



Identifying and Prioritizing Barriers to the Commercialization of Academic Research: A Contextual Analysis in Islamic Azad University

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ARTICLE INFO	ABSTRACT
Received: 04 April 2020 Revised: 01 September 2020 Accepted: 12 February 2021 Online: 16 March 2021	In Iran, the commercialization of university research is still in its infancy stage. The purpose of present study was to identify and prioritize the effective barriers to the commercialization of research in the Islamic Azad University. This study was a qualitative research using grounded theory approach, the statistical population includes academic experts and a purposeful sampling was applied based on theoretical saturation. To collect data, two methods of study and analysis of research background and semi-structured interviews were used. Research findings showed that during the last two decades, there was a high potential for intellectual production in this university. However, the findings indicated that there are five major obstacles to increasing the commercialization of academic research. Also, the division of barriers into two groups within and outside the organization highlights the wide range of these challenges and the unwillingness of university administrators to commercialize research in the short and medium perspectives. The research findings are in line with findings in other countries regarding major barriers to the commercialization of academic research.
KEYWORDS Academic research Barriers Commercialization Islamic Azad University Prioritization	

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1. Introduction

The emergence of new developments in the functions of higher education system has led fundamental changes in the missions and relationship of universities with society. One of the new missions of higher education system is to help generate national wealth by selling scientific goods and helping knowledge economy. Experts such as Levy (1998), Etzkowitz and Leydesdorff (2000) and Powers (2004) refer to this new goal as the "Third Mission", which involves any attempt to "commercialize" findings of academic research. In the Heritage dictionary (2021) the word commercialize means "To apply methods of business to for profit" (p.1). In the field of educational business, Reamer, Icerman, and Youtie (2007) consider commercialization as the process of turning technology into economically successful products. According to Chiesa and Piccalaga (1998), commercialization is the process of transferring and transforming the knowledge of research centers into various types of business activities. Active presence in the 21st century has made it inevitable to pay attention to new goals and missions for all social institutions, especially higher education system. In this regard, rethinking policies, science production processes and science economics is one of the important components. To accomplish this new mission, universities and higher education institutions need to review their goals, structure, activities, process, and products (Rouse, 2005). Therefore, the goals and missions of universities have changed and gone beyond the mere field of education and research and have become a powerful tool in the process of all-round development (Etzkowitz, 2002). One of the goals of higher education in the new millennium is to generate national wealth through the creation and production of scientific goods. It is obvious that the success of higher education system in commercializing research requires the provision of important conditions and prerequisites in the academic sector, industry and economic environments (Fakoor, 2007). The entry of universities into the education market, in addition to gaining economic independence and getting rid of dependence on government budgets, can create more motivation for faculty members to produce knowledge (Fakoor, 2006).

Despite the adoption of this new policy in many countries, research findings indicate differences in the degree of success of universities in achieving this policy. Although many higher education institutions - even in developing countries - have been able to increase their scientific production, they have not been very successful in presenting and selling these products to various sectors of the economy. In fact, numerous challenges and obstacles inside and outside the universities have prevented the rapid implementation of commercialization of scientific goods. A review of previous research findings points to some of the major barriers to knowledge commercialization. For

example, Decter, Bennett, and Leseure (2007) indicated that the factors hindering the commercialization of knowledge in universities are different financial expectations, communication problems, need for technical support, cultural differences between academia and industry, and lack of entrepreneurship in universities. The role of these factors has also been observed in the research of Kirihata (2007), and Debackere, and Veugelers, (2005). In a study entitled "Commercialization of Knowledge", Spilling (2004) indicated that the main barriers to commercialization are complexity of business environment, lack of business experience, inappropriate rules for faculty promotion, and lack of strong links between university and industry. Other researches address barriers such as the opposition of some academics to the commercialization of knowledge (Etzkowitz, 2003), existence of bureaucracy and inflexibility of the university management system (Samson & Gurdon, 1993), lack of freedom of action for faculty members to participate in business activities (Plewa, 2005), and differences in attitudes of industry activists with university administrators regarding commercialization (Debackere & Veugelers, 2005). Regarding the differences between views of industry and university activists, we can note the differences in goals, length of academic research, and differences in research needs (Fontana, Geunab & Matt, 2006). In addition, Siegel, Waldman, Atwater and Link (2003) reveal inefficient university leadership as a barrier to knowledge commercialization. These researchers believe that on the one hand management of the university's intellectual property is a relatively new phenomenon. On the other hand, the process of transferring technologies and academic goods to other sectors has caused many problems for higher education systems. For example, the staff of the "Industry-University Relations Office" which is responsible for managing and supervising the university's intellectual property, often suffers from a lack of experience, skills and inefficiencies in processes and procedures (Lockett & wright, 2005).

Another major obstacle to the commercialization of knowledge is academic culture (Ndonzuau, Pirnay, & Surlemont, 2002). The culture of most universities is dominated by the "publish or perish" slogan, which inherently makes the academic community reluctant to commercialize. Although there is a global trend towards the development of entrepreneurial universities, there are many difficulties in achieving this goal (Spilling, 2004). Interestingly, some faculty members believe that developing the economic goals of higher education may eliminate the role of the university as an independent critic of society (Etzkowitz, 2000). Conversely, some studies emphasize the need for infrastructure reform and institutional innovations to create and promote entrepreneurial culture in universities (Henrekson & Rosenberg, 2002).

Lack of mutual understanding between higher education leaders and economics actors about each other's culture may be one of the barriers to the commercialization of academic research (Debackere & Veugelers, 2005). For example, some academic researchers do not view money as a tool for scientific advancement. Conversely, businessmen see "creation of wealth" as their primary goal and view science as a means to an end to "money" (Samson & Gurdon, 1993). The main motivation of faculty members is to gain professional reputation in academic forums by publishing articles, presenting at prestigious conferences and obtaining research credits, while the main motivations of companies and entrepreneurs are to commercialize knowledge-based technologies to achieve greater financial benefits (Siegel et al., 2003; Plewa, 2005). Fontana, Geunab and Matt (2006) also point to barriers such as the length of research time, differences in views on research requirements, and technological gap between academia and industry. In sum, the need to change three very difficult features in the process of commercialization of academic research can be noted: A change in the concept of traditional slogan of "publish or perish", a change in the view of researchers on the concept of commercialization and role of money; and shifting the direction of academic research from "Disinterested research" towards real research focused on market needs (Ndonzuau, Pirnay, & Surlemont, 2002).

Iranian researchers have also become particularly interested in commercializing academic research over the past two decades. Before referring to the findings of a number of researches by Iranian scholars, it is necessary to provide brief information about the current situation of higher education system in Iran and especially the Islamic Azad University - which is of interest to the present researchers:

According to the establishment of Jundishapur University in pre-Islamic Iran, the history of the higher education system in this country is more than 15 centuries (Elgood, 1951). However, the establishment of the university in a modern structure is a gift of Western civilization since the establishment of the University of Tehran in 1935 (Zargarinejad, 2018). During the rule of the Pahlavi dynasty, universities were established in a number of provinces in Iran, but the peak of the slight growth of higher education and the increase in the number of academic disciplines and students can be delayed until the 1990s (Soofi & Goodarzi, 2017). During this decade, along with the increasing social demand for higher education, the government took two important steps: First, establishment of the Islamic Azad University as a semi-public university through the attraction of public financial resources and Second, establishment of Payame Noor University as the largest virtual university in the country. Thus, during the last three decades, Iran has witnessed a slight

growth of its higher education system, so that according to the latest official statistics, there are 2569 universities in the country such as Islamic Azad University with 530 university campuses and 1,550,000 students, Payame Noor University with 466 centers and 546,000 students and state universities with 141 campuses and 687,000 students (Institute of Higher Education Research and Planning, 2018). It is natural that the initial attractiveness of universities completely diminished under the influence of factors such as decrease in rate of population growth, increase in number of university graduates and reduction in labor market needs. Therefore, during the last decade, many universities have faced a shortage of students, and especially non-governmental universities have faced difficulties in paying the salaries of faculty members and staff (Gholami, 2020). Thus, during the last ten years higher education policies have changed from quantitative to qualitative growth through increasing scientific production and commercialization. Analysis of development policies in universities indicates the adoption of methods such as customer-centric, commercialization and the desire for economic independence. In this regard, from the legal point of view and at the policy level, major decisions have been made. For example, in addition to Article 44 of the Constitution, which emphasizes the reduction of government duties in the public sector, upstream documents such as "Comprehensive Scientific Map of Iran", "proposed model for strategic planning of universities, educational and research centers and science and technology parks", "Final document of Islamic Republic of Iran 20 Years Vision", "Twenty-year vision of the Islamic Republic of Iran on the horizon of 2025", "Document of the Islamic University", and the "Cultural charter of the Islamic Revolution of Science and Technology" have insisted on the commercialization of academic products.

For this reason, one of the duties of the Supreme Council of Science, Research and Technology is to approve the necessary policies for the commercialization of research achievements, technology transfer and dissemination, and development of new technologies (Jahed & Arasteh, 2013). Naturally, this trend will lead more universities and faculty members to business activities. Islamic Azad University - as the largest university in the country in terms of number of campuses, faculty members and students - is at the forefront of this policy (Dehghani Firoozabadi, 2019). Therefore, one of the most important missions of the managers and planners of the Islamic Azad University is to study methods of increasing financial resources by encouraging faculty members to produce scientific goods for selling to different economic sectors. Of course, it should be acknowledged that despite the appropriate scientific capacity and legal predictions, Iran's universities are not in a good position in the commercialization of academic research and entrepreneurship (Fakoor & Haji Hosseini, 2008). In fact, policy change has not necessarily led to

success, and many universities - including the Islamic Azad University - face serious obstacles and challenges in achieving the goal of "commercialization of academic research." Also, despite the existence of university entrepreneurship centers and related programs, the rate of entrepreneurial activities and the number of innovative businesses in Iran is lower than the global average (Ansari & Salmanizadeh, 2009). Let us refer to the findings of several previous researches:

Fozuni Ardakani and Zamani (2014) in a study entitled "Optimal system of commercialization of ideas and prosperities of academic research" found that the most important obstacles and limitations of commercialization are: lack of scientific, cultural, legal, political and economic infrastructure of commercialization in Iran; lack of local and network commercialization model between research, technology, production and market sectors; lack of foresight and feasibility study of ideas and technologies based on marketing research; lack of proper communication between researchers and business sectors to conduct quality research commensurate with economic/social needs of the country; the risk-freeness of the traditional private sector and the inadequacy of current university management methods for commercialization. Pour Azat and Heidari (2011) identified 41 barriers to knowledge commercialization. Hassan Gholipour, Gholipour and Roshandel Arbatani (2010) point to destructive role of factors such as non-competitiveness of university environment; negative attitudes on commercialization of educational services, inefficiency of laws and regulations, mutual distrust of academia and industry, financial problems, and lack of skilled manpower in commercialization of academic research. According to Pour Azat, Qalipour and Nadir Khanlu (2010), the most important barriers to knowledge commercialization at the University of Tehran are bureaucracy and inflexibility of management system; lack of communication networks between investors, industry activists and academics; weak asset protection laws; university dependence on government budgets; and lack motivation of officials to commercialize knowledge. Hashemnia, Emadzadeh, Samadi and Saketi (2009) indicated that two challenges of research commercialization are lack of attention to the entrepreneurial culture and conflict between commercialization and traditional tasks of universities. Mohammadi, Esmailzadeh, and Dehnouieh (2009) also emphasized on the role of political and legal barriers in the process of commercialization development. Findings of Bandarian and Ghabdezi (2009) and Nadir Khanlu (2008) refer to common obstacles such as prevalence of bureaucracy in the university, lack of freedom for faculty members to participate in business activities, universities' dependence on government budgets and lack of financial support for researchers. The findings of Fakoor (2007) and Bandarian (2007) are very similar. According to these two researchers, the main challenges of commercializing university products in Iran are: lack of investment in fundamental research;

pessimism among academia, industry and investors; structural and organizational barriers; and lack of environmental standards. According to these findings, the purpose of this study is to answer these two questions: First, why, despite the importance of commercialization of academic research, Islamic Azad University has not been able to succeed in this field and second, what are the major obstacles to commercialization of research in this university.

2. Research Method

The main purpose of this study was to investigate barriers to commercialization of academic research in Islamic Azad University, Qazvin Branch. This study was a qualitative research using grounded theory approach, the statistical population includes academic experts and a purposeful sampling was applied based on theoretical saturation. The statistical population included all faculty members of Islamic Azad University from different branches and the criteria for selection of sample was the length of teaching experience (more than 20 years) and academic qualification (Associate Professor). Targeted sampling was used to select the first person in the research sample and snowball method was used to select the next individuals. Two methods of library and semi-purposeful interviews were used to collect data. In the first stage, books and articles were studied to identify possible obstacles to commercialization of academic research. In the second stage, the total findings were prepared and adjusted into 10 main questions for use in the interview. In the third stage and during several sessions with professors of management department at Islamic Azad University of Qazvin, the accuracy and adequacy of questions were examined. In the next step, semi-structured interviews with selected individuals began. The average interview time was 1 hour and 22 minutes, and after conducting interviews with 17 people, theoretical saturation was obtained, but for more assurance, up to 23 interviews were continued. At the end of the interviews, content analysis and initial coding, axial coding and selective coding were used. According to Creswell and Miller (2000), the following measures were taken to determine the validity and reliability of the present study:

Validity: Allocating sufficient time to research and approval of the research process by 3 professors of the management department of Islamic Azad University, Qazvin Branch and using two coders to determine the accuracy of the initial coding;

Portability: Obtaining the opinion and confirmation of research findings by 4 faculty members who were not interviewed;

Reliability: Record all stages of research with detailed descriptions.

3. Results

After the interviews, their content was accurately recorded and coded paragraph by paragraph by the principal researcher. At this stage, the key points of each interview were identified and coded in relation to the barriers affecting the commercialization of academic research. Table 1 shows an example of the transcript of the interview and the open source code extracted. In this step, 196 descriptive codes of the interviews were obtained.

Table 1: Examples of how to extract concepts from interviews

Source	Quotation	No. of references	Code	Descriptive code	Basic concepts
P6	Commercialization is nothing more than a slogan, even in non-educational fields. More than 80% of the country's economy is state-owned. Political, legal, and social constraints in practice do not allow universities to actually engage in commercialization	3	T17	Government domination of the economy	Political barriers
P11	Many university presidents do not have an accurate picture of commercialization. Some of them are basically against commercialization and many are not willing to cooperate because they have to change their traditional management style	9	T3	Traditional structure of university management	Organizational Structure

After initial coding, repeated revisions, and identification of similarities and differences, codes with common content were merged. Then, according to the findings of the research literature, 24 codes concerning the barriers to commercialization of academic research were identified and placed in the form of 8 axial codes .

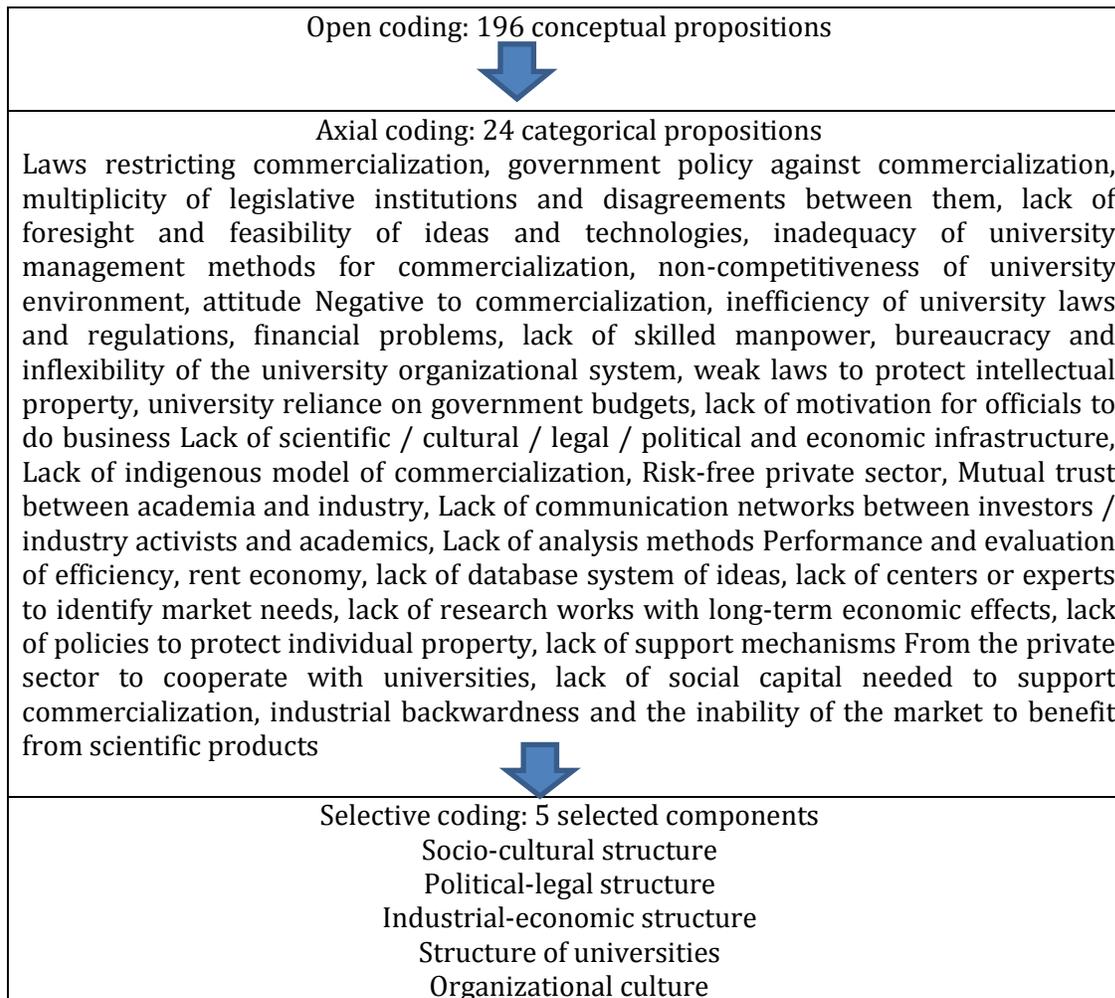


Figure 1: Data reduction process in three coding steps

To determine priority of barriers to commercialization of academic research in Islamic Azad University, two methods were used: First, the main researcher's personal judgment according to the atmosphere of each interview and the emphasis of each informant on importance and role of barriers and; Second, review the interview through listening to the words of the informants and re-reading the content of the interviews by two faculty members of department of management, Islamic Azad University, Qazvin Branch. The results of these two methods show that the cultural-social structure of Iran's society is the most important obstacle to the commercialization of academic research. Other important obstacles are as follow: political-legal structure, industrial-economic structure, and finally organizational-cultural structure of universities. Accordingly, the most important barriers to the commercialization of academic research can be divided into two general groups of intra-organizational and extra-organizational barriers (Table 2):

Table 2: Main obstacles and its components

Organizational barriers	components
Internal	Lack of foresight and feasibility of ideas and technologies; Inadequacy of common university management practices for commercialization; Non-competitive university environment; Negative attitude towards commercialization of educational services; Inefficiency of academic laws and regulations; Financial problems; Lack of skilled manpower; Bureaucracy and inflexibility of the organizational system of universities; Weak intellectual property protection laws; The university relies on government budgets; Lack of motivation in officials to commercialize knowledge
External	Lack of scientific, cultural, legal, political and economic infrastructure; Lack of a pattern of local commercialization; Traditional private sector risk-free; Mutual distrust between university and industry; Lack of communication networks between investors, industry activists and academics

The first important obstacle to the commercialization of academic research is cultural and social structure of the Islamic Azad University, which means that many faculty members oppose the idea of commercialization and do not consider it as one of the university missions. Continuing the impact of this barrier, the content analysis of the interviews shows that the political and legal structure also does not seriously support the idea of commercialization. In fact, the idea of commercialization is possible when, in the strict sense of the word, universities have independence of action in various fields, while the Islamic Azad University is under the control of government to make any decisions. Participants also stressed that although many upstream documents have emphasized the economic independence of universities in recent years, its mechanisms have not been envisaged. In addition, the political structure has caused the industrial-economic development and therefore scope of universities to commercialize their products outside Iran may be influenced by foreign relations. Thus, two unpleasant events have occurred in the process of commercialization of academic research: First, the lack of ability of various industrial and service sectors of the country to make optimal use of university research products; and second, lack of opportunities to provide research products to global markets. When these barriers are combined with the two barriers of traditional structure and organizational culture of universities, they have a double effect on the cessation of commercialization. Accordingly, many informants emphasized that internal barriers should be removed before attempting to reduce the impact of external barriers. For example, the majority of participants noted the Islamic Azad University's lack of readiness to commercialize research. Obstacles such as the prevalence of traditional management, tedious bureaucracy, inefficiency of

university laws and regulations, university's reliance on government budgets, and lack of motivation on the part of officials to commercialize knowledge were also highlighted by participants as intra-organizational barriers. The last issue that the informants pointed out was high capacity of the Islamic Azad University - compared to other universities in the country - to produce academic research, while the development and expansion of this capacity depended on the removal of obstacles.

4. Conclusion

World economic developments have changed the traditional missions of social systems, including the higher education system. Developed countries, as in the past, took the lead in accepting change and quickly sought to adapt the structure of the higher education system to new requirements. Whether they like it or not, developing countries, have moved more slowly in this direction. Accepting new changes in all aspects of life is a common dream of all human beings - whether in the First World or Third World - but it is simply not possible for everyone to achieve this dream. The bitter truth is that in many developing countries the main mission of the higher education system is still and mainly to prepare manpower. Iran's higher education system has seen a remarkable quantitative growth over the last four decades and has been able to largely meet market demand for manpower. Therefore, Iran is in a better position compared to many developing countries. This situation has caused universities to see the growth of intellectual production. However, producing science without a buyer in a world based on the knowledge economy may be a waste of resources. This is the challenge that policymakers in Iran's higher education system face nowadays. This finding is in line with the findings of Ansari and Salmanzadeh (2009); Bandarian (2007); Bandarian and Ghabdezi (2009); Fakoor (2006, 2007); Fakoor and Haji Hosseini (2008); Fozuni Ardakani, and Zamani (2014), Hashemnia et al. (2009); Hassan Gholipour, et al. (2010); Mohammadi, Esmailzadeh, and Dehnouieh (2009); Mahdavi (2010); Pour Azat and Heidari (2011); Pour Ezat et al. (2010); and Nadir Khanlou (2008). Of course, this is one side of the coin.

Other side of the coin is Iran's special situation considering impact of a set of non-organizational barriers on higher education system performance. The volume of research in Iranian universities, especially during the last two decades, shows that there is higher potential for intellectual production, but political, economic and cultural barriers hinder real commercialization. Thus, we are dealing with a garden where there is no purchaser for its good fruits or its fruits are given to

others for free. Of course, Iran is no exception. For example, the findings of the present study are consistent with the research of Noor, Ismail and Arif (2013). They found that research and technological products in Pakistan did not meet consumer needs, and that there was poor coordination between large industries and higher education institutions. The findings of the present study are also similar to the findings of Ismail, Noor and Sidek (2017) in Malaysia, which show that there are major challenges in terms of financial support, manpower and marketing strategies for the commercialization of academic products. In a general conclusion and based on the research findings, the Islamic Azad University is not yet ready at the various managerial, scientific and executive levels for the commercialization of research. Studies by Rao and Mulloth (2017), Saud Khan (2017), and Siegel and Phan, (2005) have also emphasized the unpreparedness of universities for commercialization of research. Of course, it cannot be ignored that the extreme emphasis on the commercialization of academic research can raise unrealistic expectations of those who do not consider themselves experts in marketing for research production. For this reason, Caulfield and Ogbogu (2015) rightly point out that rather than insisting on the commercialization benefits of academic research; its disadvantages should also be considered. Despite the attractive appearance of commercialization, in fact many higher education planners do not know how to achieve this goal.

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