Original Research

Identification of Barriers to Research and Technology in Sports Sciences in Iran

Nazanin Rasekh[1], Hamid Ghasemi[2*], Hossein Zareian[3], Fahimeh Mohammad Hassan[4]

1-3. Sport Sciences Research Institute, Tehran, IRAN
2. Department of Sport Management, Payam -e- Noor University, Tehran, IRAN
4. Department of Sport Management, Islamic Azad University, Science and Research Branch, Tehran, IRAN

ABSTRACT

Research, science production and technology are the most important elements of the development of countries. The main purpose of the research is to determine if the model of barriers to research and technology in sports sciences is appropriate in terms of the goodness of fit indexes. The study employed a descriptive-correlational method, which is applied in terms of purpose and exploratory in nature. To collect data, field survey method was used. The statistical population consisted of all faculty members in the field of physical education and sports sciences at Iran state universities in 2017 (n=1100). Based on the Morgan table, 320 individuals were selected using the simple random sampling method. Finally, 246 questionnaires were chosen to analyze. To collect information, a researcher-made questionnaire consisting of 44 items across a five-point Likert scale was used. The content validity of the questionnaire was confirmed based on Lawshe's table of critical values (CVR = 0.85); and reliability of the questionnaire was confirmed based on the Cronbach's alpha coefficient (α=0.82). To analyze data, exploratory and confirmatory analyses were performed using SPSS 20 and LISREL 8.5 software. The results showed that development or modification of seven factors including research and technology culture in the society (0.65), management and policymaking in the research system (0.53), research rules and regulations (0.60), the commercialization of research results (070), budgeting and research facilities (0.78), and the researchers' status (0.51) were identified as barriers to research and technology in physical education and sports sciences. In total, this model had a 65.966% predictive power on the basis of total aggregate variance percentage.

It was indicated that the model of barriers to research and technology in the field of sports sciences is appropriate in terms of the goodness of fit indexes. Obstacles and efforts to develop relevant strategies in this area could accelerate the process of developing research and technology in the field of sports sciences.

Keywords: *Researcher, Research Policy Making, Commercialization, Barriers.*

Introduction

In recent years, the attention of researchers and science policy cycles is focused on the concept of research collaboration that is a key mechanism for the production and dissemination of knowledge in science and technology and aims to improve the link between science and technology [1]. Today, the development of countries is based on science and knowledge. Research and production of science and technology are the most important elements of promotion and development of any country in economic, social, cultural, industrial and political aspects [2]. Therefore R&D systems play an effective role in creating and developing knowledge and technology, modifying business processes and methods, providing new opportunities for entrepreneurship and business development and thereby improving the economic growth of organizations [3]. Economists believe that science and technology as a powerful and effective tool can play a key role in the process of development. In the present world, countries with high level of science and technology could consider as developed countries. Therefore, many of the advanced products, methods, tools and technologies

that are obtained from the promotion and development of such countries are in the area of science and technology and on the other side, there are developing countries which are at a low level of science and technology [4]. Focusing on research and research activities provides opportunities for development and planning in any country. Therefore, research is the only way to win and prevent backwardness [5]. The increasing trend of scientific and technological developments in recent decades, high cost of research and the limitations of both human and physical capital on the other hand, make this necessity clear to national policymakers that they have to set focus areas [6]. Prioritizing research and technology is part of the process of formulating a science and technology strategy.

The development of countries has many indicators, that one of the most important is sport [7]. The relationship between sport and cultural, social, political and economic phenomena indicates the importance of sport and its role in the national development plans of countries [8]. This has led to a large investment in sports development in most countries and a high share of gross national product (GNP) and gross domestic product (GDP) allocated to sports, So that R&D share of Iran's GDP is 0.65% which is insignificant compared to other countries (for example Sweden is 3.74). Iran's GDP is very low compared to other countries. Therefore, the share of research and development in Iran will be incomparable with other countries. On the other hand, the worrying thing is that the share of research in sport in the total research budget of the country is 1.1%. In addition, the number of researchers and inventors of the physical education and sport sector in Iran is low in comparison with other countries [9]. The study of developed countries such as Australia, England, America, Canada and others in the field of sports illustrates their investment and careful planning in the field of research in sports [2]. At present, the system of research and technology has been studied in various fields of science which face many problems and obstacles. However, there are limited research in the field of sports sciences that simultaneously examines the barriers to research and technology.

Mirzaei et al. (2015) studied the barriers to using information technology in physical education and the results showed that five cultural, facilities, managerial, skill, economic factors are among the most important barriers [10]. Majidpour and Namdarian (2015) identified barriers to implement documents of policies related to science and technology. According to results they concluded that the main barriers to the implementation of the science and technology policy documents are: the problem of priorities, because each action listed in the document must have its own priority; ignoring foresight results in drafting documents; policies inadaptability with existing challenges; the absence of networking among policymakers; non-governance of major policies; the lack of multi-sectoral vision; the insular structure of bureaucracy; and lack of long-term vision to management and governance of policy programs [11].

In their research, Moradi& et al (2013) identified and prioritized the barriers to research. According to the results, environmental, individual, organizational and technical factors were identified as barriers to research; and the factor of culture had the most impact on doing research [12]. Wendyg Black (2010) mentioned social and cultural barriers, lack of economic and financial opportunities and executives' obstacles as the most important obstacles to research development in educational institutions [13]. Mazurkiewicz & Poteralska (2017) identified and categorized the barriers to innovation as follow: technical barriers, organizational barriers, and systemic barriers [14]. Sadeghi et al (2016) also examined the barriers and challenges of research activities from the students' point

of view and concluded that individual factors have the highest rank as the barrier and research factors have the lowest rank [5]. Etkinson (2004) believes that components such as bureaucracy, lack of funding, environmental disadvantages, poor incentives, and inadequate environmental facilities could be considered as obstacles to research [15]. Elsen (2008) also examined barriers in five groups of human, organizational, methodological, communication and social barriers [16].

Articles Barriers and facilitators to using digital technologies in the Cooperative Learning model in physical education

Bodsworth and Goodyear (2017) Showed that selecting a well-defined pedagogical approach that has been previously reported to support technology use, such as Cooperative Learning, will not automatically result in positive learning experiences for pupils. If practitioners are to purposefully integrate digital technologies into physical education and ensure technology can help students to learn optimally, practitioners should engage with a reflexive process of learning, such as action research, to refine and develop their practices [17].Malone and et al (2019) in Perspectives of applied collaborative sport science research within professional team sports Showed that There was a general agreement between academics and practitioners for forming research collaborations [18].

Therefore, the quantitative and qualitative development of research and technology in physical education and sport sciences and various researches in this field indicates the need for synergy between these researches. Research is a key to access self-sufficiency and all-encompassing independence. As long as a society is not scientifically accepted in the world, it cannot speak of independence. Conducting research in identifying barriers and developing a model of research and technology in this field will lead to a comprehensive program for development and promotion of sport in Iran. It can also be an effective step in providing solutions for development of endogenous technology. Awareness of the obstacles and their elimination in order to promote qualitative and quantitative research in physical education and sport sciences, with regard to their key role in the development of sport in Iran, seems necessary. Therefore, utilizing the knowledge, experience and scientific potential of researchers and research institutes can improve the quality of science production in sports science and will lead to development of research and technological publications in the field of sports science. As a result, this study aims to identify the barriers to research and technology in sports science.

Material and Methods

The purpose of this study was to identify the barriers to research and technology in the field of sport sciences in Iran. The research method was descriptive and correlational in terms of purpose, exploratory in terms of its nature and was a field research in terms of data collection. The statistical population of the study consisted of all faculty members of physical education and sport sciences in public universities in 2017. According to statistics obtained from the Sport Sciences Research Institute of Iran and Ministry of Sport and Youth about the number of faculty members of physical education and sport sciences at public universities of Iran, approximately (n=1100) were designated as the statistical population and according to Morgan table probability of reduction in returned questionnaires (n=320) individuals were selected as statistical sample using simple random sampling. After distributing the questionnaires, 246 answer sheets were finalized and analyzed. A 44-items researcher-made questionnaire with a 5-point Likert scale (very low to very high) was used to collect the data. To assess the validity of the questionnaire, the validity method of Lawshe

was used. Lawshe validation method is a method that examines the content validity of questionnaires before distribution and has a rating range (0-1 +).

The questionnaires were first given to 11 sport management professionals and they were asked to comment on each question. Their responses were then coded in three essential, essential, but useless and non-essential categories. In Lawshe method, questions that are necessary from the standpoint of the experts will be considered as the criteria to check content validity. Quantifying the opinions of experts was done using the following formula:

$$CVR = \frac{ne - n/2}{n/2}$$

ne= The number of experts who considered the question essential

n/2= Total number of experts divided by two

If the results of Lawshe will be higher than (0.8), the content validity of the questionnaire is approved and it could be distributed among the subjects. Finally, the content validity of the questionnaire (CVR = 0.85) was confirmed. Also the reliability of the questionnaire was assessed by pilot study on 30 statistical samples using Alpha Cronbach's alpha test (α = 0.82). Descriptive statistics (mean and standard deviation) were used for statistical description of the data. Exploratory factor analysis method was used to determine the factors, and confirmatory factor analysis was used to confirm the model of relation among questions and factors and factors with the concept of barriers to research and technology in Sport sciences in Iran. All analyzes were performed using SPSS18 and Lisrel8.5 at significant level (P≥0.05).

Findings

Table 1 reports the demographic characteristics of the statistical samples.

Table 1. Demographic Characteristics

Variable	Gender		Field of Study					Scientific Levels			
	Female	Male	Biomechanics	Sport Injuries	Motor Control	Sports Management	Sports Physiology	Assistan Prof.	Associate Prof.	Professor	Instructor
Number	32	167	4	24	48	91	72	174	37	4	31
Percentage	32	68	4	9	19	37	29	71	15	2	12

The results of Kolmogorov-Smirnov test also showed that the distribution of data of the concept of research and technology barriers in sport sciences area field in Iran was normal (Z = 0.86 and P = 0.72). According to the results of Table (2), the highest mean is for question 37 and the lowest is for question 34. Also, the results of Kaiser-Meyer-Olkin (sample size adequacy) equals (0.887) and Bartlett's Spearman's test (P = 0.001 and x2 = 5217.038), indicating that all the necessary assumptions regarding the use of factor analysis are met. In the next step, six factors were identified

using varimax rotation and by applying factor loadings of 0.5. Table 2 shows the mean and standard deviation of the questions.

Table 2. Mean and Standard Deviation of the Questions

No.	Questions	Mean	Standard Deviation
37	Inappropriate budget allocation of R&D departments in the field of sports science	4.84	0.64
35	Insufficient share of research budget of Iran compared to other countries	4.82	0.73
39	Inefficient spending of the country's research budget and poor distribution	4.81	0.68
38	Lack of private sector investment in science and research	4.77	0.69
36	Lack of necessary tools, equipment and information resources for sport research in Iran	4.76	0.71
21	Weak access to scientific information resources by researchers in the field of sports sciences in Iran	4.72	0.69
24	Lack of job security and peace of mind about the present and future of life for sports science researchers	4.70	0.73
15	Lack of research belief in sports sciences	4.68	0.59
14	Weak investment in the production of knowledge and not paying attention to the generation of thought	4.67	0.68
10	Lack of proper scientific and research space in the country in the field of sports sciences	4.64	0.66
1	Parallel work of research authorities in the field of sports sciences in Iran	4.63	0.69
7	Lack of long-term research strategy for the country in the field of sports sciences	4.60	0.73
6	Lack of proper management structure in the country's research system	4.57	0.64
9	Lack of evaluation, assessment and monitoring indicators in research activities in the field of sport science	4.54	0.67
15	Lack of proper organization for cooperation between industry and university	4.50	0.70
44	Neglect to take advantage of the results of research in the field of sports sciences	4.49	0.72
40	Disregard and distrust of managers to research findings in sport sciences	4.43	0.80
41	Attitude difference between researchers and executive levels of the country in the field of sport sciences	4.35	0.56
28	Weakness and complexity of standard research regulations in the country	4.31	0.60
30	Several rules and the ever-changing rules governing research without taking the opinion of researchers	4.26	0.71
32	Lack of transparency of regulations in the field of ownership and patents and innovations in the field of sport sciences	4.23	0.67
33	Lack of legal requirements to apply research results in the country	4.21	0.69
29	Administrative bureaucracy to spend approved research projects funds in the field of sports sciences in Iran	4.18	0.63
42	Time consuming to do research and not presenting results when decisions are made	4.14	0.75
43	Lack of compulsion for applying research results in the country	4.09	0.78
31	Incompatibility of conditions of employment regulations for recruiting research staff	4.07	0.55
32	Gap between research centers and industry in the field of sports sciences	4.01	0.74
33	Incompatibility of research priorities with community needs and lack of a systematic approach in analyzing and explaining the needs of sport sciences	3.98	0.67
34	Lack of proper structure for training a capable researcher in sports sciences	3.97	0.64
35	Lack of a proper scientific and research management pattern in sports	3.90	0.61

	science and research centers		
36	unclear status of non-state research and the politics of dealing with them	3.88	0.66
37	Lack of an organization to apply the results of research in sport sciences	3.84	0.69
38	Education based training system of Iran	3.83	0.61
39	Being unfamiliar with the definitions, concepts and methods of research based on international standards	3.79	0.65
40	Lack of national pride in production and innovation based on research	3.76	0.75
41	Scientific and technical gap between Iran and the world	3.74	0.70
42	Failure to promote teamwork culture in the field of sports sciences in Iran	3.66	0.72
20	The problem of having more than one job of researchers and faculty members in the field of sports sciences	3.61	0.58
22	Lack of transferring the experiences of outstanding researchers to young researchers	3.59	0.62
25	Lack of proper situation and culture of scientific cooperation inside and outside of Iran	3.55	0.63
23	Weak motivation to carry out research projects in the field of sports sciences	3.54	0.67
26	Lack of proper solution for brain drain and return of internationally renowned Iranian scientists	3.50	0.52
27	The issue that the researchers and scholars of sports sciences research remain unknown	3.46	0.77
34	Complexity of rules and regulations in clearance of research goods	3.42	0.68

The results of factor analysis presented in Table (3) show that the percentages of variance for research facilities equals (23.704) and mean and standard deviation (4.71 ± 0.70) for commercialization of research results equal to (11.379) and mean and standard deviation (4.67 ± 0.63) for research culture factor in society equal to (10.016) and mean and standard deviation (4.42 ± 0.68) for research rules and regulations equal to (8.168) and mean and standard deviation (4.12 ± 0.60), for policy making in research system equal to (7.692) and mean and standard deviation (4.03 ± 0.62). And for the status of the researchers equals to (5.007) and mean and standard deviation (3.81 ± 0.65). The results of factor loadings of the questions showed that the factor loadings of all the questions were acceptable. Totally the predictive power of this model based on the sum of the cumulative variance percentages of factors was 65.966%.

Table 3. Factor Analysis of the Principal Components

Question No.	Statues of Researchers	Policy Making in Research System	Research Regulations	Research Culture	Commercialization of Research Results	Research Facilities and Equipments
1						0.795
2						0.773
3						0.842
4						0.827
5						0.798
6					0.541	
7					0.517	
8					0.590	
9					0.527	
10					0.553	
11				0.623		
12				0.650		
13				0. 642		
14				0.541		
15				0.537		
16				0.594		
17				0.635		
18				0.609		
19			0.682			
20			0.753			
21			0.774			
22			0.705			
23			0.714			
24			0.748			
25			0.673			
26		0.753				
27		0.704				
28		0.721				
29		0.692				
30		0.665				
31		0.748				
32		0.653				

33		0.617				
34		0.648				
35		0.669				
36		0.693				
37	0.581					
38	0.603					
39	0.547					
40	0.619					
41	0.648					
42	0.627					
43	0.593					
44	0.535					
Percent of variance	5.007	7.692	8.168	10.016	11.379	23.704
Cumulative Percentage of Variance			65.966			

Checking Table 4 it is found that there is a relationship between all the items with each factor.

Table 4. Relationship between Indicators and Factors of Barriers to Research and Technology in the Field of Sport Sciences

Questions	Factors	Relation Rate	Coefficient of determination	T-value	Result
Question 1	1	0.78	0.60	14.12	Confirmed
Question 2		0.64	0.41	10.18	Confirmed
Question3		0.72	0.51	11.36	Confirmed
Question4		0.79	0.62	9.18	Confirmed
Question5		0.65	0.42	10.11	Confirmed
Question6	2	0.61	0.37	10.21	Confirmed
Question7		0.65	0.42	11.48	Confirmed
Question8		0.52	0.27	10.86	Confirmed
Question9		0.57	0.32	9.37	Confirmed
Question10		0.50	0.25	9.08	Confirmed
Question11	3	0.62	0.38	10.15	Confirmed
Question12		0.68	0.46	9.79	Confirmed
Question13		0.51	0.26	8.18	Confirmed
Question14		0.49	0.24	7.53	Confirmed
Question15		0.57	0.32	8.94	Confirmed
Question16		0.54	0.29	8.48	Confirmed
Question17		0.52	0.27	8.73	Confirmed
Question18	4	0.48	0.23	7.92	Confirmed
Question19		0.54	0.29	8.34	Confirmed
Question20		0.46	0.21	7.12	Confirmed
Question21		0.41	0.16	7.08	Confirmed
Question22		0.52	0.27	7.69	Confirmed
Question23		0.40	0.16	6.03	Confirmed
Question24		0.44	0.19	6.55	Confirmed
Question25		0.43	0.18	6.17	Confirmed
Question26	5	0.48	0.23	7.17	Confirmed
Question27		0.42	0.17	7.12	Confirmed
Question28		0.39	0.15	6.59	Confirmed
Question29		0.40	0.16	6.61	Confirmed
Question30		0.38	0.14	5.87	Confirmed
Question31		0.43	0.18	7.23	Confirmed
Question32		0.37	0.13	5.19	Confirmed
Question33		0.34	0.11	5.09	Confirmed
Question34		0.32	0.10	4.87	Confirmed
Question35		0.38	0.14	5.24	Confirmed
Question36		0.36	0.12	5.11	Confirmed

Question37	6	0.40	0.16	5.17	Confirmed
Question38		0.38	0.14	4.58	Confirmed
Question39		0.33	0.10	4.01	Confirmed
Question40		0.35	0.12	4.25	Confirmed
Question41		0.34	0.11	4.19	Confirmed
Question42		0.38	0.14	4.80	Confirmed
Question43		0.32	0.10	3.99	Confirmed
Question44		0.43	0.18	5.11	Confirmed

According to Table (5), of the nine indices mentioned for goodness of fit test, one was inappropriate and eight indices confirmed fitness. Therefore, the model is appropriate in terms of fit indices.

Table 5: Results of goodness-of-fit test

Index	Criterion	Value	Result
$df \cdot x^2$	Less than 3	2.86	Confirmed
[1]RMSEA	0.08 Less than	0.054	Confirmed
[2]GFI	0.90 More than	0.93	Confirmed
[3]AGFI	0.90 More than	0.95	Confirmed
[4]NFI	0.90 More than	0.92	Confirmed
[5]NNFI	0.90 More than	0.90	Confirmed
[6]CFI	0.90 More than	0.91	Confirmed
[7]IFI	0.90 More than	0.87	Confirmed
[8]RFI	0.90 More than	0.93	Disapproval
PNFI[9]	0.90 More than	0.92	Confirmed

[1] . Root mean square Error of Approximation
[2] . Goodness of Fit Index
[3] . Adjusted Goodness of Fit Index
[4] . Normed Fit Index
[5] . Non-Normed Fit Index
[6] . Comparative Fit Index
[7] . Incremental Fit Index
[8] . Relative Fit Index
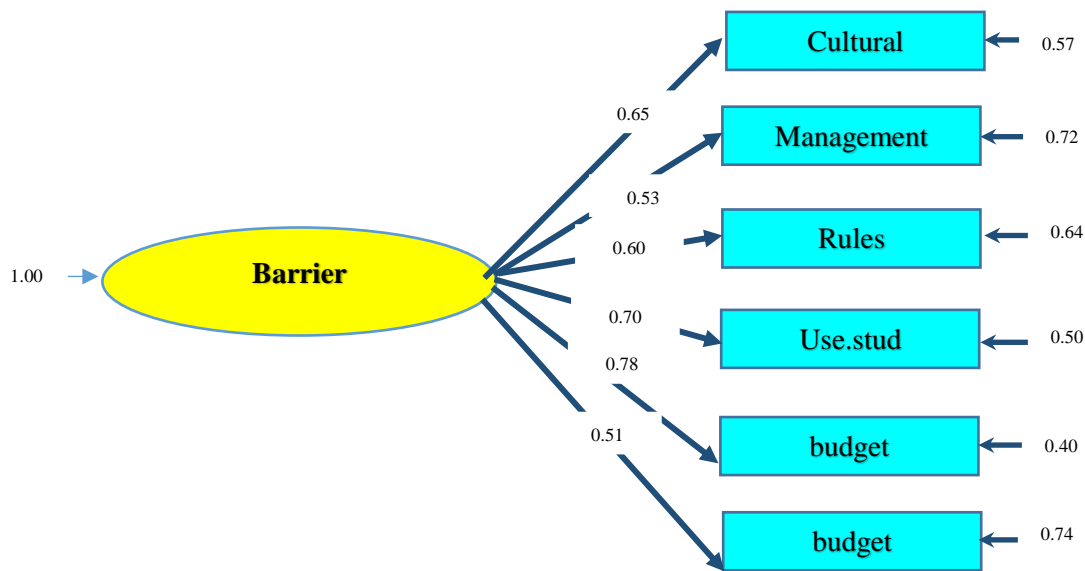[9] . Parsimony Normed Fit Index

Figure 1. Some Barriers to Research and Technology (Total) in the field of Sports Sciences in Standard mode

Discussion

Success in research and production of science and technology can be achieved if there is a proper focus on research and technology in targeted large-scale planning for sport in Iran. Understanding and identifying the barriers to research and technology in sports sciences can help solve problems in this area and provide the basis for applying research findings. Therefore, this study was developed to design a model of barriers to research and technology in the field of sports sciences in Iran. Factor analysis results showed that 44 items were reduced to six factors and those factors were extracted. The following factors are identified as barriers to research and technology in the field of sports sciences: research facilities, commercialization of research results, research culture, research rules and regulations, policy making in research system, and status of the researchers. The factor loadings results of the questions indicate that the factor loadings of all questions were acceptable. Overall, the predictive power of this model based on the sum of percentages of cumulative variance was 65.966%. Also based on standardized factor loadings results the factor of research culture was equal to 0.65, policy making in research system: 0.53, research rules and regulations: 0.60, commercialization of research results: 0.70, research facilities: 0.78, and status of the researchers: 0.51.

The results are somewhat in line with findings of Gharakhanlou and Agha Alinejad (2000) that identified five categories including individual-social, professional-specialized, organizational-administrative, facilities-equipment and financial-economic factors as major barriers to sport science research [19]. Karimian et al (2010) also explained strategic, educational, political, financial, facilities, professional, personal scientific, social cultural, organizational management as barriers to research and science production in medical sciences

114

universities which are in line with the results of this research [20]. Also the results are in line with Wendyg Black (2010) which considers social and cultural barriers, lack of economic and financial opportunities and executives' obstacles as the most important obstacles to research development in educational institutions. According to the results, the first factor in research and technology barriers in the field of sports sciences in Iran is the factor of research facilities and equipment that explains 23.704% of the total variance [13]. Safdari et al (2012) indicated that financial barriers are one of the barriers in the process of research activities [21]. In addition, Wendyg Black (2010) believes that lack of economic and financial resources is the most important obstacle for the development of research-based studies in educational institutions [13]. Etkinson (2004) identified factors such as lack of funding and inadequate environmental facilities as obstacles to research [15]. So that the research of Sumathipala et al (2004) and Majumder (2004), pointed out to the lack of research equipment and facilities, low budget dedicated to equipping and enriching libraries, lack of up-to-date information and the lack of research materials and facilities [22,23]. It can be concluded that the higher the budget for research and facilities in the country, the greater the participation in research and technology and the development of scientific papers. Many research and technology projects require financial investment and support. In developing countries, due to the lack of attention by institutions and industries to research, this part is usually dependent on the state budget. Due to the current conditions of the country and in order to develop the research and technology system, it is essential that other departments and organizations also step in to provide financial support and facilities. Overall, it the barriers could be resolved by setting up an appropriate scientific and research model, appropriate structure, reducing gaps between universities and executive bodies, and allocating the necessary funding to research.

The results showed that commercialization of research results was identified as the second barrier to research and technology in the field of sports sciences which explains 11.379% of total variance. Lack of proper management structure in the country's research system, lack of long-term research strategies for the country in the field of sports sciences, lack of unclear position of nongovernmental research and policies of dealing them, lack of evaluation indices, evaluation and monitoring of research activities in the field of sports sciences, lack of proper scientific and research situation in the country in the field of sports sciences were identified as barriers items to implementation of research results. Research and technology is one of the indicators of development in advanced societies and considering managers' reliance on research findings, the ease of project implementation and applying the results in planning and policy making, plays a more effective role in the process of applying research results.

According to the results, the third barrier to research and technology in the field of sports sciences in Iran is the factor of research culture in the society, which explained 10.016% of the total variance.

The following items were identified as barriers to research culture: failure to promote teamwork culture in the field of sports sciences in the country, weak investment in knowledge production, lack of paying attention to research in sports sciences, lack of national pride in production and innovation based on research and scientific and technical gap between Iran and the world and the question 11.

Moradi et al (2013) identified and prioritized the barriers to research; and indicated that the factor of culture had the most impact on the research [12]. Vanderlinde et al (2014) pointed to cultural issues and its necessity in the development of information technology [24]. Mirzaei et al (2015) barriers in their research on the barriers to the use of information technology in physical education at schools identified cultural barriers as the most important barriers [10]. Promoting research culture could be considered as a key tool in promoting research status in sports sciences. Despite the large number of graduates and growth of postgraduate courses in sports sciences, the culture and status of research has not yet developed well. According to the results, the fourth barriers to research and technology in the field of sports sciences in Iran is the factor of research rules and regulations that explained 8.168% of the total variance. Weak access to information and scientific information resources by researchers in

the field of sports sciences, weak motivation to undertake research projects in Sports sciences, lack of job security about the present and future of life for sports researchers, lack of appropriate situation and culture of scientific collaboration in Iran and abroad, and question 19 were identified as items of barriers to research culture. Hejazi et al. (2007) in their research on 'research barriers from the viewpoints of the faculty members of North Khorasan University of Medical Sciences' indicated that research rules and regulations were the most important research barriers that are in line with the results of this research [25]. Alamdari and Afshoun (2003) also cited administrative barriers to conducting research as the second barrier to conduct research [26]. Mirzaei et al (2016) in their research mentioned research rules and regulations in the research system as one of the barriers to the success of applied research activities at the university [10]. Haynes & Haines (1998) also believe ineffectual rules and regulation hinder successful research [27]. Solomon's (2004) studies indicated that there are several barriers to do research, one of which is the rapid change of management and the rules, all of which are in line with the results of this study [28]. According to the results, the fifth barriers to research and technology in the field of sports sciences in Iran is the factor of policy making in research system that explained 7. 69% of the total variance. The items identified as barriers to research policy making and management are as follow: Lack of pivotal solution for brain drain and return of internationally renowned Iranian scientists, researchers and scholars in sports sciences research are not known by people, complexity of standard research rules in the country, administrative bureaucracy to spend approved fund of research projects in the field of sports sciences, existence of various rules on one subject, instability, and the permanent change of research laws without the opinion of expert researchers, incompatibility of employment bylaws to employ researchers, lack of clearity of ownership and patent rules and regulations in the field of sports sciences, lack of legal requirements to apply research results in the country, inadequate share of the country's research budget compared to other countries and lack of the necessary materials, tools, equipment and information resources in the field of sports sciences. Mirzaei et al (2016) cited policy making and management in research system as one of the barriers to the success of applied research activities in universities [10]. Majidpour and Namdarian (2015) mentioned incompatibility of policies with existing challenges and lack of networking among policymakers as barriers to science and technology policies [11]. Nowadays, development of research and technology in sport requires planning, management and policy making in different areas of research [29]. Barriers to research and technology in the field of sports sciences in Iran can only be achieved through proper planning and provision of management indicators and resources in accordance with appropriate policy making and could have a significant impact on the development and success of this area of sport in the country; therefore, comprehensive, strategic, and systematic system is needed for research and technology activities of the country. Ultimately, according to the results, the sixth barriers to research and technology in the field of sports sciences in Iran is the factor of status of the researchers that explained 5.007% of the total variance. Lack of proper budget allocation for research and development of the country in the field of sports sciences, lack of private sector investment in science and research, inaccurate spending of the country's research budget and its poor distribution, managers' disregard and distrust to research findings in the field of sports sciences, different viewpoints among researchers and administrative parts of the country in the area of sports sciences, lack of requirements and assurances for applying research results in the country, and non-commitment to use the results of research in the field of sports sciences were identified as questions and items for these barriers. Sadeghi et al. (2016) also studied the barriers and challenges of research activities from the students' point of view and reported the highest rank for individual factors [5]. Elsen (2008) regards human barriers as one of the barriers to research. Numerous studies around the world have also studied the barriers to do research in academic settings [16]. Researchers and students as the country's future forces and researchers and as significant capacity to conduct research play an important role in the advancement of science and technology. The factors are including of managerial, cultural, supervisory, educational, and individual factors. The findings of the study show that the prosperity of those institutions can pose serious challenges to the vitality and dynamics of academic and research centers from within and be barrier to fulfill their mission in value creation and sustainable and balanced development of society. As a result, one of

the most important factors in scientific, research and technology development is the capacity and status of researchers, which could be improved by organizing and establishing a comprehensive system due to obtained indicators and items. Accordingly, research and development departments in physical education have considered human resource empowerment at different levels on their development plans utilizing human resource development approaches and learning processes and organizational growth.

Therefore, considering aforementioned issues, identifying ways to finance research and technology development, allocate a specific percentage of the Ministry of Sport and Youth funding to sport and youth departments with the aim of developing research and technology, organizing seminars and workshops, providing research and technology training, equipping science centers with software and hardware requirements for technology development and commercialization, developing laws, regulations, and implementing guidelines, creating and developing a culture of demand for research and development in the country are some effective suggestions to decline barriers to research and technology in sports sciences. Finally, by defining a macro strategy for the development of research and technology, it would be possible to support the research regulation as the main driving force for the development of research and technology in sports sciences in order to facilitate the process of research and technology development and to illustrate research projects with the least challenge and parallel work.

References

1. Katz, JS.,& Martin, BR. *What is research collaboration*?. Research policy, 1997; **26**(1):1-18.
2. Alizade, MH., Elahi, A. *Strategic Plan for Development of research in Physical Education and Sport Sciences* . Journal of research in sport sciences, 2010; **27**: 1-13. (Persian)
3. Rust, FC. *Requirements for a systems-based research and development management process in transport infrastructure engineering*. South African Journal of Industrial Engineering, 2015; **26**(1): 87-101.
4. Momeni, A ., Mohseni, A.,& Shabankareh, H. *Investigating the Impact of Financial Limits on Research and Development Costs on Banks and Manufacturing Companies Listed in Tehran Stock Exchange.* 1st International Conference on Accounting and Management in the Third Millennium, Rasht, Iran. Pioneers of Modern Research, 2015. (Persian)
5. Sadeghi, S. *Barriers and Challenges of Performing Research Activities from the Perspective of Students of Kermanshah University of Medical Sciences*. Educ Res Med Sci, 2016; **5**(1): 42-51. (Persian)
6. Son, S-h., Park, B., Oh, S-h., Yu, H. *Priority setting of future Technology area based on Korean Technology Foresight exercise*. Technology Management for the Global Future-PICMET, 2006; Conference: IEEE.
7. Taghavi, M., Pakzad, M., Mohaghegh, M. *Explanation of a model for prioritizing research and technology*. Methodology in Human Sciences, 2010; **16**(63): 135-58. (Persian)
8. Divsalar, M. *Identification of problems in practical physical education classes*. Research in Sport Management and Psychology, 2014. (Persian)
9. Talebpour, M., Javadipour, M. *Developing a strategic plan for sport sciences*. Research project, 2012, Sport Sciences Research Institute of Iran. (Persian)
10. Mirzaei, I., Mirzaei, M., Zare, A. *Investigating the barriers to implementation of information technology in Physical Education at schools (Deprived areas)*. Applied research in sports management, 4th year, 2015; **3**:123-133. (Persian)
11. Majidpour, M., Namdarian, L. *Identifying Barriers to Science and Technology Policy Implementation in Iran*. Innovation Management Journal, 4th year, 2015; **4**:31-60. (Persian)
12. Moradi, M., et al. *Identifying and prioritizing the barriers to research. Case study: Research institutes under the supervision of Ministry of Science*. Research and Technology of Iran, Journal of science and technology policy, 2013; **6**(1):55-70. (Persian)

13. Wendyg Black,W. *Levels of Reported Research Engagement* .2010.

 14. Mazurkiewicz, A., Poteralska, B. *Technology transfer barriers and challenges faced by R&D organisations*. Procedia engineering, 2017; **182**:457-65.

15. Etkinson, D. *Job Satisfaction*. Management, 2004; **11**(4):837-853.

16. Elsen, M. *Research and Action Research*. Peter lang press, 2008.

17. Bodsworth, H., Victoria, A. *Goodyear V A. Barriers and facilitators to using digital technologies in the Cooperative Learning model in physical education*. Physical Education and Sport Pedagogy, 2017; **22**(6):563-579.

18. Malone, J., Harper, LD., Jones, B., Chris Barnes, JP., Towlson, CH. *Perspectives of applied collaborative sport science research within professional team sports*. European Journal of Sport Science, 2019; **19**(2):147-155.

19. Gharakhanlou, R., Agha Alinejad, H. *Identifying Research Obstacles and Problems in Physical Education and Sport Sciences in Iran Universities*. Research project, Sport Sciences Research Center of Iran, 2000. (Persian)

20. Karimian, Z., Sabbaghian, Z., Saleh Seddighpour, B. *Investigating the Barriers and Challenges of Research and Production of Science in Medical Sciences Universities*. Iran Higher Education, 2011; **3**(4):35-63. (Persian)

21. Safdari, R., Ghazi Saeedi, M., Ehtesham, H., Roubayati, M., Ziaei, N. *Barriers to research in Medical Research from the Viewpoints of the Faculty Members of Birjand University of Medical Sciences in 2007*. Journal of Rafsanjan University of Medical Sciences, 2016; **6**(15): 515-526. (Persian)

22. Sumathipala, A., Siribaddana, S., Patel, V. *Under-representation of developing countries in the research literature: ethical issues arising from a survey of five leading medical journals*. BMC Medical Ethics, 2004; **5**(1):5.

23. Majumder, M. *Issues and priorities of medical education research in Asia*. Annals-academy of medicine Singapore, 2004; **33**(2):257-63.

24. Vanderlinde, R. *Institutionalized ICT use in primary education: a multilevel analysis*.computers & education, 2014; 72:1-10.

25. Hejazi, A., Khankalabi, M., Ataei, M. *Investigating Research Obstacles from the Viewpoints of Faculty Members of North Khorasan University of Medical Sciences in 2007*. Journal of North Khorasan University of Medical Sciences, 2007; **1**(1): 41-46. (Persian)

26. Alamdari, A., Afshoun, E. *Barriers to conduct research activities from the viewpoint of faculty members of universities of Yasouj*. Journal of Armaghan Danesh, 2003; 8: 27-34. (Persian)

27. Haynes, B.,& Haines, A. *Barriers and Bridge to Evidence Based Clinical Practice*. British Medical Journal, 1998; 317:273-76.

28. Solomon, SS., Tom, SC., Pichert, J., Wasserman, AC. *Impact of medical student research in the development of physician-scientists*. Investig Med, 2003; **51**(3): 149-56.

29. Nobakht, F., Ashrafi, N. *Analyzing of the Content of Published Articles on the field of Sports Technology and anticipating the future direction of the Journal of Advanced Sport Technology (JAST)*. Journal of Advanced Sport Technology, 2019; **3**(1): 37 -47. (Persian)

Corresponding Author: Hamid Ghasemi, Associate Professor of Payam -e- Noor University, IRAN.
Email: ghasemione@yahoo.com

شناسایی موانع پژوهش و فناوری در حوزه علوم ورزشی ایران

نازنین راسخ[1]، حمید قاسمی*[2]، حسین زارعیان[3]، فهیمه محمد حسن[4]

۱-۳. استادیار مدیریت ورزشی، پژوهشگاه تربیت بدنی و علوم ورزشی، ایران

۲. دانشیار مدیریت ورزشی، دانشگاه پیام نور، ایران

۴. دانشجوی دکتری، مدیریت استراتژیک در سازمان ها و رویدادهای ورزشی، دانشگاه آزاد اسلامی ، واحد علوم و تحقیقات ، تهران ، ایران

چکیده

پژوهش، تولید علم و فناوری از جمله عوامل بسیار مهم در کشورهای توسعه یافته می‌باشند. هدف اصلی دراین پژوهش این است که آیا مدل موانع پژوهش و فناوری در حوزه علوم ورزشی از برازش مطلوب برخوردار است. روش، توصیفی همبستگی بوده که به لحاظ هدف کاربردی، ماهیت اکتشافی و میدانی بود. جامعه آماری تمامی اعضای هیات علمی تربیت بدنی و علوم ورزشی دانشگاه های دولتی سال ۱۳۹۶ بودند($n=۱۱۰۰$)، درجدول مورگان ۳۲۰ نفر، با نمونه‌گیری تصادفی ساده بررسی شد. ابزار پرسشنامه محقق ساخته ۴۴ سوالی با طیف ۵ ارزشی لیکرتی بود. روایی محتوایی با روایی سنجی لاوشه ($CVR=۰/۸۵$) و پایایی با ضریب آلفای کرونباخ ($α =۰/۸۲$) محاسبه و از تحلیل عاملی اکتشافی و تاییدی و نرم افزارهای spss ۲۰ و lisrel ۸٫۵ استفاده گردید. هفت عامل، فرهنگ پژوهش و پژوهشگری در جامعه (۰/۶۵)، مدیریت و سیاستگذاری در نظام پژوهشی (۰/۵۳)، قوانین و مقررات پژوهشی (۰/۶۰)، فرآیند بکارگیری نتایج پژوهش (۰/۷۰)، بودجه و امکانات پژوهشی (۰/۷۸) و عامل وضعیت پژوهشگران(۰/۵۱) به‌عنوان موانع پژوهش و فناوری در تربیت بدنی و علوم ورزشی تبیین گردیدند که توان پیشگوئی این مدل براساس مجموع درصد واریانس تجمعی عامل‌ها برابر با ۶۵/۹۶۶ درصد بود. در نهایت می توان گفت با رفع موانع و با تدوین استراتژی‌های کلان در زمینه توسعه پژوهش و فنآوری شاید بتوان روند توسعه پژوهش و فناوری در حوزه علوم ورزشی را شکل داد.

واژه‌های کلیدی: پژوهشگر، سیاست گذاری پژوهشی، تجاری سازی، موانع.