

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

Homayoon Dinarany^a, Tahmasb Maghsoudi^{a*}, Saeed Mohammadzadeh^b, Azadeh Noorollah Noorivandi^a

^aDepartment of Agricultural Extension and Education, Shoushtar Branch, Islamic Azad University, Shoushtar, Iran

^bDepartment 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

40 shows that the share of the agricultural sector in the national gross product has increased in
41 recent years and the growth of this sector has been positive unlike other sectors. Therefore,
42 considering that this sector is a job creator, provider of food security and development of the
43 country, it is very necessary (Vahdati & Sarikhani, 2020). Considering the existence of
44 unemployment problems in Iran, the agricultural sector plays an important role in reducing this
45 problem (Hekmat, 2011). With the development of start-up jobs in the agricultural sector, which
46 emphasizes innovation and technology, the problem of unemployment will be reduced to a
47 significant extent. A country's economy flourishes when the ground is provided for innovation
48 and presence in competitive global markets (Alizadeh et al., 2022). Moving towards innovation
49 and making changes in the mix of products and services is a topic that is discussed in the field
50 of start-up business. Start-up business plays an essential role in creating employment in Iran
51 and accelerates the economic cycle, so efforts should be made to remove the obstacles and
52 problems facing this issue (Nabiuny et al., 2021). In this regard, one of the elements of
53 entrepreneurship development is to focus on the growth of start-ups (Norouzi et al., 2023). A
54 startup is a human institution that creates a new product or service in conditions of great
55 uncertainty (Blank and Dorf, 2012). Agricultural startup is an institution that tries to increase
56 the productivity and efficiency of agriculture by using new ideas and technologies (Norouzi et
57 al., 2023).

58 According to the conducted research, there are many obstacles for the creation and development
59 of agricultural start-ups in Iran. The most important of them are the low attractiveness of
60 activities in the agricultural sector to attract capital, thinking of high costs and low profit
61 margins of activities related to agriculture, mismanagement, lack of recognizing the priorities
62 of the agricultural sector, and the inability of the government information system to serve idea-
63 oriented agriculture projects and failure to make strategic decisions for progress in the
64 agricultural sector (Naderi et al., 2016a). In another research, the same researchers found
65 solutions to overcome the obstacles of Start-up agricultural businesses, including the
66 introduction of agricultural businesses to the relevant government institutions by the Science
67 and Technology Park, the support of related organizations such as the Agricultural Jihad, the
68 Deputy Food and Drug Administration for the provision of basic equipment, adjustment in
69 policies and macro decisions in the field of agriculture, financial support from governmental
70 and non-governmental institutions to provide capital in the sector of agricultural Start-up
71 businesses (Naderi et al., 2016b). In the current situation, due to the pandemic of Covid-19,
72 climate change, and the energy crisis caused by the war in Russia and Ukraine, the food system
73 is weakened globally (Allam et al., 2022). Along with the mentioned issues, population growth

74 and a 70% increase in the need for food should also be considered (FAO, 2018). In addition to
75 food system crises, population growth, high agricultural waste has also reached a significant
76 level. About one third of food is wasted in the chain of production to consumption (Lindgren
77 et al., 2018). Paying attention to agricultural start-ups in the field of using smart methods and
78 alternatives can have an effective role in increasing productivity and food security (Moro-
79 Visconti, 2021). Agricultural start-ups play a fundamental and important role in business model
80 innovation and entrepreneurship development (Mendes et al., 2022). Today, due to the high
81 risk of businesses and the desire to use new technologies, agricultural start-ups have developed
82 and expanded significantly and provided the necessary conditions for the development of
83 entrepreneurship based on innovation (Aliabadi et al., 2022). Tiwari et al., (2021) found that
84 startups have a positive impact on creating an entrepreneurial ecosystem. An entrepreneurial
85 ecosystem is a whole that enables the rapid flow of talent, information, and resources, helping
86 entrepreneurs quickly find what they need at each stage of growth. As a result, the whole is
87 greater than the sum of its parts (Robertson et al., 2020). The purpose of this research is
88 designing an agricultural start-up ecosystem in order to provide a model of the entrepreneurial
89 ecosystem in Iran, so that it can be used to increase the sustainability of entrepreneurship in
90 agricultural activities. By evaluating various researches in the field of entrepreneurship, we
91 came to the conclusion that no research has been done regarding agricultural startups and their
92 relationship with the creation and development of the entrepreneurial ecosystem. For this
93 reason, there is a research gap in this field, and it is necessary to carry out various researches in
94 this regard.

95

96 **Literature review**

97 Yousefi et al., (2016) in a research identified the factors affecting the creation and development
98 of agricultural start-ups, which include the low budget of the government to pay attention to
99 new ideas in agricultural activities, the inappropriate process of information flow and
100 communication to provide idea-oriented products to farmers, lack of interest in the idea-
101 oriented agricultural market and little investment to turn the idea into a product. Dai and Si
102 (2018) concluded, the relationship between government policies and the entrepreneurial
103 orientation of public institutions and private companies has been a controversial topic in
104 entrepreneurship research. Barba-Sánchez and Atienza-Sahuquillo (2012) concluded that
105 behavioral drivers have an effective role in entrepreneurial behavior. The need for success,
106 motivation, self-awareness, independence, dependence and competence are the most important
107 behavioral motivators. Adeel et al., (2023) concluded that attitudinal motivators have an

108 effective role on the development and sustainability of entrepreneurship. Kakani et al., (2020)
109 believed that technology-based start-ups focusing on agribusiness solutions are looking for
110 specific solutions to improve yields and increase productivity and achieve the goal of
111 sustainable food supply for decades to come. Tiwari et al., (2021) found that start-ups have had
112 a positive effect in reducing regional entrepreneurial disparities but have been less successful
113 due to the lack of financial support and funding. Results of their research indicated that macro
114 intervention factors were of greater importance in a sustainable start-up ecosystem. Aliabadi et
115 al., (2022) explained sustainable entrepreneurial ecosystem focuses on sustainable development
116 and how entrepreneurs can work to achieve innovative, risky, and profitable entrepreneurial
117 activity while maintaining economic, environmental, social, and cultural factors. Results of
118 their research indicated that ecological, economic, social and institutional dimensions were of
119 greater importance in a sustainable start-up ecosystem. The results of applying the cross-impact
120 analysis method reveal that employment, business ownership and scale, income and saving,
121 reforming laws, access to information, the existence of NGOs, and awareness and
122 understanding of risk are among the factors affecting the system sustainability. These Start-ups
123 have great potential to change the agricultural sector by increasing technologies that help
124 increase productivity in this field, related to reducing environmental and social costs in
125 production methods (Mendes et al., 2022). Martínez Campoverde and Vega Abad (2023) in
126 study of start-ups to innovate agricultural production in Ecuador concluded in Ecuador, start-
127 ups have had a remarkable growth in the last decade due to the extensive amount of benefits
128 they offer by using current technologies in the provision of a service or within production
129 processes such as in agriculture, therefore it is considered necessary to describe them and show
130 what systems they use in favor of innovation and increased agricultural production. Norouzi et
131 al., (2023) showed “slowness of processes in the public sector and lack of innovation”,
132 “numerous regulations related to the issuance of entrepreneurial licenses”, “lack of supportive
133 law for the development of Start-ups in the ecosystem”, and “government monopoly on the
134 supply of some agricultural inputs required for the Start-ups activities” are the most important
135 threats of the Iranian Agriculture Start-ups ecosystem. Therefore, based on the results of the
136 aforementioned research, agricultural ecosystems can play an effective role in the development
137 and improvement of the entrepreneurial environment and professional development. The main
138 reason for conducting this research is how we can turn the agricultural startup ecosystem into
139 an entrepreneurial environment and what internal, external, micro and macro factors should be
140 paid attention. The conceptual framework that showed in **Figure 1, is extracted from the results
141 of various researches from literature review (Table 1).**

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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 Aienza-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

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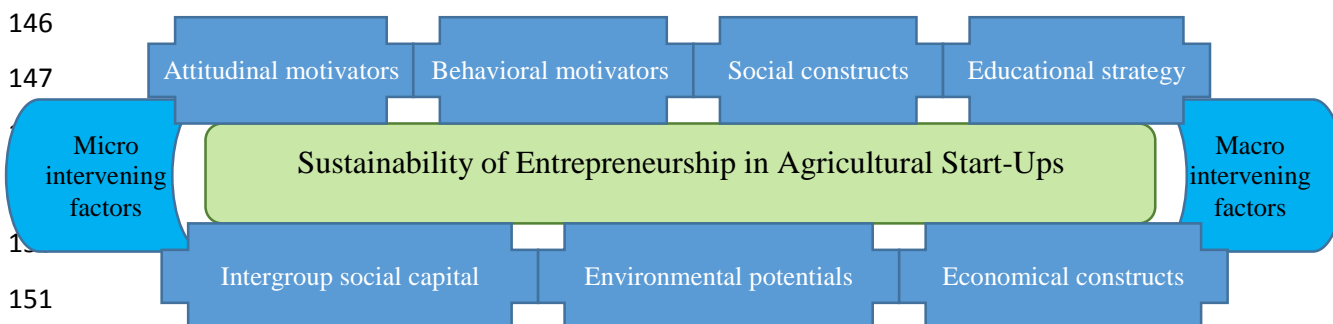


Figure 1. Conceptual framework of the research

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154 **Methodology**

155 A survey research method was applied to achieve research objectives. The population of the
156 study consisted of managers of agricultural Start-up of Iran, (N=90). All statistical population
157 was studied by census. Out of the total number of managers, 35 managers worked in the field
158 of agricultural production, 30 managers in the field of product processing, and 25 managers in
159 the field of sales and marketing. The way to contact and communicate with them was through
160 e-mail, phone call, and Eitaa and Telegram messengers. Finally, 90 managers were contacted
161 and data was collected. The questionnaire was the main instrument to collect data. The validity
162 was determined by a panel of experts. The minimum Cronbach's alpha coefficient for the factors
163 was equal to 0.81 (Table 2). First section included items about demographic characteristics.
164 Second part explained the main determining factors of the agricultural Start-up ecosystem that
165 affect the sustainability of entrepreneurship, by 131 items (Table 2). Part three indicated
166 sustainability of entrepreneurship in agricultural start-ups by 10 statements. The scale used in
167 part two and three was Likert scale (1=very low, 2=low, 3=average, 4= high, 5= very high).
168 Structural equation modeling was used to analyze the data. Structural Equation Modeling
169 (SEM) was used to test for the direct, indirect and mediating effects of the factors variables in
170 the prediction of sustainability of entrepreneurship in agricultural start-ups. According to Torfi
171 et al., (2023), it is appropriate to adopt a two-step approach for SEM: first, assessment of the
172 measurement model; second, assessment of the structural model.

173 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

174

175 **Results and discussion**

176 **Demographic characteristics of the respondents.**

177 The respondents' age showed that 40% were between 40-50 years and the average age was
178 44.26 years. Also, 55.56% of the respondents had Ph.D degrees and 44.4% had MSc. Moreover,

179 the position of 83.3% of the respondents were manager and 32.2% of them had managerial
180 experience between 1-5 years.

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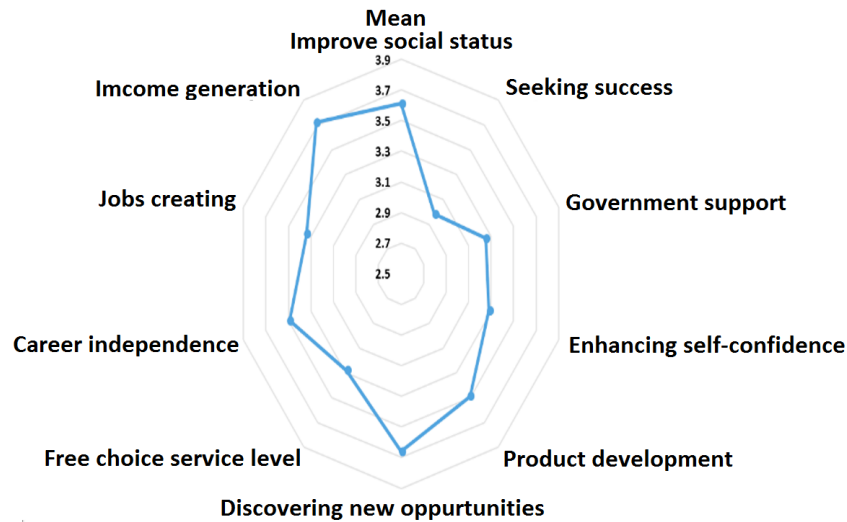
182 **Entrepreneurial Ecosystem in Agricultural Start-Up**

183 Entrepreneurial ecosystems include determinants whose performance determines the business
184 path, success and sustainability of the ecosystem. Especially in the case of start-up businesses
185 that operate with a high degree of technological innovation and service delivery (Ziakis et al.,
186 2022). Considering the critical effect that domestic and foreign investments have on the national
187 and international economy, understanding what motivates entrepreneurs is both practical and
188 theoretically important. Although research on the factors and outcomes of entrepreneurial
189 motivation has developed rapidly, it has evolved into distinct theoretical silos where
190 entrepreneurs tend to separate motivations by stage of business development to acknowledge
191 that individuals often go through all of these stages go through and experience different types
192 of motivations during their entrepreneurial process. Social, economic and individual
193 motivations play an effective role in this field (Murnieks et al., 2020). This is more important
194 in agricultural start-ups in terms of social, economic and cultural infrastructure. In this research,
195 the main determining factors of the agricultural Start-up ecosystem that affect the sustainability
196 of entrepreneurship have been analyzed.

197

198 **Behavioral motivators**

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



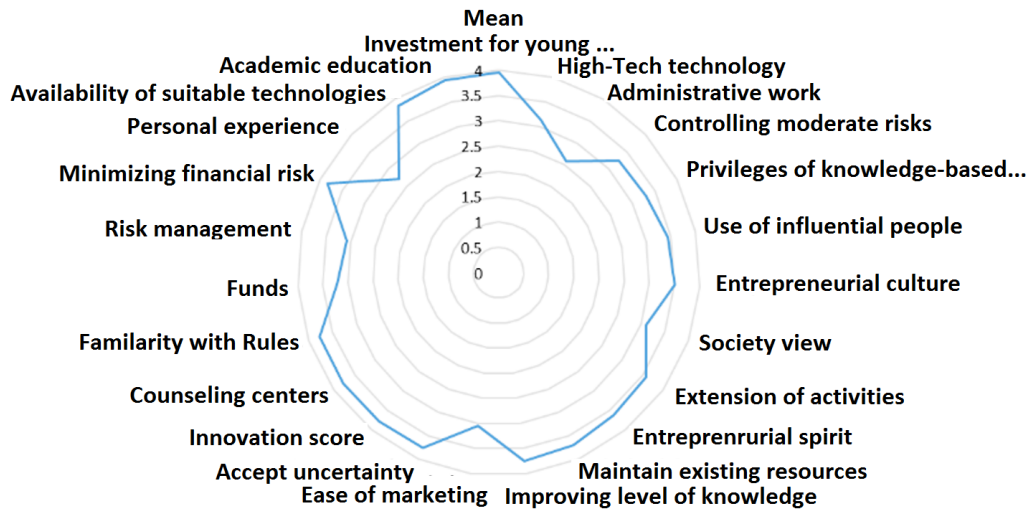
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208 **Figure 2.** Behavioral motivations for the sustainability of entrepreneurship in agricultural start-
 209 ups.

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211 **Attitudinal motivators**

212 In the study of attitudinal motivators for the sustainability of entrepreneurship in agricultural
 213 start-ups, 23 items were taken into consideration and company managers were asked to express
 214 their opinion about these items. Based on the rank average, the most important attitudinal
 215 motivations were obtained. Investment for young generations, academic education, and
 216 availability of suitable technologies were ranked first to third (Figure 3). Adeel et al., (2023)
 217 concluded, people who have more prior knowledge, entrepreneurial awareness, opportunity
 218 recognition, entrepreneurial motivation and entrepreneurial intention show more
 219 entrepreneurial behavior. In addition, people who participated in entrepreneurship education
 220 perform differently than people who did not receive any entrepreneurship education.
 221 Specifically, people who enroll in entrepreneurship education are more likely than others to use
 222 prior knowledge and awareness to identify new business opportunities and align their
 223 motivations to start a new venture.



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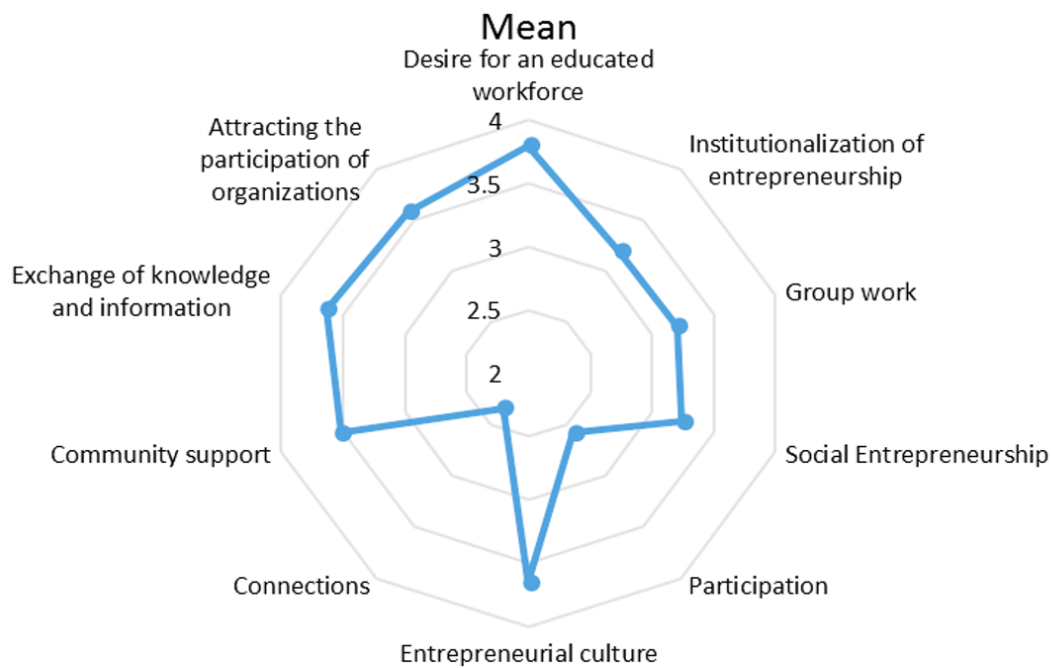
225 **Figure 3.** Attitudinal motivators for the sustainability of entrepreneurship in agricultural
 226 start-ups.

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228 **Social constructs**

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

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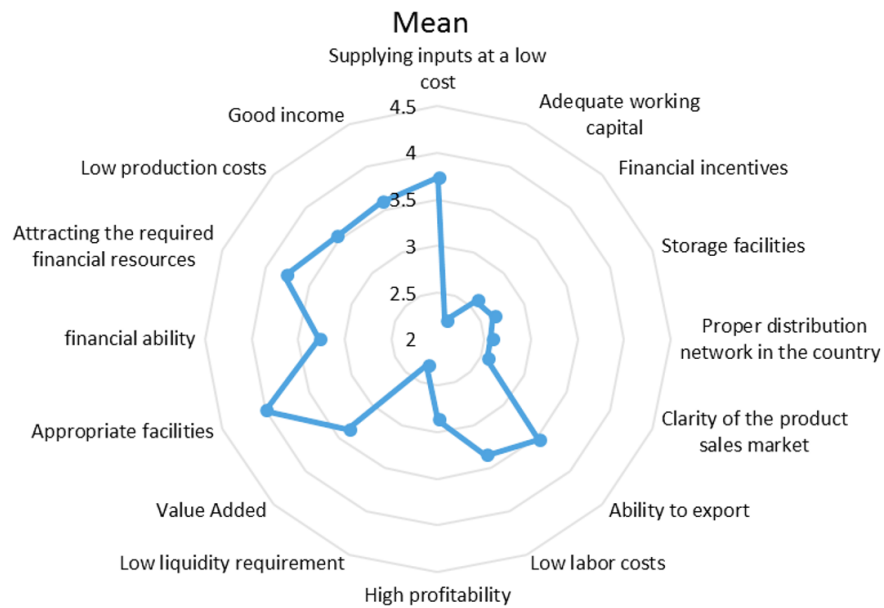
241 **Figure 4.** Social constructs for the sustainability of entrepreneurship in agricultural
 242 start-ups.

243

244 **Economical constructs**

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

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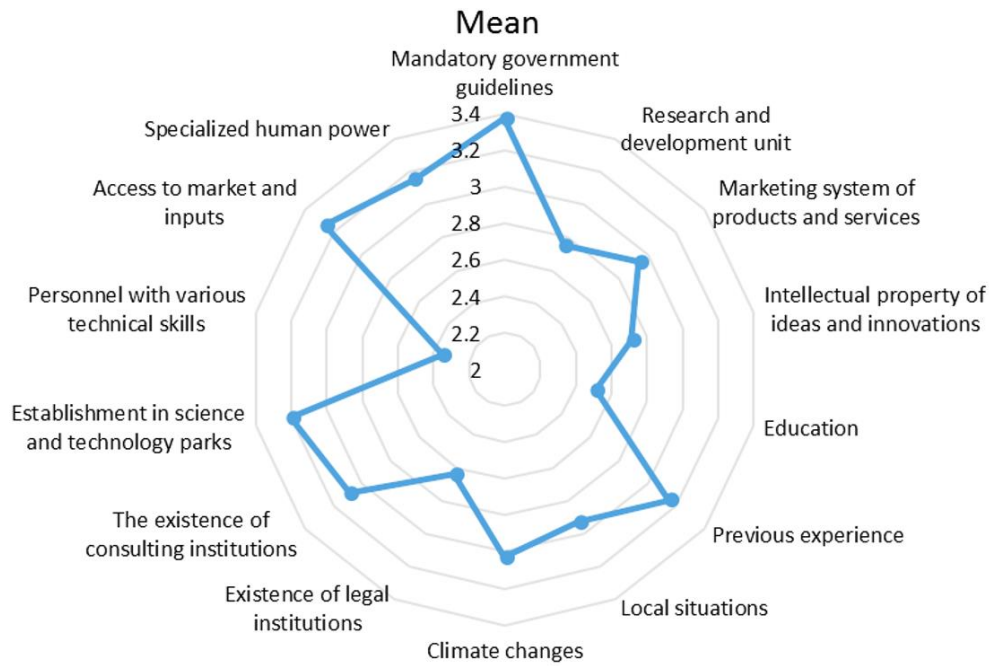


255 **Figure 5.** Economical constructs for the sustainability of entrepreneurship in agricultural
 256 start-ups.
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261 **Environmental potentials**

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



270

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

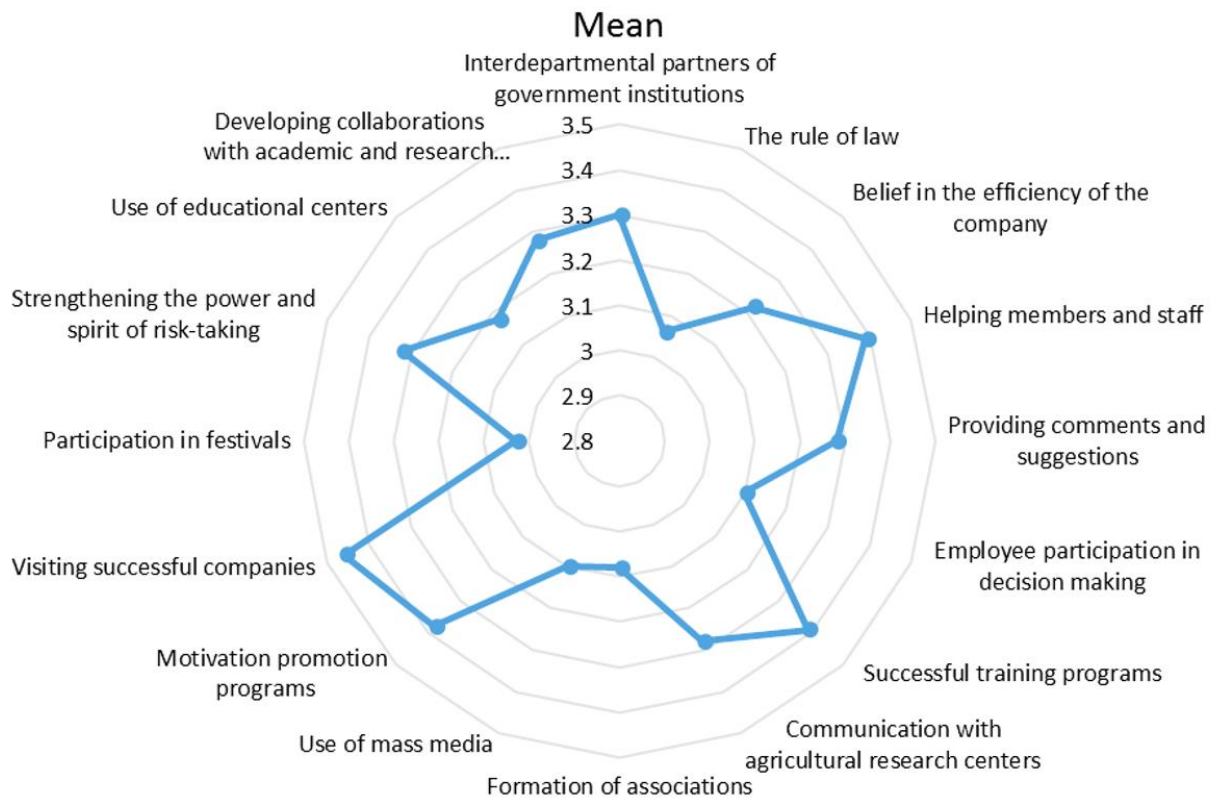
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274 **Intergroup social capital**

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

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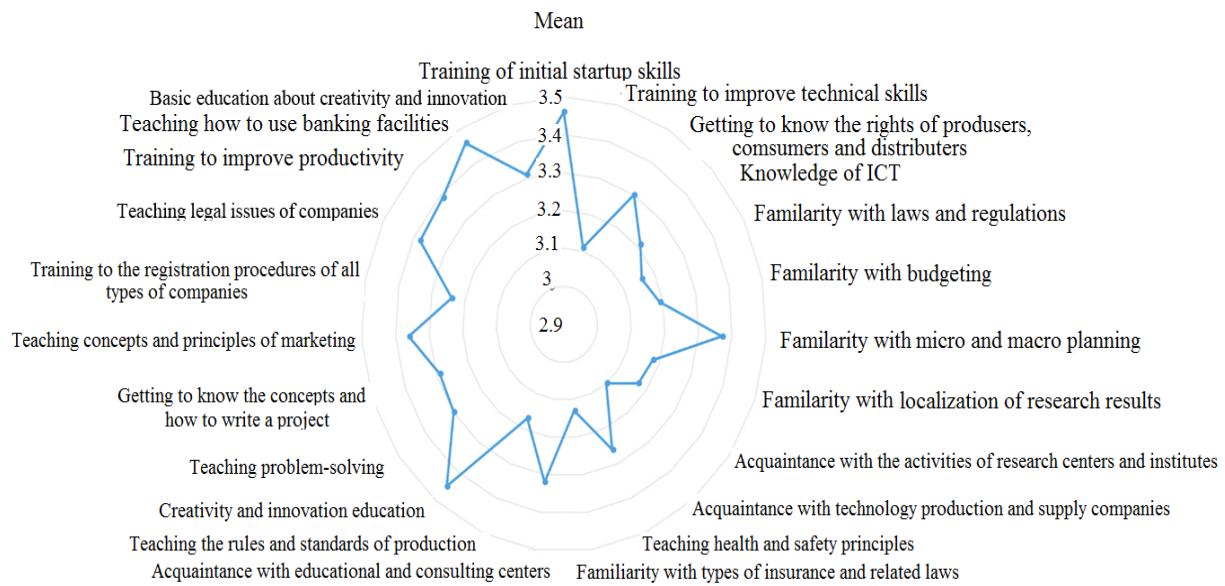
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286 **Figure 7.** Intergroup social capital for the sustainability of entrepreneurship in agricultural
 287 start-ups.

288

289 **Educational strategy**

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



298

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

301

302 **Macro intervening factors**

303 Based on the results of Figure 8, 12 items were taken into consideration in the investigation of
 304 macro intervening factors affecting the sustainability of entrepreneurship in agricultural start-
 305 ups. Managers were asked to determine the impact of these items. The obtained results showed
 306 that the most important intervening factors were performing management consulting services
 307 and the next priorities are creating service institutions to facilitate the development of
 308 companies and access to appropriate equipment to start the company.

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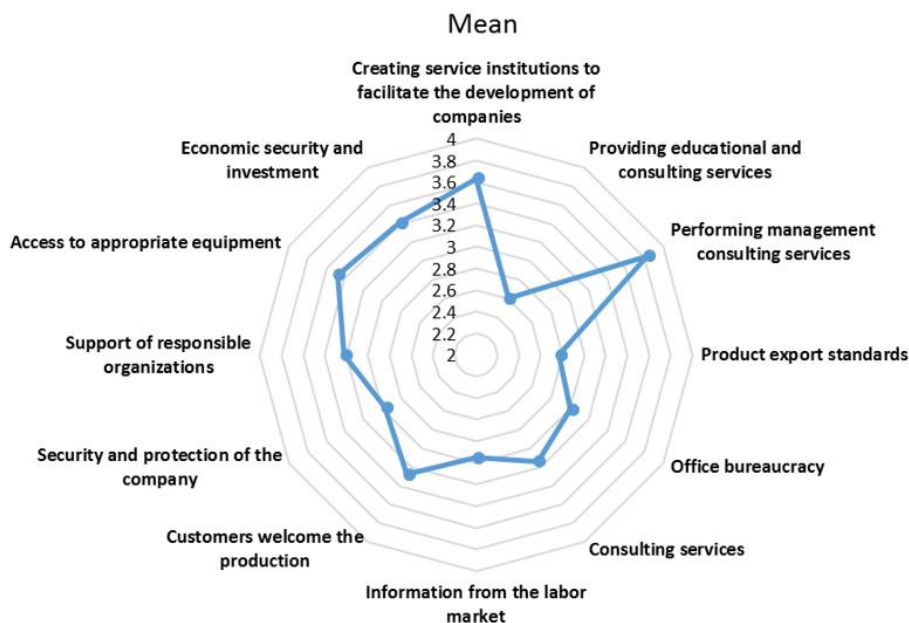
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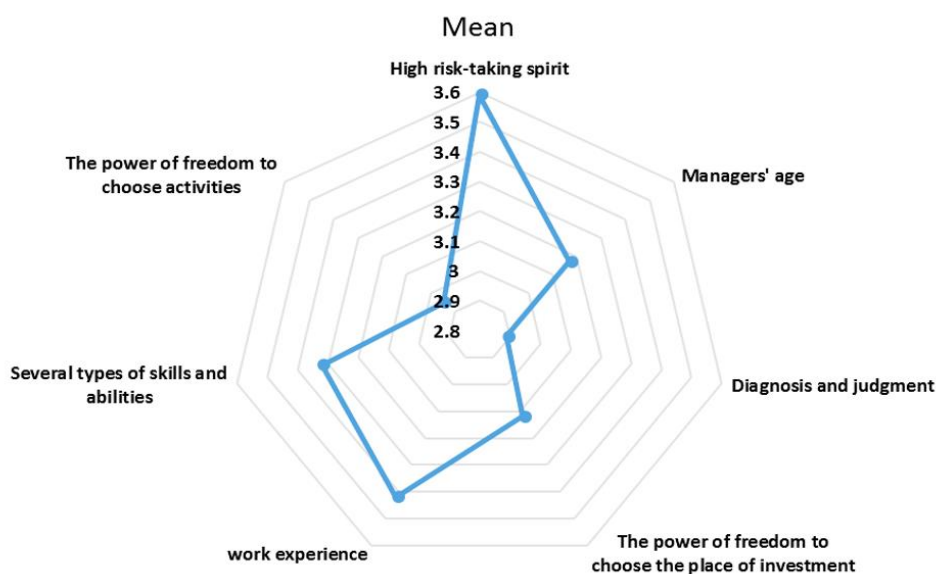


316
 317 **Figure 9.** Macro intervening factors for the sustainability of entrepreneurship in agricultural
 318 start-ups.

319
 320 **Micro intervening factors**

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

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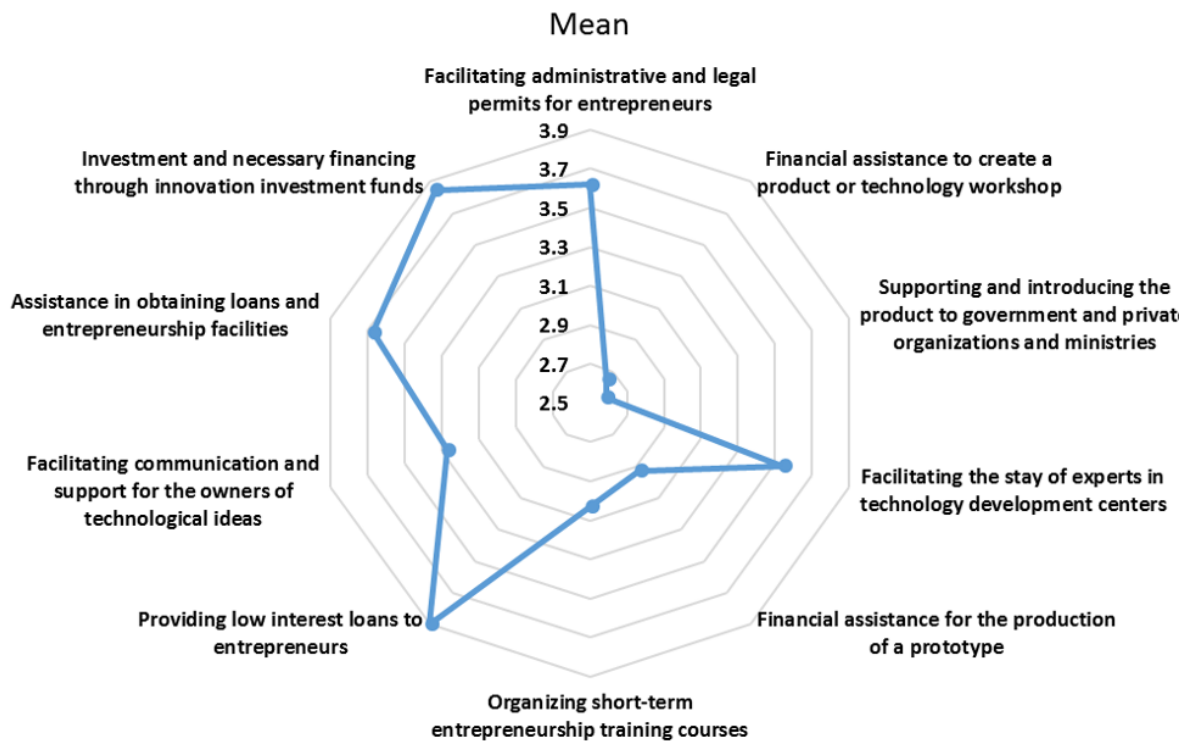


327
 328 **Figure 10.** Micro intervening factors for the sustainability of entrepreneurship in agricultural
 329 start-ups.

330

331 Entrepreneurship sustainability indicators in agricultural start-ups

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



337

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

339 Structural equation modeling (SEM)

340 In this research, SEM has been used to identify the direct and indirect effects of the factors on
341 the sustainability of entrepreneurship in agricultural start-ups. The results of confirmatory
342 factor analysis showed the initial measurement model to provide an acceptable fit for the data
343 ($X^2=2.04$; $GFI=0.98$; $TLI=0.94$; $CFI =0.96$; $IFI=0.92$; $RMSEA=0.052$). Therefore, the
344 measurement model provided a reasonable fit (Table 3). Thus, the hypothesized model was
345 judged suitable for the SEM.

346

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

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

349

350 **Convergent Validity:**

351 Convergent validity of the measurement model indicates that the observed variables that define
352 the same latent variable should have a relatively high correlation as assessed by the factor
353 loadings. Generally, values of at least 0.3 to 0.5 are interpreted as acceptable and greater than
354 0.5 to 0.7 as good, while values greater than 0.7 are interpreted as very good (Kang and Ahn,
355 2021). The results in Table 2 show the t-value for the factor loadings to all exceed 4 ($p < 0.01$)
356 and the standardized factor loading to all have values greater than 0.6. This shows good
357 convergent validity for the constructs of this study.

358
359 **Construct Reliability (CR):**

360 Construct reliability measures how well variables underlying constructs served in structural
361 equation modelling. In SEM construct reliability is depicted using confirmatory factor analysis
362 (CFA). Composite reliability is estimated based on the factor loading analysis (Lerdpornkulrat
363 et al., 2017). It is allowed to have a build reliability coefficient greater than 0.70. A value of
364 $CR \geq 0.7$ is required to achieve construct reliability (Tentama & Anindita, 2020). As shown in
365 Table 2, all of the constructs had CR which were greater than the recommended 0.70. The result
366 is a good composite or CR for the constructs measured in this study.

367
368 **Discriminant validity:**

369 Based on the results in table 4, the square root of the AVE estimate for each construct is greater
370 than the correlation between it and all other construct in the model. This means that the
371 indicators have more in common with the construct that they are associated with the other
372 constructs. Thus, discriminant validity has been showed for the constructs in the measurement
373 model.

374
375 **Assessment of the structural model:**

376 From table 4 and figure 12, it can be found that the predictive positive effect of BM ($\beta=0.612$,
377 $t\text{-value}=4.532$, $p<0.001$), AM ($\beta=0.584$, $t\text{-value}=5.124$, $p<0.001$), SC ($\beta=0.612$, $t\text{-value}=4.854$,
378 $p<0.001$), EC ($\beta=0.819$, $t\text{-value}=5.065$, $p<0.001$), EP ($\beta=0.587$, $t\text{-value}=4.085$, $p<0.001$), ISC
379 ($\beta=0.612$, $t\text{-value}=5.089$, $p<0.001$), ES ($\beta=0.681$, $t\text{-value}=9.012$, $p<0.001$), MaIF ($\beta=0.576$, $t\text{-}$
380 $\text{value}=5.018$, $p<0.001$) and MiIF ($\beta=0.641$, $t\text{-value}=3.945$, $p<0.001$) on the sustainability of
381 entrepreneurship in agricultural start-ups. Based on the research results presented in Table 2,
382 the amount of $R^2=0.812$ was estimated. This indicates that 9 constructs and 131 sub-constructs
383 have the ability to explain 81.2% of the sustainability of entrepreneurship in agricultural start-

384 ups variance. Based on the results obtained, the overall goodness of the fitting statistics showed
 385 that the structural model is well consistent with the data.

386
 387

388 **Table 4.** Results of Confirmatory Factor Analysis for the Measurement Model and the Effects
 389 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	

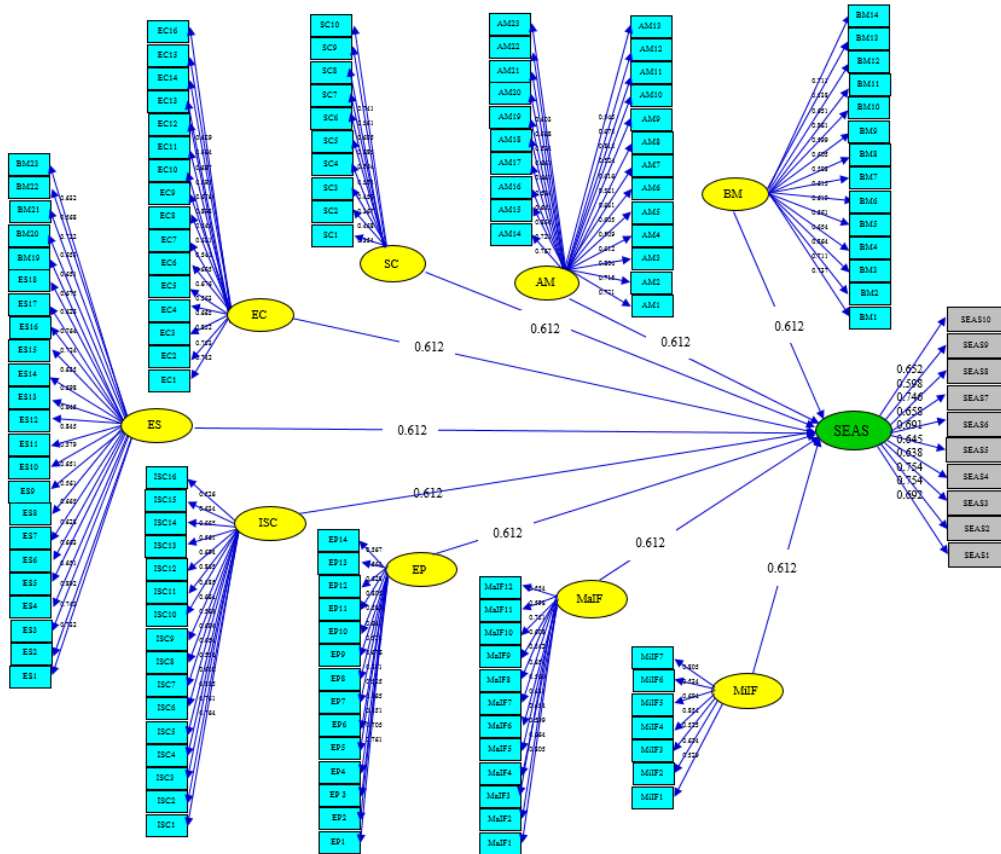
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Table 5. Means, SD and Correlations with Square Roots of the AVE.

	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

392 **Correlation is significant at the <0.01 level
 393 ^a:The square roots of AVE estimates, AVE: Average Variance Extracted.

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

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Conclusion

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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

417 attracting creative and innovative youth and will strengthen the motivation and spirit of hope
418 in the society. In addition, the social constructs that were effective on sustainability were
419 identified. The most important of them included desire for an educated workforce,
420 entrepreneurial culture and exchange of knowledge and information, which were ranked first
421 to third. Therefore, the development of entrepreneurial knowledge at the community level and
422 the expansion of entrepreneurial culture with a creative and innovative approach will be the
423 basis for the sustainability of the entrepreneurial ecosystem in startups. Economical constructs
424 were the next factor that was investigated on the sustainability of entrepreneurship in
425 agricultural start-ups. The most important economic constructs were appropriate facilities,
426 attracting the required financial resources and supplying inputs at a low cost, which were ranked
427 first to third. Therefore, it can be claimed that in the economic field, an action has been taken
428 in the direction of the sustainability of entrepreneurship in startups when the necessary facilities
429 for the development of innovation and creativity infrastructures for entrepreneurship have been
430 provided. After the things mentioned in start-up ecosystem, the impact of environmental
431 potential for the sustainability of entrepreneurship in agricultural start-ups was investigated.
432 Mandatory government guidelines, access to market and inputs and establishment in science
433 and technology parks as environmental potentials were ranked first to third. Next, visiting
434 successful companies, successful training programs and motivation promotion programs as
435 intergroup social capital were ranked first to third. In the study of educational strategies, it was
436 found that training of initial start-up skills, training to improve productivity, and teaching legal
437 issues of companies had an effective role on the sustainability of entrepreneurship in
438 agricultural start-ups. In the following, performing management consulting services, creating
439 service institutions to facilitate the development of companies and access to appropriate
440 equipment to start the activities of the company as macro intervening factors and high level of
441 risk-taking spirit, work experience and several types of skills and abilities as micro intervening
442 factors that effect on sustainability of entrepreneurship in agricultural start-ups were identified.
443 In total, the research results showed that 9 constructs and 131 sub-constructs can explain 81.2
444 percent of the variance of the sustainability of entrepreneurship in agricultural start-ups.
445 Therefore, taking the necessary measures to improve the influencing variables in the ecosystem
446 of agricultural start-ups provides the necessary potential for the sustainability of
447 entrepreneurship in the agricultural sector and can facilitate the path of agricultural
448 development as a benchmark. Agricultural entrepreneurship planners should take advantage of
449 this gift and use the results of this research to provide the necessary conditions for the
450 development of entrepreneurship in the agricultural sector.

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