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Elaboration of indices of the Third Generation of the universities of medical sciences: Status quo assessment of Iran University of Medical Sciences

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Abstract:

BACKGROUND: Universities are changing from government organizations into third generation. The aims of this study were to identify the dimensions and components of a third-generation university and assessment of the status quo of Iran University of Medical Sciences.

MATERIALS AND METHODS: This study was mixed method. In the qualitative phase, participants consisted of experts of academic management and scholars in third-generation universities. The dimensions and components of a third-generation university were identified by content analysis. A questionnaire was prepared according to dimensions and components with Cronbach's alpha of 0.86. In the quantitative phase, participants consisted of managers and experts of Iran University of Medical Sciences; they completed the questionnaire to assess the status quo of Iran University. Data analysis was performed by Colaizzi's and SPSS software.

RESULTS: Third generation of universities of medical sciences has 2 dimensions and 17 components. Software dimension consists of course content, attitude, vision and mission of the university, organizational culture, instructors, students, employees, academic management and leadership, international approach, and social accountability components. Hardware dimension consists of organizational structure, academic infrastructures, knowledge commercialization, and communication with the government, education system, university environment, and university independence components. Status in Iran University of Medical Sciences in hardware dimension was 2.53, and in software dimension, it was 2.96.

CONCLUSION: Universities are required to respond to the changes in community. Therefore, universities need to change their structures, goals, approaches, perspectives, and intra-organizational and extra-organizational communications to be able to move toward a university which is entrepreneur, skill teaching, wealth generating.

Keywords:

Iran University of Medical Sciences, organizational structure, third- Generation University

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Introduction

The advancement of science and technology has led to great changes in all societies. Social organizations, and among them, the universities, have always been exposed to these changes.

Throughout history, universities have always expressed their readiness for revision for better response to the needs of society. Therefore, they have changed from traditional universities to virtual universities in various ways. For example, globalization, freedom, and privatization

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in the education sector have changed the sanctity and credit of traditional universities.^[1] Hansen Ginkel believes the future universities to be the organizations for the development of creativity and innovation. He states that in 2050, the structures and frameworks of universities would be in a manner that maximizes creativity and innovation and could be very different from the universities we know today. The creativity and innovation that Ginkel considers as features of future universities are currently being implemented as training entrepreneur students and entrepreneurial universities.^[2] Entrepreneurship is a dynamic process of insight, change, and creation and requires tremendous energy and interest in creating and implementing ideas and new solutions.^[3] The entrepreneurship-based university aims to commercialize the results of applied research and transform it into products and value added (such as patents and new companies for students and faculty members). The concept of entrepreneurship in the university covers various methods through which the university could proceed to commercialize the generated knowledge.^[4] Reformation in the education system of medical sciences of the country, with an emphasis on the priorities of the country, is proposed as the fourth step in the health reform plan, and the Ministry of Health and Medical Education obliges itself to its effective realization. Therefore, focusing on the significant needs of the country in the field of health, and according to the 1st, 4th, and 12th policies of the 12 policies of education compiled by the Ministry of Health, the emphasis on elevating the position of universities of medical sciences and entering the third-millennium universities is essential and one of the priorities of the health system (1st policy: the institutionalization of the accountability in health system education; 4th policy: participation in the international and regional education fields; and 12th policy: development and localization of valid scientific evidence for the improvement of higher education in the field of health [education and training studies]). The universities have been changing fundamentally and are currently in the transition phase.^[5] First-generation universities (middle ages) were focused on education, and their role was to support reality. They operated scholastically, and their task was to train professionals in general fields. These universities were powerful organizations for protecting the status of government and church and supporting their rights. The main task of Medieval universities was providing education related to defending the truth, finding the truth, and submitting to the teachings of the church.^[6] The key features of the Etzkowitz model for the third-generation universities consist of group research organization, creation of a research base with commercial potential, development of an organizational mechanism for university spin-off through protected intellectual property, capacity building for organizing companies in the universities,

and merging university and commercial elements with new formats, such as university-industry research centers.^[7] Based on the study conducted by Ejubovic *et al.* in Turkey, the activities necessary for the cooperation of university and industry are categorized into four spectrums and backgrounds, consisting of education, research, valuation, and identification and categorization management.^[8] Bagheri *et al.* (2017) identified that structural dimensions of entrepreneurial university were independence, merging, professionalism, complexity, centralization, and formality, respectively. To have an entrepreneurial university, extensive structural changes in the higher education system and especially in independence, merging, and professionalism are necessary because the structural environment of an entrepreneurial university should encourage a creative and synergetic environment.^[9]

Aranha and Garcia, through research and analysis of four theories of university structure and the study of international literature, showed that the dimensions of the meta-model for Brazilian universities are: entrepreneurial vision, committed strategic leadership, generation of innovative knowledge, capitalism of innovative knowledge, cultural, social, and regional-economic development, and entrepreneurial culture.^[10] In a study called "Macro-Analysis of the Entrepreneurial University in the Three-Dimensional Framework and a Survey of This University's Success Factors," Mansourian and Fateh Rad (2013) presented a three-dimensional conceptual model of the content or behavioral, structural, and contextual factors. The structural factors include the informal and decentralized structure, knowledge-based employees, teamwork, and motivation system. The content factors are management and knowledge sharing, execution of entrepreneurial plans, and supporting the entrepreneurial research and plans. Finally, the contextual factors consist of knowledge-based and value-based context and protective laws. The research conducted by Taghipour and Hasanmoradi demonstrated that the components of an entrepreneurial university include the infrastructure, theoretical foundations, goals, background, input, process, output, assessment, development, and outcome.^[11-13] Considering that in today's world, the economic, cultural, social, and political circumstances have undergone changes, a system that teaches promotes creativity and entrepreneurial spirit and innovation to the talented students and faculty is required in the universities.^[14] The universities of medical sciences in the country also have a mission to pursue four important goals of review and revision of the mission, goals, and functions of the universities of medical sciences based on the entrepreneurial university model, engineering the processes of universities of medical sciences based on the entrepreneurial university model, and finally, development of the infrastructures

and resources of universities of medical sciences based on the entrepreneurial university model. Furthermore, the main axis of this issue is the review and revision of the structure, function, infrastructure, and processes of the universities of medical sciences in the transition to the third-generation universities.^[15] To achieve comprehensive development with a high capability for social accountability, the universities of medical sciences should not only play an educational research and health-care role but also participate in idea generation and entrepreneurship. To this end, they need to change their policies and strategies, and more importantly, to identify the dimensions and components that can be changed in their universities. After identifying the dimensions and determining the key components of a third-generation university, we moved on to the investigation and analysis of the progress and transition toward an entrepreneurial and third-generation university in the Iran Universities of Medical Sciences. Thus, the aims of this study were to identify the dimensions and components of a third-generation university and assessment of the status quo of Iran University of Medical Sciences.

Materials and Methods

Research methods and tools

Considering the research goal, this study was applied. The data were collected through mixed methods and in the domain of exploratory studies. To begin the study, permission was taken from the University Ethics Committee. The participants of the qualitative phase were the experts in the field of management and the key scholars in the field of third-generation universities, which were selected through purposive sampling. All the participants in the interview filled out an informed consent form and were allowed to leave the study at any time. The place and time of interviews were picked by the participants. The sampling was continued until no new data were found in the interviews, i.e., the data collection was done to the point of theoretical saturation. Ultimately, the number of participants was 12 persons. The views of the participants on the subject of identification of dimensions and components of third-generation universities were obtained through semi-structured interviews and qualitative content analysis. The interview began by asking the question "In your opinion, what are the key dimensions and components of the third-generation universities?" and in the process explanatory questions, such as "Can you explain more?" were asked. The data were collected, recorded, coded, and categorized into general concepts during a 3-month intensive course.

Next, a questionnaire was developed based on the extracted components and dimensions. The statistical population in the quantitative phase consisted of

the managers and experts (staff and line) of the Iran University of Medical Sciences, which were introduced to the study through census and completed the questionnaire developed by the researcher. The aim of this questionnaire was to assess the status quo of the Iran University of Medical Science according to the dimensions and components of a third-generation university. First, the goal and the statement of the problem were determined. The questions were composed according to the dimensions and components of the third-generation university. Experts in the field of questionnaire development and psychometrics were consulted for the writing, arrangement, sequence, and wording of the questions. Finally, for the face and content validity, the experts in the field of health education and management were consulted. This questionnaire consists of 48 questions on the five-point Likert scale. The reliability of this tool was determined by the Cronbach's alpha 0.86, and the face and content validity were confirmed by the experts. Colaizzi's method of data analysis, descriptive and inferential statistics, and one sample *t*-test using the SPSS software version 16.0 (IBM Corp, Newyork, USA) and $P < 0.05$ was considered as statistically significant, were used for data analysis [Figure 1].

Results

Colaizzi's (1987) method of data analysis was used for qualitative data analysis. After conducting the interviews and transcription of the recorded information on paper, all the information was carefully reviewed for a better and deeper understanding of the participants' experience and the key phrases (containing the rich concepts of the phenomenon) were extracted. Next, the meaning of each phrase was determined (the meanings were coded). The codes were categorized, and the groups were used as a reference for accreditation of primary protocols. Afterward, the results were merged into a complete description of the phenomenon under investigation and reviewed to obtain clear and nonambiguous concepts. Finally, the findings were presented to the participants

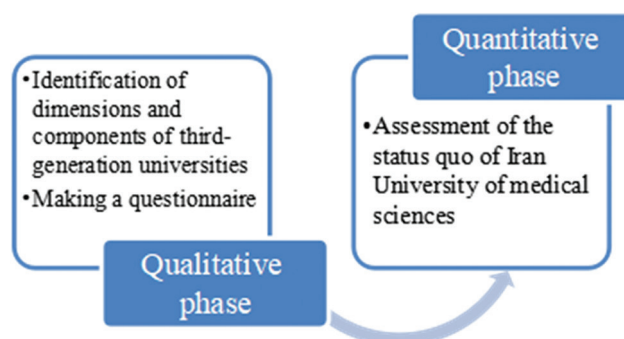


Figure 1: Study process diagram

for validation, and the authenticity of the results was confirmed (Burn and Grove, 2001, Quoted from Mousavi and Abedi 2016–2017:29). The transcribed interviews were returned to the interviewees for a review to examine the credibility of the findings and realize whether the interviewees had a correct understanding of the interview or not. The results proved the acceptability of the data. The opinion of the experts in qualitative research was also incorporated in data analysis. In the end, the analysis of interview contents and the findings were presented to three qualitative research experts for a review of the analysis process and confirmation of the validity of findings. The results proved the credibility of the data analysis.

The data obtained from the analysis of the interview texts led to identification of 381 initial codes, 32 categories or subthemes, and 2 main themes or dimensions [Table 1]. Figure 2 shows a sample of extraction process of subthemes and main themes of a third generation university.

In the second phase, we developed a 48-item questionnaire on a five-point Likert scale according to the identified dimensions and components. The experts in the field determined that the tool has both face and content

validity. The Cronbach’s alpha was determined through a pretest in a 20-individual sample to be 0.86. This questionnaire was sent to 140 staff and line managers and experts of the University of Medical Sciences, and 129 individuals completed it [Table 2].

The data in Table 3 show that among the 10 studied variables, the variable of attitude change, vision, and mission with the average and standard deviation of 3.64 ± 0.046 , 3.20 ± 0.81 are, respectively, in the first and second places. The status in both dimensions is under the average ($M = 3$). In the hardware dimension, the average is 2.53, and in the software dimension, it is 2.96.

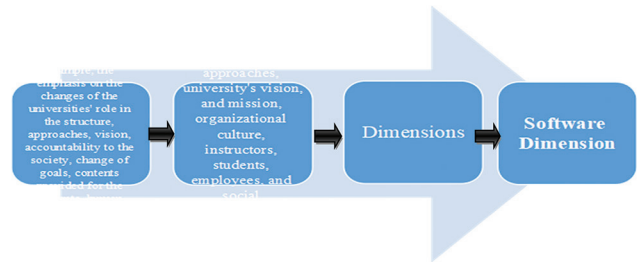


Figure 2: A sample of the extraction process of subthemes (components) and main themes (dimensions) of a third-generation university

Table 1: Subcomponents, subthemes, and dimensions

Main categories (dimensions)	Categories	Number of initial codes	Subcomponents
Software	Course contents	18	Competency based
			Skill learning
			Product based
	Attitude change	11	Belief-based
			Description and determination of future
	Vision and mission	20	Empowerment
			Initial selection
	Instructors	24	Involving faculty members
			Cultural change
	Organizational culture	29	Student centered
			Control of input systems
	Students	24	Improving the employees
			Involving employees
Employees	16	Change leadership	
		Change management	
Academic management and leadership	22	Accountability	
		International interactions	
Social accountability	28	Content internationalization	
		Change in the plans	
International approach	26	Formality-complexity-centralization and decentralization	
		System dynamicity	
Hardware	Organizational structure	29	Education environment enrichment
			Privatization
	Education system	25	Wealth generation
			Industry and university
	University environment	23	University spin-off
			Technology and science parks
	University independence	23	Technology/infrastructure development
Commercialization of knowledge	19		
Communication with government	18		
University infrastructures	26		

Table 2: t-test for hardware components

Status quo	Statistics	Average	Minimum–maximum	SD	SE	t	P
Components	Organizational structure	2.91	1-5	0.53	0.09	-4.12	0.001
	Education system	2.88	1-5	0.97	0.09	-1.08	0.000
	University environment	2.94	1-5	0.68	0.1	-3.87	0.000
	University independence	2.16	1-5	0.8	0.07	-4.11	0.001
	Commercialization of knowledge	2.04	1-5	0.69	0.11	-6.09	0.001
	Communication with government	2.6	1-5	0.54	0.9	-5.74	0.001
	University infrastructure	2.21	1-5	0.73	0.14	-2.52	0.000

SD=Standard deviation, SE=Standard error

Table 3: Investigation of the status of variables being studied (software)

Components	Average	Minimum–maximum	SD
Course contents	2.88	1-5	±0.053
Change of vision	3.64	1-5	±0.46
Vision and mission	3.2	1-5	±0.81
Instructors	3.08	1-5	±0.74
Organizational culture	3	1-5	±0.44
Students	2.38	1-5	±0.59
Employees	2.51	1-5	±0.93
Academic management and leadership	2.86	1-5	±0.38
Social accountability	2.96	1-5	±0.49
International approach	3.17	1-5	±0.63

SD=Standard deviation

Discussion

Working toward the third-generation university can prevent loss of capital and resources, help wealth generation, increase the financial resources and revenues of the university, guide the students and faculty members toward entrepreneurship and creating employment opportunities, developing new ideas and inventions, etc. This ultimately results in the improvement and excellence of society.^[16]

To facilitate the transition to a third-generation university, the necessary measures in both the

In a study, Zamanian *et al.* showed that the structure of services has the most, and the structure of government has the least impact on the third-generation university. According to the results of a study of the entrepreneurship level of universities, dimensions of structure of services, organizational infrastructure, structure of output management, and structure of government were the priority, respectively.^[17,18] In a study, Mahdi concluded that for the formation of a third-generation university and benefiting from its advantages and privileges, the education and skill training of the students, faculty members, managers, and employees of the academic system must be the focus of strategies and policies of the universities and higher education organizations.

In other words, the formation and effectiveness of an entrepreneurial university would not be possible without

the systematic development of entrepreneurship education and effective education and skill training of the students, instructors, managers, and employees of the academic system and improving the entrepreneurial traits of human resources. Therefore, one of the key aspects and features of a third-generation (entrepreneurial) university is the development of vocational, professional skills and competencies, empowerment of the students and instructors in line with the process of national development, and solving the issues of society through scientific methods.^[19] Nowruzzi Kbkma *et al.* showed that to achieve an entrepreneurial university, there should be extensive structural changes in the higher education system, especially in dimensions of independence, merging, and professionalism, since the structural environment of an entrepreneurial university must encourage a creative and synergic environment.^[20] Furthermore, Behzadi *et al.* demonstrated that the model for an entrepreneurial university in terms of organizational entrepreneurship includes components such as the quality of alumni, publication of scientific findings, the attraction of financial resources, research contracts, patent registration, creating university spin-off businesses, establishing technology and science parks, the organizational culture of entrepreneurship, flexible organizational structure, entrepreneurial approach of the instructors, macromanagement, course contents, and students' characteristics.^[21]

Bagheri *et al.* showed in a study that the structural components of a third-generation university consist of merging, independence, professionalism, complexity, centralization, and formality. The results of this

study indicate that to accomplish an entrepreneurial university, extensive structural changes should take place in the higher education system and especially in the dimensions of independence, merging, and professionalism because the structural environment of an entrepreneurial university should encourage the environment of creativity and synergy. Furthermore, the merging role of the leader is one of the components of independence and merging, and one of the most effective components in the aforementioned structures.^[9]

Innovation and limitation

The innovation of the present study is due to the type of mixed research that provided rich and first-class information, as well as the University of Iran as one of the prestigious universities with international students, and steps have been taken to move toward the third generation of universities in its programs and goals, which requires an initial assessment and review. The limitation of this study was that only one university was evaluated as a sample. It is recommended that all universities of the Ministry of Health and Medical Education be evaluated. Furthermore, according to the cultural context and economic conditions of the country for the transition of universities to the third and fourth generation, an internal standard framework should be designed. Furthermore, the indicators of change leadership and how to change in all dimensions should be studied.

Conclusion

The results of the first phase focused on the identification of dimensions and components of a third-generation university and were classified into two categories: hardware and software. Each dimension had several subcomponents; for example, the components in the software dimension were the instructors, students, course contents, taking an international approach, vision, mission, social accountability, etc., In the second phase, we analyzed the status quo of the university and found out that in terms of transition to a third-generation university, like other universities in the country, Iran University of Medical Sciences is in the initial stages. To facilitate the transition to the third generation university, the empowerment of instructors should be considered and the curricula of university departments should move towards outcome-based. Other factors such as the interaction of students and educators with world-renowned universities in order to benefit from their experiences in the field of entrepreneurship and wealth creation, creating the necessary infrastructure in universities, changing the attitudes of students, educators and employees, accepting entrepreneurial organizational culture, striving for social accountability, revising the goals, mission and vision of the university,

increasing the connections between the university and industry, recognizing the independence of the university, managing and leading the process of change and improving the education system and environment will be helpful in moving towards the third generation university.

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Ethical statement

The code of ethics was obtained from the Ethics Committee Vice Chancellor for Research & Technology at Iran University of Medical Sciences (IR.IUMS.FMD.REC.1399.388).

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Conflicts of interest

There are no conflicts of interest.

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