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Designing the Model of Influential Factors to Modify Mashhad University of Medical Sciences into a Third Generation University Using a Qualitative Approach

Background: Experts and scholars of higher education believe that entrepreneurship is a condition for survival and development of universities. Therefore, the purpose of the present study was to recognize the influential factors and design a model in order to modify Mashhad University of Medical Sciences into a third generation university.

Methods: This is an applied developmental research, conducted by Delphi method in the second semester of 2018-2019. Thirty scholars were selected via purpose-based sampling including faculty members, managers and experts of Mashhad University of Medical Sciences. First, the factors and components related to the third generation university were extracted via the review of databases and research background. Henceforth, several sessions were held in three phases and the factors and components were developed based on consensus.

Results: Finally, the appropriate model for the modification of Mashhad Medical University to a third generation university was finalized and 7 factors and 25 components were recognized. The factors included: the development of appropriate organizational strategies and guidelines, creation of contexts and structural conditions in the organization, the focus and attention of management and human resources to entrepreneurship, reformation of the education and research system with the emphasis on entrepreneurship, more interaction with the external environment and internationalization, enhancement of infrastructures, equipment, and financial resources, application of cultural and ideological values on the path of change. In accordance with the statistics based on Kendall's coefficient, for the recognized factors to modify Mashhad University of Medical Sciences to a Third Generation University, the result was equal to 0.79 in the second phase of Delphi technique, and was 0.86 in the third phase. The findings represent strong unanimity of panel members about the factors of the conceptual model of the research.

Conclusion: According to the results of three phases of Delphi technique, the seven influential factors were recognized to have impact on the modification of Mashhad University of Medical Sciences to a Third Generation University. Via the explanation and identification of the present status, effective steps can be conducted for the modification of this important university to a Third Generation University and the results can be used in other medical universities of the country.

Keywords: Entrepreneurship, Delphi technique, Qualitative research, Third Generation University

طراحی مدل عوامل مؤثر تبدیل دانشگاه علوم پزشکی مشهد به دانشگاه نسل سوم با استفاده از رویکرد کیفی

زمینه و هدف: صاحب نظران و اندیشمندان حوزه آموزش عالی، کارآفرینی را شرط بقا و توسعه دانشگاهها به شمار می‌آورند. لذا هدف این تحقیق شناسایی عوامل مؤثر و طراحی مدل جهت تبدیل دانشگاه علوم پزشکی مشهد به دانشگاه نسل سوم می‌باشد.

روش: مطالعه حاضر از بعد هدف در دسته تحقیقات توسعه‌ای-کاربردی قرار دارد و به روش دلفی در نیمسال دوم تحصیلی ۹۸-۹۷ انجام گرفت. تعداد ۳۰ نفر صاحب نظر شامل اعضای هیأت علمی و مدیران و متخصصان از دانشگاه علوم پزشکی مشهد با روش نمونه-گیری مبتنی بر هدف انتخاب شدند. در ابتدا عوامل و مؤلفه‌های مرتبط با دانشگاه نسل سوم از طریق مرور گسترده پایگاه‌های اطلاعاتی و پیشینه تحقیق استخراج گردید. سپس با تشکیل چند جلسه در سه دوره، عوامل، مؤلفه‌ها بر اساس اتفاق نظر تدوین شد.

یافته‌ها: در نهایت مدل مناسب تبدیل دانشگاه علوم پزشکی مشهد به دانشگاه نسل سوم با تعداد ۷ عامل و ۲۵ مؤلفه نهایی شد. این عوامل شامل تدوین استراتژی و راهبردهای مناسب سازمانی، ایجاد بسترها و شرایط ساختاری و زمینه‌ای سازمان، تمرکز و توجه مدیریت و منابع انسانی سازمان به کارآفرینی، اصلاح نظام آموزشی و پژوهشی با تاکید بر کارآفرینی، تعامل بیشتر با محیط بیرونی و بین المللی سازی، بهبود زیر ساختها و تجهیزات و منابع مالی، دکارگیری ارزشهای فرهنگی و عقیدتی در مسیر تغییر می‌باشد. آمار حاصل از ضریب توافق با هماهنگی کندال برای عوامل شناسایی شده تبدیل دانشگاه علوم پزشکی مشهد به دانشگاه نسل سوم برای مرحله دوم تکنیک دلفی برابر ۰/۷۹ و برای مرحله سوم دلفی برابر ۰/۸۶ به دست آمد که حاکی از اتفاق نظر قوی و قابل قبول اعضای پانل در رابطه با عوامل مدل مفهومی تحقیق می‌باشد.

نتیجه گیری: با توجه به یافته‌های حاصل از اجرای سه مرحله تکنیک دلفی، عوامل مؤثر شناسایی شده برای تبدیل دانشگاه علوم پزشکی مشهد به دانشگاه نسل سوم، عوامل هفت‌گانه مذکور می‌باشد که با تبیین و شناخت وضعیت موجود آنها می‌توان گام مؤثری در جهت تبدیل این دانشگاه عظیم کشور به دانشگاه نسل سوم برداشت و از نتایج آن برای سایر دانشگاه‌های علوم پزشکی کشور نیز بهره‌مند شد.

واژه‌های کلیدی: کارآفرینی، تکنیک دلفی، دانشگاه، تحقیقات کیفی، نسل سوم

تصمیم نمودن عواملی که بر تحولی دانشگاه مشهد علوم پزشکی به دانشگاه نسل سوم با استفاده از رویکرد کیفی

الخلفية والهدف: يعتبر الباحثون والعلماء في مجال التعليم العالي روح المبادرة كشرط لبقاء الجامعات وتطويرها. كان الغرض من هذه الدراسة هو تحديد العوامل الفعالة وتصميم نموذج لتحويل جامعة مشهد للعلوم الطبية إلى جامعة من الجيل الثالث (الراقيه).

الطريقة: هذه الدراسة هو في فئة البحوث التطبيقية التنموية غرضاً، وقد تم ذلك باستخدام طريقة دلفي في عام ۹۸-۱۳۹۷ هـ. ش. تم اختيار ثلاثين خبيراً من أعضاء هيئة التدريس والمدبرين والمتخصصين في جامعة مشهد للعلوم الطبية من خلال طريقة أخذ العينات الهادفة. استخرجنا العوامل من مكونات الجيل الثالث المتعلقة بالجامعة من خلال التجول الواسع في قواعد بيانات وخلفيات الدراسة ثم تمت صياغة المكونات براء متفقه خلال عدده جلسات في ثلاث جولات.

النتائج: بالنهاية؛ تم النموذج المناسب لتحويل جامعة مشهد للعلوم الطبية إلى جامعة من الجيل الثالث مشتملاً على سبعة عوامل و ۲۵ عنصراً؛ صياغة الاستراتيجيات التنظيمية المناسبة، وضع السياقات التنظيمية والشروط، تركيز الإدارة والموارد الانسانية على زيادة الأعمال، اصلاح النظم التعليمية والبحثية مع التركيز على زيادة الأعمال، التدويل خلال اكثرتفاعل مع البيئة الخارجية. تحسين البنية التحتية والمعدات والموارد المالية و اخيرا استخدام القيم الثقافية والأيدولوجية في طريق التغيير. كان معامل كيندال لاتفاق أو معاملات العوامل المحددة لتحويل جامعة مشهد للعلوم الطبية إلى الجيل الثالث من تقنية دلفي ۰,۷۹ للمرحلة الثانية و ۰,۸۶ للمرحلة الثالثة لدلفي، مما يشير إلى إجماع قوي ومقبول بين أعضاء الفريق. يرتبط بعوامل النموذج المفاهيمي للبحث.

الخلاصة: وفقاً لنتائج المراحل الثلاثة لتقنية دلفي، يبدو ان العوامل الفعالة المحددة لتحويل جامعة مشهد للعلوم الطبية إلى الجيل الثالث هي العوامل السبعة المذكورة التي يمكن أن تكون خطوة فعالة نحو تحويل هذه الجامعة العظيمة الوطنية إلى جامعة راقية من الجيل الثالث و تستفيد الجامعات الطبية الأخرى في جميع أنحاء البلاد من هذه النتائج.

الكلمات المفتاحية: زيادة الأعمال، تقنية دلفي، الجامعة، البحث النوعي، الجيل الثالث

اعلى معيار کو مد نظر رکھتے ہوئے مشهد یونیورسٹی آف میڈیکل سائنسز کو تیسری نسل کی یونیورسٹی میں تبدیل کرنے کے لئے مؤثر عوامل کا ماڈل تیار کرنا۔

بیگراؤنڈ: اعلیٰ تعلیمی اداروں کے ماہرین کا کہنا ہے کہ یونیورسٹیوں کی ترقی اور بقا، علم کو عملی صورت دینے میں ہے۔ اس تحقیق کا هدف مشهد یونیورسٹی آف میڈیکل سائنسز کو تیسری نسل کی یونیورسٹی میں تبدیل کرنے کے مؤثر عوامل کی شناخت اور اس کا ماڈل بنانا ہے۔

روش: یہ تحقیق ایک ترقیاتی اقدام ہے اور ڈلفی کی طرز پر رواں برس میں انجام دیا گیا ہے۔ اس تحقیق کے لئے مشهد یونیورسٹی آف میڈیکل سائنسز کی اکیڈمک کونسل اور طب کے مختلف شعبوں کے تیس ماہرین کو شامل کیا گیا۔ سب سے پہلے ویب سائٹوں سے تیسری نسل کے عوامل اور تشکیلی عناصر کو حاصل کیا گیا۔ ان کو تحقیق کی بنیاد قرار دیا گیا۔ اس کے بعد ماہرین نے تین جلسوں میں عوامل اور تشکیلی عناصر پر اتفاق کر کے ان کی تدوین کی۔

نتیجے: تحقیق کے نتیجے میں مشهد یونیورسٹی آف میڈیکل سائنسز کو تیسری نسل کی یونیورسٹی میں تبدیل کرنے کے سات عامل اور پچیس تشکیلی عناصر کی تشخیص دی گئی۔ مشهد یونیورسٹی آف میڈیکل سائنسز کو تیسری نسل کی یونیورسٹی بنانے کے لئے کینڈال کو ایشینٹ سے حاصل شدہ اعداد و شمار سے پتہ چلتا ہے کہ دوسرے راونڈ میں یہ ریشیو صفر اعشاریہ سات نو تھا اور تیسرے مرحلے میں ڈلفی کو ایشینٹ صفر اعشاریہ آٹھ چھے تھا یعنی ان اعداد و شمار سے ظاہر ہوتا ہے کہ اکیڈمک کونسل کے ممبران اور ماہرین نے مشهد یونیورسٹی کو تیسری نسل کی یونیورسٹی بنانے کے ماڈل کو بھرپور سندیت دی ہے۔

سفرارہ: تین مراحل ڈلفی تکنیک کے نتائج کے مطابق، مشهد یونیورسٹی آف میڈیکل سائنسز کو تیسری نسل میں تبدیل کرنے کے نشاندہی کردہ مؤثر عوامل مندرجہ بالا سات عوامل ہیں جو اس عظیم یونیورسٹی کو قومی یونیورسٹی میں تبدیل کرنے کی سمت مؤثر اقدام ہوسکتے ہیں۔ تیسری نسل کی یونیورسٹی کو ملک کے دیگر میڈیکل یونیورسٹیوں کے نتائج سے فائدہ اٹھایا گیا۔

کلیدی الفاظ: انٹریپرائیورسپ، ڈلفی تکنیک، یونیورسٹی، کوالٹیو ریسرچ تیسری نسل کی یونیورسٹی

INTRODUCTION

The duty of universities was education and research in the past. It has changed recently and a third duty has been undertaken by universities in accordance with the global developments and changes, as well as in relationship among three key operators of innovative national systems (industry, government, university). The third duty is entrepreneurship in the university and engagement in social and economic development of the community. (1) In our country, most of universities are involved in the first generation while a limited number are considered in the second generation, and the third generation of universities is not conducted at all. Consequently, many of graduates do not have sufficient skills of entrepreneurship and are not successful to find an occupation (2). Based on the traditional duty of the universities (first generation), there is great number of graduates in the job market; it is an essence to make fundamental modification in the education and research structure of important universities toward Third Generation University; that are duty-oriented and focus on research and technology. Forty-two percent of graduates are unemployed and 850,000 people are added to this percentage, annually. Fifteen to twenty thousands of Ph.D. graduates are unemployed and more than 7,500,000 people are added, annually. The graduates of universities who work in service jobs such as plagiarism of scientific documents or selling their documentation have increased unfortunately. There are several issues that the educational system dealing with in the country includes: writing dissertation for others, separate performance of higher education without attention to the quality and quantity of the needs of society and industry, incompatibility between employees and occupations, promotion of marketing in educational institutes, the increase of higher education centers (up to 2800 center), lack of development model and roadmap in higher education, brain drain that worth more than \$ 60 billion, and political approaches in educational centers. The mentioned issues result in billions of dollars damages which threaten the national interests in long terms.

Development in different arenas that happened in some countries in the last two decades has brought higher education to new enhancement including employment-based education, the growth of problem-based research, and higher education accountability to industry and society. Therefore, the higher education here means handling education and research duty along with the new duty that is active participation in technology development, as well as individual, organizational, and international business (4). It is expected that universities, relying on its core duty of education and research, create knowledge-based business in order to apply graduates' capabilities and realize continuous growth of university, industry, governance and other parts of the society in all arenas (5). A Third Generation University is innovative, risky and trains entrepreneurship behaviors (6). Kyrö explains the concepts of Third Generation University as follows: in the first step, the university performs as an entrepreneur organization, in the second step, university

members including faculty members, students and other staff have the characteristics of an entrepreneur and in the third step, the interactions between the university and the community is based on entrepreneurial attitude (7). Therefore, the Third Generation University is a place that new occupations are created. They support entrepreneurs including educational, financial and marketing supports. Consequently, the entrepreneurs have access to library, laboratories, growth centers, etc. In these universities, opportunities are provided for the investors in order to run new business centers (6). Beyond theoretical education, the career skills of the majors and also the management skills, and how to use opportunities and innovations are taught to the students. Furthermore, the realities and essences of the market are provided for the students and creative and new ideas are welcomed. This develops entrepreneurship among students. The graduates of the Third Generation Universities do not wait to look for a job after graduation, otherwise, they would be an entrepreneur (8).

Entrepreneurship does not have a long history in medical sciences. In our country, in accordance with the third economic, social, and cultural development program, the development of entrepreneurship have become a part of the medical university plans. Although education is not the only factor to develop entrepreneurship in medical sciences, it is highly important as a minor component of a development system (9).

Health Higher Education System in the Islamic Republic of Iran has established the health system modification plan in which great duties are mentioned for the Health Higher Education in order to realize the program. In order to upgrade the effectiveness of higher education in the realization of this program, a clear roadmap has been prepared in accordance with the strategic documents. Consequently, practical and feasible programs have been provided in a systematic structure. The following strategic documents have been considered:

- ✓ *Iran vision in 2025*
- ✓ *General policies of the health system communicated by the Supreme Leader*
- ✓ *Comprehensive scientific health map*
- ✓ *Documents of Cultural Revolution Council*

Based on the strategic documents, the duty of health higher education is described as follow: "providing and training human resources that are committed, professional and entrepreneur based on the local and national needs in the health system"; accordingly, there are guidelines and administrative instructions to realize macro policies including developmental and innovative plans in medical educations. One of these programs is the creating third generation universities (3). Medical Sciences Universities should work with industry; otherwise, they would result in recession. Although, to some extent, the interaction between industry and university is in good condition in clinical and therapeutic fields, special attention is required for the commercialization of the basic medical sciences (10). Accordingly, the medical universities of the country should identify their special characteristics, so that they can be less

dependent on the general budget. This is highly important so that the organization can program in order to make it accountable to the changing condition of the society. Therefore, it is necessary for the universities to write their duties, identify their strengths and weaknesses in order to obtain the influential factors in order to become a third generation university (3).

METHODS

This is an applied developmental research that was conducted in Mashhad University of Medical Sciences in the second semester of 2018-2019 and Delphi method was used. Delphi method is originally developed as a systematic, interactive, and forecasting method that relies on a panel of experts. Sampling method was based on the purpose; the participants were selected based on their resumes and experiences. There were 30 participants in each phase that had the inclusion criteria; seventeen of them were faculty members, four of them were full professors, five participants were associate professors, eight of them were assistant professors, and the others were students of professional Ph.D. The inclusion criteria were as follows: all members should have had educational and research experiences, be acquainted with the concept of the third generation university, have experiences in management of decision making in educational organization while being expert in this field, and have had related research works. The consent was signed in person and the purposes of the study were explained. The exclusion criteria was participants' lack of interest to continue or not participating in the Delphi meetings. In the beginning, a thorough review was done in theories and authentic documents in databases, the models were analyzed, and the factors and components (8 factors and 25 components) were extracted.

The extracted titles were reviewed by the researcher and based on that a check list including 8 factors and 25 components was designed in order to modify Mashhad University of Medical Sciences to a third generation university. Delphi meetings were held in three phases. After identification of experts, the time and place of the meetings were settled. The experts expressed their opinion about the importance of every factor and component of the checklist both verbally and in written (they said if they agree or disagree and explained their opinion). Moreover, the participants were asked to mention other factors or components that were not written in the checklist. At the end of meeting, all answers and opinions of the participants were analyzed. Any variable that was agreed by more than 70 percent of Delphi panel members, was considered significant and retained in the model, otherwise, they were deleted. Furthermore, the writing of the factors and components were corrected based on the participants' opinion. In this phase, the panel members disagreed with one factor and one components and added one new factor and 5 components. In the second phase, 8 factors and 29 components were mentioned in the checklist. In the second Delphi meeting, the experts expressed their opinions both verbally and in written. The participants were asked to express their opinions about the criteria of the first phase in Likert

scale with level of "totally agree" to "totally disagree" and made their suggestions. After gathering and analyzing the opinions of the panel members, the factors and components that obtained the average score of 4 and a bit more were kept in the study and the variables that were approximately equal or less than 4 were omitted and extracted from the model. Finally, 7 factors and 25 components were agreed by the panel members in order to be included in the model of modifying Mashhad University of Medical Sciences to a third generation university (in this phase, one factor and 4 components were deleted). In total, due to disagreement among members and lack of homogeneity in their answers, the third phase of Delphi technique was held. The members' opinion about the importance of factors and components were gathered. The results of this phase showed that the scores of all factors and components (7 factors and 25 components) were more than 4 and no factor or component was deleted in this phase. Consequently, the model of modifying Mashhad University of Medical Sciences to a third generation university was finalized.

RESULTS

In terms of personal information, 60 percent of participants (18 persons) were male and 40 percent (12 persons) were female. 17 participants (57 percent) were faculty members and 13 of them (43 percent) were managers and staff of Mashhad University of Medical Sciences.

During Delphi meetings, the answers were categorized, the similar opinions were merged, the repeated ones were omitted, and the long items were summarized. Of the total number of 8 factors and 25 components, one factor and one components were omitted, and one factor and five components were added. In total, the checklist including factors, components and indexes to modify Mashhad University of Medical Sciences to a Third Generation University was designed in the second phase of the meetings and 8 factors and 29 components were agreed.

After the analysis of answers in the second phase and integration of similar ideas and deleting the repeated ones, from the 8 factors and 29 components, one factor and four components were deleted, and the rest remained without any changes. Then, due to disagreement of panel members, the third level of Delphi technique was conducted. After gathering experts' opinions about the importance of all factors and components, the third level of Delphi technique was done. The results of this phase presented that the score of all factors and components (7 factors and 25 components) was higher than 4 and no factor or component was deleted in this phase. Therefore, the final model of modifying Mashhad University of Medical Sciences to a Third Generation University was finalized with 7 factors and 25 components.

Furthermore, Kendall's coefficient of concordance was used in order to agree on the answers and opinions. Kendall's coefficient of concordance is a scale to determine the degree of agreement among different categories of N objects or person. Actually, via this scale the rank correlation among k collections can be found. This scale is useful especially in the studies related to "Interjudge Reliability".

Table 1. The primary checklist of factors and components to transform Mashhad University of Medical Sciences to a third generation university

Writing appropriate strategies for the organization	Being an entrepreneur in the strategic documents and programs, the strategy of transforming technology, entrepreneurial approach of professors
Reforming the legal and administrative support system	Paying attention to multidisciplinary and interdisciplinary systems, reforming syllabus, effective assessment and the feedback of performance, rules and regulations and guidelines
Creating structural contexts and conditions in the organization	Promoting entrepreneurial culture, supporting innovations, planning the university syllabus
Focusing of organizations' leadership and management on entrepreneurship	Managers' intellectual property, supportive management, entrepreneurship management in higher education, developing entrepreneurial capabilities and wealth generation in senior managers
Developing capabilities and abilities of human resources	Entrepreneurship training courses, extracurricular activities and seminars, complementary empowerment measurements
More interaction with outside of the organization (national and international) and internationalization	Enhancing international collaboration, supporting research activities outside the university and international ones, increasing communications and educational and research grants abroad
Enhancing infrastructures, equipment and financial resources	Facilities and equipment, funds, allocation of funds
Paying attention to cultural and religious issues and values of society in the path of change	The governing values of the society, preparing the culture of the society

Kendall's Coefficient of Concordance presents that basically people who have categorized issues based on their importance have similar criteria and they have agreement in this regard (11).

The results of Kendall's Coefficient of Concordance was 0.79 in the second phase of Delphi technique and 0.86 in the third phase demonstrated unanimous agreement of the members about the aspects of the model. Finally, after confirmation of the conceptual model by the experts in Delphi technique and the confirmation of Interjudge reliability, the model was designed as shown in figure 1.

Moreover, in order to strengthen the results of the study, the significance of all identified factors and components were evaluated via student's t-test, comparing mean with a fixed number. In this test, the scores of participants' viewpoints about each variable were calculated and then the averages of their scores were compared with 4. This test showed that whether the identified factors and components were higher than 4 or not.

In accordance with the mentioned explanations, and estimation of the required parameters and calculation of t-test and p-value, the results demonstrate that all factors and components studied in the third level of Delphi technique were significant. Therefore, all assumed variables of the conceptual model including 7 factors and 25 components were identified and finalized in the model of modifying Mashhad University of Medical Sciences to a third generation university. Table 2 presents the findings related to the factors of the model and the components; however the indexes are not presented in the research.

According to the recorded findings in table 2 that were calculated with P-value, the assumption of statistical zero or actually the assumption of the level of experts' disagreement was rejected in the level of test error ($\alpha=0.05$). It could be concluded that these factors are significant with the confidence factor of 95 percent and are significant factors in modifying Mashhad University of Medical Sciences to a third

generation university.

However, the question is that whether the level of significance and influence of each factor is similar from the experts' point of view or not. This question was responded using one-way ANOVA test in order to assess the importance of factors to be ranked. Therefore, conducting ANOVA test and the result of F-Fisher and P-value that were 1.697 and 0.125, respectively; there was found no reason to reject the assumption ($P\text{-value} = 0.125 > \alpha=0.05$). Therefore, it could be stated that from the experts' viewpoint, the level of influence of identified factors to modify Mashhad University of Medical Sciences to a third generation university is similar and there is no significant difference between the levels of importance of the factors. Figure 2 clearly depicts the level of influence or importance of each factor along with the scatter rate of each factor. However, it should be noted that these differences are not significant and their levels of influence are similar. Therefore, there is no priority among the factors to modify Mashhad University of Medical Sciences to a third generation university.

DISCUSSION

Reviewing the models of the third generation university, it could be understood that a group of them such as the models of Ropke (1998), Jacob et al (2003) and Etzkowitz (2004) insist that entrepreneur university have entrepreneurial activities while the other group of models such as Guerrero and Urbano (2010) focus on the influential factors on the formation of third generation universities (12-15). Although several studies have been conducted on entrepreneur universities and their factors and components, few studies could be found to identify the influential factors on becoming entrepreneur in the Medical Universities of the country directly. It should be noted that the third millennium universities are of high importance for the Deputy of Education, Ministry of Health and have provided special packages for innovations based on higher education.

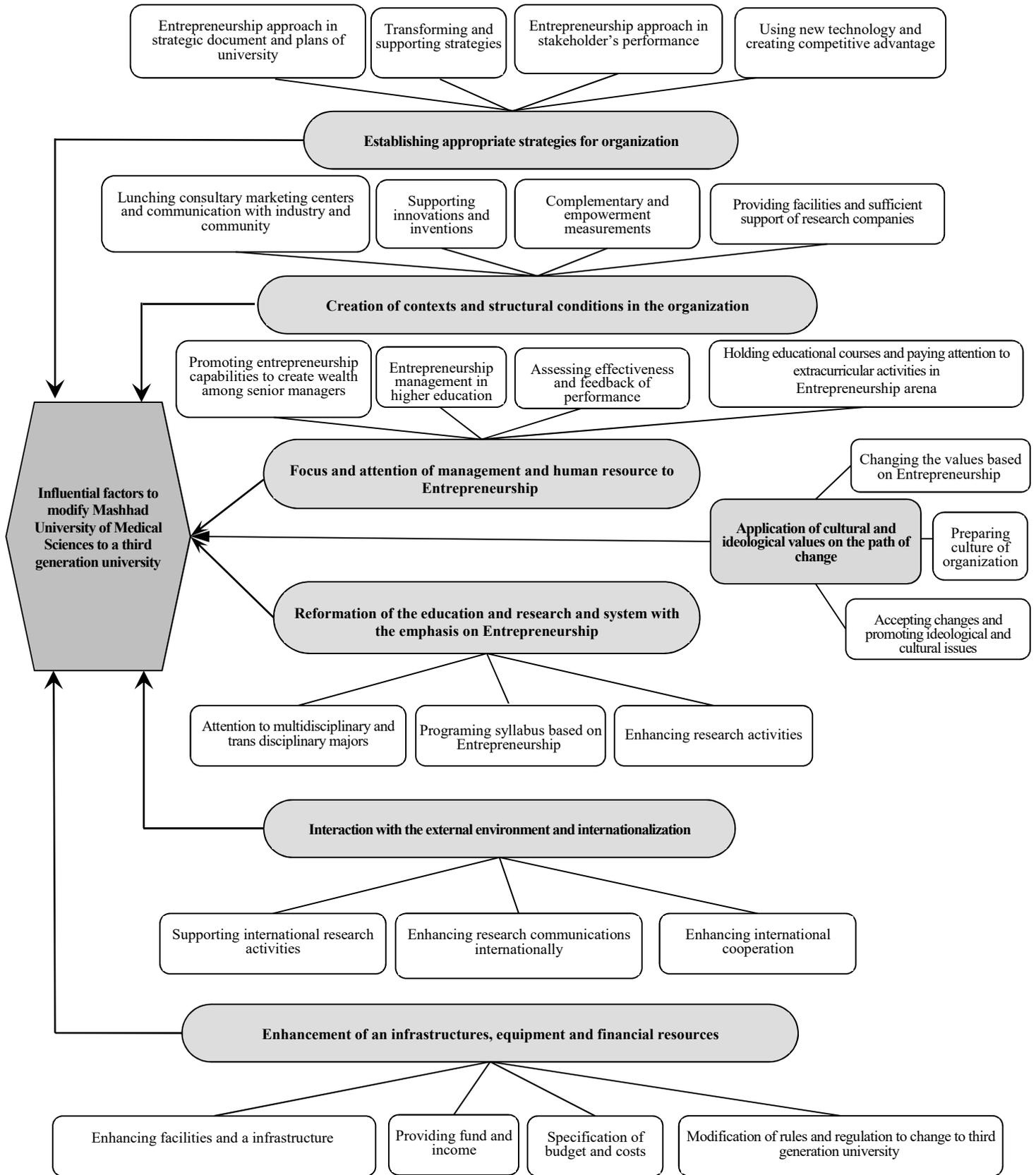


Figure 1. Final conceptual model extracted from Delphi technique (Model of transforming Mashhad University of Medical Sciences to a Third Generation University)

Table 2. Student's t-test in order to analyze the significance of the level of panel members' agreement (expert group) about the identified factors to transform Mashhad University of Medical Sciences to a third generation university

Identified factors	Distribution of relative frequency percentage of experts' responses					Descriptive statistics		Test results			result
	Totally disagree	disagree	To some extent	agree	Totally agree	average	Standard deviation	T statistics	Degrees of freedom	P-value	
Writing appropriate strategies for the organization	0%	0%	0%	4%	96%	4.96	0.21	22.000	22	0.000	accepted
Creating structure context and conditions in the organization	0%	0%	0%	30%	70%	4.70	0.47	7.091	22	0.000	accepted
Focusing the management and human resources of the organization on entrepreneurship	0%	0%	0%	30%	70%	4.70	0.47	7.091	22	0.000	accepted
Reforming educational and research system with emphasis on entrepreneurship	0%	0%	0%	22%	78%	4.78	0.42	8.899	22	0.000	accepted
More interaction with outside environment (national and international) and internationalization	0%	0%	0%	9%	91%	4.91	0.29	15.199	22	0.000	accepted
Enhancement of infrastructures, equipment and financial resources	0%	0%	0%	17%	83%	4.83	0.39	10.223	22	0.000	accepted
Using cultural and religious values in the path of change	0%	0%	0%	30%	70%	4.70	0.47	7.091	22	0.000	accepted

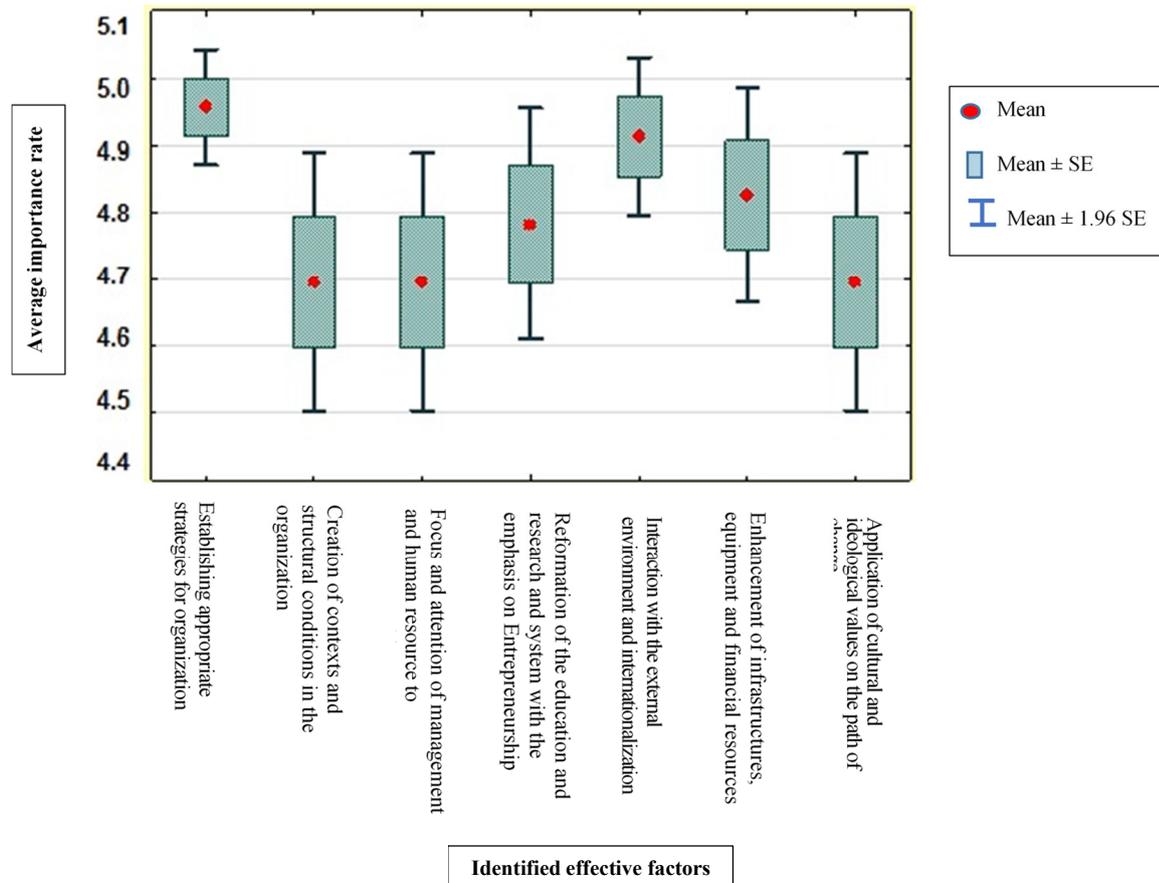


Figure 2. Comparing the level of importance of each influential and significant factor on the modification of Mashhad University of Medical Sciences to a third generation university

On the condition that the medical universities of the country become Third Generation University, their status in the knowledge-based economy would be explained and their dependency on governmental budget would be minimized. Entrepreneurship in health would lead to the convert of cost economy to wealth, development of service export and medical products, increase of interaction among governments in different arenas such as currency exchange, decrease of consumerism and providing thousands of job opportunities for the graduates (1).

The current study had a qualitative approach and attempted to consider all influential factors in modification of the Third Generation University. Therefore, the main factors and components of the third generation universities were identified and based on them the model has been designed. According to the perspectives of experts, it could be concluded that the influential factors to modify a Medical Sciences University to a third generation university are as follows: the development of appropriate organizational strategies and guidelines, creation of contexts and structural conditions in the organization, the focus and attention of management and human resources to entrepreneurship, reformation of the education and research system with emphasis on entrepreneurship, more interaction with the external environment and internationalization, enhancement of infrastructures, equipment and financial resources, and application of cultural and ideological values on the path of change. The modification of universities to third generation universities and development of entrepreneurship require concurrent attention to identified factors. Moreover, the implementation of the model at universities requires establishment of policies, strategies, and action plan and also continuous assessment of the programs. Although the purpose of the current study was to design the model of third generation university, it could be noted that entrepreneurship is highly important in universities. Further studies are needed in this area. According to the findings of the study, policy makers, managers and authorities of the universities should attempt to enhance entrepreneurship at universities.

In conclusion, in accordance with the results and findings of the present study and the importance of the issue, the following items are resulted in the modification of Mashhad University of Medical Sciences to a third generation university. Following, some suggestion and solutions are mentioned:

According to the role and position of the third millennium universities in the development of the country especially in scientific issues, the authorities of Medical Sciences Universities should consider all factors and components of the suggested model in order to modify Mashhad University of Medical Sciences to a third generation university. In other words, the authorities should pay attention to the development of appropriate organizational strategies and guidelines, creation of contexts and structural conditions in the organization, the focus and attention of management and

human resources to entrepreneurship, reformation of the education and research system with the emphasis on entrepreneurship, more interaction with the external environment and internationalization, enhancement of infrastructures, equipment and financial resources, and application of cultural and ideological values on the path of change.

Based on the findings of the present study, it is suggested that the authorities and managers of Mashhad University of Medical Sciences should pay special attention to the establishment of strategies, since this factor had the highest average score in the study and had the least standard deviation. It means that the experts had the least disagreement about this factor. Therefore, based on the components of this factor, it is suggested:

- The position of entrepreneurship should be clear in the duty of the university
- Managers, deputies, professors and students should have entrepreneurship approach in their performance
- To support innovation and intellectual property
- To pay special attention to the level of technology in the processes and performances

In conclusion, based on the findings of the study, the factor of using cultural and ideological values should be considered specifically. Since it is less considered in other models but the findings of the present study showed that it is important and it can be influential in the modification of Mashhad University of Medical Sciences to a third generation university. Therefore, this factor is the turning point of the study and the following issues should be notified: promoting the culture of entrepreneurship in the university, development of elitist, promotion of the culture of supporting innovations, acceptance of change and promotion of cultural and ideological issues, and modifications based on entrepreneurship

It is hoped that great measurements will occur in the modification of medical universities to the third generation universities in order to save resources and provide pure knowledge and achieve knowledge-based economy, so that it can finally develop the society.

Ethical considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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