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Agricultural Start-up Ecosystem: A Model of Entrepreneurial Ecosystem in Iran

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ABSTRACT

A sustainable entrepreneurial ecosystem is developed and expanded with an emphasis on innovation-based entrepreneurship in emerging Start-ups. This phenomenon requires identifying the influencing factors in this process. This study aimed to analyze the agricultural start-up ecosystem in order to provide a model of the entrepreneurship in Iran. A survey research method was applied to achieve research objectives. The population of the study consisted of managers of agricultural Start-up of Iran, (N= 90). The questionnaire was the main instrument to collect data. Confirmatory factor analysis and structural equation modeling were used to analyze the data. In total, the research results showed that 9 constructs and 131 sub-constructs could explain 82.1% of the variance of entrepreneurial sustainability in agricultural Start-ups. Based on the obtained results, the overall goodness of fit statistics shows that the structural model fits well with the data. The planners of the agricultural entrepreneurship sector can play an effective role in smoothing the development path of agricultural entrepreneurship in Start-ups by using the results of this study and considering the identified factors.

Keywords: Employment, Entrepreneurship, Innovation, Sustainable development.

INTRODUCTION

Agriculture is the key to development in the field of human civilization (Sharma *et al*., 2022; Anthony *et al*., 2014; Loizou *et al*., 2019). This section is an important source of business and commercial activity that has always absorbed a significant part of the labor force (Norouzi *et al*., 2023). In Iran, like in other developing countries, agriculture is one of the most important economic sectors and includes a high percentage of production and employment. Examining the past events, the climate situation, the current employment situation and urbanization clearly shows that the share of the agricultural sector in the national gross product has increased in recent years and the growth of this sector has been positive, unlike other sectors. Therefore, considering that this sector is a job creator, provider of food security, and development of the country, it is very necessary (Vahdati and Sarikhani, 2020). Considering the existence of unemployment problems in Iran, the agricultural sector plays an important role in reducing this problem (Hekmat, 2011). With the development of start-up jobs in the agricultural sector, which emphasizes innovation and technology, the problem of unemployment will be reduced to a significant extent. A country's economy flourishes when the ground is provided for innovation and presence in competitive global markets (Alizadeh *et al*., 2022).

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Moving towards innovation and making changes in the mix of products and services is a topic that is discussed in the field of start-up business. Start-up business plays an essential role in creating employment in Iran, and accelerates the economic cycle, so, efforts should be made to remove the obstacles and problems facing this issue (Nabiuny *et al*., 2021). In this regard, one of the elements of entrepreneurship development is to focus on the growth of start-ups (Norouzi *et al*., 2023). A startup is a human institution that creates a new product or service in conditions of great uncertainty (Blank and Dorf, 2012). Agricultural startup is an institution that tries to increase the productivity and efficiency of agriculture by using new ideas and technologies (Norouzi *et al*., 2023).

According to the conducted research, there are many obstacles for the creation and development of agricultural start-ups in Iran. The most important of them are as follows (Naderi *et al*., 2016a):

Low attractiveness of activities in the agricultural sector to attract capital,

Thinking of high costs and low profit margins of activities related to agriculture,

Mismanagement and lack of recognizing the priorities of the agricultural sector,

Inability of the government information system to serve idea-oriented agriculture projects

Failure to make strategic decisions for progress in the agricultural sector.

In another research, the same researchers found solutions to overcome the obstacles of Start-up agricultural businesses, including the followings (Naderi *et al*., 2016b):

Introduction of agricultural businesses to the relevant government institutions by the Science and Technology Park,

Support of the related organizations such as the Agricultural Jihad, the Deputy on Food and Drug Administration for the provision of basic equipment,

Adjustment in policies and macro decisions in the field of agriculture,

Financial support from governmental and non-governmental institutions to provide capital in the sector of agricultural Start-up businesses

In the current situation, due to the pandemic of Covid-19, climate change, and the energy crisis caused by the war in Russia and Ukraine, the food system is weakened globally (Allam *et al*., 2022). Along with the mentioned issues, population growth and a 70% increase in the need for food should also be considered (FAO, 2018). In addition to food system crises, population growth and high agricultural waste have also reached a significant level. About one third of food is wasted in the chain of production to consumption (Lindgren *et al*., 2018). Paying attention to agricultural start-ups in the field of using smart methods and alternatives can have an effective role in increasing productivity and food security (Moro-Visconti, 2021). Agricultural start-ups play a fundamental and important role in business model innovation and entrepreneurship development (Mendes *et al*., 2022). Today, due to the high risk of businesses and the desire to use new technologies, agricultural start-ups have developed and expanded significantly and have provided the necessary conditions for the development of entrepreneurship based on innovation (Aliabadi *et al*., 2022). Tiwari *et al*. (2021) found that startups have a positive impact on creating an entrepreneurial ecosystem, which is a whole that enables the rapid flow of talent, information, and resources, helping entrepreneurs quickly find what they need at each stage of growth. As a result, the whole is greater than the sum of its parts (Robertson *et al*., 2020).

The purpose of this research is designing an agricultural start-up ecosystem in order to provide a model of the entrepreneurial ecosystem in Iran, so that it can be used to increase the sustainability of entrepreneurship in agricultural activities. By evaluating various researches in the field of entrepreneurship, we came to the conclusion that no research has been done regarding agricultural startups and their relationship with the creation and development of the entrepreneurial

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ecosystem. For this reason, there is a research gap in this field, and it is necessary to carry out various researches in this regard.

Yousefi *et al*. (2016) identified the factors affecting the creation and development of agricultural start-ups. This included the low budget of the government to pay attention to new ideas in agricultural activities, the inappropriate process of information flow and communication to provide idea-oriented products to farmers, lack of interest in the idea-oriented agricultural market and little investment to turn the idea into a product. Dai and Si (2018) concluded that the relationship between government policies and the entrepreneurial orientation of public institutions and private companies has been a controversial topic in entrepreneurship research. Barba-Sánchez and Atienza-Sahuquillo (2012) concluded that behavioral drivers have an effective role in entrepreneurial behavior. The need for success, motivation, self-awareness, independence, dependence and competence are the most important behavioral motivators. Adeel *et al*. (2023) concluded that attitudinal motivators have an effective role on the development and sustainability of entrepreneurship. Kakani *et al*. (2020) believed that technology-based start-ups focusing on agribusiness solutions are looking for specific solutions to improve yields and increase productivity and achieve the goal of sustainable food supply for decades to come. Tiwari *et al*. (2021) found that start-ups had a positive effect in reducing regional entrepreneurial disparities but have been less successful due to the lack of financial support and funding. Results of their research indicated that macro intervention factors were of greater importance in a sustainable start-up ecosystem. Aliabadi *et al*. (2022) explained that sustainable entrepreneurial ecosystem focuses on sustainable development and how entrepreneurs could work to achieve innovative, risky, and profitable entrepreneurial activity, while maintaining economic, environmental, social, and cultural factors. Results of their research indicated that ecological, economic, social and institutional dimensions were of greater importance in a sustainable start-up ecosystem. The results of applying the cross-impact analysis method reveal that employment, business ownership and scale, income and saving, reforming laws, access to information, the existence of NGOs, and awareness and understanding of risk are among the factors affecting the system sustainability. These start-ups have great potential to change the agricultural sector by increasing technologies that help increase productivity in this field, related to reducing environmental and social costs in production methods (Mendes *et al*., 2022). In a study of start-ups to innovate agricultural production in Ecuador, Martínez Campoverde and Vega Abad (2023) concluded that start-ups had a remarkable growth in the last decade due to the extensive amount of benefits they offer by using the current technologies in the provision of a service or within production processes such as in agriculture. Therefore, it is considered necessary to describe them and show what systems they use in favor of innovation and increased agricultural production. Norouzi *et al*. (2023) showed that the most important threats of the Iranian Agriculture Start-ups ecosystem are as follows:

Slowness of processes in the public sector and lack of innovation",

Numerous regulations related to the issuance of entrepreneurial licenses",

Lack of supportive law for the development of Start-ups in the ecosystem",

Government monopoly on the supply of some agricultural inputs required for the Start-ups activities"

Therefore, based on the results of the aforementioned research, agricultural ecosystems can play an effective role in the development and improvement of the entrepreneurial environment and professional development.

The main reason for conducting this research is how we can turn the agricultural startup ecosystem into an entrepreneurial environment and what internal, external,

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micro and macro factors should receive attention. The conceptual framework shown in Figure 1 is extracted from the results of various researches from literature review (Table 1).

MATERIALS AND METHODS

A survey research method was applied to achieve research objectives. The population

Table 1. Extracted components and their operational definition based on their indicators.

Components	References	Operational definition based on their indicators
Behavioral Motivators	(Barba-Sánchez and Atienza-Sahuquillo, 2012; Dai and Si, 2018; Aliabadi *et al*., 2022)	Income generation, government support, self-confidence, new opportunities, job creating, social status, success, free services, product development
Attitudinal motivators	(Aliabadi *et al*., 2022; Adeel *et al*., 2023; Norouzi *et al*., 2023)	Minimize risk, marketing, innovation, funds, culture, sprit, knowledge, counseling, education, experience
Social constructs	(Lang and Fink, 2019; Tuatul Mahfud *et al*., 2020; Aliabadi *et al*., 2022)	Participation, group work, connections, community, institutionalization, education
Economical constructs	(Nabiuny *et al*., 2021; Aliabadi *et al*., 2022; Tahir and Burki 2023)	Income, working capital, incentives, export, market, added value, facilities, costs
Environmental potentials	(Dai and Si, 2018; Aliabadi *et al*., 2022; Adeel *et al*., 2023; Norouzi *et al*., 2023)	Climate change, education, institutions, experience, innovations, skills, technology parks, access to market, human power, guidelines
Intergroup social capital	(Lang and Fink, 2019; Aliabadi *et al*., 2022)	Communication, motivation, association, participation, risk-taking, education, law, efficiency, suggestion system
Educational strategy	(Ratten and Jones, 2021; Tuatul Mahfud *et al*., 2020; Lang and Fink, 2019; Aliabadi *et al*., 2022)	Problem solving, creativity, innovation, education, acquaintance with different institute, startup skills, familiarity with laws, budgeting, localization, micro and macro planning, marketing, productivity, efficiency, banking facilities, ICT
Macro intervening factors	(Tiwari *et al*., 2021; Yousefi *et al*., 2016; Alizadeh *et al*., 2022)	Investment, consulting services, export standard, bureaucracy, market, customer welcome, access to equipment, services institutes
Micro intervening factors	(Tiwari *et al*., 2021; Tuatul Mahfud *et al*., 2020; Lang and Fink, 2019; Aliabadi *et al*., 2022)	Age, skills, experiences, freedom, diagnosis, judgment, sprit
Entrepreneurship sustainability	(Aliabadi *et al*., 2022; Norouzi *et al*., 2023; Mendes *et al*., 2021; Tiwari *et al*., 2021)	Innovation investment, facilities, support owner of technology idea, education and training, financial assistance, legal permits

Figure 1. Conceptual framework of the research.

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of the study consisted of managers of agricultural Start-up of Iran, (N= 90). All statistical population was studied by census. Out of the total number of managers, 35 worked in the field of agricultural production, 30 in the field of product processing, and 25 in the field of sales and marketing. The way to contact and communicate with them was through e-mail, phone call, and Eitaa and Telegram Messengers. Finally, 90 managers were contacted and data was collected. The questionnaire was the main instrument to collect data. The validity was determined by a panel of experts. The minimum Cronbach's alpha coefficient for the factors was equal to 0.81 (Table 2). The first section included items about demographic characteristics. The second part explained the main determining factors of the agricultural start-up ecosystem that affect the sustainability of entrepreneurship, by 131 items (Table 2). Part three indicated sustainability of entrepreneurship in agricultural start-ups by 10 statements. The scale used in part two and three was Likert scale (1= Very low, 2= Low, 3= Average, 4= High, 5= Very high). Structural equation modeling was used to analyze the data. Structural Equation Modeling (SEM) was used to test for the direct, indirect, and mediating effects of the variable factors in the prediction of sustainability of entrepreneurship in agricultural start-ups. According to Torfi *et al*. (2023), it is appropriate to adopt a two-step approach for SEM: firstly, assessment of the measurement model, and secondly, assessment of the structural model.

RESULTS AND DISCUSSION

Demographic Characteristics of the Respondents .

The respondents' age showed that 40% were between 40-50 years and the average age was 44.26 years. Also, 55.5% of the respondents had PhD degrees and 44.4% had MSc. Moreover, 83.3% of the respondents were manager and 32.2% of them had managerial experience between 1-5 years.

Entrepreneurial Ecosystem in Agricultural Start-up

Entrepreneurial ecosystems include determinants whose performance determines the business path, success, and sustainability of the ecosystem, especially in the case of start-up businesses that operate with a high degree of technological innovation and service delivery (Ziakis *et al*., 2022). Considering the critical effect that domestic and foreign investments have on the national and international economy, understanding what motivates entrepreneurs is both practical and theoretically important. Although research on the factors and outcomes of entrepreneurial motivation has developed rapidly, it has evolved into

Table 2. The Cronbach's Alpha coefficient for the factors and the number of items of each factor.

Factors of the agricultural start-up ecosystem	Number of items	Cronbach's Alpha coefficient
Behavioral motivators	10	0.94
Attitudinal motivators	23	0.91
Social constructs	10	0.86
Economical constructs	16	0.92
Environmental potentials	14	0.86
Intergroup social capital	16	0.81
Educational strategy	23	0.86
Macro intervening factors	12	0.94
Micro intervening factors	7	0.88
Entrepreneurship sustainability	10	0.92

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distinct theoretical silos where entrepreneurs tend to separate motivations by the stage of business development to acknowledge that individuals often go through all of these stages and experience different types of motivations during their entrepreneurial process. Social, economic, and individual motivations play an effective role in this field (Murnieks *et al*., 2020). This is more important in agricultural start-ups in terms of social, economic, and cultural infrastructure. In this research, the main determining factors of the agricultural start-up ecosystem that affect the sustainability of entrepreneurship were analyzed.

Behavioral Motivators

In the study of behavioral motivators, 10 items were examined, and the managers were asked to express the behavioral motivations for the sustainability of entrepreneurship in agricultural start-ups. Then, based on the rank average, the most important behavioral motivation was obtained. Generating income, discovering new opportunities, and improving social status were ranked first to third (Figure 2). Barba-Sánchez and Atienza-Sahuquillo (2012) explained that certain reasons had more influence on entrepreneurial behavior, such as the need for achievement, self-realization, independence, affiliation, competence, power, and making money or being one's own boss.

Attitudinal Motivators

In the study of attitudinal motivators for the sustainability of entrepreneurship in agricultural start-ups, 23 items were taken into consideration and company managers were asked to express their opinion about these items. Based on the rank average, the most important attitudinal motivations were obtained. Investment for young generations, academic education, and availability of suitable technologies were ranked first to third (Figure 3). Adeel *et al*. (2023) concluded that people who had more prior knowledge, entrepreneurial awareness, opportunity recognition, entrepreneurial motivation and entrepreneurial intention showed more entrepreneurial behavior. In addition, people who participated in entrepreneurship education perform differently than people who did not receive any entrepreneurship education. Specifically, people who enroll in entrepreneurship education are more likely

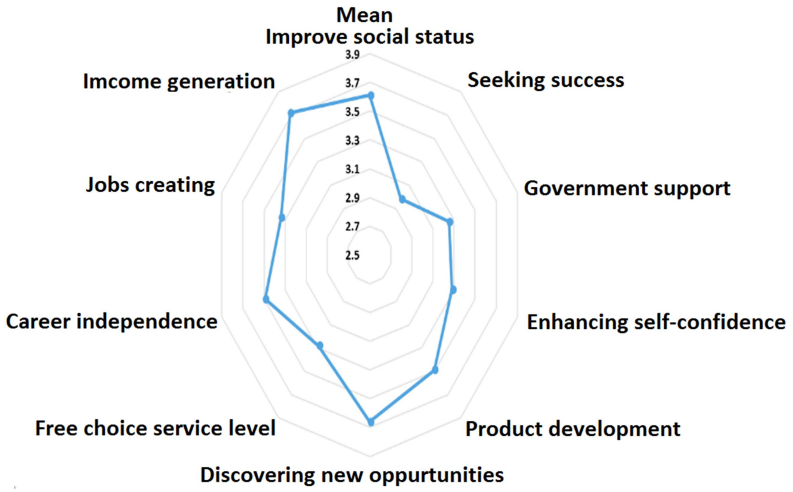

Figure 2. Behavioral motivations for the sustainability of entrepreneurship in agricultural start-ups.

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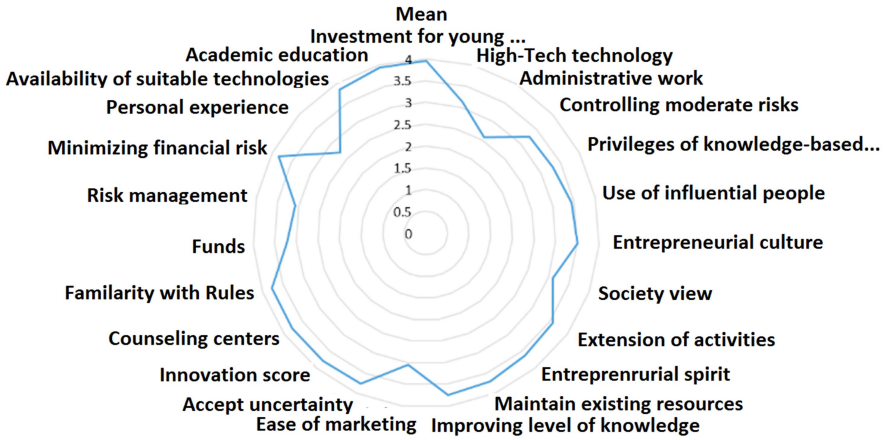

Figure 3. Attitudinal motivators for the sustainability of entrepreneurship in agricultural start-ups.

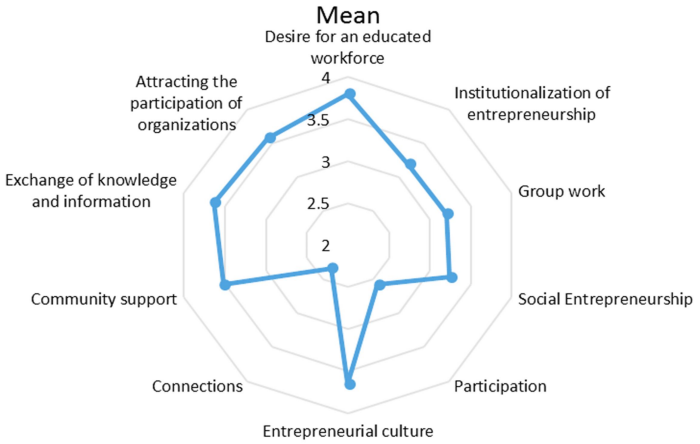

Figure 4. Social constructs for the sustainability of entrepreneurship in agricultural start-ups.

to use prior knowledge and awareness to identify new business opportunities than others, and align their motivations to start a new venture.

Social Constructs

In the study of social constructs for the sustainability of entrepreneurship in agricultural start-ups, 10 items were examined. Desire for an educated workforce, entrepreneurial culture and exchange of knowledge and information were ranked first to third (Figure 4). Song *et al.* (2020) explained that social security had a positive effect on the technology-based entrepreneurial activity. Tuatul Mahfud *et al.* (2020) revealed that entrepreneurial attitude orientation, social capital, and psychological capital collaboratively and interactively influence the entrepreneurial intention. Psychological capital was shown to have a positive partial mediation effect on the relationship between entrepreneurial attitude orientation and entrepreneurial intention. Finally, psychological capital was also found to fully mediate the impact of a social capital on entrepreneurial intention.

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Economical Constructs

In the study of economical constructs for the sustainability of entrepreneurship in agricultural start-ups, 16 items were examined. Among them, appropriate facilities, attracting the required financial resources, and supplying inputs at a low cost were ranked the first to third (Figure 5). Tahir and Burki (2023) explained that entrepreneurship had a positive and significant effect on economic growth in emerging economies. The relationship between human capital and economic growth for BRICS economies is both positive and statistically significant. Finally, the causality test showed a unidirectional relationship from entrepreneurship to economic growth. According to the results obtained in this study, encouraging young people to pursue entrepreneurial careers is likely to help solve the problem of youth unemployment in BRICS economies.

Environmental Potentials

Based on the results in Figure 6, 14 items were examined in the field of environmental potential for the sustainability of entrepreneurship in agricultural start-ups. Company managers were asked to express the effectiveness of these items. The obtained results showed that the managers considered the most important potential to be mandatory government guidelines, access to market and inputs, and establishment in science and technology parks were ranked the first to third. Dai and Si (2018) concluded that the relationship between government policies and the entrepreneurial orientation of public institutions and private companies was a controversial topic in entrepreneurship research.

Intergroup Social Capital

In the study of effective intergroup social capital for the sustainability of entrepreneurship in agricultural start-ups, 16 items were examined. Managers were asked to express the impact of each item on the improvement process. The obtained results showed that the items visiting successful companies, successful training programs, and motivation promotion programs were ranked the first to third (Figure 7). The entrepreneurship and social capital literature in recent years has highlighted the innovative and problem-solving capacity of social entrepreneurs as new positions that seek to solve socio-economic problems in rural areas and induce sustainable change (Lang and Fink, 2019).

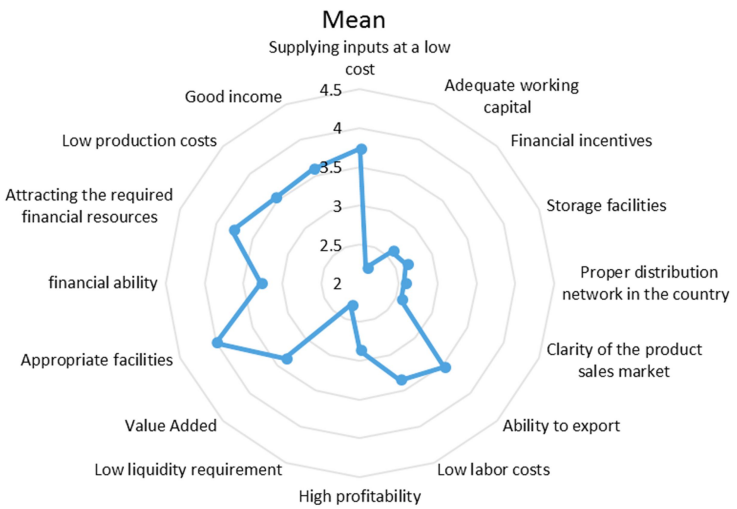

Figure 5. Economical constructs for the sustainability of entrepreneurship in agricultural start-ups.

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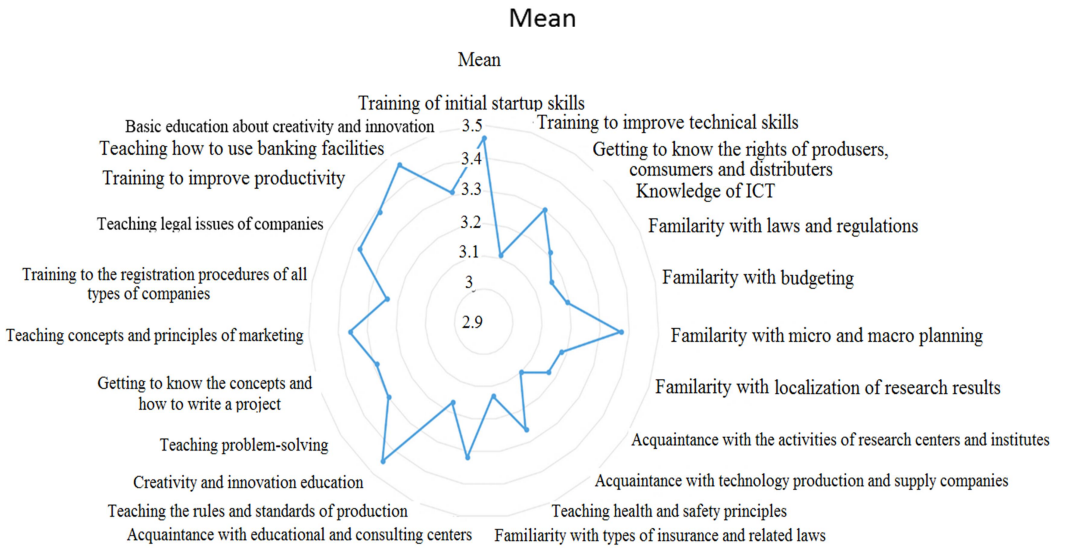

Figure 8. Educational strategies for the sustainability of entrepreneurship in agricultural start-ups.

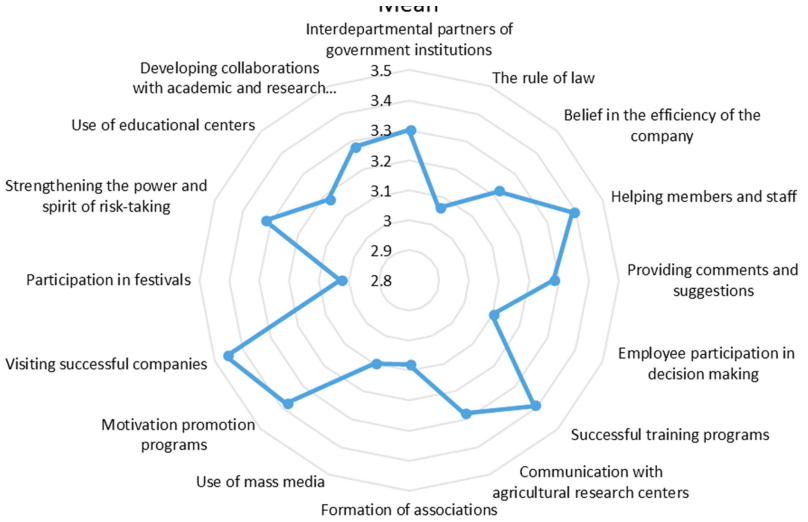

Figure 7. Intergroup social capital for the sustainability of entrepreneurship in agricultural start-ups.

Educational Strategy

In Figure 8, the effective educational strategies of sustainability of entrepreneurship in agricultural start-ups were examined in the form of 23 items. Managers were asked to determine the effectiveness of each strategy. The obtained results showed that the managers considered teaching of "how to use banking facilities" to be the most important educational strategies, and the next priorities were training of initial Start-up skills, training to improve productivity, and teaching legal issues of the companies. Ratten and Jones (2021) believed entrepreneurship education was one of the most popular subjects in management education, due to its ability to link practice with theory.

Macro Intervening Factors

Based on the results of Figure 8, 12 items were taken into consideration in the

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investigation of macro intervening factors affecting the sustainability of entrepreneurship in agricultural start-ups. Managers were asked to determine the impact of these items. The obtained results showed that the most important intervening factors were performing management consulting services, and the next priorities were creating service institutions to facilitate the development of companies and access to appropriate equipment to start the company.

Micro Intervening Factors

In the investigation of micro-intervening factors effective on the sustainability of entrepreneurship in agricultural start-ups, 7 items were investigated. The results obtained from the prioritization of these intervening factors showed that the high level of risk-taking spirit among managers was the most important intervening factor, and the work experience and several types of skills and abilities were among the next priorities (Figure 10).

Entrepreneurship Sustainability

Indicators in Agricultural Start-ups

In the study of sustainability of entrepreneurship in agricultural start-ups, 10 indicators raised in theoretical studies and interviews with elites were taken into consideration. The results showed that the most important indicator was to provide low interest loans to entrepreneurs, and the next priorities were investment and the necessary financing through innovation investment funds and assistance in obtaining loans and entrepreneurship facilities (Figure 11).

Structural Equation Modeling (SEM)

In this research, SEM was used to identify the direct and indirect effects of the factors on the sustainability of entrepreneurship in agricultural start-ups. The results of confirmatory factor analysis showed the initial measurement model to provide an acceptable fit for the data (X^2= 2.04; GFI= 0.98; TLI= 0.94; CFI= 0.96; IFI= 0.92; RMSEA= 0.052). Therefore, the measurement model provided a reasonable

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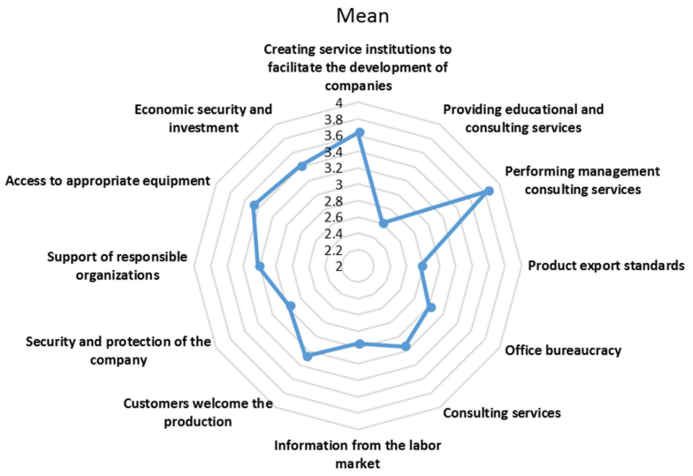

Figure 9. Macro intervening factors for the sustainability of entrepreneurship in agricultural start-ups.

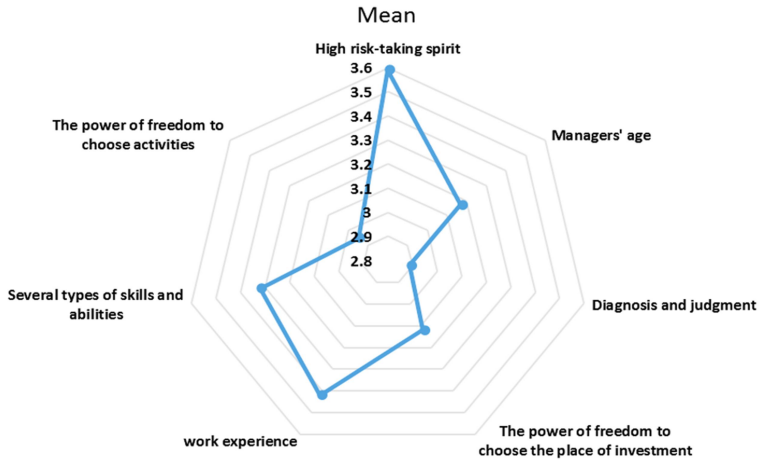

Figure 10. Micro intervening factors for the sustainability of entrepreneurship in agricultural start-ups.

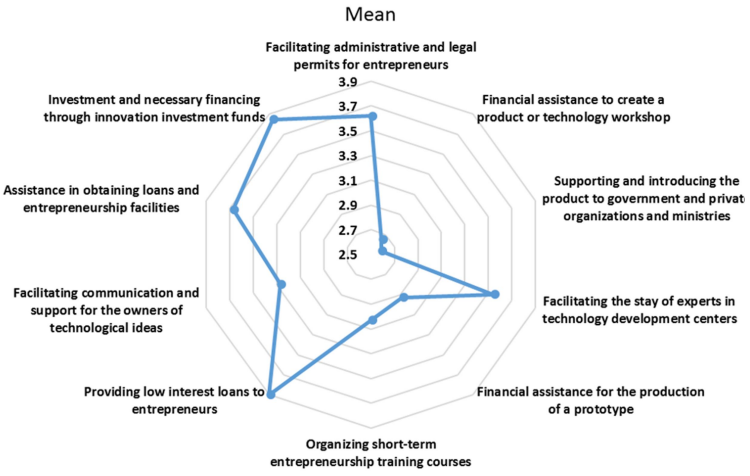

Figure 11. Indicators of entrepreneurship sustainability in agricultural start-ups.

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fit (Table 3). Thus, the hypothesized model was judged suitable for the SEM.

Convergent Validity

Convergent validity of the measurement model indicates that the observed variables that define the same latent variable should have a relatively high correlation as assessed by the factor loadings. Generally, values of, at least, 0.3 to 0.5 are interpreted as acceptable, and those greater than 0.5 to 0.7 as good, while values greater than 0.7 are interpreted as very good (Kang and Ahn, 2021). The results in Table 2 show the t-value for the factor loadings exceed 4 ($P< 0.01$) and the standardized factor loading to all have values greater than 0.6. This shows good convergent validity for the constructs of this study.

Construct Reliability (CR)

Construct reliability measures how well the variables underlying constructs served in structural equation modelling. In SEM construct, reliability is depicted using confirmatory factor analysis (CFA). Composite reliability is estimated based on the factor loading analysis (Lerdpornkulrat *et al*., 2017). It is allowed to have a build reliability coefficient greater than 0.70. A value of CR $\geq$ 0.7 is required to achieve construct reliability (Tentama and Anindita, 2020). As shown in Table 5, all of the constructs had CR that were greater than the recommended 0.70. The result is a good composite or CR for the constructs measured in this study.

Discriminant Validity

Based on the results in Table 4, the square root of the AVE estimate for each construct is greater than the correlation between it and all other construct in the model. This means that the indicators have more in common with the construct that they are associated with the other constructs. Thus, discriminant validity is shown for the constructs in the measurement model.

Table 3. Summary of Goodness of Fit Indices for the measurement model.[a]

Fit indices	X^2	P	GFI	CFI	TLI	IFI	RMSEA
Value in study	2.04	0.02	0.98	0.96	0.94	0.92	0.052
Suggested value	-	> 0.05	> 0.80	> 0.90	> 0.90	> 0.90	< 0.08

[a]Goodness of Fit Index (GFI), Tucker-Lewis Index (TLI), Comparative Fit Index (CFI), Incremental Fit Index (IFI), Root Mean Square Error of Approximation (RMSEA).

Table 4. Results of Confirmatory Factor analysis for the measurement model and the effects of constructs on outcome.

Constructs	CR	AVE	Outcome	Path coefficient	t-Value	R^2
Behavioral Motivators	0.754	0.83		0.612	4.532	
Attitudinal Motivators	0.762	0.85		0.584	5.124	
Social Constructs	0.858	0.82	Sustainability of	0.612	4.854	
Economical Constructs	0.895	0.84	entrepreneurship in	0.819	5.065	
Environmental Potentials	0.767	0.85	agricultural start-	0.587	4.085	0.812
Intergroup Social Capital	0.861	0.84	ups	0.612	5.089	
Educational Strategy	0.785	0.81		0.681	9.012	
Macro Intervening Factors	0.845	0.92		0.576	5.018	
Micro Intervening Factors	0.834	0.91		0.641	3.945	

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Assessment of the Structural Model

From Table 4 and Figure 12, the predictive positive effect of BM (β= 0.612, t-Value= 4.532, P< 0.001), AM (β= 0.584, t-Value= 5.124, P< 0.001), SC (β= 0.612, t-Value= 4.854, P< 0.001), EC (β=0.819, t-Value= 5.065, P< 0.001), EP (β=0.587, t-Value= 4.085, P< 0.001), ISC (β= 0.612, t-Value=

Table 5. Means, SD and correlations with square roots of the AVE.

Variable	Mean	SD	BM	AM	SC	EC	EP	ISC	ES	MaIF	MiIF
BM	3.87	0.81	0.83 [a]								
AM	3.95	0.92	0.81**	0.85 [a]							
SC	3.84	0.84	0.73**	0.74**	0.82 [a]						
EC	4.06	0.85	0.69**	0.69**	0.81**	0.84 [a]					
EP	3.92	0.81	0.75**	0.71**	0.80**	0.79**	0.85 [a]				
ISC	3.95	0.98	0.73**	0.72**	0.73**	0.74**	0.75**	0.84 [a]			
ES	4.06	0.82	0.81**	0.78**	0.71**	0.75**	0.72**	0.77**	0.81 [a]		
MaIF	4.08	0.84	0.79**	0.74**	0.70**	0.74**	0.82**	0.82**	0.84**	0.92 [a]	
MiIF	3.98	0.87	0.69**	0.69**	0.81**	0.75**	0.70**	0.74**	0.72**	0.74**	0.91 [a]

**Correlation is significant at the P< 0.01 level. [a] The square roots of AVE estimates, AVE: Average Variance Extracted.

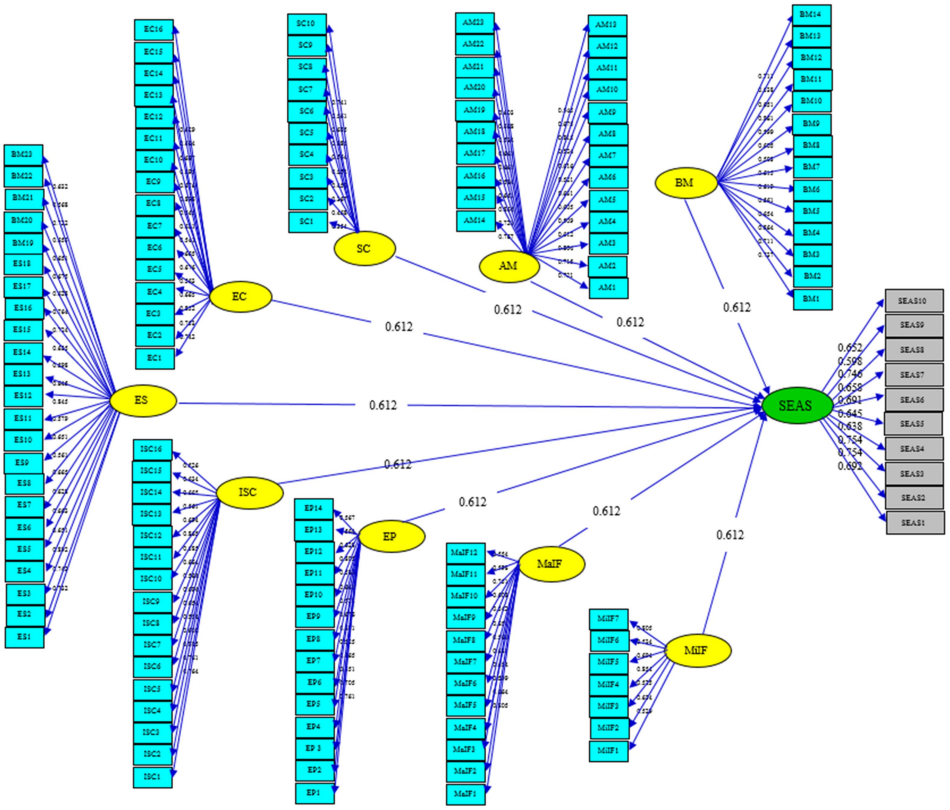

Figure 12. Path Model with Standardized Factor Loadings. SEAS: Sustainability of Entrepreneurship in Agricultural Start-Ups; BM: Behavioral Motivators; AM: Attitudinal Motivators; SC: Social Constructs; EC: Economical Constructs; EP: Environmental Potentials; ISC: Intergroup Social Capital; ES: Educational Strategy; MaIF: Macro Intervening Factors, and MiIF: Micro Intervening Factors.

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5.089, P< 0.001), ES (β=0.681, t-Value= 9.012, P< 0.001), MaIF (β= 0.576, t-Value= 5.018, P< 0.001), and MiIF (β= 0.641, t-Value= 3.945, P< 0.001) are on the sustainability of entrepreneurship in agricultural start-ups. Based on the research results presented in Table 4, the amount of R^2= 0.812 was estimated. This indicates that 9 constructs and 131 sub-constructs have the ability to explain 81.2% of the sustainability of entrepreneurship in agricultural start-ups variance. Based on the results obtained, the overall goodness of the fitting statistics showed that the structural model was well consistent with the data.

CONCLUSIONS

Creation and expansion of agricultural start-ups for the development of entrepreneurship is a multi-dimensional issue. Analyzing the agricultural Start-up ecosystem will play an important role in entrepreneurship and employment. The results of the analysis showed that the most important behavioral motivation that has an effect on the sustainability of entrepreneurship in agricultural start-ups includes generating income, discovering new opportunities, and improving social status that were ranked first to third. Therefore, it is very important for the government sector to facilitate income generation and provide the necessary conditions for discovering new sources of income and efforts to strengthen the social position of startups in the agricultural sector. Also, the important attitudinal motivations in this regard were include investment for young generations, academic education, and availability of suitable technologies that were ranked first to third. Therefore, providing the necessary facilities to strengthen the attitude of people regarding working in startup companies will play an effective role in attracting creative and innovative youth and will strengthen the motivation and spirit of hope in the society. In addition, the social constructs that were effective on sustainability were identified. The most important of them included desire for an educated workforce, entrepreneurial culture and exchange of knowledge and information, which were ranked first to third. Economical constructs were the next factor that was investigated on the sustainability of entrepreneurship in agricultural start-ups. The most important economic constructs were appropriate facilities, attracting the required financial resources and supplying inputs at a low cost, which were ranked first to third. Therefore, it can be claimed that in the economic field, an action has been taken in the direction of the sustainability of entrepreneurship in startups when the necessary facilities for the development of innovation and creativity infrastructures for entrepreneurship have been provided. Overall, the research results showed that 9 constructs and 131 sub-constructs can explain 81.2 percent of the variance of the sustainability of entrepreneurship in agricultural start-ups. Therefore, taking the necessary measures to improve the influencing variables in the ecosystem of agricultural start-ups provides the necessary potential for the sustainability of entrepreneurship in the agricultural sector and can facilitate the path of agricultural development as a benchmark. Agricultural entrepreneurship planners should take advantage of this findings and use the results of this research to provide the necessary conditions for the development of entrepreneurship in the agricultural sector.

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اکوسیستم استارت آپی کشاورزی: الگویی از اکوسیستم کارآفرینی در ایران

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چکیده

یک اکوسیستم کارآفرینی پایدار با تأکید بر کارآفرینی مبتنی بر نوآوری در استارت‌آپ‌های نوظهور توسعه و گسترش می‌یابد. این پدیده مستلزم شناسایی عوامل موثر در این فرآیند است. این مطالعه با هدف تحلیل اکوسیستم استارت آپی کشاورزی به منظور ارائه مدلی از کارآفرینی در ایران انجام شد. برای دستیابی به اهداف تحقیق از روش تحقیق پیمایشی استفاده شد. جامعه آماری پژوهش را مدیران شرکت های نوپا کشاورزی ایران (۹۰ نفر) تشکیل می دادند. ابزار اصلی جمع آوری داده ها پرسشنامه بود. برای تجزیه و تحلیل داده‌ها از تحلیل عاملی تأییدی و مدل‌سازی معادلات ساختاری استفاده شد. در مجموع، نتایج تحقیق نشان داد که ۹ سازه و ۱۳۱ زیرسازه می توانند ۸۲.۱ درصد واریانس پایداری کارآفرینی را در استارت آپ های کشاورزی توضیح دهند. بر اساس نتایج به‌دست‌آمده، آمار کلی برازش نشان داد که مدل ساختاری برازش خوبی با داده‌ها دارد. برنامه ریزان بخش کارآفرینی کشاورزی می توانند با استفاده از نتایج این پژوهش و در نظر گرفتن عوامل شناسایی شده، نقش موثری در هموارسازی مسیر توسعه کارآفرینی کشاورزی در استارت آپ ها ایفا کنند.

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