ACCEPTED ARTICLE

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

Homayoon Dinarany[a], Tahmasb Maghsoudi[a]*, Saeed Mohammadzadeh[b], Azadeh Noorollah Noorivandi[a]

[a]Department of Agricultural Extension and Education, Shoushtar Branch, Islamic Azad University, Shoushtar, Iran
[b]Department of Agricultural Extension and Education, Agricultural Sciences and Natural Resources University of Khuzestan, Mollasani, Khuzestan, Iran

*Corresponding author: Email: Tahmasebmaghsoudi@gmail.com

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 can explain 82.1 percent the variance of entrepreneurial sustainability in agricultural Start-ups. Based on the obtained results, the overall goodness of fit statistics showed 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: Agricultural Start-up, Employment, Entrepreneurship, Innovation, Iran, 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 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 & 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). 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 the 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, lack of recognizing the priorities of the agricultural sector, and the inability of the government information system to serve idea-oriented agriculture projects and failure to make strategic decisions for progress in the agricultural sector (Naderi et al., 2016a). In another research, the same researchers found solutions to overcome the obstacles of Start-up agricultural businesses, including the introduction of agricultural businesses to the relevant government institutions by the Science and Technology Park, the support of related organizations such as the Agricultural Jihad, the Deputy 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 (Naderi et al., 2016b). 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, high agricultural waste has 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 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. An entrepreneurial ecosystem 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 ecosystem. For this reason, there is a research gap in this field, and it is necessary to carry out various researches in this regard.

Literature review

Yousefi et al., (2016) in a research identified the factors affecting the creation and development of agricultural start-ups, which include 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, 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 have 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 sustainable entrepreneurial ecosystem focuses on sustainable development and how entrepreneurs can 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). Martínez Campoverde and Vega Abad (2023) in study of start-ups to innovate agricultural production in Ecuador concluded in Ecuador, start-ups have had a remarkable growth in the last decade due to the extensive amount of benefits they offer by using 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 "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", and "government monopoly on the supply of some agricultural inputs required for the Start-ups activities" are the most important threats of the Iranian Agriculture Start-ups ecosystem. 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, micro and macro factors should be paid attention. The conceptual framework that showed in Figure 1, is extracted from the results of various researches from literature review (Table 1).

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

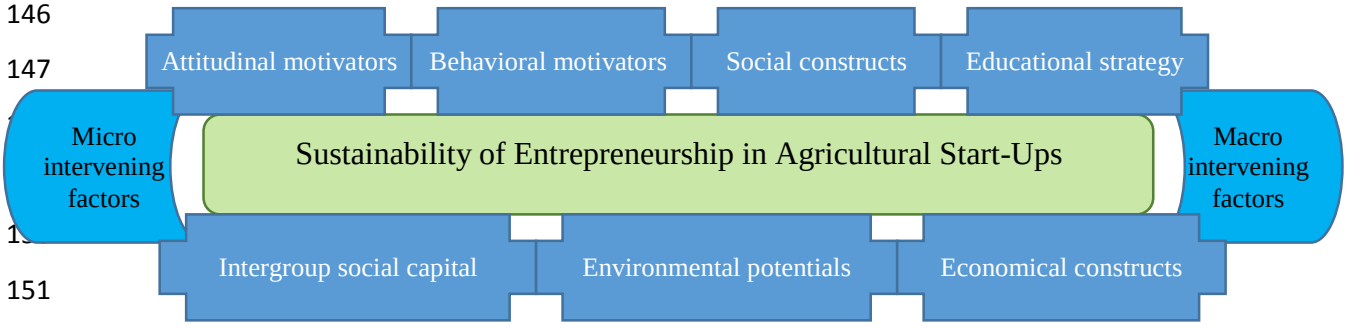

Figure 1. Conceptual framework of the research

Methodology

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). All statistical population was studied by census. Out of the total number of managers, 35 managers worked in the field of agricultural production, 30 managers in the field of product processing, and 25 managers 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). First section included items about demographic characteristics. 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 factors variables 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: first, assessment of the measurement model; second, assessment of the structural model.

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

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, 55.56% of the respondents had Ph.D degrees and 44.4% had MSc. Moreover,

the position of 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 distinct theoretical silos where entrepreneurs tend to separate motivations by stage of business development to acknowledge that individuals often go through all of these stages go through 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 have been 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. 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 certain reasons have 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.

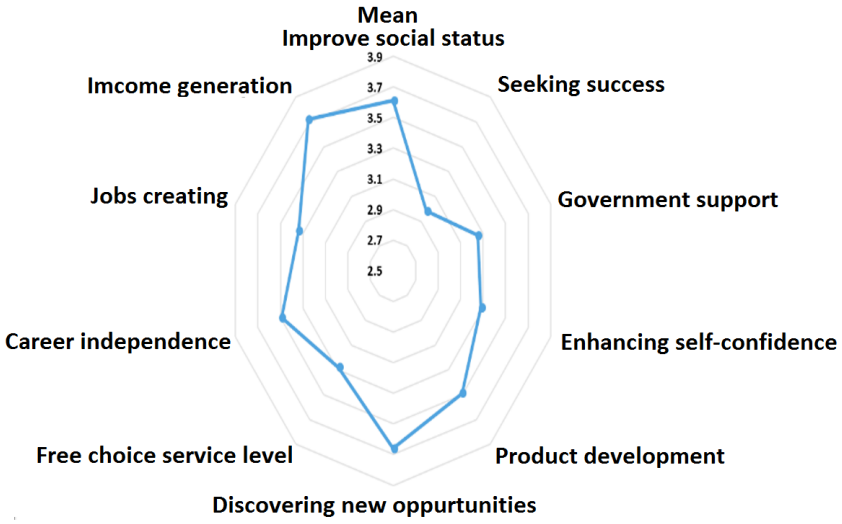

Figure 2. Behavioral motivations for the sustainability of entrepreneurship in agricultural start-ups.

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, people who have more prior knowledge, entrepreneurial awareness, opportunity recognition, entrepreneurial motivation and entrepreneurial intention show 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 than others to use prior knowledge and awareness to identify new business opportunities and align their motivations to start a new venture.

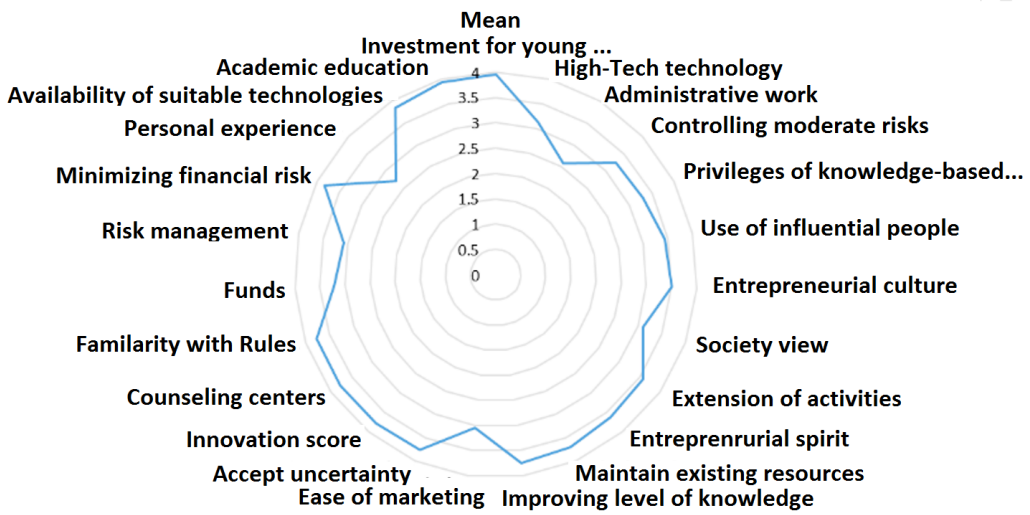

Figure 3. Attitudinal motivators for the sustainability of entrepreneurship in agricultural start-ups.

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 social security has 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.

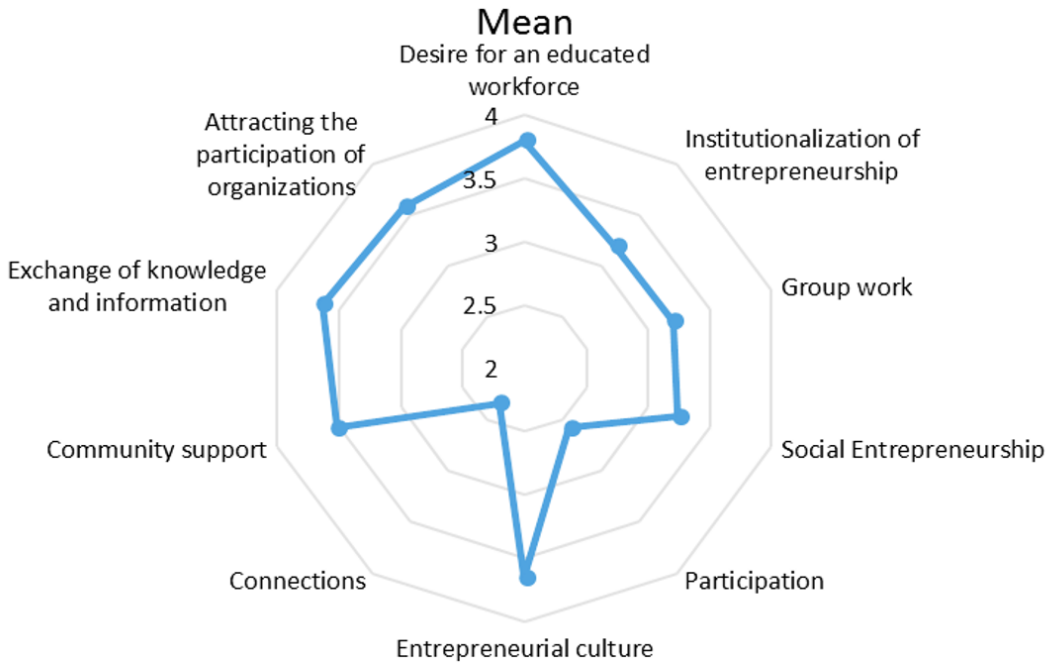

Figure 4. Social constructs for the sustainability of entrepreneurship in agricultural start-ups.

Economical constructs

In the study of economical constructs for the sustainability of entrepreneurship in agricultural start-ups, 16 items were examined, appropriate facilities, attracting the required financial resources and supplying inputs at a low cost were ranked first to third (Figure 5). Tahir and Burki (2023) explained that entrepreneurship has 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.

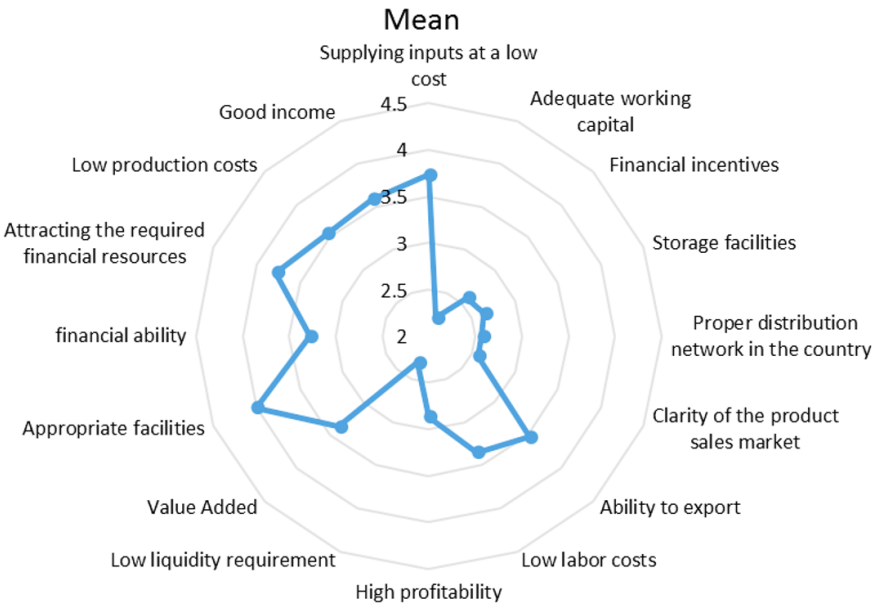

Figure 5. Economical constructs for the sustainability of entrepreneurship in agricultural start-ups.

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 first to third. Dai and Si (2018) concluded, the relationship between government policies and the entrepreneurial orientation of public institutions and private companies has been a controversial topic in entrepreneurship research.

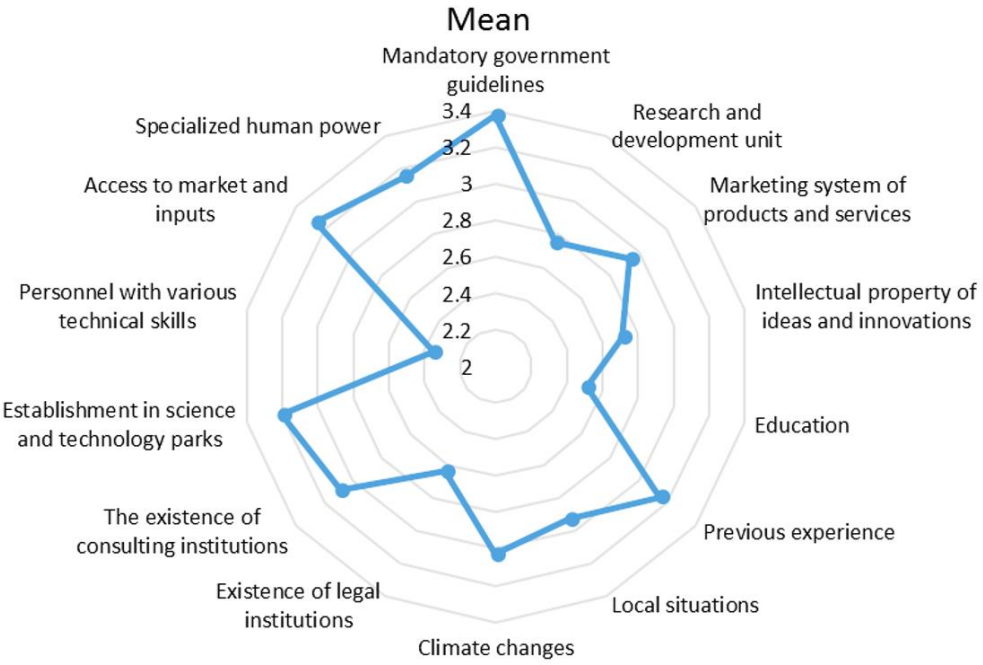

Figure 6. Environmental potential for the sustainability of entrepreneurship in agricultural start-ups.

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 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)

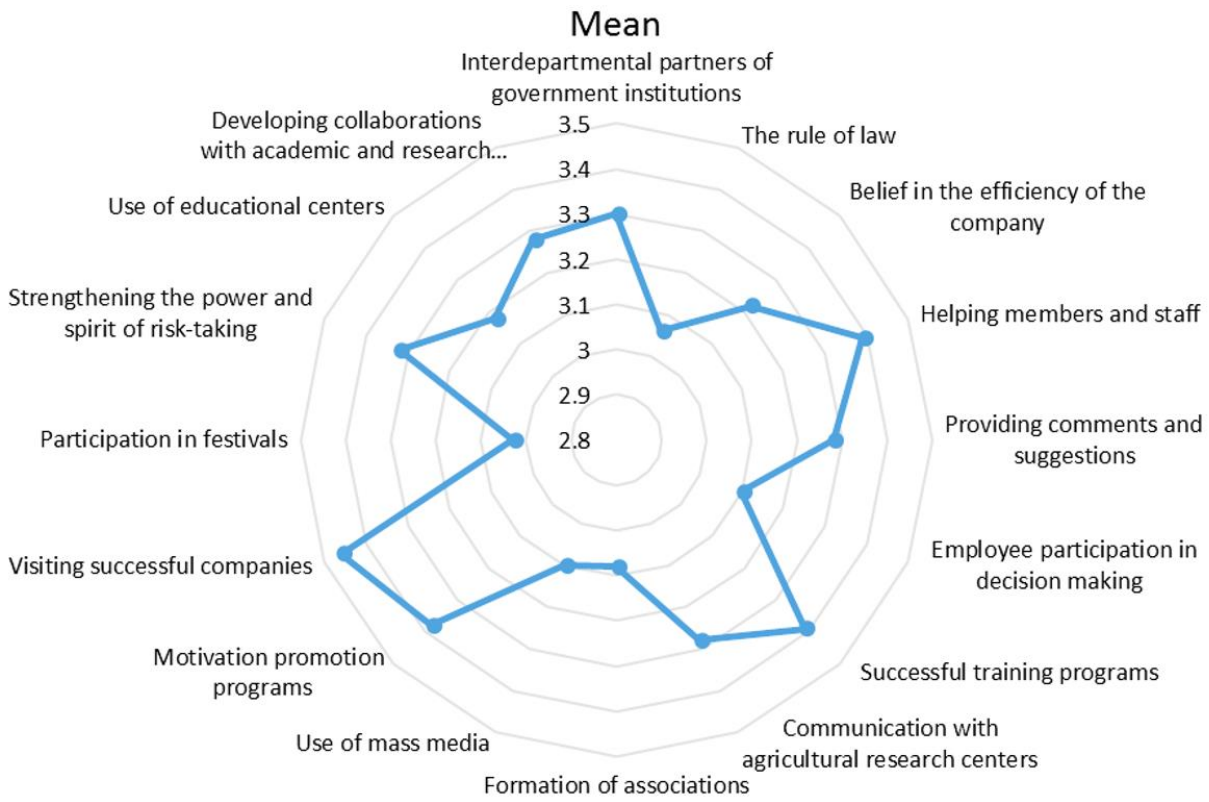

Figure 7. Intergroup social capital for the sustainability of entrepreneurship in agricultural start-ups.

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 consider teaching how to use banking facilities to be the most important educational strategies, and the next priorities are training of initial Start-up skills, training to improve productivity, and teaching legal issues of companies. Ratten and Jones (2021) believed entrepreneurship education is one of the most popular management education subjects due to its ability to link practice with theory.

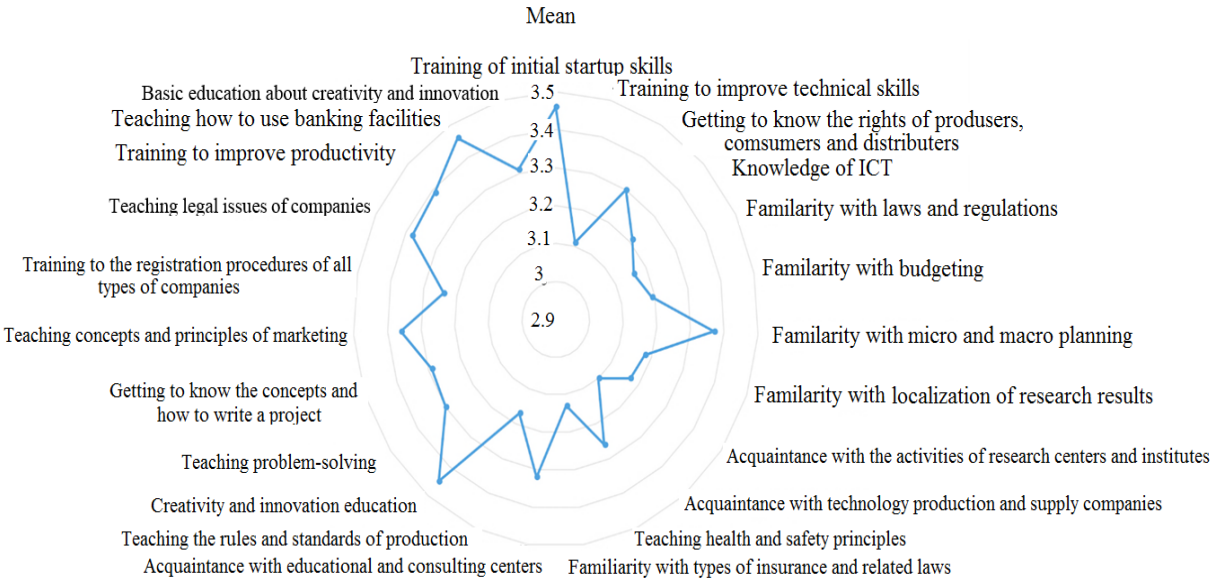

Figure 8. Educational strategies for the sustainability of entrepreneurship in agricultural start-ups.

Macro intervening factors

Based on the results of Figure 8, 12 items were taken into consideration in the 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 are creating service institutions to facilitate the development of companies and access to appropriate equipment to start the company.

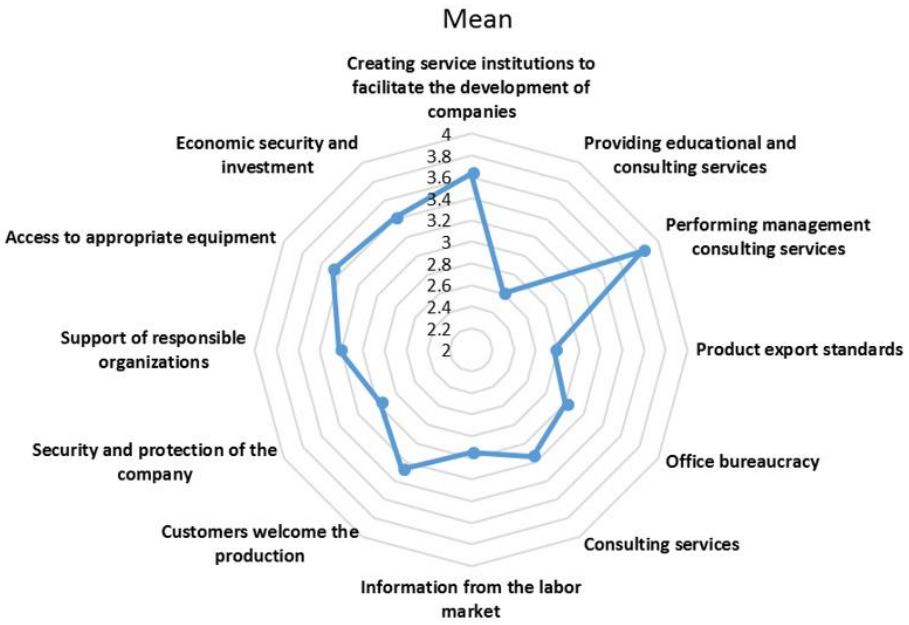

Figure 9. Macro intervening factors for the sustainability of entrepreneurship in agricultural start-ups.

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 is the most important intervening factor, and work experience and several types of skills and abilities are among the next priorities (Figure 10).

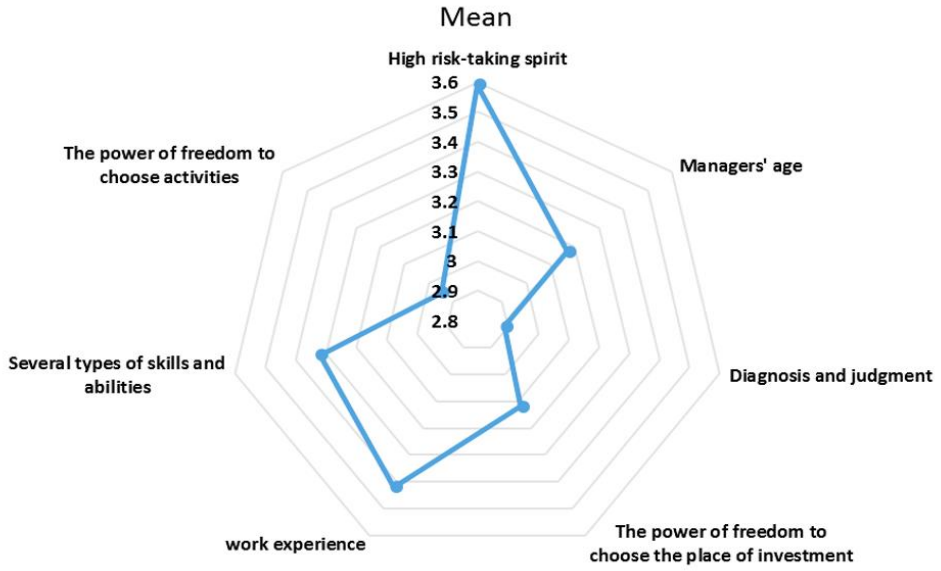

Figure 10. Micro intervening factors for the sustainability of entrepreneurship in agricultural start-ups.

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 is providing low interest loans to entrepreneurs and the next priorities are investment and necessary financing through innovation investment funds and assistance in obtaining loans and entrepreneurship facilities (Figure 11).

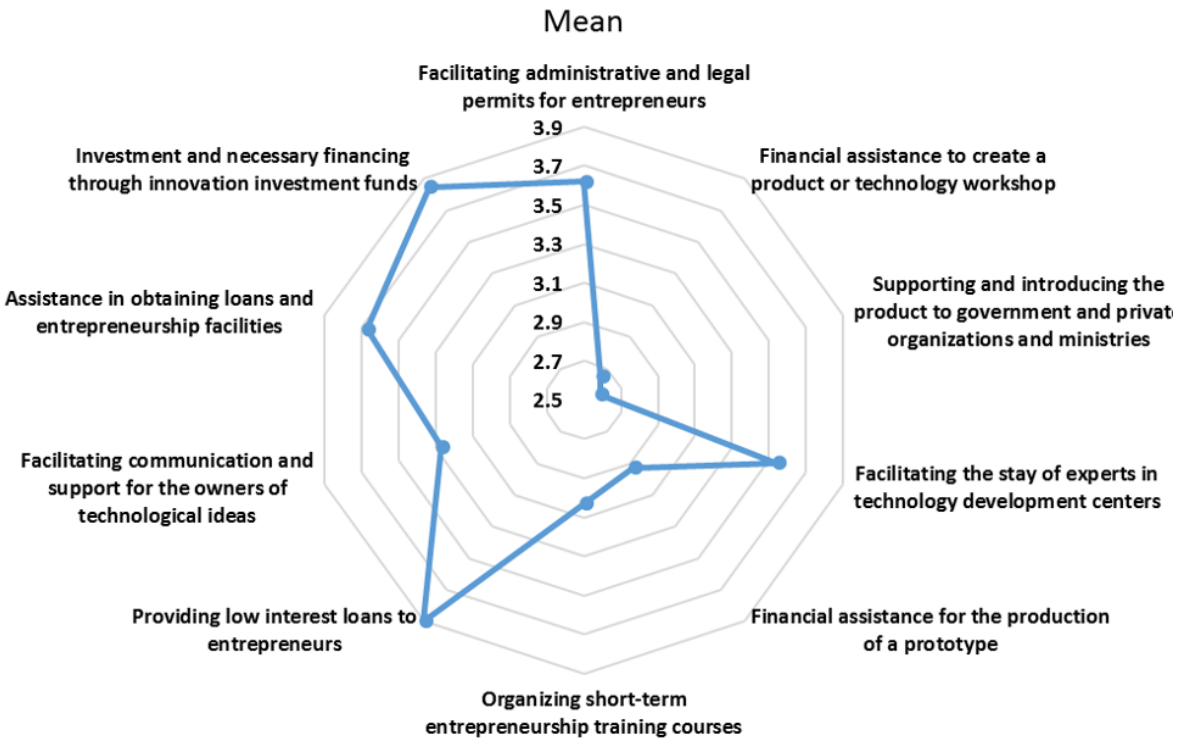

Figure 11. Entrepreneurship sustainability indicators in agricultural start-ups.

Structural equation modeling (SEM)

In this research, SEM has been 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 fit (Table 3). Thus, the hypothesized model was judged suitable for the SEM.

Table 3. Summary of Goodness of Fit Indices for the Measurement Model.

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
Suggest value	-	>0.05	>0.80	>0.90	>0.90	>0.90	<0.08

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

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 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 to all 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 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 & Anindita, 2020). As shown in Table 2, all of the constructs had CR which 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 has been showed for the constructs in the measurement model.

Assessment of the structural model:

From table 4 and figure 12, it can be found that 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=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, $p<0.001$) on the sustainability of entrepreneurship in agricultural start-ups. Based on the research results presented in Table 2, 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 is well consistent with the data.

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	Sustainability of entrepreneurship in agricultural start-ups	0.612	4.532	0.812
Attitudinal Motivators	0.762	0.85		0.584	5.124	
Social Constructs	0.858	0.82		0.612	4.854	
Economical Constructs	0.895	0.84		0.819	5.065	
Environmental Potentials	0.767	0.85		0.587	4.085	
Intergroup Social Capital	0.861	0.84		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	

Table 5. Means, SD and Correlations with Square Roots of the AVE.

	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 <0.01 level

[a] :The square roots of AVE estimates, AVE: Average Variance Extracted.

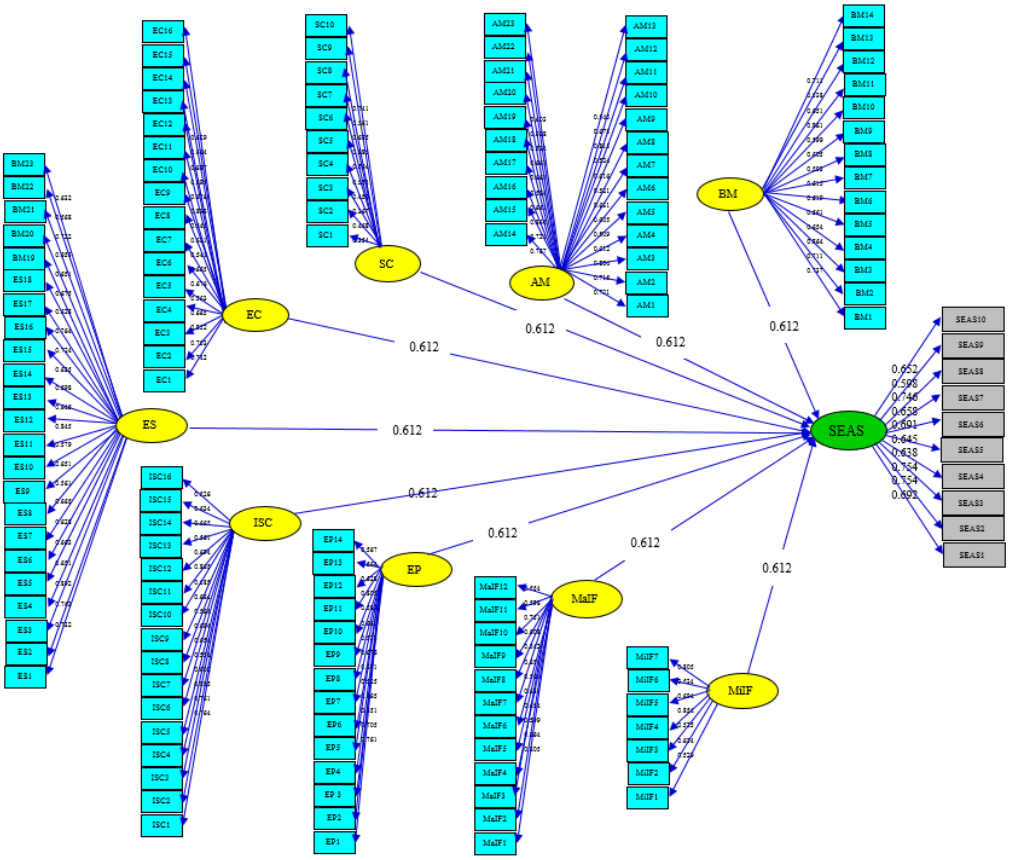

Figure 12. Path Model with Standardized Factor Loadings. SEAS: Sustainability of Entrepreneurship in Agricultural Start-Ups; BM: Behavioral Motivators; AM: Attitudinal Motivators; SC: Social Constructs; EC: Economical Constructs; EP: Environmental Potentials; ISC: Intergroup Social Capital; ES: Educational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

Conclusion

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. Therefore, the development of entrepreneurial knowledge at the community level and the expansion of entrepreneurial culture with a creative and innovative approach will be the basis for the sustainability of the entrepreneurial ecosystem in startups. 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. After the things mentioned in start-up ecosystem, the impact of environmental potential for the sustainability of entrepreneurship in agricultural start-ups was investigated. Mandatory government guidelines, access to market and inputs and establishment in science and technology parks as environmental potentials were ranked first to third. Next, visiting successful companies, successful training programs and motivation promotion programs as intergroup social capital were ranked first to third. In the study of educational strategies, it was found that training of initial start-up skills, training to improve productivity, and teaching legal issues of companies had an effective role on the sustainability of entrepreneurship in agricultural start-ups. In the following, performing management consulting services, creating service institutions to facilitate the development of companies and access to appropriate equipment to start the activities of the company as macro intervening factors and high level of risk-taking spirit, work experience and several types of skills and abilities as micro intervening factors that effect on sustainability of entrepreneurship in agricultural start-ups were identified. In total, 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 gift and use the results of this research to provide the necessary conditions for the development of entrepreneurship in the agricultural sector.

References:

1) Adeel, S., Daniel, A.D., Botelho, A. (2023). The effect of entrepreneurship education on the determinants of entrepreneurial behaviour among higher education students: A multi-group analysis, Journal of Innovation & Knowledge, 8 (1), 100324, https://doi.org/10.1016/j.jik.2023.100324.

2) Ahmadinejad, M. (2020). Knowledge Commercialization in Agricultural Higher Education: A Two-Step Approach to Structural Equation Modeling. International Journal of Agricultural Management and Development, 10(2), 149-166. https://ijamad.rasht.iau.ir/article_673811.html

3) Aliabadi, V., Ataei, P., Gholamrezai, S. (2022). Identification of the relationships among the indicators of sustainable entrepreneurial ecosystems in agricultural Start-ups, Journal of Innovation & Knowledge, 7 (4), 100245, ISSN 2444-569X, https://doi.org/10.1016/j.jik.2022.100245

4) Aliabadi, V., Ataei, P., Gholamrezai, S. (2022). Identification of the relationships among the indicators of sustainable entrepreneurial ecosystems in agricultural startups. Journal of Innovation & Knowledge, Volume 7, Issue 4, https://doi.org/10.1016/j.jik.2022.100245.

5) Alizadeh, M., Ommani, A. R., Noorollah Noorivandi, A., Maghsoodi, T. (2022). Determinants of Eco-Innovations in Agricultural Production Cooperatives in Iran. JAST, 24 (1) :1-12. http://jast.modares.ac.ir/article-23-48078-en.html

6) Allam, Z., Bibri, S.E., Sharpe, S.A. (2022). The rising impacts of the COVID-19 pandemic and the Russia–Ukraine War: Energy transition, climate justice, global inequality, and supply chain disruption, Resources, 11 (11), p. 99-114, https://www.mdpi.com/2079-9276/11/11/9910.3390/resources11110099

7) Anthony, O., Ifeanyi Ndubuto, N., Ogbonnaya, O. U., & Maria Etomchi, N. (2014). Analysis of Entrepreneurial Behavior among Cassava Farmers in Ebonyi State, Nigeria. International Journal of Agricultural Science, Research and Technology in Extension and Education Systems (IJASRT in EESs), 4(2), 69-74. https://ijasrt.shoushtar.iau.ir/article_517382.html

8) Barba-Sánchez, V., Atienza-Sahuquillo, C. (2012). Entrepreneurial behavior: Impact of motivation factors on decision to create a new venture, Investigaciones Europeas de Dirección y Economía de la Empresa, 18 (2), 132-138, https://doi.org/10.1016/S1135-2523(12)70003-5.

Blank, S. and Dorf, B. (2012). The Startup Owner's Manual, K&S Ranch (publishers), ISBN 978- 0984999309, 12 pp

9) Dai, W and Si, S. (2018). Government policies and firms' entrepreneurial orientation: Strategic choice and institutional perspectives, Journal of Business Research, 93, 23-36, https://doi.org/10.1016/j.jbusres.2018.08.026.

10) FAO. (2018). The future of food and agriculture – Alternative pathways to 2050. In FAO (Ed.), Food and Agriculture Organization of the United Nations (Issue November). Licence: CC BY-NC-SA 3.0 IGO. https://www.fao.org/3/I8429EN/i8429en.pdf

11) Field, A. (2009). Discovering Statistics Using SPSS. Sage: London.

12) Hekmat, M. (2011). Entrepreneurship Approaches in Agricultural Cooperatives. International Journal of Agricultural Science, Research and Technology in Extension and Education Systems (IJASRT in EESs), 1(1), 39-45. https://ijasrt.shoushtar.iau.ir/article_517755.html

13) Kang, H and Ahn, J. (2021). Model Setting and Interpretation of Results in Research Using Structural Equation Modeling: A Checklist with Guiding Questions for Reporting, Asian Nursing Research, 15 (3), 157-162, https://doi.org/10.1016/j.anr.2021.06.001.

14) Lerdpornkulrat, T., Poondej, C., & Koul, R. (2017). Construct reliability and validity of the shortened version of the information-seeking behavior scale. International Journal of Information and Communication Technology Education, 13(2), 27–37. https://doi.org/10.4018/IJICTE.2017040103

15) Lindgren, E., Harris, F., Dangour, A.D., Gasparatos, A., Hiramatsu, M., Javadi, F., Loken, B., Murakami, T., Scheelbeek, P., & Haines, A. (2018). Sustainable food systems—A health perspective. Sustainability Science (pp. 1505–1517), 13(6). https://doi.org/10.1007/S11625-018-0586-X/FIGURES/2

16) Loizou, E., Karelakis, C., Galanopoulos, K and Mattas, K. (2019). The role of agriculture as a development tool for a regional economy, Agricultural Systems, 173, 482-490, ISSN: 0308-521X, https://doi.org/10.1016/j.agsy.2019.04.002.

17) Mahfud, T., Triyono, M. B., Sudira, P & Mulyani, Y. (2020). The influence of social capital and entrepreneurial attitude orientation on entrepreneurial intentions: the mediating role of psychological capital, European Research on Management and Business Economics, 26 (1), 33-39, https://doi.org/10.1016/j.iedeen.2019.12.005.

18) Martínez Campoverde, D. J., & Vega Abad , C. R. (2023). Study of Start-ups in the cloud to innovate agricultural production in Ecuador (IoT, data in the cloud). Journal of Business and Entrepreneurial Studie, 7(2). https://doi.org/10.37956/jbes.v7i2.327

19) Mendes, J.A.J., Bueno, L.O., Oliveira, A.Y., Gerolano, M.C. (2022). Agriculture Start-ups (Agtechs): Abiblio metric study. International Journal of professional Business Review, 7(1), 1-18. https://www.openaccessojs.com/JBReview/article/view/312/193

20) Moro-Visconti, R. (2021). Food Tech and Agri Tech Start-up valuation. In R. Moro-Visconti (Ed.), Start-up Valuation (pp. 363–390). Springer International Publishing. https://doi.org/10.1007/978-3-030-71608-0_15

21) Murnieks, C. Y., Klotz, A.C., Shepherd, D.A. (2020). Entrepreneurial motivation: A review of the literature and an agenda for future research. Journal of Organizational Behavior, 41 (2), 115-143. https://doi.org/10.1002/job.2374

22) Nabiuny, E., Bayat, M.R and Aram, F. (2021).The Role of Start-ups in Creating Employment and the Economic Cycle (Case Study of Iran),1st International Conference on Industrial Engineering, Management, Economy and Accounting, Tehran, Iran. https://civilica.com/doc/1220659

23) Naderi, N., yusefi, Z., & Rezaei, B. (2016a). Phenomenology of barriers to the creation and launch of agricultural start-ups. Entrepreneurship strategies in agriculture, 3(5), 35-46. https://jea.sanru.ac.ir/article-1-127-en.html

24) Naderi, N., yusefi, Z., & Rezaei, B. (2016b). Identify of reduction and overcome strategies to barriers the creation and launch agricultural Start-ups with a phenomenological approach. Journal of Technology Development Management, 4(3), 127-150. https://jtdm.irost.ir/article_571.html?lang=en

25) Norouzi, A., Sadighi, H., Abbasi, E., Shabanali Fami, H., Mokhtari Aski, h. (2023). Strategic analysis of Start-up ecosystem in Iran's agricultural sector. Journal of Global Entrepreneurship Research, 13, (1), 156-175. https://doi.org/10.1007/s40497-023-00346-4

Norouzi, A., Sadighi, H., Abbasi, E., Shabanali Fami, H., & Mokhtari Aski, H. (2023). Strategic analysis of startup ecosystem in Iran's agricultural sector. J Glob Entrepr Res, 13 (1), 1-17 . https://doi.org/10.1007/s40497-023-00346-4

26) Robertson, J., Pitt, L., & Ferreira, C. (2020). Entrepreneurial ecosystems and the public sector: A bibliographic analysis, Socio-Economic Planning Sciences, Volume 72, 100862, ISSN 0038-0121, https://doi.org/10.1016/j.seps.2020.100862.

27) Sharma, B., Lakra, U., Sharma, R and Sharma, S. R. (2022). A comprehensive review on nanopesticides and nanofertilizers—A boon for agriculture, Chapter 16, Editor(s): Mansour Ghorbanpour, Muhammad Adnan Shahid, Nano-enabled Agrochemicals in Agriculture, Academic Press, 273-290, ISBN 9780323910095, https://doi.org/10.1016/B978-0-323-91009-5.00026-4.

28) Song, C., Park, K. M., & Kim, Y. (2020). Socio-cultural factors explaining technology-based entrepreneurial activity: Direct and indirect role of social security, Technology in Society, 61, 101246, https://doi.org/10.1016/j.techsoc.2020.101246.

29) Tahir, M and Burki, U. (2023). Entrepreneurship and economic growth: Evidence from the emerging BRICS economies, Journal of Open Innovation: Technology, Market, and Complexity, 9(2), 100088, https://doi.org/10.1016/j.joitmc.2023.100088.

30) Tentama, F & Anindita, W. (2021). Employability Scale: Construct Validity and Reliability. International Journal of Scientific & Technology Research Volume 9, Issue 04, 3166-3170.

31) Tiwari, A., Hogan, T and O'Gorman, C. (2021). The good, the bad, and the ugly of 'Start-up India' a review of India's entrepreneurship policy, Economic and Political Weekly, 56 (50), 45-52. https://doras.dcu.ie/26570/

32) Torfi, K., Ommani, A. R., Noorollah Noorivandi, A., & Sabouri, M. (2023). Application of SEM Analysis for Designing Strategic Model for Agricultural Sustainable Development (ASD) in Iran. International Journal of Agricultural Science, Research and Technology in Extension and Education Systems (IJASRT in EESs), 13(2), 87-102. https://ijasrt.shoushtar.iau.ir/article_703434.html

33) Vahdati, K., & Sarikhani, S. (2020). An Overview of Sustainable Agriculture Development in Iran and in the World. Strategic Research Journal of Agricultural Sciences and Natural Resources, 5(1), 19-32. https://srj.asnr.ias.ac.ir/article_113049.html?lang=en

34) Yousefi, Z., naderi, N., & rezaei, B. (2017). Factors affecting of the growth of agricultural Start-ups. Innovation Management Journal, 5(4), 1-18. https://www.nowavari.ir/article_46949.html?lang=en