

Identifying and Prioritizing Barriers to Commercializing Researches and Innovations in East Azerbaijan University with AHP Techniques and Providing Appropriate Strategies

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Abstract

The purpose of this research is to identify, prioritize the barriers to commercialization of research findings and academic innovations in the eastern province. This research is in terms of survey method and in terms of purpose. Sample size with Cochran formula, 177 out of 330 university staff were selected. Subsequently, the main and secondary criteria were identified. Finally, the main obstacles (individual, structural, cultural, process) and 18 sub-obstacles were identified. Data was analyzed using Hierarchical Analyzer Software (AHP) software, prioritization. The results showed that cultural barriers with the weight of 436 / is the most important barrier and the international exchange of knowledge with the final weight of 191 / barrier is ranked first. Therefore, organizational culture is a major factor and should be strengthened. International exchange of knowledge is possible through easy access to scientific articles and the recruitment of international professors.

Key Words: Barriers to Commercialization, Research Findings, Analytical Hierarchy Process (AHP)

1. Introduction

In the age of knowledge-based economics, the system of research and production of science is a potential source of ideas that must become community-market products and services. According to this view, the development of national innovation will not be achieved by increasing the number of research and research projects and linking the achievements of the research system with the market system is essential. Research findings play an important role in improving the quality of life and developing community well-being. These findings will not be important unless they are used and if they are not available to applicants and do not have the necessary economic justification. (Santesso & Tuqwell, 2006)

Certainly, the entry of higher education into the field of marketing and marketing of products, with market requirements and customer standards, has opportunities and positive outcomes. Its minimal impact will be increased benefits, helping the university's financial autonomy, and its maximum implications will be increased living standards

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(safety and security), quality of life, wealth generation and economic growth . (Hassanqulipour and Sharifi, 2008)

Considering that the humanities (especially accounting and management) are the most important part of higher education in Iran. But it has not been able to make a significant contribution to scientific production. Determining the true cause of this issue requires research. In this research, we try to identify what factors are among the most important barriers to commercialization in universities.

2. Statement of the problem

The study of the trends in universities in Iran indicates the tendency of customer orientation, commercialization and institutions of higher education to communicate with economic institutions. Following this trend, the more and more tendencies the universities, and in particular the faculty members, will lead to business activities.

Commercialization is a process in which an idea or product is converted into products, services, and processes available on the market. That is, the findings from the scientific research will enter the market, and new ideas and findings will be developed into new products or services or consumer-friendly technologies around the world. (Fakour and Haj Hosseini,2008)

Global transformations affect universities and their roles as an element that influences contemporary societies. With the changing conditions of the world, attitudes toward universities have also changed, so that universities, in addition to research and education, play a role in the new mission of economic partnership and development. The need for this new mission is felt when it was felt that there was no proper mechanism for transferring scientific results from research to industry as a problem (Etzkowitz, 1989)

Since the findings and research results are not deployed until they reach the realm of society and their revenues are not the source of the community, they are not only the source of wealth, but also the loss of various resources and the creation of problems for communities. Therefore, commercialization in countries is on the agenda of many research organizations and research centers. But despite the acceptance of this issue and its special attention, numerous evidence from around the world suggests that, although a large number of technology development research efforts were technically successful, only a small percentage of them succeeded in commercializing. This reflects the complexity of the commercialization process. (Bandarin and Fierce, 2009)

Now, in Iran, the entry of universities into knowledge business has become an advantage, but our universities have not yet been able to effectively integrate their scientific findings into the industry and establish an effective inter-industry between industry and university. (Pirezat and Heidari, 2011)

It is clear that commercialization is not always easy and successful (Decter, 2007)

In this study, considering the importance of the issue and the great impact that this can have on the success of other industries, we first identify the obstacles to commercialization of academic research in East Azerbaijan province. We then prioritize them so that we can take a step forward and realize the goals of academic researchers.

3. Background research

In a study entitled "The New Technology Development Assessment Model for Assessing Commercialization Opportunities and Fuzzy AHP Approaches" in the Republic of Korea, Chu and Lee have identified the factors that influence the success of the commercialization of new products. The results of this study showed that marketing is the dominant criterion for product commercialization, especially in business, customer needs, and the level of profitability and market competitive factors that appear to be of particular importance. (CHO & LEE, 2013)

Dr. Tang identified the "Identification of technology between university and industry: frameworks and constraints" presented in the context of transmission technology in China's Chinese province. Among them are: the dominance of foreign investors in important sectors of production, research on the lack of research in the industry, the lack of knowledge scientists, the lack of entrepreneurship, the lack of innovation, the concentration of academics on education. These obstacles ultimately create the gap between the goals of universities and the industry. (Teng, 2010)

With the presentation of the article "Transfer of Technology between University and Industry: Frameworks and Constraints," Dr. Tang identified the barriers that were present in the technology transfer process in the Xi'an province of China. Among them are: the dominance of foreign investors in important sectors of production, the lack of research funding in the industry, the lack of leading knowledge scientists, the lack of entrepreneurial spirit, the lack of innovative spirit, the mere academic focus on education. These obstacles ultimately create the gap between the goals of universities and industry. (Teng, 2010)

Based on the comparison of the methods of the five most prestigious universities in the world (Harvard, Yale, Oxford, Cambridge, Royal College of London), based on the 2007 rankings of the Institute of Higher Education. By reviewing the methods and models of commercial transfer, the design of the model has been chosen as superior. According to the results, the choice of motivating policies for professors in income distribution is of the highest importance for encouraging the commercialization of knowledge in universities and university entrepreneurship and the necessity of networking, financial support, the creation of necessary structures, and the freedom of action of professors in the order of the next priorities. Data and physical support have the least importance over other necessities.

Foray, in a study entitled Knowledge transfer between university and industry in Switzerland, examines barriers to knowledge transfer and the mechanisms of this process. The most important barriers identified in this research are: the low participation of industry in higher education, the lack of information in the industry, the lack of interest in participating in scientific projects, the lack of appropriate orientation of research and development, and the achievement of non-commercialization, lack of Financial resources, high administrative levels, uncertainty about the results of cooperation, organizational barriers, different perceptions of business priorities, intellectual property rights problems. In order to support the transfer of applied knowledge, he recommends the creation of new models for managing intellectual property and targeting small businesses as facilitators of this process (Foray, 2007)

In his research, Nielson and his colleagues examined the challenges of the commercialization process in six US, Japan and China universities, and listed the following factors as the most important obstacles:

- 1) The lack of financial and human resources
- 2) Failure to create and maintain high-quality scientific knowledge
- 3) Non-interaction of business actors
- 4) Focusing policy makers on structure rather than content and expecting quick returns on investing in activities
- 5) The lack of clarity of the priorities and objectives of technology transfer by the academic directors
- 6) Information and cultural barriers between universities and business
- 7) Contradictory goals at universities, including inadequate rewards or negative effects on the researchers involved in the commercialization process. (Nilsson et al., 2006)

4. Theoretical framework and conceptual model of research

The theoretical framework and conceptual model of this research is to determine the criteria for "Collaboration networks for the commercialization of knowledge: the approach to business marketing". Based on this research, four categories of knowledge barriers to commercialization are as follows:

1. Cultural obstacles
2. Individual barriers
3. Process and operational barriers
4. Structural and background barriers

5. The main questions of the research

- 1) What are the barriers to commercialization of university research and innovation in the universities of East Azerbaijan?
- 2) Prioritizing the Barriers Effective on the Commercialization of Academic Researches and Innovations in East Azerbaijan University Universities?
- 3) What are the appropriate solutions to eliminate barriers to commercialization of academic research and innovation in universities in East Azerbaijan?

6. Research Methodology

In this research, the first step was to study and prepare the basic principles of library studies and literature review and research background. In the second stage, using the field survey and using the guidance of professors and experts, the paper was prepared. After analyzing the respondents' opinions, they prepared the data for the third step and analyzed. At this stage of the research, AHP hierarchical analysis method was used to prioritize the existing barriers.

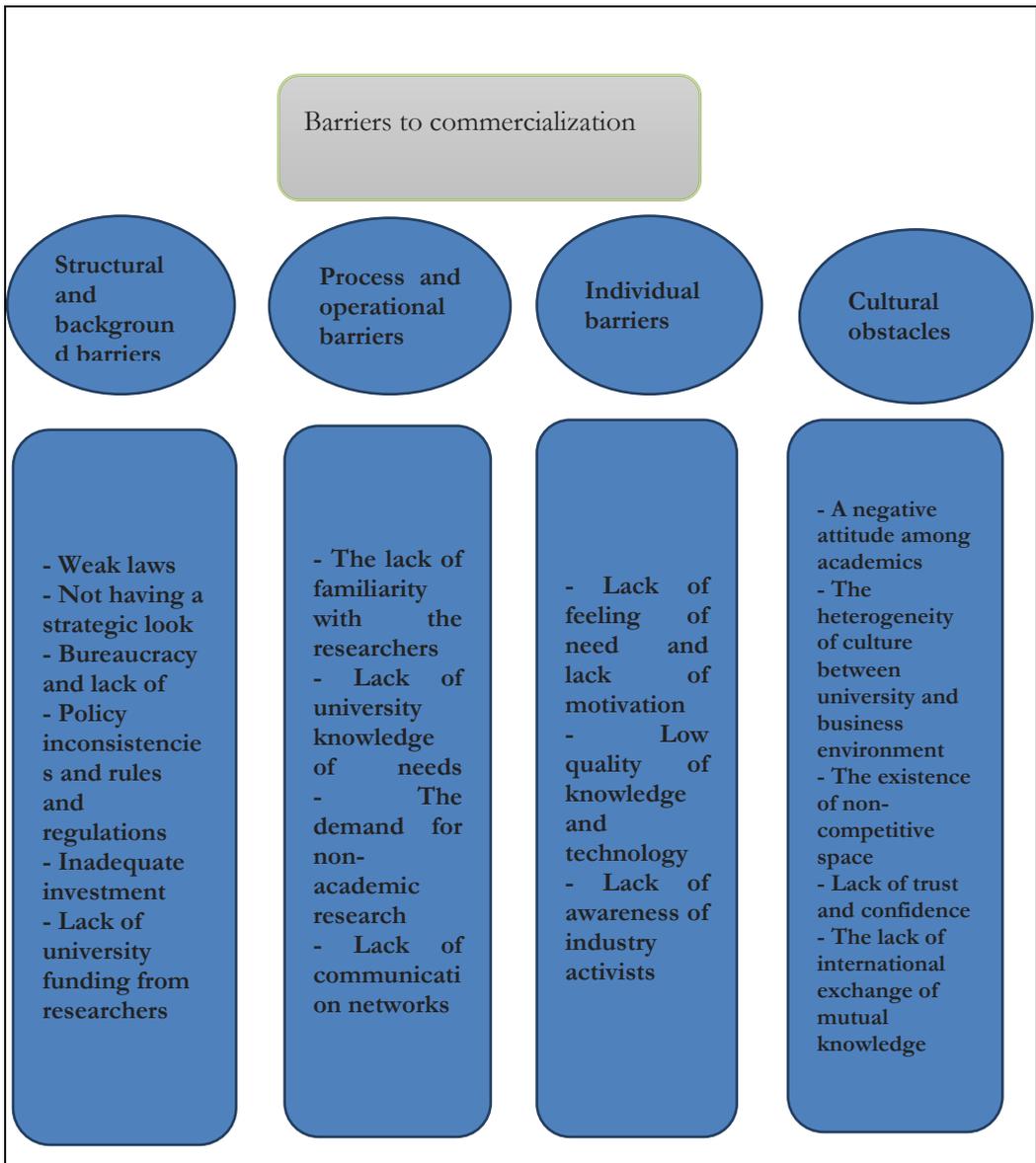


Figure 1-Conceptual model of research

7. Sphere of research:

The spatial domain is the area in which the statistical community is located and the sampling must be carried out from that community. In the present research, the territory is located in the universities of East Azerbaijan Province.

8. The realm of research time:

The realm of this research is from March 2015 to September 2016.

9. Statistical Society

Considering that the purpose of this study is to investigate the barrier of commercialization of research and academic innovations, therefore our study population of all relevant academic experts of the universities is about 330 people.

10. Sampling method and sample size determination

In this research, a stratified random sampling method was used for sampling and a questionnaire was used. The Cochran formula was used to calculate the sample size. The sample size is 177 people.

11. Operational definition of research variables

Based on the research and the conceptual model of the research, the present research variables include four main criteria and 18 sub-criteria that are used in the modeling of the process analysis process analysis process as presented in the table below.

12. Validity of the research instrument

Content validity ensures that the scale involves a series of examples for the use of the concept. The larger the sample of the conceptual domain is, the greater its content validity will be. In other words, content validity describes how to describe the dimensions and components of the concept (Khaki, 2005).

To design a questionnaire, the questionnaire and its contents were examined by the respected professor and the faculty members of the universities and their corrective comments were considered.

13. Reliability of the research tool

Reliability or reliability is one of the technical features of the measurement tool. That is, the measure of the same conditions gives the same results. A time test is a high probability that the observed scores and their actual scores are highly correlated (Khaki, 2005)

In this research, based on the nature of the questionnaire, decision matrix compatibility method was used for estimation of reliability.

Table 1: Random index

N	1	2	3	4	5	6	7	8	9	10
RI	0	0	0/58	0/9	1/12	1/24	1/32	1/41	1/45	1/51

In the table below, the compatibility rate of the research questionnaires is presented. As you can see, the compatibility rate of all questionnaires is less than 0.1, so their reliability is confirmed.

Table2: Inconsistency rate

Row	Title of the questionnaire	The number of paired	comparisons incompatibility rate
1	Individual barriers	3	0/03

2	structural and background barriers	15	0/07
3	cultural	10	0/07
4	Process and operational barriers	6	0/008

14. Data analysis method

The hierarchical analysis process reflects the natural behavior and human thinking. This technique examines complex issues based on their interactions and turns them into a simple way to solve them. Applying this method requires four basic steps.

Step 1: Modeling: The problem and the decision goal are listed in a hierarchy of decision elements that are interconnected. Decision elements include "decision indicators" and "decision options." The hierarchical analysis process requires breaking a problem with several indicators into a hierarchical level. The high level represents the main goal of the decision-making process. The second level represents the major and basic indicators. Provides the final level of decision-making options.

Step Two: Preferential Judgment (Paired Comparisons): Includes comparisons between different decision options, based on each indicator, and judging by the importance of the decision indicator by performing a pairwise comparison. The decision maker then has to create a set of matrices that quantitatively measure the importance or relative relativity of the indices relative to each other and each choice option with respect to the indices relative to other options. This is accomplished by making two-to-one comparisons between the decision elements and the allocation of numerical privileges.

Table 3: Valuation of comparisons relative to each other in the hierarchical process approach

Value	Comparison status	i to j description
1	Equally Preferred	The option or index i does not prioritize j, or they are of equal importance.
3	moderately Preferred	The option or index i is slightly more important than j.
5	Strongly Preferred	The option or indicator i is more important than j.
7	very strongly Preferred	The option i has a lot more preference than j.
9	Extremely Preferred	The option i of j is absolutely more important and comparable to j.
2, 4, 6 and 8	middle course	The values between the preferential values, for example, 8, represent the significance of more than 7 and the lower of 9 for i.

Step Three: Calculating Relative Weights: Determining the weight of "decision elements" relative to each other through a set of numerical calculations is the next step in the process of analytic hierarchy. Performing the calculations to determine the priority of each decision element using the information of the paired comparison matrix. The results of paired comparisons are represented in the form of a matrix, which are referred to as the primitive super-matrix (irregular). Based on the "Sate theory", after the formation of the primary super matrix, the next step is to determine the priority. To determine the priority, the concept of normalization and averaging is used (Sate, 1980)

After normalizing the values of each row, the mean will be taken. The following formula is used to normalize the values without using the software.

$$r_{ij} = \frac{\bar{a}_{ij}}{\sum_{i=1}^m a_{ij}}$$

Step Four: Integration of Relative Weights: In order to rank decision choices, at this stage, we must multiply the relative weights of each element in the weight of the higher elements in order to obtain the final weight. By doing this for each option, the amount of final weight is obtained.

15. Work execution process

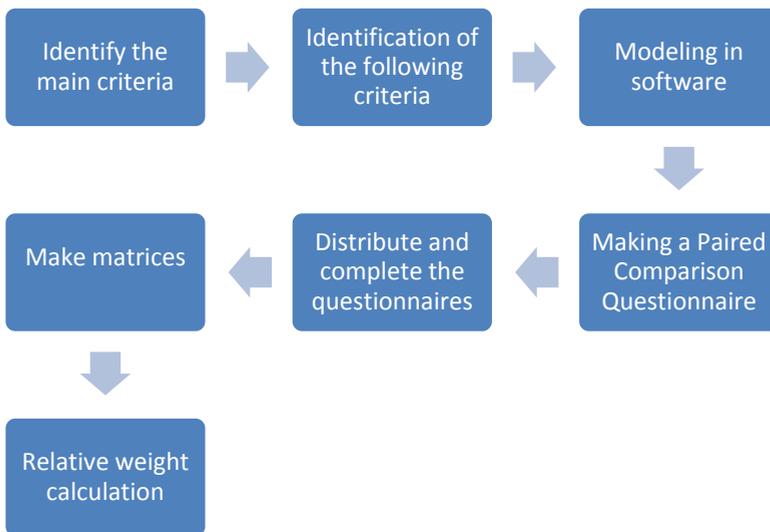


Figure 2: The implementation process of the research

16. Statistical description of general questionnaires

After selecting 177 people as a statistical sample, 27 questionnaires had high inconsistency and were eliminated and 150 questionnaires were selected for analysis.

Analysis of data and res

Table 4: Research variables include main criteria and sub criteria

Row	Indicators	Dimensions of the shells
1	Individual obstacles	The lack of a sense of need for the commercialization of knowledge and lack of motivation at universities
2		Low quality of knowledge and technology produced in universities
3		Lack of awareness of industry activists from the technologies produced at the university

4	Structural and background barriers	Weak laws protecting intellectual property at the national level
5		Lack of strategic vision for transferring knowledge from university to industry
6		red tape and lack of flexibility in university management system
7		Inconsistency of the policies and regulations of universities with the industry sector
8		Inadequate investment for technology development and transfer by the university
9		The lack of university sponsorship from researchers to exploit the knowledge generated by them
10	Cultural barriers	A negative attitude among academics about engaging in business activities
11		Cultural heterogeneity between university and business environment
12		The existence of a non-competitive environment in the university and industry
13		Lack of mutual trust between academic sectors and industry and investment
14		The lack of international knowledge exchange
15	Process and operational barriers	Unaware of academic researchers with academic skills
16		Lack of university recognition of needs and prioritization of the business sector
17		The demand for non-academic research
18		Lack of communication networks between investors, industry activists and academics

Table5: Matrix of Paired Comparisons of Main Criteria

	Individual	Cultural	Structural	The process
Individual	1	/190	/205	/220
Cultural	5/261	1	1/958	2/254
Structural	4/857	/510	1	2/111
The process	4/541	/443	/473	1

Table 6: Normalized Matrix and Main and Average Rows

	Individual	Cultural	Structural	The process	Average row
Individual	/0638	/0886	/0563	/0393	/061
Cultural	/3359	/4666	/5385	/4035	/436
Structural	/3101	/2379	/2750	/3779	/300
The process	/2899	/2067	/1300	/1790	/201

Table7: Prioritizing the main criteria of the problem

Priority	Criterion	Weight
1	Cultural barriers	/436
2	Structural and underlying obstacles	/300
3	Process and operational barriers	/201
4	Individual obstacles	/061

17. Calculate the relative weight of sub criteria

The matrix of paired comparisons below the criteria of individual barriers and their relative weight calculation. Each of the main criteria of the problem has different sub-criteria, each of them separately analyzed.

In the table below, the matrix of paired comparisons is presented below the criteria for individual barriers, after analyzing it using the AHP Master software. The incompatibility coefficient of this matrix is 03 /. Therefore, this matrix has an acceptable incompatibility coefficient (less than 0.1).

Table 8: The matrix of paired comparison below the criteria for individual barriers

	Lack of need and lack of motivation at universities for commercialization of knowledge	Low quality of knowledge and technology produced at universities	Lack of awareness of industry activists from the technologies produced at the university
Lack of need and lack of motivation at universities for commercialization of knowledge	1	/666	4/251
Low quality of knowledge and technology produced at universities	1/521	1	3/754
Lack of awareness of industry activists from the technologies produced at the university	/235	/266	1

Table 9: Normalized matrix below the criteria for individual barriers and average rows

	Lack of need and lack of motivation at universities for commercialization of knowledge	Low quality of knowledge and technology produced at universities	Lack of awareness of industry activists from the technologies produced at the university	Average rows (weight)
Lack of need and lack of motivation at universities for commercialization of knowledge	1	/666	4/251	/393
Low quality of knowledge and technology produced at universities	1/521	1	3/754	/495
Lack of awareness of industry activists from the technologies produced at the university	/235	/266	1	/111

Table 10: individual metrics are ranked according to the weights obtained from the analysis of the results.

Priority	Criterion	(weight)
1	Low quality of knowledge and technology produced at universities	/495
2	Lack of need and lack of motivation at universities for commercialization of knowledge	/393
3	Lack of awareness of industry activists from the technologies produced at the university	/111

18. Paired comparison matrix below the criteria of cultural criteria and their relative weight calculation

In Table 11-11, the matrix of paired comparisons, the criteria are presented after analysis using Master AHP software. The incompatibility coefficient of this matrix is 0.07. Therefore, this matrix has an acceptable maladaptive coefficient (less than 0.1).

Table 11: Matrix of Paired Comparisons under Criterion Criteria

	A negative attitude among academics about engaging in business activities	The heterogeneity of culture between university and business environment	The existence of a non-competitive environment in the university and industry	Lack of mutual trust and confidence in the academic, industrial and investment sectors	The lack of international knowledge exchange
A negative attitude among academics about engaging in business activities	1	/210	1/244	1/756	/236
The heterogeneity of culture between university and business environment	4/751	1	1/854	1/535	/646
The existence of a non-competitive environment in the university and industry	/803	/539	1	2/532	/215
Lack of mutual trust and confidence in the academic, industrial and investment sectors	/569	/651	/394	1	/158
The lack of international knowledge exchange	4/235	1/547	4/644	6/321	1

Table 12: Normalized matrix below the criteria of cultural criteria and mean rows

	A negative attitude among academics about engaging in business activities	The heterogeneity of culture between university and business environment	The existence of a non-competitive environment in the university and industry	Lack of mutual trust and confidence in the academic, industrial and investment sectors	The lack of international knowledge exchange	Average rows (weight)
A negative attitude among academics about engaging in business	1	/210	1/244	1/756	/236	/103

activities						
The heterogeneity of culture between university and business environment	4/751	1	1/854	1/535	/646	/255
The existence of a non-competitive environment in the university and industry	/803	/539	1	2/532	/215	/121
Lack of mutual trust and confidence in the academic, industrial and investment sectors	/569	/651	/394	1	/158	/081
The lack of international knowledge exchange	4/235	1/547	4/644	6/321	1	/440

In table 4-13, the criteria for cultural criteria are prioritized based on the weight obtained from the analysis of the results.

Table 13: Prioritizing the following criteria for cultural criteria

Priority	Criteria	weight
1	The lack of international knowledge exchange	/439
2	The heterogeneity of culture between university and business environment	/259
3	The existence of a non-competitive environment in the university and industry	/120
4	A negative attitude among academics about engaging in business activities	/103
5	Lack of mutual trust and confidence in the academic, industrial and investment sectors	/080

In Table 4-14, the matrix of paired comparisons is presented below the criteria for structural and underlying criteria. The incompatibility coefficient of this matrix is 07 /. Therefore, the matrix has an acceptable incompatibility coefficient (less than 0.1).

Table 14: The matrix of paired comparisons under the structural and underlying criteria

	The weak laws protecting intellectual property at the national level	Not having a strategic look at transferring knowledge from university to industry	bureaucracy industry and the lack of flexibility of the university management system Not having	Misunderstanding of the University's policies and regulations with the support sectors of the	Inadequate investment for technology development and its transfer by the university	The lack of university sponsorship from researchers to exploit the knowledge generated
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						by them
The weak laws protecting intellectual property at the national level	1	/376	1/857	3/267	2/843	2/463
Not having a strategic look at transferring knowledge from university to industry	2/659	1	4/261	3/569	4/148	3/145
bureaucracy industry and the lack of flexibility of the university management system Not having	/538	/234	1	/284	/788	/317
Misunderstanding of the University's policies and regulations with the support sectors of the	/306	/280	3/521	1	1/111	/393
Inadequate investment for technology development and its transfer by the university	/351	/241	1/269	/900	1	1/251
The lack of university sponsorship from researchers to exploit the knowledge generated by them	/406	/317	3/154	2/541	/799	1

Table 15: Normalized matrix under the criteria of structural and subfield and average rows

	The weak laws protectin g intellectu al property at the national level	Not having a strategic look at transferrin g knowledge from university to industry	bureaucracy industry and the lack of flexibility of the university managemen t system Not having	Misunderstandin g of the University's policies and regulations with the support sectors of the	Inadequate investment for technology developmen t and its transfer by the university	The lack of university sponsori p from researchers to exploit the knowledge generated by them	Average rows
The weak laws protecting intellectual property at the national level	1	/376	1/857	3/267	2/843	2/463	/217
Not having a strategic look at transferring knowledge from university to industry	2/659	1	4/261	3/569	4/148	3/145	/376
bureaucracy industry and the lack of flexibility of the university management system Not having	/538	/234	1	/284	/788	/317	/066
Misunderstandin g of the University's		/280	3/521	1	1/111	/393	/107

policies and regulations with the support sectors of the	/306						
Inadequate investment for technology development and its transfer by the university	/351	/241	1/269	/900	1	1/251	/094
The lack of university sponsorship from researchers to exploit the knowledge generated by them	/406	/317	3/154	2/541	/799	1	/137

In Table 16-16, the following criteria of the structural and baseline criteria are prioritized based on the weights obtained from the analysis of the results.

Table 16: Prioritization of the following criteria for structural and contextual criteria

Priority	Criteria	weight
1	Not having a strategic look at transferring knowledge from university to industry	/376
2	The weak laws protecting intellectual property at the national level	/217
3	The lack of university sponsorship from researchers to exploit the knowledge generated by them	/137
4	Dissemination of university policies and regulations with sections	/107
5	Inadequate investment for technology development and transfer by the university	/094
6	Bureaucracy and lack of flexibility in university management system	/066

In Table 4-17, the matrix of paired comparison is presented below the criteria of process and operational criteria, after analysis using the software. The incompatibility coefficient of this matrix is 01 /, so this matrix has an acceptable incompatibility coefficient (less than 0.1)

Table 17: Matrix of Paired Comparisons under the Criteria for Process and Operations

	Unaware of academic researchers with academic skills	Lack of university recognition of needs and prioritization of the business sector	Lack of demand for academic research	Lack of communication of networks between investors, industry activists and academics
Unaware of academic researchers with academic skills	1	1/241	/338	3/574

Lack of university recognition of needs and prioritization of the business sector	/805	1	/282	2/324
Lack of demand for academic research	2/954	3/541	1	6/325
Lack of communication networks between investors, industry activists and academics	/279	/430	/158	1

Table 18: The normalized matrix below the process and operational criteria and the mean of the rows

	Unaware of academic researchers with academic skills	Lack of university recognition of needs and prioritization of the business sector	Lack of demand for academic research	Lack of communication networks between investors, industry activists and academics	Average rows
Unaware of academic researchers with academic skills	/1984	/1997	/1901	/2702	/214
Lack of university recognition of needs and prioritization of the business sector	/1594	/1609	/1586	/1757	/163
Lack of demand for academic research	/5863	/5700	/5624	/4783	/549
Lack of communication networks between investors, industry activists and academics	/0553	/0692	/0888	/0756	/072

In Table 17-19, the following criteria for process and operational criteria are prioritized based on the weights obtained from the analysis of the results.

Table 19: Prioritization of the criteria for process and operational criteria

Priority	Criteria	weight
1	Lack of demand for academic research	/551
2	Unaware of academic researchers with academic skills	/214
3	Lack of university recognition of needs and prioritization of the business sector	/164
4	Lack of communication networks between investors, industry activists and academics	/074

The final weight of the sub-criteria

Based on the analyzed data, the weight of each of the sub-criteria of the model is derived based on matrix coefficients. As we see below, the underlying criterion of the lack of international exchange of knowledge under the cultural criteria is the most important criterion for barriers to the commercialization of findings and academic research in the open universities of East Azerbaijan.

Table 20: Final weight of sub-criteria

Row	Index weight	Weight of Indices	Weight Dimensions and Components
1	Individual barriers (201/0)	Lack of need and lack of motivation in universities for knowledge commercialization (0.339) - (I1)	0/079
2		Low quality of knowledge and technology produced in universities (495/0) - (I2)	0/099
3		Lack of awareness of industry activists from the technologies produced at the university (111/0) - (I3)	0/022
4	Structural and background barriers (300/0)	The weak laws protecting intellectual property at the national level (0.217) - (S1)	0/065
5		Not having a strategic look at transferring knowledge from university to industry (376/0) - (S2))	0/113
6		Bureaucracy and Non-Flexibility of University Management System (066/0) - (S3)	0/020
7		Dissemination of the University's policies and regulations with industry support (0.17) - (S4)	0/032
8		Inadequate investment for technology development and transfer by university (0.94) - (S5)	0/028
9		The lack of financial support from researchers to exploit the knowledge produced by them (137/0) - (S6)	0/041
10		Cultural barriers (436/0)	A negative attitude among academics about engaging in business activities (103.10) - (C1)
11	The heterogeneity of culture between university and business environment (0.259) - (C2)		0/113
12	The existence of non-competitive space in the university and industry (120/0) - (C3)		0/052
13	Lack of mutual trust and confidence in academic, industry and investment sectors (080/0) - (C4)		0/035
14	The lack of international knowledge exchange (439/0) - (C5)		0/191
15	Process and operational barriers (0.061)	Unaware of academic researchers with academic skills	0/013
16		Lack of knowledge of the university about the needs and prioritization of the business sector (0/164) - (P2)	0/010

17		Demand is not based on academic research (0.551) (P3)	0/034
18		Lack of communication networks between investors, industry activists and academics (0.074) - (P4)	0/004

19. The results of the main research questions:

- What are the barriers to commercialization of research and academic innovations in AES universities?

1. Individual barriers
2. Cultural barriers
3. Structural and background barriers
4. Process and operational barriers

- What are the priorities of the barriers to commercialization of academic research and innovation in the universities of the province? Cultural barriers with a weight of 436 / the most important criterion and after structural barriers with a weight of 300 /, followed by process and operational barriers weighing 201 /, and after individual barriers weighing in at 0.061.

- What are the appropriate solutions for eliminating barriers to commercialization of findings and academic innovations in the universities of AES?

As culture is considered as the most important obstacle to the commercialization of academic research in the universities of AES, solutions are presented for removing cultural barriers:

20. Proposals for removing barriers to commercialization of academic research

1. Strategies to bridge cultural barriers: Activate communication centers with industry and establish these centers independently and privately overseas, inform about required projects or organizations requiring specific plans, forming the think tank think tank and elite Identify and meet the needs, oblige the industry to employ elites and inventors in their industrial expertise, create ways to connect inventors with investors, support television programs for removing barriers to commercialization, create spaces for the international exchange of knowledge through increased Scientific articles and the use of international lecturers, increase of credit Mutual material between different academic and industrial sectors through mutual cooperation.

2. Strategies for addressing structural and regulatory barriers: Developing a strategic vision for transferring knowledge from university to industry through national policy-making, establishing a collaborative process between centers that are commercially-oriented, such as science and technology parks, the Foundation National elites, growth centers, fund for support for researchers, universities, technical and vocational centers, industrial and governmental research centers, elite and talent management training for company managers, comprehensive and precise rules for protecting intellectual property and preventing theft Scientific research and invention, increasing flexibility and reducing

bureaucracy in the fashion system Faculty of Law and Communications, increasing financial support of the university for researchers, and providing low-cost facilities to exploit knowledge produced by them.

3. Solutions to overcome process and operational barriers: Create the basis for demand. Centering academic research and commercializing them through accurate target market needs, increasing communication between the academic sector and industry by organizing various seminars and international exhibitions. And the establishment of growth and technology centers, activating investment chambers.

4. Solutions for removing individual barriers: Formation of courses for entrepreneurship and their commercialization in universities, holding industrial tours for students and researchers in order to increase industrial visibility, organizing university tours for artisans to see academic achievements, motivating and feeling needed. In universities and academics for the commercialization of knowledge by sharing them with the profits from the commercialization of academic research, increasing the quality of knowledge and technologies produced at universities with the participation of high and international level professors, hold monthly meetings between industry activists and academics to learn about the achievements of universities.

21. Research constraints

1. The low tendency of university administrators and faculty members of some universities to collaborate with this research.
2. Data gathering due to the wide geographical distribution of the statistical community and the lack of a network of inter-academics for similar items.

22. Suggest future researchers

1. Identification and Prioritization of Commercialization Barriers from the Point of View of Industry Owners and Industries
2. Identification and prioritization of key factors in the success of academic research commercialization
3. Factors Influencing Commercialization of Technology in Government Research Organizations
4. Identify and prioritize requirements for knowledge trading in the university

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