human capital and financial capital.

Practical implications

The following guidelines are based on our results to help administrators at universities and agricultural centers of higher education. First, considering that perception of the financial capital had the greatest impact on start-up launching intention among the students, it could be hypothesized that increasing students' access to loans and financial resources from public and private banks and angel investors will boost their willingness to launch start-ups. It is also noteworthy that female students believed that financial capital had a greater effect on start-up launching intention than male students. Female students believed that access to financial and economic resources from public and private banks and angel investors increases start-up launching intention.

Moreover, considering that the perception of the human capital component was the second most effective component for start-up launching intention, increasing students' access to education related to entrepreneurship and launching start-ups at the university level are crucial as many students are unfamiliar with how to launch a start-up. If they receive the necessary training in this regard, it is more likely that they will be motivated to launch a start-up. Also, increasing access to educational workshops related to entrepreneurship, as well as holding entrepreneurial events such as start-up weekends which provide students with experiential education in the field of entrepreneurship, will allow students to gain the necessary knowledge to launch start-ups.

We argue that receiving proper training in the classroom, educational workshops and entrepreneurial events will change students' views on entrepreneurship and launching a start-up. A short survey on this matter could be highly informative. In such a survey, students of agriculture are asked questions regarding entrepreneurship education (EE) and launching a start-up. An average EE higher than 3 suggests students support an increase in entrepreneurship education at universities. In addition, experienced professors in the field of entrepreneurship and start-up and their high-quality instruction can create a positive mindset in students towards entrepreneurship and launching start-ups. Male students assign more significance to the

effect of the human capital component on start-up launching intention than female students. They believe that access to entrepreneurship education, workshops and entrepreneurship events at universities, professors' familiarity with entrepreneurship and start-ups, as well as the quality of entrepreneurship education provided by professors increase start-up launching intention among students.

Limitations and future research

This research has a number of limitations. Our study sample was composed entirely of university students, which limits the generalizability of the results to other groups. Also, we recommend that future studies evaluate the entrepreneurial ecosystem at other faculties and among students of other fields to improve generalizability.

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