





Original Article

The relationship between entrepreneurship components and communication skills of managers: a structural equation modeling

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Abstract

Background: The purpose of this study was to look into how managerial integrity and the elements of academic entrepreneurship relate to one another.

Methods: This research was descriptive-correlational in nature. 1832 people made up the statistical population of the survey, including management, staff, and faculty from Islamic Azad Universities in District 6. 315 individuals that were chosen using stratified random sampling made up the estimated sample size. Data collection method was an academic entrepreneurship questionnaire that included 23 questions and a managers' good character questionnaire that included 26 questions. By using exploratory factor analysis, the dimensions of academic entrepreneurship were discovered, and the internal validity of the questionnaires was confirmed by Cronbach's alpha (higher than 0.7).

Results: The elements of academic entrepreneurship (organizational competencies, continuous contact, university aims and policies, entrepreneurial marketing, and culture) and the positive and substantial path coefficient ($p = 0.001$) were found to be significantly correlated.

Conclusion: The change in educational quality and the investigation of the effective parameters for encouraging entrepreneurship in academic settings were the key factors in increasing the willingness for entrepreneurship. If the willingness for entrepreneurship was associated with a good character, it can have positive results and effectiveness that can be used by managers.

Keywords: Entrepreneurship; Case Managers; Social Skills; Universities.

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Introduction

The entrepreneurial role that colleges play is one of their key responsibilities. Academic entrepreneurship entails addressing the scientific issues facing society, the government, and businesses, fostering creativity among university students, bringing the findings of academic research to the market, and developing and selling new technologies (1). According to researchers, academic entrepreneurship

encompasses all entrepreneurial endeavors, including but not restricted to patent university assignment, technology transfer, development centers, science and technology parks, new company creation in the university, licensing, and regional development (2). A new generation of universities that significantly contribute to the growth of entrepreneurship is produced by the evolution of educational institutions in contact with the social and economic

environment (3). It is obvious that universities and the higher education system need to transform into entrepreneurial institutions in order to align with the processes of local, regional, and global economic development and depart from their traditional position as mere knowledge producers. They should also serve as one of the variables that generates money and serves as an organizing force for entrepreneurial activities (4). Also, one of the important variables related to human resources is good character. It is known as one of the most important ways of organizational development (5). Therefore, the need of educational institutions for leaders and people who can cultivate good character has been felt (6). A good character indicates that a person lives according to high level values. A person who lacks good character compromises on high level values (7). Unfortunately, with the existing gaps in this area of organizations, addressing the moral character of managers and employees is one of the important issues that measures should be taken to develop it (8). In order to organize and develop human resources based on university education and place them in the labor market for knowledge-based manufacturing, academic entrepreneurship is a new sector of economic activity. The essential elements in boosting interest in entrepreneurship in this regard are improving the quality of education and determining the most effective guidelines for promoting entrepreneurship in academic environments. The purpose of this study (District 6 Islamic Azad Universities of Tehran) was to examine the connection between the elements of academic entrepreneurship and the integrity of managers.

Methods

Study design: The application, nature, and method of this study was survey and descriptive-correlational, respectively. Deputies and managers, staff, and

academics from the Islamic Azad Universities of District 6 (1832 people) made up the statistical population of the study.

Sampling: Using Morgan's table, the sample size was calculated to be 315 individuals. They were chosen using stratified random sampling that took into account the size of the class. By reviewing articles and books related to the research topic literature, academic entrepreneurship and the managers' good character questionnaires were developed. 23 questions in a questionnaire were used in this study to gauge academic entrepreneurship. It evaluates various organizational competencies, constant engagement, academic objectives and policies, entrepreneurial marketing, and culture.

Questionnaire and data collection: On a 5-point Likert scale (I firmly disagree, I disagree, I somewhat agree, I agree, I strongly agree), each question was graded. Additionally, 26 questions and components were used to assess the integrity of managers. These included the traits of courage, tolerance, honesty, modesty, humility, optimism, and responsibility. A 5-point Likert scale was used to grade each issue (I firmly disagree, I disagree, I somewhat agree, I agree, and I definitely agree). Strongly disagree received a score of 5, strongly agree received a score of 1, agree received a score of 2, somewhat agree received a score of 3, and agree received a score of 4. Utilizing the methods of maximum likelihood and varimax rotation, exploratory factor analysis was utilized to determine the components of academic entrepreneurship. 23 sub-dimensions (indices) associated with academic entrepreneurship were condensed into five factors based on the findings of the factor analysis. Prior to factor analysis, the Kaiser, Meyer, and Olkin (KMO) criterion was employed to verify the quality of the data and examine the precision of the sample.

Table 1. Eigenvalue of each factor and the cumulative frequency of variance percentage (after rotation) of academic entrepreneurship

| Factor | Eigenvalue | VP* | Cumulative frequency of VP* |
|--------|------------|--------|-----------------------------|
| 1 | 5.272 | 22.923 | 22.923 |
| 2 | 3.835 | 16.673 | 39.596 |
| 3 | 2.310 | 10.046 | 49.642 |
| 4 | 1.746 | 7.592 | 57.234 |
| 5 | 1.169 | 5.083 | 62.318 |

*VP: Variance percentage

The correlation coefficient of the data was calculated using this method. The data was better suited for analysis the larger the KMO. KMO ranges from 0 to 1, and data greater than 0.7 were eligible for analysis. Additionally, Bartlett's sphericity test demonstrates the variables' relationships and the validity of the factor analysis' findings. Findings in Table 1 showed that the sample's KMO for academic entrepreneurship has a value of 0.955, which was acceptable. Additionally, the significance of Bartlett's test (p-value < 0.05)) (with a statistic of 1956.129 with a degree of freedom of 133, with P: 0.000) indicated that the prerequisites for using factor analysis have been met. Structural equation modelling in the Amos software was carried out to analyze the data.

In academic entrepreneurship, Table 2 displays the eigenvalue of each factor and the explanatory power of the variance of that factor. These five variables, each of which has an eigenvalue over 1, account for 62.318% of the variation in the general idea. It should be remembered that the eigenvalue of each factor measures the contribution of each factor to explaining the common variance and was calculated as the sum of the squared factor loads of a factor. The degree to which a factor explains the variation of the entire notion was indicated by its explanatory power of variance.

The findings of an exploratory factor analysis to determine the dimensions of managers' good character, which included 26 sub-dimensions (indices) connected to good character, are shown in Table 2. The results show that the KMO score for

sampling quality is 0.971, which is acceptable, and that the prerequisites for using factor analysis have been met based on the significance of Bartlett's test (p-value < 0.05) (with a statistic of 5875.124, a degree of freedom of 165, and a P: 0.000). Table 2 displays the eigenvalues of each factor in good character along with the variance's explanatory power for each factor. The variance of the general notion is explained by these seven components, each of which has an eigenvalue greater than one.

Using Cronbach's alpha, the internal reliability of the questionnaires was determined in a preliminary investigation of 27 individuals from the statistical sample. According to the findings of Table 3, since Cronbach's alpha values are higher than (0.7), the internal reliability of all dimensions was confirmed.

Table 2. Eigenvalue of each factor and the cumulative frequency of variance percentage (after rotation) of good character

| Factor | Eigenvalue | VP* | Cumulative frequency of VP* |
|--------|------------|--------|-----------------------------|
| 1 | 6.202 | 23.852 | 23.852 |
| 2 | 2.752 | 10.584 | 34.437 |
| 3 | 2.186 | 8.407 | 42.844 |
| 4 | 1.506 | 5.793 | 48.637 |
| 5 | 1.413 | 5.436 | 54.073 |
| 6 | 1.155 | 4.444 | 58.517 |
| 7 | 1.044 | 4.015 | 62.533 |

*VP: Variance percentage

Results

Figure 1 presents the results of structural equation modeling to examine the research questions.

The results in Table 4 and Table 5 show that the research model has a good fit.

Does the moral character of managers at District 6's Islamic Azad Universities correlate with organizational competence? The findings demonstrated a substantial correlation between managerial skill and moral character among students from Islamic Azad Universities in District 6 (p=0.001, β=0.47). The incremental (direct)

Table 3. Reliability of research questionnaire dimensions

| Dimension | Cronbach's alpha | Number of questions of each dimension |
|-------------------------------|------------------|---------------------------------------|
| Academic entrepreneurship | 0.834 | 23 |
| Organizational competences | 0.835 | 4 |
| Continuous interaction | 0.747 | 5 |
| University goals and policies | 0.715 | 6 |
| Culture | 0.759 | 4 |
| Entrepreneurial marketing | 0.707 | 4 |
| good character | 0.777 | 26 |
| courageous | 0.726 | 4 |
| tolerant | 0.741 | 6 |
| honest | 0.840 | 4 |
| humble | 0.736 | 4 |
| optimist | 0.798 | 4 |
| responsible | 0.718 | 4 |

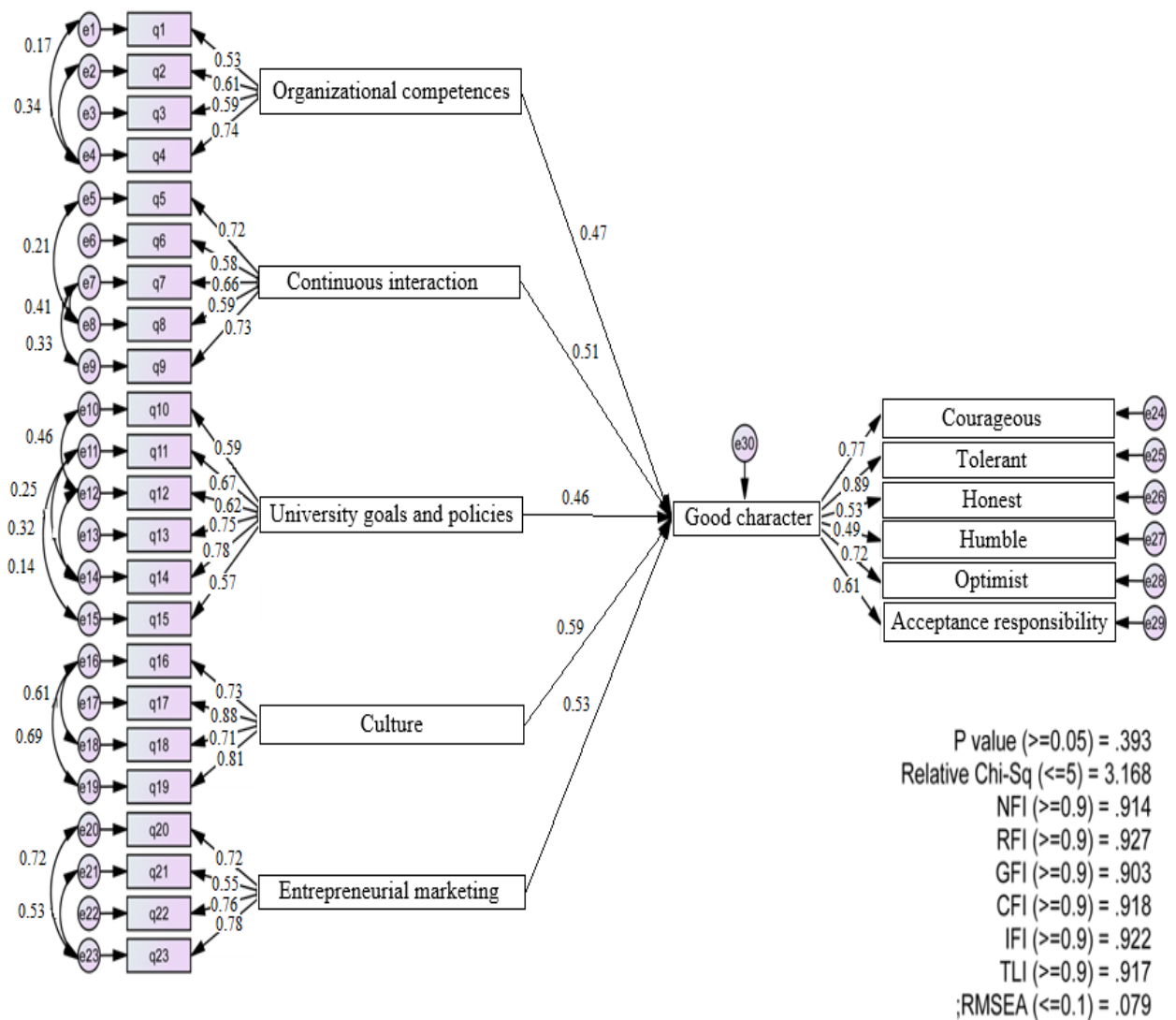


Figure 1. The results of structural equations to examine the research questions

Table 4. Fit indices of the proposed model of research questions

| index | Acceptable limit | Reported value |
|---------|-------------------------------|----------------|
| CMIN/DF | equal to or smaller than 3 | 3.168 |
| GFI | Equal to or greater than 0.9 | 0.918 |
| AGFI | Equal to or greater than 0.9 | 0.786 |
| NFI | Equal to or greater than 0.9 | 0.914 |
| IFI | Equal to or greater than 0.9 | 0.922 |
| TLI | Equal to or greater than 0.9 | 0.917 |
| CFI | Equal to or greater than 0.9 | 0.914 |
| RMSEA | equal to or smaller than 0.08 | 0.079 |

kind of this relationship results from the path coefficient's positive value. It indicates that as competency is applied more effectively, the studied managers at the Islamic Azad Universities in District 6 become better people.

Are managers at Islamic Azad Universities in District 6 good people who engage in constant interaction? In District 6's Islamic Azad Universities, the findings showed a substantial correlation between ongoing interaction and managers' moral character ($p=0.001$, $\beta=0.51$). This relationship is of an incremental (direct) type because of the positive value of the route coefficient. The good character of the managers who studied at the Islamic Azad Universities in District 6 is therefore said to have improved with the expansion of continuous engagement.

Are the objectives and guiding principles of the Islamic Azad Universities in District 6 in line with the moral character of their administrators? The findings showed a strong correlation ($p=0.001$, $\beta=0.48$) between the objectives and philosophies of the Islamic Azad Universities in District 6 and the good moral character of the managers who were under study. This relationship is of an incremental (direct) type because of the positive value of the route coefficient. This indicates that if goals

and policies are more fully implemented, District 6's analyzed managers' moral character will also improve.

Does the culture of the Islamic Azad Universities in District 6 influence the managers' moral character? The findings showed a substantial correlation ($p=0.001$, $\beta=0.59$) between the culture and the moral character of the management of the Islamic Azad Universities in District 6. The fact that the route coefficient is positive indicates that this relationship is incremental (direct). This indicates that as culture is more fully implemented, the studied managers at the Islamic Azad Universities in District 6 have better moral character.

Does the moral integrity of managers at Islamic Azad Universities in District 6 have anything to do with entrepreneurial marketing? The findings demonstrated a substantial correlation between entrepreneurial marketing and the moral character of managers educated at Islamic Azad Universities in District 6 ($p=0.001$, $\beta=0.53$). This relationship is of an incremental (direct) type because of the positive value of the route coefficient. The good character of the managers who studied at the Islamic Azad Universities in District 6 is therefore said to have improved as the use of entrepreneurial marketing has increased.

Discussion

According to the study's findings, managerial integrity and organizational competency go hand in hand. No study that compared and evaluated the study's findings with those of earlier studies could be located in this area.

Table 5. Examining the relationship between the variables in the fifth sub-questions of the research

| Question | Path coefficient (CI) | Statistic t | p-value |
|--|-----------------------|-------------|---------|
| Competence → Good character of managers | 0.47 (0.39-1.12) | 5.098 | 0.001 |
| Continuous interaction → the good character of managers | 0.51 (0.486-1.23) | 8.409 | 0.001 |
| Goals and policies → good character of managers | 0.48 (0.396-1.18) | 6.134 | 0.001 |
| Culture → good character of managers | 0.59 (0.491-1.36) | 5.700 | 0.001 |
| Entrepreneurial marketing → the good character of managers | 0.53 (0.489-1.29) | 7.965 | 0.001 |

If the organization has the necessary competences in the area of entrepreneurship and innovation and can maintain its competitive advantages and organizational competences, the managers will also act more appropriately, resulting in an improvement in the good character of the managers. According to the study's findings, managers' moral integrity and ongoing interaction are directly related. The findings of this study are in line with those of a study by Zenger & Joseph, who discovered that interactions and communication inside an organization will enhance managers' behavior. If the interactions and communications in the organization are constructive and effective and each member of the organization has an effective behavior and interaction with each other, the character and behavior of the employees and managers will move towards a good character (9).

The study's findings showed a connection between the managers' moral character and the university's aims and policies. Andersen & Kjeldsen conducted research in this area and verified the findings of the earlier study. Goals and policies in many cases direct the behaviors, personalities, manners, customs and behaviors and if the goals and policies of the organization are aimed at improving behavior in the organization, the good character of the managers will also improve (10).

According to the study's findings, there is a direct link between a company's culture and its managers' moral character. The study's findings are in line with those of a study by Lee, who discovered that the culture controlling the organization significantly influences the personality and conduct of leaders. If organizational culture and customs emphasize positive and good behaviors and attitudes, the behavior and character of all people will be good, and the behavior and character of organizational managers will also be good. According to the study's findings, managerial integrity

and entrepreneurial marketing go hand in hand. However, entrepreneurial marketing and efforts to offer novel products and services need to improve interactions and have an innovative spirit, and ultimately, entrepreneurial marketing will lead to the good character of managers. In this regard, no study has been found to compare and evaluate the results of the present study with those of previous studies (11).

Both Nejad Haji Ali Irani and Hedayat Fasandoz, a description of how moral behavior serves as a mediator to explain how good character affects spirituality in the workplace. The analysis's findings revealed that moral behavior and spirituality in the workplace are significantly and positively influenced by good character (12). Rahimi and Shujaei Baghini analyzed the status of managers' moral character at Damghan University and Shahrood University of Technology in a study they conducted. According to the findings of the previous study, Shahrood University of Technology and Damghan University had significantly different standings for the traits of excellent character of managers (courage, humility, passion, and compassion) (13), which is similar to the findings of the current study. An investigation by Homberg & Heine titled "Motivation in Public Sector Organizations: An Introduction to the Special Issue" revealed a favorable and significant relationship between moral character and public service motivation (14). The study "How to evaluate the impact of academic spin-offs on local development: an empirical analysis of the Italian case" was done by Iacobucci & Micozzi. They discovered that entrepreneurship and public service motivation are positively and significantly correlated and that academic entrepreneurship boosts public service motivation (15). A positive and significant association between academic entrepreneurship and moral character was found by Powers & McDougall in their

study, "University Start-Up Formation and Technology Licensing with Firms that Go Public: A Resource-Based View of Academic Entrepreneurship" (16). A study by Baldini et al. titled "Institutional Changes and the Commercialization of Academic Knowledge: A Study of Italian Universities' Patenting Activities between 1965 and 2002" discovered a significant and favorable link between academic entrepreneurship and managers' moral character (17).

Academic entrepreneurship and its constituent parts are closely related, and these include managerial integrity, organisational skills, ongoing communication, institutional objectives and policies, culture and entrepreneurial marketing, and university goals and policies. Therefore, it is recommended to promote innovation and entrepreneurship in the organization, develop culture. Also, organizational managers are recommended to do their best for the realization of academic entrepreneurship and solving comprehensive needs. In this regard, they should support the desired entrepreneurial plans of the university to meet the needs of the society.

It is also recommended to create and design new services in the university, to use information technology in the university to share information, to update organizational knowledge in a unique way in the university, to turn up-to-date knowledge into plans and instructions to create desirable outcomes in the organization. It is also recommended to obtain information on the experience and expertise of others according to the needs of the university in the area of entrepreneurship, communicate with leading and prominent people in business, and communicate with entrepreneurial graduates. Also, growth centers and science and technology parks of the university should be established in creating entrepreneurship, and an interaction should be established with entrepreneurial professors and students, the

university's vision of entrepreneurship should be defined. The entrepreneurship should be defined as a priority of the university, the professors should be aware of the goals of the university in the area of entrepreneurship, and if necessary, the professors should be trained in the area of entrepreneurship. The rules and regulations of the university should be changed in line with entrepreneurship, the necessary environment should be created in line with the realization of entrepreneurship, the attitude of people should be directed to increase creativity and entrepreneurship, and creative thinking should be supported by the university. Also, conferences should be held to increase academic entrepreneurship, creative thoughts should be supported from every person in the organization, university innovations should be transferred to industrial partners. Mechanisms should be considered to transfer entrepreneurship to the industry. Also, the innovations should be made according to the needs of the industry and the need of the market should be identified to create innovation. All of these measures can enhance the good character among the managers.

Recommendations

According to the results of this study, it is recommended:

The growth centers and science and technology parks of the university should be established and interact with the entrepreneurial professors and students, and the university's vision of entrepreneurship should be defined, and entrepreneurship should be introduced as a priority of the university. The professors should be aware of the goals of the university in the area of entrepreneurship, if necessary, the professors should be trained in the area of entrepreneurship, the rules and regulations of the university should be changed in line with entrepreneurship. To realize entrepreneurship, the necessary environment should be created, people's attitudes should be directed towards

increasing creativity and entrepreneurship, creative thinking should be supported by the university, and festivals and conferences should be held to increase academic entrepreneurship, and creative thoughts should be supported by every person in the organization. Academic innovations and discoveries should be transferred to industrial partners, mechanisms should be considered to transfer entrepreneurship to the industry, innovations should be made according to the needs of the industry, the market's need to create innovation should be identified to increase the motivation of public service.

Conclusion

According to the findings of the current study, there is a clear connection between academic entrepreneurship and its constituents, such as organizational competences, ongoing contact, university goals and policies, entrepreneurial marketing and culture, and public service motivation. Hence, it is necessary to promote innovation and entrepreneurship in the organization and the organizational culture should be in line with the realization of academic entrepreneurship and solving comprehensive needs, and the entrepreneurial plans and methods desired by the university should be in line with the realization of the needs of the society. It is also recommended to create and design new services in the university, to use information technology in the university to share information, to update organizational knowledge in a unique way in the university, to turn up-to-date knowledge into plans and instructions to create desirable outcomes in the organization. It is also recommended to obtain information on the experience and expertise of others according to the needs of the university in the area of entrepreneurship and communicate with leading and prominent people in business, and communicate with entrepreneurial graduates to improve the good character of managers by continuous interaction, innovation and

entrepreneurship in the organization. Also, organizational culture should be developed in line with the realization of academic entrepreneurship and solving the comprehensive needs, and support the entrepreneurial plans and methods desired by the university and support them so that the needs of the society for successful entrepreneurial marketing are met.

Authors' contribution

Saeid Hossein Abadi and Rostam Pourrashidi developed the study concept and design. Hamid Reza Mollaei acquired the data. Mahdi Mohammad Bagheri and Saeid Hossein Abadi analyzed and interpreted the data, and wrote the first draft of the manuscript. All authors contributed to the intellectual content, manuscript editing and read and approved the final manuscript.

Informed consent

Questionnaires were filled with the participants' satisfaction and written consent was obtained from the participants in this study.

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Conflict of interest

The authors declare that they have no conflict of interests.

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Appendix 1: questionnaire

| | |
|-----|--|
| q1 | I can create and design new services in my organization. |
| q2 | In my organization, information technology is used to share information. |
| q3 | Organizational knowledge is updated uniquely in my organization. |
| q4 | Updated knowledge is converted into plans and guidelines to create desired results in my organization. |
| q5 | Based on the needs of the university in the field of entrepreneurship, the experience and expertise of others is acquired. |
| q6 | A communication is established with significant and prominent people in business. |
| q7 | Communication with entrepreneurial and successful graduates is not interrupted. |
| q8 | Growth centers and science and technology parks are considered by university in creating entrepreneurship. |
| q9 | Mutual thinking and interaction is established with entrepreneurial professors and students. |
| q10 | The university's vision of entrepreneurship is defined. |
| q11 | Entrepreneurship is introduced as a university priority. |
| q12 | The professors will be informed about the goals of the university in the field of entrepreneurship. |
| q13 | If necessary, professors are trained in the field of entrepreneurship. |
| q14 | If necessary, university rules and regulations will be changed in line with entrepreneurship. |
| q15 | The necessary environment will be created to realize entrepreneurship |
| q16 | People's attitude is directed towards increasing creativity and entrepreneurship. |
| q17 | Creative thinking is supported by the university. |
| q18 | Festivals and conferences are held to increase university entrepreneurship. |
| q19 | Creative thoughts of every person in the organization are encouraged. |
| q20 | It is tried to transfer university innovations and discoveries to industrial partners. |
| q21 | Mechanisms are considered to transfer entrepreneurship to industry. |
| q22 | Given the needs of the industry, innovations are made. |
| q23 | The market needs to create innovation is known. |
