GLOBAL UNIVERSITY RATING INDICATORS AND SUGGESTION FOR ESTABLISHMENT OF ENTREPRENEUR UNIVERSITIES IN AZERBAIJAN

Abstract. The purpose of this study is to summarize the evaluation criteria based on the organizations that determine the ranking of universities in the international arena and to formulate a proposal for the establishment of entrepreneur universities in Azerbaijan. The topic was studied by the method of qualitative research. The data for the study were collected from the evaluation tables of five different organizations that make up the rankings of the world’s universities. The obtained data were analyzed by the document analysis method. As a result of the study, certain proposals were made regarding the importance of transforming Azerbaijani higher education institutions into entrepreneur universities. It is revealed that, the prospective changes of the Azerbaijani universities into the entrepreneur universities is predicted to benefit the country’s social and economic development and in return increase the level of these universities in the Global University ranking tables.

Keywords: higher education, university rankings, indicators, entrepreneurial university

INTRODUCTION

When we look at the past development prospects of universities, in the middle of the 19th century the main mission of the universities were education and training (Jencks & Riesman, 1968). During this period, the quality and reputation of universities depended on their success in education and training (Orkun, 2019, p.26).

However, in the last few decades, the expectations from the universities, by the government, society and corporations, has been changed. There were several forces
which drove these revolutions. First of all, the fact that some universities conduct much more expensive research has made it difficult for the government to cover the cost of this research (Yelkikalan et al., 2010, p.52). At the same time, the need for companies to conduct research in universities has accelerated this process of cooperation. The second main factor, of course, is the process of globalization. In the past, companies only cooperated with universities in their regions, but today they have a chance to open up to the global arena. Nowadays many universities are undergoing the change because the participants of education expect them to strengthen the bond between the stakeholders in order to intensify this dichotomous contribution. (Miller et al. 2014) The third reason for the change is the change in the expectations of states from universities. The governments now need not only to conduct research and develop technological innovations, but also to work with industry to bring the investment needed to conduct this research to universities (Wissema, 2009, p.13-14).

With these changes, and most importantly, economic problems on a global basis, the third mission of the universities, as mostly has been called the entrepreneurial university emerged. The changes in this sector made a path for many higher education institutions to modify their behavior and led to the emergence of entrepreneurialism (Kirby, 2005). As a result, in the global world, some universities, in addition to their traditional research and teaching functions, formed a third function, cooperation with industry and society, and they stepped into a new process which was supposed to be very important for the region in which they are located. To achieve this goal, they tried to develop modern educational models that enable lifelong learning, strengthen creativity and strengthen social relations. During this process, many scientists have tried to form various corporate models that focus on the interaction of universities with the society in which they are located (Etzkowitz, 2003; Etzkowitz vd., 2000; Gibbons, 1994; Jongbloed, Enders, & Salerno, 2008; Leydesdorff, 2000; Sábato & Botana, 1968).

In parallel with this development process, the number of universities has increased, and ranking competitions between universities have necessitated the
emergence of systems that shape their ranking. These institutions, which currently form the ranking of universities, evaluate them based on various quality indicators. These criteria include university academic achievement, student satisfaction, number of published research papers, published literature, number of teachers per student, university campus quality, university admission standards, alumni employment rates, and monthly incomes of the university staff (Koc & Yılmaz, 2010: 18).

Although the organizations that determine the global ranking of universities have been criticized for the units and categories they use, some of the information they have obtained can be said to be very important for the development of society. Publicizing the criteria used by these organizations in the evaluation of universities through the media is very useful in terms of attracting students and investors from both the local market and abroad. (Abramo & D’Angelo, 2015; Bougnol & Dulá, 2015; Daraio, Bonaccorsi & Simar, 2015; Jarocka, 2015; Kaycheng, 2015; Yudkevich, Altbach & Rumbley, 2015). Based on the impetus given to the formation of entrepreneurial universities and the competition between them, we believe that it is necessary to prepare proposals on the formation of such universities in our country.

In the first part of this study, we will identify the criteria used by the organizations that rank universities in the global sphere and make generalizations between them. The second part of the study is to compare the characteristics of entrepreneur universities and the generalized criteria of university rankings, to formulate proposals on the impact of the formation of entrepreneurial universities in Azerbaijan on the position of these universities in the world rankings. In order to achieve this goal, the following questions have been examined:

1. What criteria do the organizations that determine the ranking of world universities use?

2. What are the common criteria used by the organizations that determine the ranking of the world’s universities in the evaluation?

3. What are the characteristics of enterprising universities?
4. Which of the characteristics of enterprising universities coincide with the criteria based on the rankings of world universities?

5. How can the world ranking of universities in Azerbaijan be raised?

**METHODODOLOGY**

When we conduct qualitative research, different research patterns are used, including action research, phenomenology, case study, ethnography, narrative research and embedded theory. (Saban & Ersoy, 2019). To carry out this scientific study, and analyze the relationships between the study groups, one of the qualitative research methods, document analysis design was used. Document analysis is a systematic procedure for reviewing or evaluating documents—both printed and electronic (computer-based and Internet-transmitted) material. (Bowen, 2009, p.27)

It allows monitoring a qualitative process intended to present events in a holistic way. After the determination of the research method and design, the next step is data collection and analysis. In this research document analysis, which is using data collection methods, has been chosen as a research design.

**Data collection and analysis**

The data of the research was obtained by document analysis. Document analysis, is one of the qualitative research methods, is used to analyze written documents, such as deeply and systematically. (Wach, 2013) There are a variety of documents which can be used as the source of study and evaluated systematically. Researchers generally analyze the prior knowledge, and then they integrate the necessary information into their own studies. This analysis method includes some crucial steps, such as finding, selecting, appraising (making sense of), and synthesizing data contained in documents (Bowen, 2009, p.28). In this study, documents were obtained from the websites of organizations that develop the ranking tables of universities, and from various sources such as Google Scholar and Researchgate. In the findings section of the study, the criteria and indicators found in the documents used in the research were discussed. In the discussion section, the characteristics of the entrepreneurial universities and the ranking criteria were compared, the results of the document research were discussed, and
recommendations based on the results were given. There are several university ranking tables, but the most topical and remarkable ranking systems are the Academic Ranking of World Universities (ARWU, also known as Shanghai rankings); the Times Higher Education World University Rankings (THE), and the QS (Quacquarelli Symonds Limited) World University Rankings (Chen & Liao, 2012). For that reason, within the scope of the study, the aforementioned ranking systems were selected and the criteria that they were based on in measurement and evaluation were examined.

Findings

After examining the criteria of the institutions that determine the ranking of the universities in the world and comparing them with the characteristics of the entrepreneur universities, the following findings were obtained in this study, which investigated the benefits of the existence of entrepreneur universities in Azerbaijan.

A - Global University Rankings and the criteria they use

In the 20th century, international rankings of the higher education institutes were not the focus of attention. However, after the emergence of the Shanghai rankings these ranking tables started to get the attention of all the specialists at universities, mass media companies, and most of the members of the public, they directly started to affect these people’s choices. (Kim, 2015, p.169). Globalization and internationalization of education at a higher level resulted in the emergence of the new worldwide trend, which is called Global university rankings. Today there is a big challenge among the higher education institutions for becoming the «world-class» university and obviously they are trying to increase their rank in these league tables (Komotar, 2019, p.1) For instance, the government leaders in some countries, such as China, Germany, and France, have swiftly developed some research and development centers in order to increase the statues of their universities in the given ranking tables (Kim, 2015). In this part of the research, the answer to the question,

1. Academic Ranking of World Universities (ARWU)

The first ranking tool among all others was Academic Ranking of World Universities (ARWU), and it was commonly called as Shanghai Ranking because it was firstly published by Shanghai Jiao Tong University in 2003. When it was first
emerged the aim of the ARWU was to determine the global standing of the best universities in China. However, it attracted a big interest from other higher education institutes, governments and public media in different parts of the world. In 2005 The Economist published a questionnaire and reported that among all other global university rankings ARWU was the one which was used more than others. (Academic Ranking of World Universities, n.d.)

Quality education, outputs of the research, quality faculty and per capita performance are the major criteria for determining the best universities in these ranking tables. In terms of the quality of education, the ranking table utilises the indicators of the institutions’ alumni winning Nobel Prizes and Fields Medals. There are two indicators of the research outputs in this ranking table: published papers in Nature and Science and indexed papers in the Science Citation Index and Social Sciences Citation Index. (Fauzi et al. 2020, p.85) ARWU ranks totally more than 1800 universities and it publishes only the best 1000 of them.

Table 1

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Indicator</th>
<th>Code</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of Education</td>
<td>Quality of Education Alumni of an institution winning Nobel Prizes and Fields Medals</td>
<td>Alumni</td>
<td>10%</td>
</tr>
<tr>
<td>Quality of Faculty</td>
<td>Staff of an institution winning Nobel Prizes and Fields Medals</td>
<td>Award</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>Highly cited researchers in 21 broad subject categories</td>
<td>HiCi</td>
<td>20%</td>
</tr>
<tr>
<td>Research Output</td>
<td>Papers published in Nature and Science*</td>
<td>N&amp;S</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>Papers indexed in Science Citation Index-expanded and Social Science Citation Index</td>
<td>PUB</td>
<td>20%</td>
</tr>
<tr>
<td>Per Capita Performance</td>
<td>Per capita academic performance of an institution</td>
<td>PCP</td>
<td>10%</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>

According to the ranking table the meaning of the codes including «Alumni», «Award», «HiCi», «N&S», «PUB» and «PCP» have the following meaning (Academic Ranking of World Universities, n.d.): 

1. **Alumni**: is considered as the number of students who got bachelor’s, master’s or doctoral degrees from the institution and different weights set related to the graduation year of the students.

2. **Award**: is meant as the number of the staff of a university who has won the Nobel Prizes in Physics, Chemistry, Medicine and Economics and Fields Medal in Mathematics during the time they have been working in that institution.

3. **HiCi**: the primary affiliations of Highly Cited Researchers selected by Clarivate Analytics.

4. **N&S**: the number of papers, being only limited to publications of «Article» type, published in Nature and Science between 2015 and 2019.

5. **PUB**: the number of articles indexed in Science Citation Index-Expanded and Social Science Citation Index in 2019.

6. **PCP**: the number which is gained by dividing the weighted scores of the aforementioned five indicators to the figures of full-time equivalent academic staff.

2. **QS (Quacquarelli Symonds Limited) World University Rankings**

The first QS (Quacquarelli Symonds Limited) World University Rankings were announced in 2004 by British Quacquarelli Symonds. Nowadays, this ranking collects data from over 3000 higher educational institutions, and ranks minimum 800 and it is consists of both regional and world ranking tables. These rankings include 6 indicators to evaluate four different key areas, namely research, teaching, employability and international outlook, with various weights (QS World University Rankings, n.d.):

a. **Academic reputation (40%)**: It is measured by the results of the global survey of over 100,000 academics, and they vote for the top universities in their field
of study. Participants of the survey choose 30 universities, except their own institution.

**b. Employer reputation (10%):** the indicator that collects the data in the same way as academic reputation. 50,000 recruiters who hire some graduates from different universities are surveyed to determine their ideas.

**c. Faculty/student ratio (20%):** is usually cited by learners as one of the very necessary metrics when they compare the universities. This is too challenging to determine this ratio, but it is also the most effective proxy metric for teaching quality.

**d. Citations per faculty (20%):** it is considered the most widely used input both in local and global universities and measures institutional research quality using our Citations per Faculty metric. In order to yield the score for this section, the total number of citations within the last five years is divided by the figures of academicians in a university. It is a fact that today nearly half of the all research citations are allocated for the Life Sciences. Taking it into consideration QS applies different measurements for different fields in order to evaluate institutions’ true research capacity.

**e. International student and staff ratio (10%):** it is shared halfly by the number of international students and the staff.

Although some universities have changed their rankings over the past two years, as it is seen in Table-4, according to the statistics of QS-World University Rankings in 2020 and 2021 the first 10 places in a ranking table are shared by The United States of America, The United Kingdom and only one European country, Switzerland. There were 5, 4 and 1 universities from those countries, in the top 10 universities, respectively.

**3. Times Higher Education World University Rankings (THE)**

The THE, The World University Rankings, appeared in 2004 and provides the list of the world’s best universities with the help of their experts that evaluate universities with 13 separate performance indicators, based on their teaching, research, knowledge transfer and international outlook. THE do not only rank the
universities globally, but also give a comprehensive insight for the students about Asia University, World Reputation, Young University, Emerging Economies and Latin America Rankings. (THE World University Rankings, n.d.) If we compare it with other university rubrics, the Times differentiate itself in this category by giving a 30% share to teaching among ranking categories. (Fauzi et al., 2020, p.84) This ranking’s methodology includes 5 key areas and assesses the universities based on teaching (30%), research (30%), citations (30%), industry income (2.5%), and international outlook (7.5%). Moreover, «Z-scores» were developed for all sets of data, except for the results of the academic reputation survey, and this calculation enables the ranking table to do some comparisons between data types. (Pavel, 2015, p.59) In table 2 you can see a detailed description of all ranking indicators and their shares for each category.

Table 2

THE World University Rankings methodology (Source: https://www.timeshighereducation.com/world-university-rankings/world-university-rankings-2021-methodology)
In 2021 after collecting data from more than 1,500 global research universities and making a survey among 22,000 leading scholars in 93 different countries and regions, THE announced its rankings. In order to reach accurate results it also analysed more than 80 million citations to 13.6 million academic publications (from Elsevier’s Scopus database) published within the period of four years, from 2015 to 2019. The Oxford University, which stands at the top of the list this year, has been a leader of the ranking since 2016. Another interesting fact in this year’s ranking is the entrance of China’s Tsinghua University in the top 20 universities, being the first Asian University succeeding to do it under the current methodology. Surprisingly, this year there are 141 first-time entrances in the ranking and India stands at the top of the new entry list with 14 universities, by boosting its number 63. Although there are 8 universities from the USA in the top 10 list, there has been a decline in the overall number of American universities. (THE World University Rankings, n.d.)

**B - Entrepreneur Universities**

The change is not new for the universities and since their first appearance in society, universities are trying to change to fit the environments in which they function, and nowadays they try to turn into an entrepreneur universities, by trying to reflect the internal development of the university, external demands and increased role of the knowledge-based innovation in the society’s improvement. They are mostly becoming entrepreneur for not only contributing the local economic development, but also to the regional sphere. (Gibb, 2012, p.5)

Based on the aforementioned definitions contained in previous literature, we can understand that these institutions are flexible organizations that interact with its social and economic environment. These features enable them to stimulate institutional income and job creation by promoting entrepreneur activities in education, research and enhancing the third mission of the university service.
Table 3

Mapping of the definition of an Entrepreneurial University

(García-Aracil et al., 2013)

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
</table>
| «Entrepreneur University» | - «Universities that are considering new sources of funds like patents, research under by contracts and entry into a partnership with a private enterprise».  
- «The entrepreneurial university involves the creation of new business ventures by university professors, technicians, or students».  
- «University technology transfer is defined as formal efforts to capitalize upon university research by bringing research outcomes to fruition as commercial ventures. Formal efforts are in turn defined as organizational units with explicit responsibility for promoting technology transfer».  
- «An entrepreneurial university, on its own, seeks to innovate in how it goes to business. It seeks to work out a substantial shift in organizational character so as to arrive at a more promising posture for the future. Entrepreneurial universities seek to become «stand-up» universities that are significant actors in their own terms».  
- «An entrepreneurial university can mean three things: the university itself, as an organization becomes entrepreneurial; the member of the university are turning themselves somehow into entrepreneurs; and the interaction of the university with the environment».  
- «The entrepreneurial university is characterized by close university-business partnerships, by greater faculty responsibility for accessing external sources of funding, and by a managerial ethos in institutional governance, leadership and planning».  
- «As at the heart of any entrepreneurial culture, entrepreneurial universities have the ability to innovate, recognize and create opportunities, work in teams, take risks and respond to challenges».  
- «Just as the university trains individual students and sends them out into the world, the entrepreneurial university is a natural incubator, providing support structures for teachers and students to initiative new ventures: intellectual, commercial and conjoint».  
- «An entrepreneurial university is based both commercialization (customs made further education courses, consultancy services and extension activities) and commoditization (patents, licensing or student owned star-ups)».  
- «….is nothing more than a seller of services in the knowledge industry….»  
- «Entrepreneurialism is a reflection both of institutional adaptiveness to a changing environment and of the capacity of universities to produce innovation through research and new ideas». |

Keeping all these in mind we can state some missions of these universities as following:

1: **Teaching activities** Universities are the institutions where students, who are becoming professionals or entrepreneur after their graduation, are trained and educated. Therefore, the entrepreneur universities can contribute to the development of those entrepreneurs before their graduation and have an impact on human capital.
The human capital refers to the collection of skills, knowledge and competencies inherited through the education and training process. To keep this in mind, entrepreneur universities could have a role in economic impact via the generation, attraction and retention of skilled human capital and entrepreneurs. (Guerrero et al., 2015, p.748) The graduates of the entrepreneur universities can be defined as a person who is able to show spirits, mindsets, behaviors, attitudes and abilities of entrepreneur. There are some characteristics of such behavior including: seeking for opportunities, taking initiatives, ownership of development, seeing things through a successful conclusion, autonomy, decision making (intuitive), networking ability, thinking strategically, being able to negotiating, persuasive abilities, and willing to take risks in order to make a benefit, and fulfilling economic and social needs. (Ghina et al., 2015, p.12)

2: Research activities One of the goals of the entrepreneur universities is to enhance the research capacity of the universities. To pursue some research activities, namely patents, trademarks, licenses and copyrights are categorized to develop, transfer and commercialize new knowledge. There is a big impact on social and economic aspects of the university which is facilitated by the internal and external innovation and knowledge transfer by the expert researchers. (Ghina et al., 2015, p.13)

3: Third mission activities Beyond the research and the teaching missions of the universities there is one very crucial mission, the third mission, which complements the first two. The research establishments of the universities need to play a great role as a stimulator and facilitator of the transfer of the knowledge to business and society. For that reason, the third mission of the universities support the development of the new structures, processes and results of the interaction taking place between the universities and the different parts of the society. Ghina et al (2015) states that the activities of entrepreneur universities can be seen in different forms, joint ventures, spin-offs, incubators and science parks and this tools used by them to promote the improvement of new businesses.(p.18) These third missions do not only include the commercialization of the research outcomes via the collaboration with industry, creation of spin-off companies, but also contributing to the policy making and the involvement of the university practices in the social and cultural life.
C- Reflection of the Entrepreneur University missions in Global University Ranking Tables

When we compare three main global university ranking tables, we can conclude that the common criteria that affect the reputation of universities in the international arena can be listed as follows:

– Academic prestige of universities (international prestige, academic staff indicators and number of teachers per student)
– Number of references and research on scientific publications of universities
– Number of foreign students and academic staff who trust universities

Table 4

Comparison of the entrepreneur university missions and Global university ranking evaluation criteria

<table>
<thead>
<tr>
<th>Global University Ranking</th>
<th>Indicator</th>
<th>Percentage</th>
<th>Entrepreneur University Mission</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Ranking of World Universities (ARWU)</td>
<td>Highly cited researchers in 21 broad subject categories</td>
<td>20%</td>
<td>Research Mission</td>
</tr>
<tr>
<td></td>
<td>Papers published in Nature and Science*</td>
<td>20%</td>
<td>Research Mission</td>
</tr>
<tr>
<td></td>
<td>Papers indexed in Science Citation Index-expanded and Social Science Citation Index</td>
<td>20%</td>
<td>Research Mission</td>
</tr>
<tr>
<td>Quacquarelli Academic Ranking of Limited of Universities (QS)</td>
<td>Academic Reputation</td>
<td>40%</td>
<td>Teaching Mission</td>
</tr>
<tr>
<td></td>
<td>Faculty/student ratio</td>
<td>20%</td>
<td>Third Mission</td>
</tr>
<tr>
<td></td>
<td>Citations per faculty</td>
<td>20%</td>
<td>Research Mission</td>
</tr>
<tr>
<td></td>
<td>International student and staff ratio</td>
<td>10%</td>
<td>Teaching Mission</td>
</tr>
<tr>
<td>Times Higher Education World Rankings (THE)</td>
<td>Teaching (The learning environment)</td>
<td>25%</td>
<td>Teaching Mission</td>
</tr>
<tr>
<td></td>
<td>Research(Volume, Income and Reputation)</td>
<td>30%</td>
<td>Teaching Mission</td>
</tr>
<tr>
<td></td>
<td>Citations(research influence)</td>
<td>30%</td>
<td>Research Mission</td>
</tr>
<tr>
<td></td>
<td>International Outlook(staff, students, research)</td>
<td>7.5%</td>
<td>Teaching Mission</td>
</tr>
<tr>
<td></td>
<td>Industry income(knowledge transfer)</td>
<td>2.5%</td>
<td>Third Mission</td>
</tr>
</tbody>
</table>
Additionally, it clearly seems that the common criteria of the ranking tables that determine the rankings of universities in the world rankings and the missions of entrepreneurial universities converge. That is to say, entrepreneurial universities, as we have stated before, aim to improve the quality of education at the university, to form the research culture in this direction and to direct the findings of the researches to economic and social development both in the domestic context and in the international arena as a result of these two actions.

When we look at the ranking tables more specifically we can easily determine some evaluation criteria which overlap with one of three missions of entrepreneur universities. (Table-4)

D- Azerbaijani Universities in Global University Rankings and Entrepreneur Universities

Since gaining its independence, the government in Azerbaijan has carried out educational reforms in accordance with world standards. Examples of these reforms are the «Education Reform Program» approved in 1999, the «State Program for the Development of Technical Vocational Education» in 2007, and «The State Strategy for the Development of Education in the Republic of Azerbaijan» approved in 2013 (Ministry of Education, 2009), and most recently, the «State Program for Increasing the International Competitiveness of the Higher Education System in the Republic of Azerbaijan for 2019-2023» approved in 2018. At the same time, innovative steps have been taken in the field of education within the country. For example, starting from 2014, SABAH Groups consisting of «Literate, Skilled and Prepared» students have been established in higher education institutions of the Republic of Azerbaijan, and international dual degree agreements have been signed to benefit from the best practices of countries with strong educational structures such as Russia, America and Austria signed. (State Program to increase the international competitiveness of the system for Higher education in the Republic of Azerbaijan (2019-2023) However, even if we talk about the existence of this development today, it is an undeniable fact that none of the universities in our country is among the top 500 universities in the world. For example, when we
look at the results of the QS University Rankings in 2021, only two universities of the country, Azerbaijan State University of Economics and Baku State University, are in a list and unfortunately both of them couldn’t take place even in the first 1000 universities (Baku State University was between 801-1000 in 2019 and 2020 rankings) (QS University Rankings, n.d). THE Times University rankings also didn’t give a place to Azerbaijani universities in the ranking table in 2021. However, in 2020 Azerbaijan State University of Economics was in the ranking between 601 and 1000. (THE Times University rankings, n.d)

Results

We can conclude that the steps taken by Azerbaijani educational institutions today are highly commendable, and this long-term process should be accelerated with the cooperation of internal and external partners. So, today, at a time when universities are becoming third-generation universities, taking advantage of the experience of entrepreneur and innovative universities in Western countries will have a positive impact on our universities to rise to higher positions in the rankings. Moreover, the existence of these universities will highly affect the country’s economy. We think that in order to increase the initiative of students in our country, first of all, starting from the lowest levels of education the entrepreneurship must be taught to the students. This will increase the creativity and innovative abilities of students in both schools and universities. This, in turn, will increase the initiative of enterprises. At the same time, starting at the school level, education participants need to be taught «Research» skills, the value of information transparency, and the dangers of plagiarism. Transformation of universities into enterprising higher education institutions will ensure the existence of quality education, personality-oriented approach, innovation and competitive educational institutions, which are among the requirements of the educational strategies of our country.

References:


40. State Program to increase the international competitiveness of the system for Higher education in the Republic of Azerbaijan (2019-2023), Retrieved from https://static.president.az/media/W1siZiIsIjIwMTgvMTgvMTEvMTYvMjJnIzkiN2pFRERE9WTFU1BSTiFSQU1JXzlfMTIAYM19DVV9JTExBUl9VQ0hVTI9BWkFZQ0FOX1JF