IRSTI14.35.07

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Measurement of Innovative Activity in Kazakhstan Universities

Abstract: The innovative potential of private universities in Kazakhstan has been studied. The triple helix approach is used when innovation activity is the result of three forces. The role of the state in the university is played by educational institutions. The other two forces are science and production. The authors compared two methods of researching websites: the study of the activity of the relevant departments and the study of the above-mentioned forces by keywords. The results showed on the example of universities, that keyword research can provide reliable results.

Key words:triple helix, innovative activity, measurement of innovative activity, Kazakhstan universities, science, production, university.

DOI: https://doi.org/10.32523/2220-685X-2019-55-4-57-67

Introduction

The main idea of a new model of innovation processes - the theory of the triple helix is that the institutions responsible for creating new knowledge – universities - have a dominant position in this process (Etzkowitz, 2008).

Universities aim to give a level of education to their graduates suitable to take jobs in the society or industry in their specialty. This task can be performed only by those universities that are integrated into the production chain of the existing system in a niche most convenient for them – production of k08nowledge and passing it to society and industry (Myrzakhmet, 2018).

In the past universities managed to perform this function; however, it was fragmentary and depended on specific executers. Nowadays this activity should be put on stream. This cannot be done without appropriate organisational changes and establishment of a necessary and effective organisational structure.

The present study considers the innovation potential of the leading private universities of Kazakhstan: Almaty Management

University (AlmaU, 2018), Turan university (Turan, 2018), University of International Business (UIB, 2018).

The aim of the present paper is to investigate the main driving forces involved in the innovation process of private universities and the interaction between them.

As is known (Etzkowitz, 2008; Myrzakhmet, 2018), there are three models of the innovation process: a statist model (an administrative-command model), a laissez-faire model (a market model), and a triple-helix model.

In the administrative-command model, all actions in the university are subordinated to the educational process. There is no great need to exist for science and business, and if they exist, they exist only as a part of the educational process.

In the market model, education remains the dominant factor, and science and production become autonomous, but dependent on education components.

In the triple helix model, all three factors are equal partners and are well-integrated with each other.

Methods of research

The study was carried out by the webometric method (Thelwall, 2017), where the unit potential is defined as the number of pages opened on the university's website when the specific term is being searched. To determine the interaction number of units, the number of sites containing both terms is counted.

In Method *I* all university departments and companies at the university are divided into three categories of units: education, science and business. In the innovation process the functions of the state at the university level are performed by the units in the education category - departments, institutes (faculties) and other educational units. The science component is represented by research institutes, scientific laboratories, research centers and other research units which produce scientific products. The business category includes technoparks, business incubators, commercialization offices and other units that yield products or provide services (other than the main educational products and services).

In Method *II* key words and their synonyms were used instead of departments. The following keywords were used:

- for the group of Education: education, learning, teaching;

• for the group of Science: science, research, experiment;
• for the group of Business: business, production, entrepreneurship.

Results

Method *I*

The innovative model of Almaty Management University covers the entire university and focuses resources within the university in the most necessary places (AlmaU, 2018). There are at least four business units:

• Open*AlmaU*;
• Center for Mediation and Conflict Resolution;
• NGO Expert Center;
• Institute for Educational Development.

These units provide either educational services in the open market (in contrast to the main activity of the university) or advice and services to public or private enterprises and institutions (Table 1, 2).

Table 1: List of *AlmaU* units by type of activity

Education	*Science*	*Business*
Faculty of Basic Preparation	Research and Development (R&D) Department	Open*AlmaU*
Graduate School of Business	Scientific Environment	Center of Mediation and Conflict Resolution
Graduate School of Management		NGO Expert Center
Graduate School of Public Policy and Law		Institute for Educational Development
Center of Excellence		
AlmaU Language Center		
School of Engineering Management		

Table 2: Potential and interaction of elements of the innovative ecosystem of *AlmaU*

	Education	Science	Business
Education	4171		
Science	111	236	
Business	2040	99	3855

Education has the greatest potential and with a modest lead over business. This confirms the fact that *AlmaU* is positioned as the top entrepreneurial university of Kazakhstan. Figure *1* shows that the research part of the university is weak and cannot be a leading force in the triple helix. The university uses technology transfer more than its development. For effective work of the university as an entrepreneurial one, *AlmaU* should pay close attention to development of scientific units.

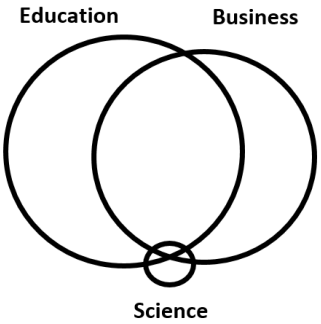

Figure 1: Ratio of components of the innovation ecosystem in *AlmaU*.
Note: compiled by the authors based on the data in Table *2*

The experience of development of innovative activity in the Almaty Management University shows:

• The university has created business units approaching the main profile of the university in terms of potential;

• All three elements of the university's innovative ecosystem work together smoothly preserving their autonomy;

• Science is a weak link in the innovation ecosystem, which does not allow the university to become a fully entrepreneurial university;

• The weakness of science is the main reason it cannot yet become a basic element of the ecosystem which is important for the effective development of the university as an innovative driver of the development of society.

Turan University was established in *1992* in Almaty and is the core of the educational corporation. The university provides training in *23* undergraduate programs, *15* Master programs, *5* Ph.D. programs in the most popular areas including economics, humanities and law, and at the Academy of Cinema and Television. In its development strategy for the years *2016-2020*, the university announced that it is necessary to start a new type of activities at the university, transform its internal environment and change its interaction with the external

environment in conditions of resource scarcity (financial, information and human resources) to overcome existing constraints. To solve these problems an entrepreneurial university can build new educational models aimed at training professionals who are able to generate innovative ideas and products for various sectors of society and economy (Turan, 2018)(Table 3).

Table 3: List of units of Turan University by type of activity

Education	*Science*	*Business*
Foundation	Institute of System Studies of Kazakhstan Society	International Leadership Institute
Faculty of Economics	Institute of World Economy and International Relations	
Faculty of Humanities and Law	Research Institute of Tourism	
Academy of Cinema and TV		

There is at least one business unit - the International Leadership Institute - the structural unit of Turan University, which carries out international educational activities for the implementation of additional and postgraduate business education, as well as leadership and innovation programs. The aim of the Institute is to develop leadership, creative, and managerial skills among young people, representatives of business, education, and science, which provide leading positions and a high level of competitiveness in the international, dynamically developing economic space(Table 4).

Table 4: Potential and interaction of elements of the innovation ecosystem of Turan University

	Education	Science	Business
Education	516		
Science	2	24	
Business	12	2	23

As illustrated in Figure *2*, the education component of Turan University has the greatest potential while the business lags far behind. This confirms that this university is positioned as a purely educational institution [4]. At the same time, Figure *2* shows that the research part of the university has practically no potential and, therefore, cannot become the leading force in the triple helix in the foreseeable future. Business and science are completely dependent on education and, at the same time, science relies entirely on business.

For effective work of the university as an entrepreneurial one, Turan University should dedicate great attention to the development of business as an independent complex and start developing scientific divisions.

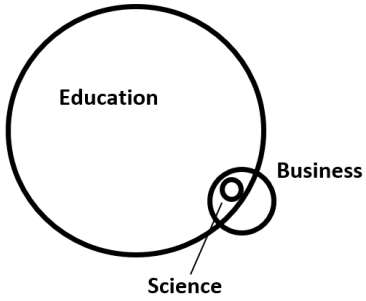

Figure 2: Organization of the innovation ecosystem of Turan University.
Note: compiled by the authors based on the data in Table *4*

The experience of innovation development in Turan University shows the following:

• The university has not succeeded in creating a scientific and production complex yet, approaching in terms of potential to the main profile divisions of the university;

• Not all three elements of the university's innovative ecosystem are sufficiently autonomous, especially science and business;

• Science is the weakest link in the innovation ecosystem preventing the university from becoming a true entrepreneurial university;

• The weakness of science is the main reason why it cannot become a basic element of the ecosystem which is important for the effective development of the university as an innovative driver of the society progress.

The University of International Business (UIB) was founded in *1992* and positions itself as a leader in private higher education (UIB, 2018). *UIB* has developed programs which combine the traditions of academic learning and technologies of the modern business education. The mission of the university is to influence the socio-economic development of the country by preparing competitive specialists of a new formation, ensuring advanced development and achieving competitive positions in education on the global scale. During a quarter of a century of its existence *UIB* has accumulated considerable experience in training specialists with graduate education able to

manage business and be a leader in various fields of the economy(Table 5).

Table 5: List of *UIB* units by type of activity

Education	*Science*	*Business*
Bachelor's program	Scientific-Research Institute of Innovative Economy	Career Centre
Master's program		
Doctoral program		
MBA		
DBA		

There is at least one business unit - Career Centre, which acts as a key link between the institution and employers. Partnerships with employers allow Career Centre to collect and track the interests and needs of companies and project them to capabilities of the university and its students and trainees. This allows the university students to acquire the knowledge about the specific activities of specific companies and gain practical experience without leaving the university walls.

Career Center consolidates partner relations with short-term and long-term formal cooperation agreements which grant not only internships, but also job opportunities in various economic, technical and humanitarian fields. To date, the university has agreements with over *250* partner companies. In virtue of the university's good relations with companies, partners and employers accept students on part-time employment terms, which enables students to receive practical experience with no harm to their studies. Training dedicated to preparation for career building are conducted regularly: negotiation techniques, self-presentation, successful resume writing, etc. Career Center maintains a database of *UIB* alumni which accumulates information about the graduates. The technical capabilities of the database allow one to generate a query with specific characteristics to find a job seeker suitable for the job(Table 6).

Table 6: Potential and interaction of elements of the innovation ecosystem of the *UIB*

	Education	Science	Business
Education	699		
Science	9	24	
Business	274	6	277

In *UIB*, education is on the first place and business is on the second place in terms of the potential size. This university presents itself mainly as an educational institution. At the same time, Figure *3* shows that the research part of the university does not have sufficient capacity and cannot be the leading force in the triple helix. Business depends entirely on education and has a weak interaction with science. For effective work of the university as the entrepreneurial one, close attention should be paid to the development of business as an independent complex as well as to substantial improvement scientific divisions.

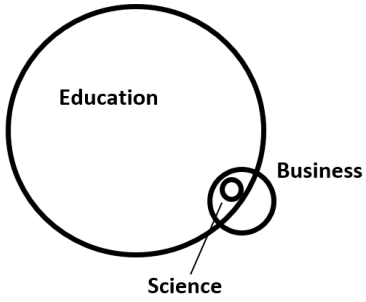

Figure 3: Organization of the innovative ecosystem of the *UIB*. Note: compiled by the authors based on the data in Table *6*.

Experience in the development of innovation in the *UIB* shows:

• The university has not yet succeeded in creating a scientific and production complex, approaching in terms of potential to the main profile divisions of the university;

• Not all three elements of the university's innovative ecosystem work well together, especially science and business;

• Science is a weak link in the innovation ecosystem hindering the university's transformation into a fully entrepreneurial university;

• The weakness of science is the main reason why it yet become the fundamental element of the ecosystem, which is extremely important for the effective development of the university as an innovative driver of the development of society.

Method *II*

The cells in Table *7* show the number of opening pages on university websites, when searching departments (method I) or keywords (method II). All numbers are normalized to the group of Education, which is reduced to *100* for ease of comparison. Although

there is no strict correlation between the results of the first and second methods, one can observe some general patterns. For example, in the first method, the group of Education always dominates, and in the second method, the group of Business dominates in two universities with good business schools. In both methods, science lags far behind.

Table 7: Potential of the universities' innovative ecosystems studied by two methods

University: Method #	Education	Science	Business
AlmaU: Method I	100	6	92
AlmaU: Method II	100	88	129
Turan: Method I	100	5	4
Turan: Method II	100	78	68
UIB: Method I	100	3	40
UIB: Method II	100	85	173

Conclusions

Thus, the study of the innovative ecosystems in the leading private universities of Kazakhstan shows that:

• Universities have not yet succeeded in creating a scientific and production complex approaching in terms of potential to the main profile units of universities, except for *AlmaU*, whose business component is powerful enough and can be on a par with the education component;

• Science element of all the universities studied is the weakest link in the innovation ecosystem preventing them from becoming real entrepreneurial universities;

• The weakness of science is the main reason why it cannot become the main element of the ecosystem, which is extremely important for the effective development of the university as an innovative driver of the society's development.

References

1. AlmaU Departments.Available at:http://www.almau.edu.kz/(accessed20.03.2018)
2. Etzkowitz H. The Triple Helix. University–Industry–Government Innovation in Action.- New York: Routledge,2008. – 180 p.
3. Малая тройная спираль: партнерство науки, бизнеса и науки в университетах[Текст]: отчет о НИР (промежуточ.): ЕНУ; рук.

МырзахметМ. – Актобе., 2018. – 75 с. – Исполн.: МырзахметМ., БегимбайК., ИдрисоваА. – Инв. № 0118PKU0324.
4. Thelwall M. Web Indicators for Research Evaluation: A Practical Guide.- New York: Morgan & Claypool, 2016. - 155 p.
5. Turan University Departments.Available at: http://www.turan-edu.kz/(accessed23.03.2018)
6. UIB. UIB Departments.Available at: http://uib.kz/(accessed18.03.2018)

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Қазақстандық жоғары оқу орындарының инновациялық белсенділігін өлшеу

Аннотация:Қазақстанның меншік жоғары оқу орындарының инновациялық әлеуеті зерделенді. Үштік спираль әдісі инновациялық қызмет үш компонент әрекетінің нәтижесі болған кезде қолданылады. Бұл үдерісте университет негізгі рөл атқарады. Басқа екі құраушысы болып ғылым және өндіріс табылады. Авторлар Қазақстан университеттерінің сайттарын зерттеудің екі әдісін салыстырды: тиісті бөлімшелердің және кілт сөздер бойынша жоғарыда аталған ортақ топтардың қызметтері зерттелді. Нәтижелер университеттердің мысалында кілт сөздерді зерттеу сенімді нәтиже бере алатынын көрсетті.

Кілт сөздер:үштік спираль, инновациялық қызмет, инновациялық қызметті өлшеу, Қазақстан университеттері, ғылым, өндіріс, университет.

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Измерение инновационной активности казахстанских вузов

Аннотация: Изучен инновационный потенциал частных вузов Казахстана. Подход тройной спирали используется тогда, когда инновационная деятельность является результатом действия трех компонентов. Одну из основных ролей в данном процессе играет университет. Две другие составляющие - наука и производство. Авторы сравнили два метода исследования сайтов университетов Казахстана: изучение деятельности соответствующих подразделений и вышеперечисленных состовляющих по ключевым словам. Результаты показали на примере университетов, что исследование ключевых слов может дать надежные результаты.

Ключевые слова:тройная спираль, инновационная деятельность,измерение инновационной активности, казахстанские вузы, наука, производство, университет.

References

1. AlmaU Departments. Available at:http://www.almau.edu.kz/ [in English]. (accessed 20.03.2018)
2. Etzkowitz H. The Triple Helix. University–Industry–Government Innovation in Action (New York, Routledge, 2008).[in English]
3. Myrzakhmet M., Begimbay K. and Idrisova A.Malaya troinaya spiral: partnerstvo nauki, biznesa i nauki v universitetakh [Small triple helix: partnership of science, business and education in universities]. otchet o NIR [Research Report] (Aktobe, 2018).[in English]
4. Thelwall M. Web Indicators for Research Evaluation: A Practical Guide.(New York, Morgan & Claypool, 2016).[in English]
5. Turan University Departments.Available at: http://www.turan-edu.kz/(accessed23.03.2018).[in English]
6. UIB Departments. Available at: http://uib.kz/(accessed18.03.2018).[in English]