

Designing an entrepreneurial university model in higher education in South Khorasan Province

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Abstract

Entrepreneurship is mentioned as the driving force of economic development. Under these circumstances, universities are no longer seen as institutions for the production and dissemination of knowledge solely for teaching and research, and it is expected that these universities will play a more active role in the development of the national economy and its regions. This research is a survey in terms of how to collect data and is applied in terms of purpose. The statistical population of the present study includes all professors, staff, experts and higher education experts of South Khorasan province. In order to select a statistical sample, a multi-stage random stratified method with proportional assignment was used. The data collection tool in this research is a researcher-made questionnaire. Confirmatory factor analysis (CFA) with partial least squares (PLS) approach was used to analyze the data using Smart PLS3 software. The results show that among the identified factors, the underlying factors had the highest and the knowledge exchange had the lowest priority. Regarding the underlying factors of supporting innovation, entrepreneurial behaviors, new ideas and teamwork in the university and regarding the exchange of knowledge, it is suggested that the university connect industrial, educational and research activities (larger communities) to each other. Take steps to influence the overall knowledge ecosystem.

Keywords: entrepreneurial university, structural, background, content, knowledge exchange
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1 Introduction

The foundation of any country's civilization is laid in its universities and in the countries that today are referred to as developed countries; Industrial developments have started from universities and scientific centers and with the alignment of the needs and goals of the university and industry, has led to the formation of a proper relationship between these two institutions [1]. It has been a long time since the establishment of traditional universities in which education was of the utmost importance. The tendency to advance science turned these traditional universities into universities in which basic research had won first place. With the passage of time and the need of industry for special research in order to meet the goals of industrial development, new universities emerged; The first university revolution, which began in the early nineteenth century, added applied research as a new function to the traditional

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activity of the university, or education [6, 17]. In these universities, applied research occupied the top position. Many universities emerged in this way; That is, the owners of industries in line with economic goals and in the form of research and development units, established scientific and research institutes; After a while, in addition to conducting custom research by industry owners, these institutes also held training courses for employees of the same industries; And little by little, their scope of activity became a full-fledged university. But given the astonishing speed of science, especially in the field of advanced technologies, the complex communications of industry, government, and academia; and the need for the phenomenon of technological innovation as the most important indicator of productivity, the entrepreneurial university has emerged with a more sublime task [14, 15]. The role of the university has traditionally been as a support structure in the flow of innovation from a theoretical point of view. Recently, this trend has changed and universities have taken on different roles to the extent that new technologies have emerged from academic research [11, 7]. The academic community has become entrepreneurial both in its internal dynamics and in its external relations with businesses for research contracts and the transfer of knowledge and technology. Entrepreneurship has always been a topic of interest for universities as well as developing economies. For developing countries, entrepreneurship serves as a vital tool for reviving a stagnant economy through innovative investment and the value created by entrepreneurs [3, 4].

Entrepreneurial University includes and expands the research university. However, in some analyzes, analysts see academic entrepreneurship as deviating from the goals of a research university. UNESCO describes modern universities in the global perspective of higher education for the 21st century: "A place where entrepreneurial skills are developed in higher education to facilitate graduates' capabilities and to become job creators". In fact, the effective interaction between the university, industry and government, which is the key to improving the conditions of innovation in society based on knowledge, is in the hands of the entrepreneurial university. The important point here is a new order among the active institutions to encourage innovation. In the new environment, organizational innovation, new social arrangements and work culture, and new avenues for interaction to accelerate the innovation process are far more important than physical possibilities.

Universities, as centers of higher entrepreneurship education, are likely to play an important role in increasing entrepreneurship, self-efficacy, self-employment, and risk-taking among graduates, and thus achieving positive outcomes for individuals, leading companies, and society [17, 9].

One of the main challenges of the current century that exists in all societies and countries, whether developed or developing, is the "employment" of university graduates. In the last one or two decades, all societies around the world have discussed innovation and entrepreneurship together to solve the employment crisis, and since higher education institutions must meet the needs of society, attention to entrepreneurship and employment is increasingly felt and the third generation of universities, namely universities. Entrepreneurs have stepped into the arena. In this regard, the issue of employment of educated people, youth, knowledge-based economy is a new concept that the government is very much looking for, and a large number of knowledge-based companies have been established in South Khorasan. It is the basis of manpower changes, and fortunately in the city of Birjand, the student-to-citizen ratio is one in six, and it has tremendous potential from the educated and young workforce that should be considered. South Khorasan has a long history of entrepreneurship and it is very important that entrepreneurship is valuable in the province. The university should be oriented towards entrepreneurship so that the educated youth can solve the problems of the province and the country, and solutions must be found that can be implemented and the problems can be solved. So far, two entrepreneurship cafes have been established at Birjand University that one of the important purposes of establishing these centers is to hold a diverse set of educational and promotional programs for entrepreneurship, specialized meetings, gatherings, lectures and workshops, and to further connect the industry and government sectors with the universities of the province. Despite these capacities and talents in the province, a model vacancy is felt for the entrepreneurial university in the province. This research intends to provide a model of entrepreneurial university for the universities of the province, while carefully examining the research conducted in this field and the opinion of experts in this field in the province. Therefore, the main issue in this research is what appropriate model can be provided for the third generation university (entrepreneur) in higher education in South Khorasan province?

2 Theoretical foundations and research background

2.1 The concept of entrepreneurial university

The term entrepreneurial university means entrepreneurial action in the structures and perspectives of a university. Entrepreneurial University is a natural inquisitor that tries to simultaneously carry out its missions (teaching, research and entrepreneurial activities), while creating enough space for the academic community (teachers, students and staff)

to be able to identify, discover and extract innovations and creative ideas that can be turned into new investments [13].

2.2 Steps of turning a university into an entrepreneurial university

According to Etzkowitz [7], there are three steps to transforming a university into an entrepreneurial university that the quality of each stage is usually not necessarily based on the quality of the previous stages and of course the order of the steps may be reversed according to environmental characteristics. In the initial stage, the university institute adopts a strategic vision and acquires the ability to set and set its own priorities. In the second stage, the university institute finds its current role in commercializing the intellectual assets resulting from the activities of its professors and students. In the third stage, the academic institution plays a leading role in improving its local innovation environment through cooperation with industry and government [12, 5].

2.3 Entrepreneur university models

Numerous models of entrepreneurial university have been proposed by various authors with knowledge about the performance of entrepreneurial organizations, and in this section we will mention two examples:

Model of Entrepreneur University of the Organization for Economic Cooperation and Development (2014):

In this model, the guidance framework for the entrepreneurial university includes: Leadership and administrative processes, motivation of individuals and organizational capacities, development of entrepreneurship in teaching and learning, entrepreneurship entry routes, university-industry relationship, entrepreneurship university as an international institution and measuring the impact of entrepreneurship university.

Model of Ghanbari et al Entrepreneur University [10]: In this model, the market (primary customers and networks such as entrepreneurial networks and international companies). Policy (strong leadership practices and support for government structures in the form of institutions; regulatory framework of incentives and capitalist legislation); Financial capital (micro-loans, budgeting, venture capital and angel investors); Culture (visible successes, risk and failure tolerance, and social status of entrepreneurs); Sponsorships (infrastructure, professional sponsorships such as legal and accounting and non-governmental organizations); Human capital (educational institutions and labor force). As mentioned, this model includes the six components of financial capital, culture, market, human capital, sponsorships and politics.

Several researches have been done on the subject under study, and we will suffice to mention a few examples:

Safarian Navekhi et al. [16] conducted a study entitled "Identifying the components of the entrepreneurial university". The results show that the identified categories that have the greatest impact on the establishment of the entrepreneurial university are: Internal factors (service quality, financial resources, capability, organizational structure, organizational culture, educational and research policies - management and leadership) and external factors (national and regional contextual factors, international factors). Bagheri et al. [2] wrote an article entitled "Discovering and prioritizing the dimensions and components affecting the structure of the entrepreneurial university: a proposal for success in the tasks of the third generation of universities". The result of this study indicates that in order to realize the entrepreneurial university, extensive structural changes in the higher education system should be made, especially in the dimensions of independence, composition and professionalism; Because the structural environment of the entrepreneurial university should encourage an atmosphere of creativity and synergy. Also, the combined role of the leader, which is considered as components of composition and independence, are among the most influential components in the mentioned structure. Sewej et al. [18] wrote an article entitled "Entrepreneurship Orientation of Public Universities in the Republic of Serbia: An Experimental Study". The results show that the Entre-U questionnaire is a reliable scale not only for developing countries, but also applicable to developing countries. Using this questionnaire, the level of respondents' initiatives as well as the nature of innovative activities is determined. This was done in all the universities of the Republic of Serbia and had different results. On the other hand, those who do not have an entrepreneurial orientation, work to the extent of being able to cooperate with industries and university policies. Fernandez [8] wrote an article entitled "Entrepreneurial University, a selection of best practices". The results showed that Spanish universities are of great importance in internalization, use of active methods, mission and strategy, and management team support. The results also show good innovative and creative practices that can be replicated in any university and guidelines are available for universities to promote entrepreneurship as well as demonstrate the positive social and economic impact on society by providing community tools and facilities for entrepreneurship. Therefore, students should be educated using these methods.

3 Research methodology

This research is a survey in terms of how to collect data and is applied in terms of purpose. The statistical population of the present study includes all professors, staff and experts of higher education in South Khorasan province, whose number is 3894 people that the number of samples corresponding to this community according to Morgan and Krejcie table is 350 people. In order to select the statistical sample, a multi-stage random stratified method with proportional assignment was used. In this way, each of the three groups of statistical community was considered as a class; then, based on the number of each class, a ratio of the number of samples was assigned to that class. The desired samples of each class were randomly selected according to the volume of each class. The table below shows how the population is distributed and the statistical sample in this study.

Table 1: How to distribute the community and samples

Number of sample	Number of community	Class title
139	1545	Professors
192	2134	Staff
19	215	Experts
350	3894	Total

The data collection tool in this research is a researcher-made questionnaire. Several studies were used to design this questionnaire. This questionnaire includes 5 dimensions, 15 components and 104 items. The dimensions of this questionnaire include structural factors, content factors, contextual factors, the core of the entrepreneurial university and knowledge exchange. This questionnaire also has 15 components of professionalism, organizational capacity, organizational environment development, various investments, entrepreneurial perspective, curriculum planning, teaching-learning process, strengthening entrepreneurial culture, creating a science and technology park, creating reproductive businesses, the strong technical core of the entrepreneurial university, measuring the impact of the entrepreneurial university, entrepreneurial pathways, trade and foreign relations of the university for the exchange of knowledge and dissemination of scientific findings and research contract. To assess the validity in the first place, by accurately defining each of the components of the research, the indicators of measuring each component, and scales composed of these criteria, the validity of the content of the questionnaire was ensured. In the second place, the indicators and scales of each component were provided to the supervisor and 25 experts in the field of research. Each of these individuals independently commented on the content coverage of the criteria and scales and, in general, confirmed the validity of the content of the questionnaire. Cronbach’s alpha coefficient was used to measure reliability. The table below shows the reliability of each dimension of the research separately.

Table 2: Reliability of each dimension of the research separately

Cronbach's alpha	Components	dimensions
0.722	1. Professionalism	1. Structural factors
0.859	2. Organizational capacity	
0.847	3. Development of organizational environment	
0.820	4. Various investments	
0.896	Structural factors	
0.871	5. Entrepreneurial perspective	2. Content factors
0.931	6. Curriculum planning	
0.952	7. Teaching-learning process	
0.955	Content factors	
0.940	8. Strengthening the entrepreneurial culture	3. Underlying factors
0.811	9. Creating a science and technology park	
0.759	10. Creating reproductive business	
0.927	Underlying factors	
0.819	11. The strong technical core of the entrepreneurial university	4. The core of the entrepreneurial university
0.873	12. Measuring the impact of entrepreneurial university	
0.889	13. Entrepreneurial paths	
0.893	The core of the entrepreneurial university	
0.777	14. University trade and foreign relations for knowledge exchange	5. Knowledge Exchange
0.900	15. Publication of scientific findings and research contract	
0.897	Knowledge exchange	

To analyze the data in the descriptive statistics section, descriptive statistical analysis methods including tables and graphs, standard deviation and variance, etc. have been used. In the inferential statistics section, in order to evaluate the appropriateness of the measurement tool (questionnaire), confirmatory factor analysis (CFA) with partial least squares (PLS) approach was used by Smart PLS3 software. Also, in order to investigate the type of data distribution, skewness and elongation, to investigate the questions and objectives of the research due to the normality of data distribution, one-sample t-test and Friedman ranking test by spss26 software have been used.

4 Research findings

4.1 Descriptive statistics

Table 3: Descriptive indicators of research variables

Gained score range		Score range of questions		Variance	Standard deviation	Average	number of samples	Variables
Most	Least	Most	Least					
5	1.25	5	1	0.41	0.64	3.33	350	Professionalism
5	1	5	1	0.58	0.76	3.71	350	Organizational capacity
5	1	5	1	0.59	0.76	3.49	350	Organizational environment development
5	1.5	5	1	0.53	0.72	3.73	350	Various investments
5	1.88	5	1	0.32	0.56	3.56	350	Structural factors
5	1	5	1	0.66	0.81	3.36	350	Entrepreneurial perspective
5	1.90	5	1	0.54	0.74	3.64	350	Curriculum planning
5	1.70	5	1	0.53	0.72	3.58	350	Teaching process - learning
5	1.87	5	1	0.39	0.62	3.53	350	Content factors
5	1	5	1	0.54	0.73	3.61	350	Strengthening the culture of entrepreneurship
5	1	5	1	0.84	0.91	3.54	350	Creating a science and technology park
5	1.67	5	1	0.49	0.70	3.77	350	Creating reproductive businesses
5	1.69	5	1	0.36	0.59	3.64	350	Underlying factors
5	1	5	1	0.66	0.81	3.34	350	Strong technical core of entrepreneurial university
5	1.25	5	1	0.67	0.82	3.59	350	Measuring the impact of entrepreneurial university
5	1.5	5	1	0.58	0.76	3.73	350	Entrepreneurship paths
5	1.50	5	1	0.41	0.64	3.56	350	The core of the entrepreneurial university
5	1.40	5	1	0.53	0.72	3.53	350	University trade and foreign relations for knowledge exchange
5	1	5	1	0.76	0.87	3.20	350	Publication of scientific findings and research contract
5	5 1.47		1	0.52	0.72	3.37	350	Knowledge exchange

As shown in the table above, the mean scores of all the variables in the table above are greater than 3 (center of the 5-choice spectrum). Therefore, it can be concluded that most people have chosen the options above 3. The minimum value of the scores of the variables is more than 1 and the maximum value of the scores of the variables is less than 5, and this shows that the coding and entry of the questionnaire information into the software has been entered completely and correctly without violation.

4.2 Inferential statistics

4.2.1 Confirmatory factor analysis - evaluation of research model

After checking the normality of the data, it is time for factor analysis. In confirmatory factor analysis, the researcher tries to obtain confirmation of a hypothetical factor structure. That is, it determines whether the data is consistent with a particular factor structure in the hypothesis. Confirmatory factor analysis is also used to assess the validity of the indicators of a structure in the questionnaire to determine the necessary coordination and alignment between the indicators (questions). The diagram below shows the factor analysis model with standardized path coefficients and loads.

In the diagram above, the yellow boxes indicate the items (questionnaire questions) and the ellipses indicate the latent variables. The numbers on the arrows drawn between the latent variables and the items are the same as the standardized factor loads. The numbers on the arrows that connect the two latent variables are the same as the standardized path coefficients. The numbers inside the latent variables represent the values of the coefficient of determination. Factor load values show the amount of correlation between items and variables, and if the numerical value of this index was calculated for a item less than 0.4, it should be removed from the model and the model run again with the remaining items. The following diagram illustrates the factor analysis model in the case of significance coefficients.

In the above diagram, the numbers on the arrows are the same as the statistics. Decisions are made based on the values of staying or deleting a item in the model. In fact, if the value of t between items and variables is less than 1.96, that item should be removed from the model.

To fit the measurement model (appropriateness of the questionnaire) in the partial least squares (PLS) method, the following items are checked:

1. Cronbach’s alpha
2. Composite reliability (CR)
3. Factor load coefficients and its significance
4. Evaluation of the average variance extractive (AVE)
5. Fornell and Larker matrix

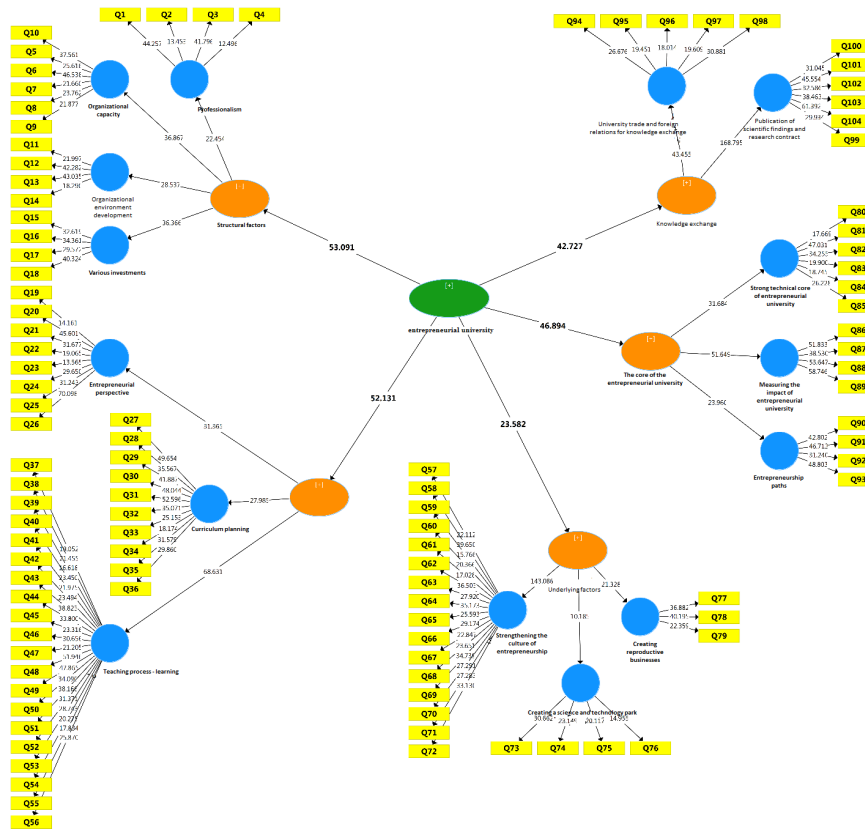


Figure 1: Confirmatory factor analysis model with standardized path coefficients

4.2.2 Investigate the amount of standardized factor load and T-coefficients between items and latent variables

From the standardized coefficient measurement model, it can be deduced that there is a significant correlation between the relevant latent variables and their corresponding indicators. Standardized coefficients, in fact, represent the coefficients of standardized path or loads of factors between factors and indicators. In order to have validity, there must be a significant correlation between the variables and the questions of the questionnaire (items). If the standardized factor load is higher than 0.4, it can be said that the questions in question have good explanatory power.

T- values show the significance of each of the parameters, and if the value of *t* is greater than the absolute value of 1.96 or the significance level is less than 0.05, the parameters of the model are significant, and then the validity of the structures can be confirmed at a significance level of 0.05.

Due to the wide range of questions, we are sorry to bring the table for calculating the load factor and *t* in this section, and we have provided it separately in the appendices section. But the results of this part of the research show that the value of *t*-statistic and the level of significance between the items and the latent variables related to themselves in all cases are calculated more than 1.96 and less than the error level of 0.05, respectively. Therefore, the significance of the relationships between items and their corresponding variables is confirmed. Also, the amount of standardized factor load for all questions of the questionnaire is more than 0.4, respectively, and there is no need to delete an item in the model.

4.2.3 Cronbach’s alpha coefficient, composition reliability coefficient and average variance extracted (AVE)

The following table shows the results of Cronbach’s alpha coefficients, composite reliability and average variance extraction.

As can be seen, the Cronbach’s alpha value and the composite reliability coefficient of all variables are within the acceptable range and above 0.7. Also, the value of AVE of all variables is all above the 0.5 limit. Therefore, it can be inferred that the convergent reliability and validity of the studied variables are acceptable and desirable.

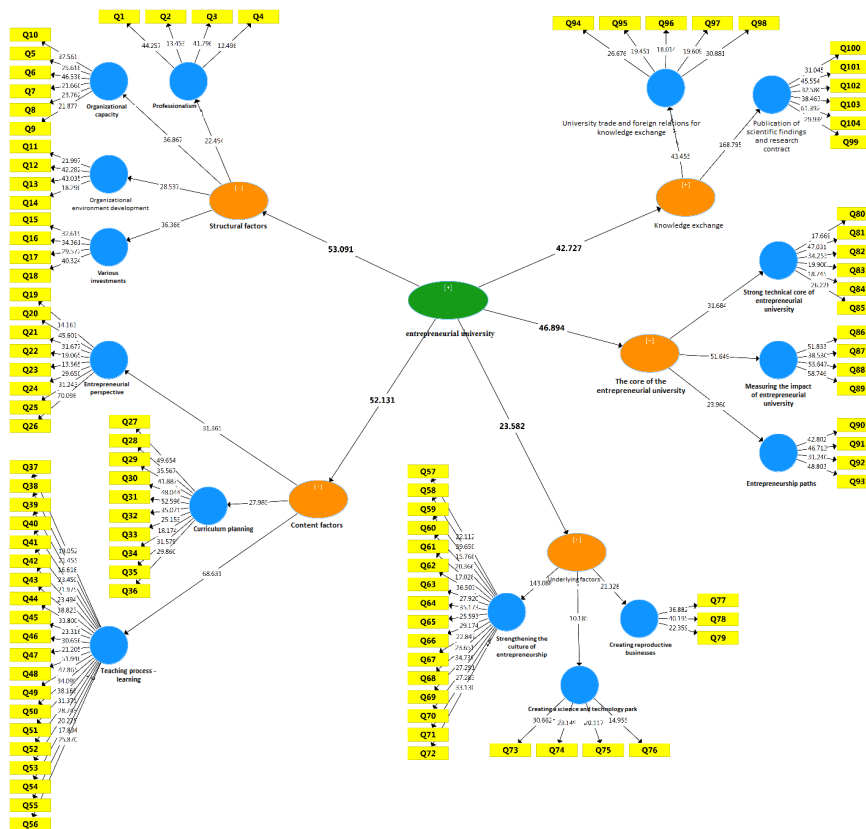


Figure 2: Confirmatory factor analysis model with t-value

Table 4: Results of Cronbach’s alpha coefficient, composite reliability coefficient and AVE

Average Variance Extracted (AVE) > 0.5	Composite Reliability > 0.7	Cronbachs Alpha > 0.7	Variables
0.617	0.911	0.896	<u>Structural factors</u>
0.548	0.827	0.722	Professionalism
0.587	0.895	0.859	Organizational capacity
0.571	0.841	0.748	Organizational environment development
0.649	0.881	0.820	Various investments
0.650	0.959	0.955	<u>Content factors</u>
0.533	0.900	0.871	Entrepreneurial perspective
0.619	0.942	0.931	Curriculum planning
0.525	0.956	0.952	Teaching process - learning
0.536	0.937	0.927	<u>Underlying factors</u>
0.530	0.947	0.940	Strengthening the culture of entrepreneurship
0.637	0.875	0.811	Creating a science and technology park
0.676	0.862	0.759	Creating reproductive businesses
0.635	0.910	0.893	The core of the entrepreneurial university
0.529	0.870	0.819	Strong technical core of entrepreneurial university
0.725	0.913	0.873	Measuring the impact of entrepreneurial university
0.750	0.923	0.889	Entrepreneurship paths
0.811	0.915	0.897	Knowledge exchange
0.528	0.848	0.777	University trade and foreign relations for knowledge exchange
0.668	0.923	0.900	Publication of scientific findings and research contract

4.2.4 Divergent validity study (Fornell and Larker method)

If the correlation between tests that measure different characteristics is low, the tests have diagnostic or divergent validity. Divergent validity also measures the ability of a measurement model to differentiate the observable variables of that model from other observations in the model and it is in fact a complement to the convergent validity that is measured by the Fornell-Larker test.

The table above shows the results of divergent validity study by Fornel and Larker (1981) method. As can be seen, the value of the AVE root of the latent variables in the present study, which are located in the cells located in the main diameter of the matrix, is greater than the value of the correlation between them, arranged in the lower and left cells of the main diameter. Therefore, it can be said that in the above model, the constructs (hidden variables) in the model have more interaction with their questions than with other structures. In other words, the divergence validity of the model is appropriate.

Table 5: Divergent validity results by Fornell and Larker method

Research variables	Professionalism	Organizational capacity	Organizational environment development	Various investments	Entrepreneurial perspective	Curriculum planning	Teaching process - learning	Strengthening the culture of entrepreneurship	Creating a science and technology park	Creating reproductive businesses	Strong technical core of entrepreneurial university	Measuring the impact of entrepreneurial university	Entrepreneurship paths	University trade and foreign relations for knowledge exchange	Publication of scientific findings and research contract
Professionalism	0.74														
Organizational capacity	0.40	0.77													
Organizational environment development	0.37	0.57	0.76												
Various investments	0.66	0.43	0.54	0.81											
Entrepreneurial perspective	0.41	0.36	0.42	0.38	0.73										
Curriculum planning	0.38	0.32	0.32	0.36	0.56	0.79									
Teaching process - learning	0.52	0.39	0.44	0.41	0.50	0.46	0.72								
Strengthening the culture of entrepreneurship	0.29	0.33	0.35	0.39	0.26	0.18	0.28	0.73							
Creating a science and technology park	0.35	0.43	0.35	0.32	0.37	0.31	0.45	0.25	0.80						
Creating reproductive businesses	0.49	0.38	0.48	0.50	0.43	0.31	0.50	0.51	0.43	0.82					
Strong technical core of entrepreneurial university	0.35	0.48	0.45	0.42	0.43	0.40	0.46	0.20	0.44	0.46	0.73				
Measuring the impact of entrepreneurial university	0.45	0.49	0.48	0.42	0.45	0.38	0.46	0.28	0.47	0.52	0.54	0.85			
Entrepreneurship paths	0.55	0.53	0.48	0.52	0.36	0.34	0.49	0.35	0.38	0.52	0.37	0.54	0.87		
University trade and foreign relations for knowledge exchange	0.58	0.48	0.50	0.65	0.42	0.41	0.41	0.37	0.41	0.44	0.37	0.52	0.52	0.73	
Publication of scientific findings and research contract	0.65	0.46	0.47	0.64	0.46	0.42	0.48	0.37	0.41	0.46	0.48	0.51	0.57	0.64	0.82

4.2.5 Significance study of model components

After performing the confirmatory factor analysis and testing the measurement tool (questionnaire), we will look for the question whether the five factors (structural, content, context, university core and knowledge exchange) can be considered as factors in the form of a model or no. According to the type of questions included in the research questionnaire, this concept will be possible using the second-order confirmatory factor analysis. The diagram below shows the conceptual model in the case of standardized path coefficients.

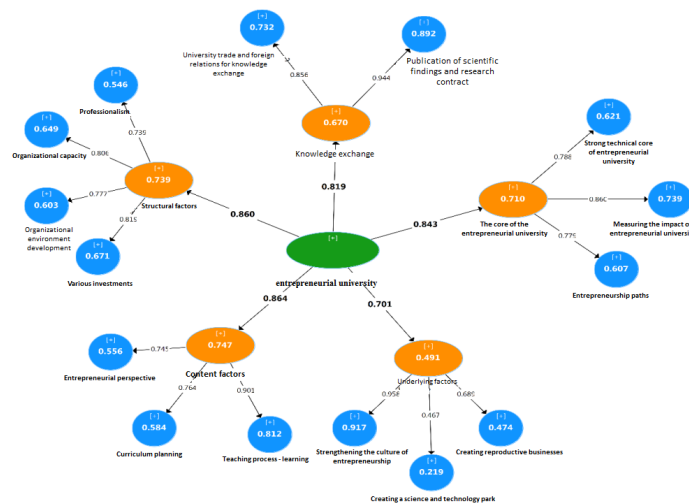


Figure 3: Standardized path coefficients in the second-order confirmatory factor analysis model

The diagram below shows the conceptual model in the case of significant coefficients of *t*.

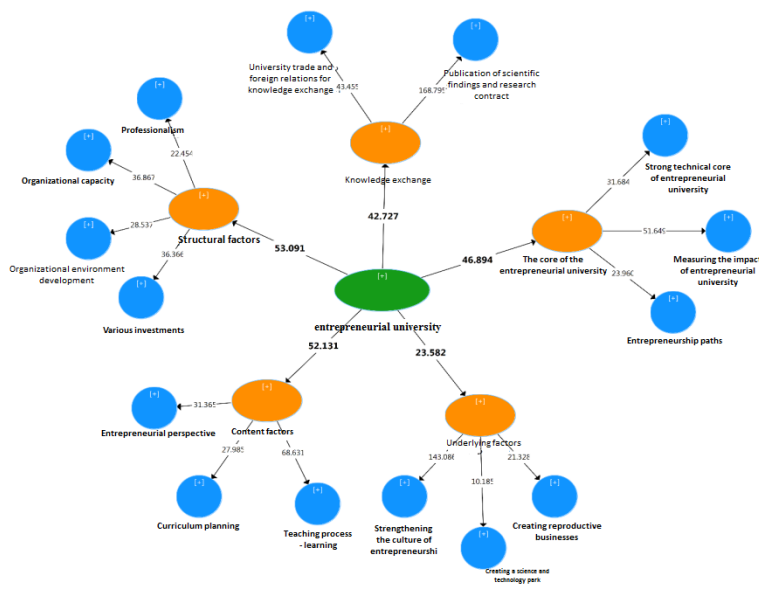


Figure 4: Significance coefficients of *t* in the second-order confirmatory factor analysis model

The table below shows the model fit indices and the significance of the relationships.

Table 6: Model fit indices with path coefficients and significant *t* values regarding the relationships between model variables

The amount of Q2 dependent variable	The coefficient of determination of the dependent variable	Significance level	Amount of statistics <i>t</i>	Path coefficient	The main variables of the model	
					Dependent variable	Independent variable
0.265	0.739	0.00	53.091	0.860	Structural factors	Entrepreneurial university
0.281	0.747	0.00	52.131	0.864	Content factors	Entrepreneurial university
0.176	0.491	0.00	23.582	0.701	Underlying factors	Entrepreneurial university
0.296	0.710	0.00	46.894	0.843	The core of the entrepreneurial university	Entrepreneurial university
0.330	0.670	0.00	42.727	0.819	Knowledge exchange	Entrepreneurial university

$GOF = \sqrt{Communalities \times R^2} = \sqrt{0.412 \times 0.649} = 0.516$

As can be seen in the table above, the entrepreneurial university is examined from five angles or factors (structural, content, contextual, university core and knowledge exchange). Using *T*-values and significance level, a decision will be made to approve or reject this component. According to the results of the above table, it can be concluded that the relationships between the variables are considered significant. There is a criterion called GOF to evaluate the fitting power of the model in the partial least squares method. The GOF criterion was developed by Tenenhaus et al. [19] and is calculated according to the formula in the table. Three values of 0.01, 0.25 and 0.36 have been introduced as weak, medium and strong values for GOF. As can be seen in the table above, the GOF standard value was 0.516, which according to the above classification indicates a strong fit of the research model. Therefore, the model presented for the entrepreneurial university in higher education in South Khorasan province is appropriate and has high power.

4.2.6 Review of research objectives

Main objectives

1. Presenting the model of entrepreneurial university in higher education of South Khorasan province
2. Ranking of indicators of entrepreneurial university in higher education of South Khorasan province

As can be seen in the table above, since the significance level of the test with a statistical value of 81,360 equals zero and less than 0.05, it is inferred that the null hypothesis of the Friedman test is rejected and the opposite

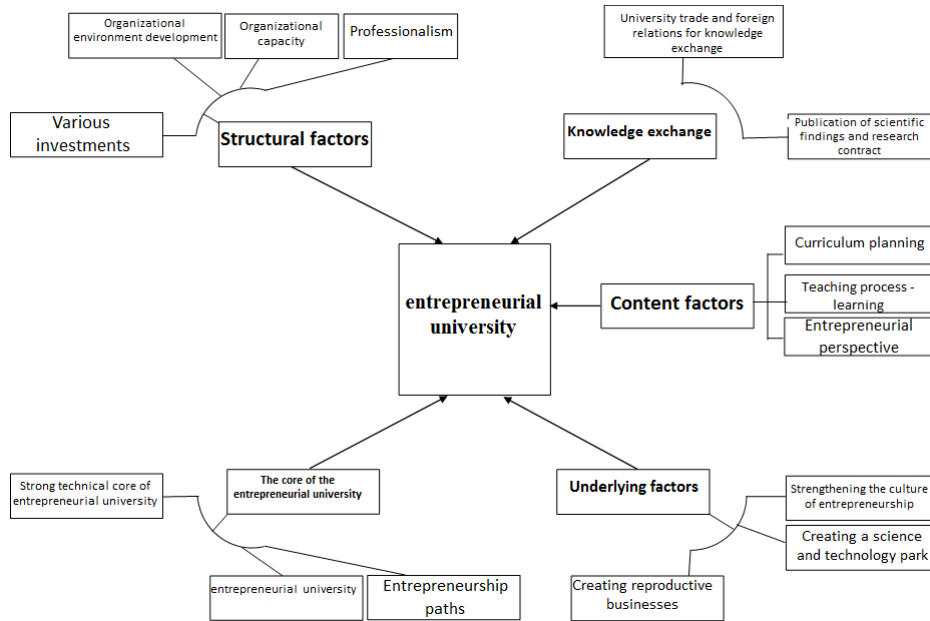


Figure 5: Model of entrepreneurial university in higher education of South Khorasan province

Table 7: Friedman ranking test results

Test statistics	
The amount of chi-square statistics	81.360
Degree of freedom	4
Significance level	0.00

hypothesis that the mean factors are different (structural, Content, context, university core and knowledge exchange) are approved. Therefore, it can be stated that the importance of the factors studied in the research is not the same and is different. The rank of each of the factors is given in the table below.

Table 8: Final results of factor ranking

Rating factors	Average rating	Variables
1	3.36	Underlying factors
2	3.19	Structural factors
3	3.08	The core of the entrepreneurial university
4	3	Content factors
5	2.37	Knowledge exchange

-Sub-objectives

1. Ranking of structural factors of entrepreneurial university in higher education of South Khorasan province

Table 9: Friedman ranking test results

Rating factors	Average rating	Variables
1	2.87	Various investments
2	2.84	Organizational capacity
3	2.34	Organizational environment development
4	1.96	Professionalism
Significance level	Degree of freedom	The amount of chi-square statistics
0.00	3	128.69

As can be seen in the table above, because the significance level of the test with a statistical value of 128.69 is equal to zero and less than 0.05, it is inferred that the importance of the structural factors studied in the research is not the same and is different. The rank of each factor is given in the table above.

2. Ranking of content factors of entrepreneurial University in higher education of South Khorasan province

Table 10: Friedman ranking test results

Rating factors	Average rating	Variables
1	2.20	Curriculum planning
2	2.05	Teaching process - learning
3	1.76	Entrepreneurial perspective
Significance level	Degree of freedom	The amount of chi-square statistics
0.00	2	36.11

Findings show that the significance level of the test with a statistical value of 36.11 is equal to zero and less than 0.05. Therefore, it is inferred that the importance of content factors is not the same and is different. The rank of each factor is given in the table above.

3. Ranking of background factors of entrepreneurial university in higher education of South Khorasan province

Table 11: Friedman ranking test results

Rating factors	Average rating	Variables
3	1.95	Strengthening the culture of entrepreneurship
2	1.97	Creating a science and technology park
1	2.08	Creating reproductive businesses
Significance level	Degree of freedom	The amount of chi-square statistics
0.168	2	3.566

As can be seen in the table above, because the significance level of the test with a statistical value of 3.566 is equal to 0.168 and more than 0.05, it is inferred that the importance of the underlying factors is the same and not different. The rank of each factor is given in the table above.

4. Ranking the core factors of entrepreneurial university in higher education of South Khorasan province

Table 12: Friedman ranking test results

Rating factors	Average rating	Variables
1	2.21	Entrepreneurship paths
2	2.11	Measuring the impact of entrepreneurial university
3	1.68	Strong technical core of entrepreneurial university
Significance level	Degree of freedom	The amount of chi-square statistics
0.00	2	57.95

As can be seen in the table above, because the significance level of the test with a statistical value of 57.95 is equal to zero and less than 0.05, it is inferred that the importance of the core factors of the university is not the same and is different. The rank of each factor is given in the table above.

5. Ranking of knowledge exchange factors of entrepreneurial university in higher education of South Khorasan province

As can be seen in the table above, because the significance level of the test with a statistical value of 25.97 is equal to zero and less than 0.05, it is inferred that the importance of knowledge exchange factors studied in the research is not the same and is different. The rank of each factor is given in the table above.

5 Discussion and conclusion

In the field of studies related to entrepreneurship and innovation, there has been a long-term interest and attention to the entrepreneurial behavior of academic researchers and more generally the entrepreneurial activities of the

Table 13: Friedman ranking test results

Rating factors	Average rating	Variables
1	1.63	University trade and foreign relations for knowledge exchange
2	1.37	Publication of scientific findings and research contract
Significance level	Degree of freedom	The amount of chi-square statistics
0.00	1	25.97

university. Public research organizations, especially universities, are increasingly becoming entrepreneurs and have welcomed the realization of the commercial values resulting from research and have sought and pursued new organizational structures that bring a higher level of scientific research and innovation. Pressure is mounting on higher education institutions around the world to change and transform: Globalization, social mobility, the development of online technologies, the competition of governments and the geopolitical, demographic and, of course, economic pressures on governments to re-evaluate their investments in government financial services, all create a very uncertain and impossible environment. Forecasts have played a role in higher education. For decades, higher education institutions have been adapting to reflect the changing environments in which they operate and seek success. In this regard, the University of Entrepreneurship pays attention to various meanings and identities such as creativity, commercialization, new investment and employment and can be considered an organizational response to the challenges and pressures of the external environment. In fact, today the traditional role of universities has changed from focusing on education and research to active participation in the economic development of the region and this issue has caused that in addition to education and research (the previous two missions of universities), taking into account global developments and changes in the relationship of the three main actors in national innovation systems (industry, government and academia), entrepreneurship as The third mission should be left to the universities.

The results of the first main question of the research, which states what is the model of entrepreneurial university in higher education in South Khorasan province, states that using library studies and surveys of professors, staff and experts in higher education in South Khorasan province, 5 aspects, 15 components and 104 indicators were identified as effective factors on the entrepreneurial university and presented in the form of the entrepreneurial university model, which is shown in the previous section with Figure 5.

Also, in response to the second main question of the research, which states the ranking of entrepreneurial university indicators in higher education in South Khorasan province, it states that contextual factors had the highest and knowledge exchange had the lowest priority. The order of importance of the factors is as follows:

1- Background factors 2- Structural factors 3- Entrepreneurial University core 4- Content factors 5- Knowledge exchange

The results of the first sub-question of the research which states that what the ranking of structural factors of entrepreneurial university in higher education of South Khorasan province is? States that the order of importance of structural factors of entrepreneurial university in higher education of South Khorasan province is as follows:

1- Various investments 2- Organizational capacity 3- Development of organizational environment 4- Professionalism

The results of the second sub-question of the research, which states what the ranking of content factors of entrepreneurial university in higher education of South Khorasan province is, indicate that the importance of content factors of entrepreneurial university in higher education of South Khorasan province is as follows:

1- Curriculum planning 2- Teaching process-Learning 3- Entrepreneurial perspective

The results of the third sub-question of the research, which states what the ranking of the underlying factors of entrepreneurial university in higher education in South Khorasan province is, indicate that the order of importance of underlying factors in higher education in South Khorasan province is as follows:

1- Creating reproductive businesses 2- Creating a science and technology park 3- Strengthening the entrepreneurial culture

The results of the fourth sub-question of the research, which states what the ranking of core factors of entrepreneurial university in higher education of South Khorasan province is, states that the importance of core factors of entrepreneurial university in higher education of South Khorasan province is as follows:

1- Entrepreneurship Paths 2- Measuring the Impact of Entrepreneurial University 3- Strong Technical Core of

Entrepreneurial University

The results of the fifth sub-question of the research, which states what the ranking of entrepreneurial knowledge exchange factors in higher education in South Khorasan province is, states that the importance of entrepreneurial university knowledge exchange factors in higher education in South Khorasan province is as follows:

1- Trade and foreign relations of university for knowledge exchange 2- Publication of scientific findings and research contract

According to the ranking of factors in this study, which are contextual factors, structural factors, the core of the entrepreneurial university, content factors and knowledge exchange, suggestions are presented based on strengthening each of the above dimensions in higher education in South Khorasan province.

In order to strengthen the underlying factors in higher education in South Khorasan province, it is suggested:

Commitment to innovation, creativity and entrepreneurship must be institutionalized in the current culture of the university.

Innovation, entrepreneurial behaviors, new ideas and teamwork at the university should be supported.

In order to strengthen structural factors in higher education in South Khorasan province, it is suggested:

The university should invest in developing staff capabilities to support the university's entrepreneurial programs.

Clear incentives and rewards for employees who actively support and are involved in the university's entrepreneurial programs; would have existed.

In order to strengthen the core of the entrepreneurial university in higher education in South Khorasan province, it is suggested:

The University should monitor and evaluate compliance with the law in support of start-ups.

The university should be sufficiently aware of the importance / value of developing entrepreneurial skills among staff and students.

In order to strengthen the content factors in higher education in South Khorasan province, it is suggested:

Defined and explained entrepreneurial mission at all levels of the organizational structure of the university.

Establish a commercialization strategy in the university and provide the necessary support for economic projects.

In order to strengthen the exchange of knowledge in higher education in South Khorasan province, it is suggested:

Provide opportunities for staff and students by the university to engage with the external / business environment in entrepreneurial activities.

The university should take steps to connect industrial, educational and research activities (larger communities) to each other in order to influence the overall knowledge ecosystem.

Other future researchers are also encouraged to consider the following:

Research on other variables that affect academic entrepreneurship (unexplained factors);

Doing this research in the coming years to compare their results with the results of this research (as a base year);

Research on academic entrepreneurship and the factors affecting it by methods other than survey, especially qualitative research such as case study and longitudinal research;

Finally, we state that this research, like any other research, has its limitations. Among the limitations of this research can be mentioned the following:

1. Using a questionnaire that indicates its inherent limitation.
2. Not being able to generalize the results of this research to other universities
3. Lack of control of the researcher over preventing the application of the subject's personal opinion in answering the questions.
4. Lack of consideration of research control factors.

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