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ORIGINAL ARTICLE

Small and medium-sized enterprises in health sector implementation and mapping the future developed education health based on seven pillars of sustainability

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ABSTRACT

The present study was conducted with the aim of educational small and medium-sized enterprises (SMEs) in healthcare sector and mapping future developed education and training. Therefore, the effects of seven pillars of sustainability (7PS) model including environment, economic, social, educational, cultural, technical, and political aspects on future sustainability of educational SME for nurses have investigated. A structured questionnaire survey was conducted and multi-criteria decision-making method was used to rank effects of the seven pillars. The results showed that technical, educational and cultural aspects have the most effect on sustainability of educational SMEs for Nurses in Iran, respectively. Accessing to educational content and analysis enables nurses deepen their knowledge which makes the technical and educational aspects of 7PS more highlight for nurses. Moreover, the coronavirus disease (COVID-19) pandemic made tele-learning and social network tools as integral component of the nurses' educational systems.

Key words: small and medium-sized enterprises, mapping the future education, education, developed training, seven pillars of sustainability model

INTRODUCTION

Creating and supporting small and medium-sized enterprises (SMEs) is one of the main priorities in economic development programs in many developed and newly developed countries. SMEs play an important role in creating employment and providing a suitable platform for innovation and increasing exports. Small companies have more flexibility and more entrepreneurship and creativity. SMEs can more easily adapt to rapid environmental changes and respond more quickly to economic and political factors. SMEs attract and employ large sections of the population and train skilled labor. Specialized human resources for large companies are made by small and medium companies.[1]

The complex and rapid developments of the last few decades, as well as the acceleration of the process of globalization, have led various societies to try to prepare themselves more and more for the acceptance of

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change. Until a few decades ago, what was considered an economic advantage was the establishment and operation of large corporations, and it was argued that the larger these corporations, the more dynamic and powerful the economy. Based on that, giant companies also appeared. But recent developments, especially demographic pressures, moment-by-moment innovations, more complex management and decision-making processes, the need for immediate and necessary decisions, and experiences from the activities of SMEs are important. This study investigates the impact of the existence of SMEs in health sector on the education process of nurses in the future.

Due to the rising trend in patient-centered care, nurses must continuously enhance their professional competencies to ensure the quality of healthcare provision.[2] Electronic learning (E-learning) systems based on web-based technology has the ability to facilitate nurses to engage in more learning.[3] E-learning is defined as an "educational process that uses information and communication technologies to create training, to distribute learning content, communication between students and teachers and for management of studies".[4] As compared with traditional learning, E-learning is a more flexible method for nurses' in-service learning without time, distance, and space barriers[5] and makes them to be more self-control[5] by choosing the proper schedule. Prof. Mohammadian believes that environment, economic, social, educational, cultural, technical, and political aspects are seven pillars of sustainability (7PS) which has been introduced as 7PS model.[6] The authors of this paper believe that mapping 7PS to educational SMEs with the aim of educating nurses using E-learning system would make a clear roadmap for future of these SMEs.

BACKGROUND

Small and medium enterprises

The literature on the employment of small units is very extensive, and this breadth has led to different definitions for this unit in different countries. These definitions vary according to age, population, cultural structure and degree of development. SMEs have many similarities in different countries of the world, but nevertheless, the same definition cannot be obtained from them. Each country has a definition of these businesses according to their specific circumstances. Most of these definitions are based on quantitative criteria such as number of employees and turnover.[1]

Universities and SME companies

The relationship between university and industry is a process that is formed over time and is derived from national needs and necessities in historical periods.[7] This relationship is a topic that has been raised in society for many years and many theoretical and practical measures in the field is done. University and industry are the two main institutions of society in the current knowledge-based world, and today the need for communication and interaction between these two institutions is felt more than ever. The necessity of the relationship between the university and industry is the result of the mutual needs of these two institutions and the acceleration of the development process. The industry needs both trained and specialized manpower for technical and managerial jobs as well as research and development. Accordingly, if the capabilities that exist in universities are used to meet the needs of society, the first steps for industrial self-sufficiency with the aim of national development will be taken.[8]

The relationship and cooperation between universities and industry is of special importance in the scientific progress of countries and is an important component in the development of knowledge of countries. In most developed countries, scientific growth in universities can be attributed to their close cooperation with industries and industrial development in a competitive environment due to having a purposeful and demand-oriented relationship between industries and universities[9] in collaboration with universities and industry, academic researchers. After presenting their point of view and being accepted by the industry, they can obtain the necessary financial resources for research, and companies can learn the necessary skills and use them to promote scientific progress and innovation of their products.[10]

In many countries, universities have become organizations with scientific and commercial missions, and the transfer of technology from academia to industry has been considered a key driver of innovative strategies.[11]

University-industry cooperation is currently an important economic issue.[12] Pressured industries need knowledge to upgrade their technology and competency in global markets, and academics transfer their knowledge to industry.[13]

Azagra-Caro *et al.*[14] by examining the dynamic interaction between university and industry through knowledge transfer channels, have noticed that knowledge transfer in university-industry interactions, with or without a contract, can be formal or informal.[14] If no agreement is reached between the parties, informal channels can access knowledge, expertise and equipment as well as existing technical and scientific capabilities. However, in the case of a formal contract, official channels are allowed to take advantage of the knowledge, expertise and equipment available at the university. University patents have become the official

mechanism for transferring knowledge between academia and industry since the United States enacted the Baidal Act.

Wang *et al.*[13] state that since university-industry cooperation is very important for research and innovation in knowledge-based societies, governments have also designed various policies to encourage innovation and university-industry cooperation, and according to the urgent needs of industries to technologies. Recently, the cooperation between the university and industry in research and development projects has become very extensive and has been of great importance and value for both parties.

Chang[10] examines the development of collaborative inventions between academia and industry. In the period of industry-university cooperation, in addition to operationalizing the university's research achievements, the industries also improve their research and development capabilities. Thus, the cooperation between the university and industry to some extent reveals the intention and desire of industry to industrialize the university's research achievements.

Shahverdian[15] has studied the impact of environmental factors on the establishment and development of university growth centers, which are a new approach to the relationship between academia and industry. Because growth and entrepreneurship centers are among the emerging institutions that help universities fulfill their mission in achieving their goals and mission. The establishment and development of these centers have had a significant impact on the interaction of universities with society and industry.

Jones *et al.*[16] by studying university-industry interactions and by examining small and medium-sized companies in Australia, concluded that human resource transfer has a positive effect on innovation.[16] The transfer of human resources through innovation also affects the performance of the company.[17] Human resource development by hiring new graduates and preparing graduates with more training to provide professional staff, generates performance benefits in the form of innovation and indirectly leads to productivity and sales growth.[18]

Universities are divided into three generations based on approaches and executive structures: first-generation universities that are learning universities; Second generation universities, *i.e.,* research-oriented universities, and third generation universities that are leading and innovative.[19] Third-generation universities, along with education and research, connect with industry and connect to it to pursue new goals. Graduates of this type of university are entrepreneurs who seek opportunities and create jobs. In fact, the university, in macro politics, must be able to solve the country's problems. Today, meeting the needs of the country and the central issue is the most important concern of universities that are considered third generation universities.[20]

Mapping the future education

Stable performance

Performance can be defined according to the concept of quality and the ability of the organization to achieve internal and external goals, and it should be noted that performance includes several dimensions.[21]

The formation of competitive markets and human need for growth and development in the economic and social field has caused special attention of societies, especially companies, to performance and companies in various ways seek to improve their performance[22] is a multidimensional conceptual sustainability. Which is not easily understood and its definition in our time is very difficult and complex.[23]

Sustainability is the ability to develop and maintain performance in the long run as a result of continued stakeholder satisfaction over time and the ability to simultaneously understand and manage economic, social and environmental performance.[24] Researchers believe that if the world's population and economy continue to grow at the current rate, the use of the planet's natural resources will exceed its capacity, leading to issues of environmental conservation called sustainable development. Sustainable development is a development that addresses current needs without compromising the ability of future generations to meet their own needs.[25] More precisely, the strategy of sustainable development means establishing harmony between humans and between man and nature, and means that sustainability requires social communities to manage the environmental perspective along with the economic perspective in the development and improvement of performance.[21]

The present age is when customers and individuals in society expect companies and organizations to be responsible and to consider the next generation in their activities and operations. Because giving importance to the next generation in carrying out activities is a positive step towards sustainable performance and shows the organization's commitment to a sustainable global economy.[26]

Social perspective

Relationships between institutions and individuals reveal the quantity and quality of social interactions that have the highest place in economic development and human resources in any development program. Society has no

social capital with educated and professional institutions and human resources, but is isolated from each other. This is why social capital is so important, first of all, it enables the solution of social problems collectively, which means positive synergy.

Second, the existence of trust and cooperation based on awareness minimizes the cost of transactions based on exchange theory. Because cooperation prevents wastage of energy, time and money.[27] Organizational social responsibility means that organizations should be more careful about the consequences and effects of their activities and consider their effects on the environment, society and members of society. In general, the social responsibility of the organization refers to aspects of the activities of the organization that pay more attention to social interests than organizational interests.[28]

Hawks and Adash theory

In the last two decades, the unity of markets and the increase in consumer awareness have changed the structure of demand. Due to its special structure, large industries do not have the necessary flexibility to respond to consumer diversification, the growth of small industries has been provided more than ever. Other factors have also been effective in transforming the demand structure and moving towards small and medium industries. The most important of these are: (1) The desire of large industries to return to their core specialties and outsource other manufacturing sectors to small and satellite industries and meet a significant portion of their needs through contracting. (2) Decreased confidence in market trends and high maintenance costs of production sectors. (3) Innovation in process production.

Cluster development model theory

For about three decades, the cluster structure in Italy has attracted the attention of development scientists. In some industrial disciplines, relying on specific advantages arising from skills and knowledge (which over time have become the social capital of the regions), these clusters have been able to provide economic growth in their geographical contexts. Each industrial cluster consists of a number of small industries and a variety of financial services, consulting, marketing *etc.* By creating regular communication networks and systematic cooperation with each other, these industries, while achieving mass production indicators, also have the advantages of small industries such as innovation and diversity.[29]

Admiral believes that in the new arrangements, the relationship between large and small industries is changing significantly. It may no longer be right to compare small and large enterprises. It is no longer a matter of quantitative relative change, but of intelligent changes in collaboration networks that enable industries of all scales to specialize in the projects that are most appropriate for them. In other words, it is not just large or small that creates an advantage, but expertise and efficiency that ensures the survival of a firm. Therefore, firms need to work together to survive in the market, among which large firms, more than firms small ones need cooperation.

Creating, growing and developing businesses

Recent Useful Papers on the Growth Process of Businesses, O'Farrell *et al.*,[30] Gabe *et al.*,[31] Hanks *et al.*,[32] and Holmes *et al.* [33] All of these have been studied and published to show the growth and dynamism of businesses. In addition, Birley and Westhead provided a general empirical study of growth in these firms. [34] Research has comprehensively examined the issue of growth. The most important results of this research can be summarized as follows:

In general, most theories of sustainable equilibrium have been concluded from industrial economies, which have insufficiently focused on growth dynamics or those that tend to minimize costs. Some of them consider big companies as the fixed income of the economy. In this context, there are significant studies and practices on time management and the importance of its effect on the achievable growth rate in a firm. Random models of corporate growth have been developed mainly in the field of economics, in short, many factors are effective in corporate growth, so there is no dominant factor.

Various experts have divided the stages of creation and development of small businesses into several formats. Traditionally, the cycle of this type of business can be examined in five steps as followed:[35,36]

Step of creating a business

The first stage involves activities related to the initial formation of the business. In the initial stage, an entrepreneurial process is created and creativity is required. Creativity, evaluation and networking are needed to accumulate and obtain financial and non-financial resources. The overall goal, mission and direction of the business are determined in the form of entrepreneurial strategy at this stage.

Starting a business

At this stage, the necessary activities are done to create a formal business plan, seek capital, carry out marketing activities and create an effective entrepreneurial team.

Growth stage

This step requires significant changes in entrepreneurial strategy. Because competitors and other market forces are transforming themselves and new challenges are

facing businesses. At this stage, the growth and transition from individual entrepreneurial leadership to managerial team-oriented leadership is important.

Business consolidation stage

This stage is the result of both market conditions and the efforts of entrepreneurs. During this stage, companies' competition and customers' indifference to entrepreneurs' goods and services increase and the market becomes saturated. In addition, business sales are steady and the company must plan for the next three to five years. Innovation is critical to the future success of the business.

Innovation or decline stage

Companies that do not pay attention to innovation will have no destiny but destruction. Companies that are financially successful often try to acquire other innovative companies and thus ensure their growth. A number of companies are also pursuing the production of new products or services.

The 5th wave/tomorrow age theory or theory of comprehensive everything

After passing the four waves (ages) until 1970 various businesses could affect and improve educational technologies, and information technology (IT) but since we reached the 70s the internet of things (IoT)-education technologies became able to change and improve the various businesses, and even impact our lives. Besides this, they can change the global policy from traditional methods to sustainable modern innovative digital productive methods. IoT-based educational economy (business) make this learning business procedure faster, safer with higher productivity even possible. Edu 5.0 concept changes the educational paradigm from traditional to modern with huge productivity in different aspects of life to prepare for future concerns.

D3 Revolutions

Based on the 5th wave/tomorrow age theory or theory of comprehensive everything, three technological revolutions (D3 Revolutions) have shaped the dawn of the 21st century and used to map future training. These D3 Revolutions include: Digitalization, Decarbonization, and Decentralization.

These technologies would create smart education. however, barriers cause challenges to apply these technologies and creating modern areas like E-learning and massive open online courses (MOOCs). It is required to indicate these barriers and find solutions to apply them and change humans' lives to maintain the world. Based on the 5th wave theory and related theories, models and concepts, today's challenges and tomorrow's crises have been discussed that in our world of that technology development and rapid growing made ever-quickening change, the human mind is threatened by shattering. Proper solutions and policies could make people to deal with new challenges for the future education. Prof. Mohammadian as theoretician of the 5th wave theory believes that sustainability has four more pillars than the three from United Nations (UN). He contends that seven pillars are required to develop sustainability: environment, economic, social, educational, cultural, technical, and political aspects form educational sustainability. These aspects make a puzzle in which all the segments are directly or indirectly related to each other. Figure 1 presents the 7PS model and its classification.

Fundamentally, we are settling on edge of future that confronts future shocks including tomorrow's educational challenges, new businesses' barriers, modern training style risks, and human competencies challenges and so on. Figure 1 presents the point that we are perched on: As in previous section was declared, solutions are required to deal with ubiquitous and digitalization challenges to be able to apply them in different educational businesses and services towards creating modern areas. The 5th wave/tomorrow age theory or theory of comprehensive everything could be a comprehensive strategy to find out solutions to deal with such challenges, even to tackle future shocks for mapping the future education. These days, the world confronts global challenges as well as future shocks, which threaten human beings and the future of the world for living. So, it is vital to deal with them to maintain the nature and humanity.

The 5th wave age theory, introduced by Prof. Mohammadian (2017–2019), describes the future of industry as the symbol of western culture and the future of society as the symbol of non-western culture from 2020 to 2030 as shown in Figure 1. This theory enables modern educational SMEs to evaluate their sustainability based on seven pillars including economic, environmental, social, cultural, technical, educational and political as shown in Figure 2.

D3 Revolutions

The main points of 5th wave theory are listed as follows: (1) The 5th wave theory is to measure the readiness to change into the new age/wave we are just entering. (2) Modern business/Future of business. (3) Edge of tomorrow (the first step of this edge 2020–2030). (4) Future of Industry 4.0 (I5.0) and future of Society 5.0 (Society 6.0) - SME 5.0/Hybrid SMEs/Tomorrow's SMEs. (5) Future crises/shock, Tomorrow's readiness. (6) Proceeding of future of I4.0 (I5.0) as a symbol for west. There is a western concept similar to DIGITALIZATION which is named Industry 4.0. It describes intelligent and smart networking of products based on

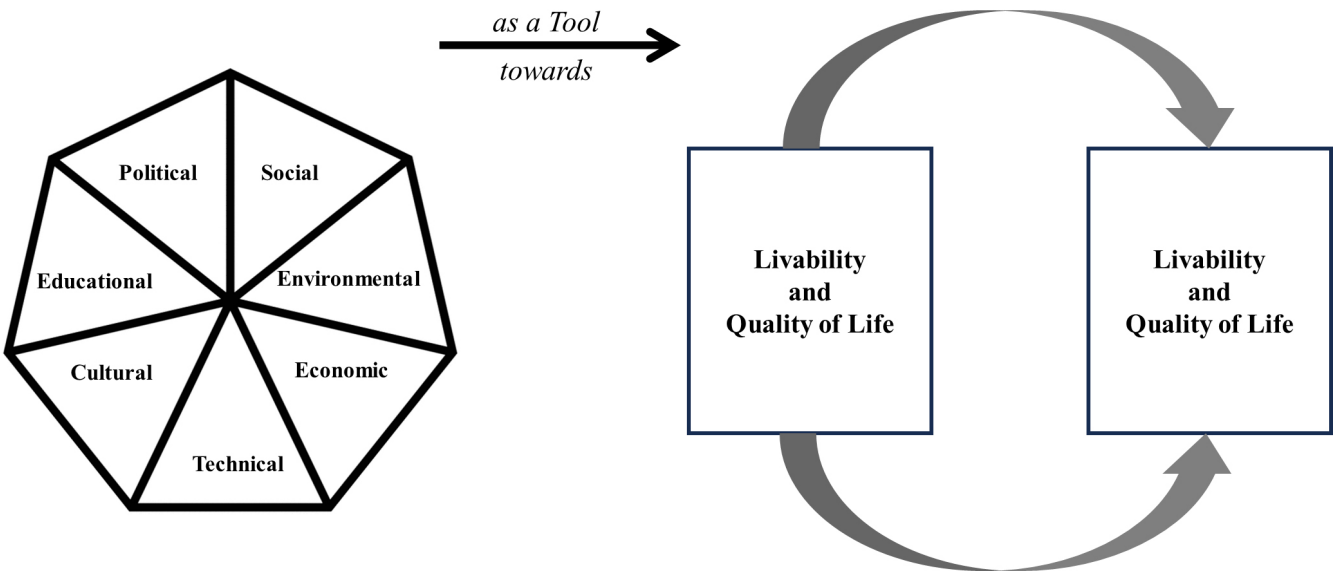

Figure 1. Seven Pillars of Sustainability/7PS Model.[37,38]

4th technology areas: Embedded systems, Smart factories, Strong networks, Cloud computing and IT security. (7) Proceeding of the future of Society5.0 (Society6.0) as a symbol for non-west. Society 5.0 is a non-western concept similar to UBIQUITOUS. It is about being or seeming to be everywhere at the same time in an intelligent society based on: REAL LIFE + HIGH TECH + VIRTUAL REALITY.

This theory is introduced to support all businesses specially SMEs to (a) FORECAST, (b) PREVENT, and (c) FACE, for the TODAY'S CHALLENGES and TOMORROW'S CRISIS/SHOCKS. TODAY'S CHALLENGES and TOMORROW'S CRISIS have impacted levels of: Knowledge, Technology, Business which called KTB model by Prof. Mohammadian, to provide societies: (1) Blue-Green Sustainability (a new concept)[47,55], (2) Innovative digital readiness, and (3) Recovery and CSR strategies; BY LEVERAGING ON: CSR 1.0 which is Corporate Social Responsibility and CSR 2.0 which is Corporate Sustainability Responsibility APPROACHES; USING INNOVATIVE DIGITAL INFRASTRUCTURES: (1) Open innovation, (2) Implementation, development, and application of future, and (3) Future of the 4.0 technologies (5th technologies); Which can influence, change, and improve Education and Training on digital infrastructure as well as our lives.

The 5th wave theory is based on some other theories, concepts, methods, and models which are invented, introduced and developed by Prof. Mohammadian (2010–2019)[43,56,57,58,59] *e.g.*: (1) i-Sustaianbility Plus Theory, (2) Doost Cultural Theory (DCT theory), (3) 7 pillars of sustainability model (7PS), (4) Knowledge, Technology, & Busniess (KTB) model, (5) 3D Socio-Eco-Environment SMEs model, (6) DRM methodology (Doost Research Methodology), (7) Doost Sustainability Digitalization Impact Comprehensive model (D-SDIC model), and (8) SME 5.0/Hybrid SMEs/Tomorrow's SMEs concept.

RESEARCH METHODOLOGY

Seven pillars of sustainability model (7PS model)

A new concept for SMEs in "The 5th wave theory" is presented based on 3D Socio-Eco-Environment SMEs model named "HYBRID SMEs/SME 5.0/Tomorrow's SMEs"[44,51] which is shown in Figure 3[58,59] and its priorities It is as follows: (1) Environmental responsibility, (2) Social cohesion, and (3) Economic efficiency.

Based on the 7PS model, it is possible to measure the sustainability compass by using 7PS DPIr Model which is. These models are presented in the following table and figures (Mohammadian HD, 2017-2019).[37,38,58–60]

Educational sustainability is measured using three variables: impact (I), probability (P) and ratio (r), whose formula is shown in Table 1. Figures 3 and 4 present how to monitor educational sustainability as readiness comprehensive plan to recognize the educational consequences caused by today's challenges and tomorrow's crises.[58,59] The 7PS package model is combination of the models related to 7PS with a focus on technological sustainability with digital approaches.[37]

In the 5th wave theory educational SMEs are changing from a traditional educational business economy to INNOVATIVE DATA and Blue-Green

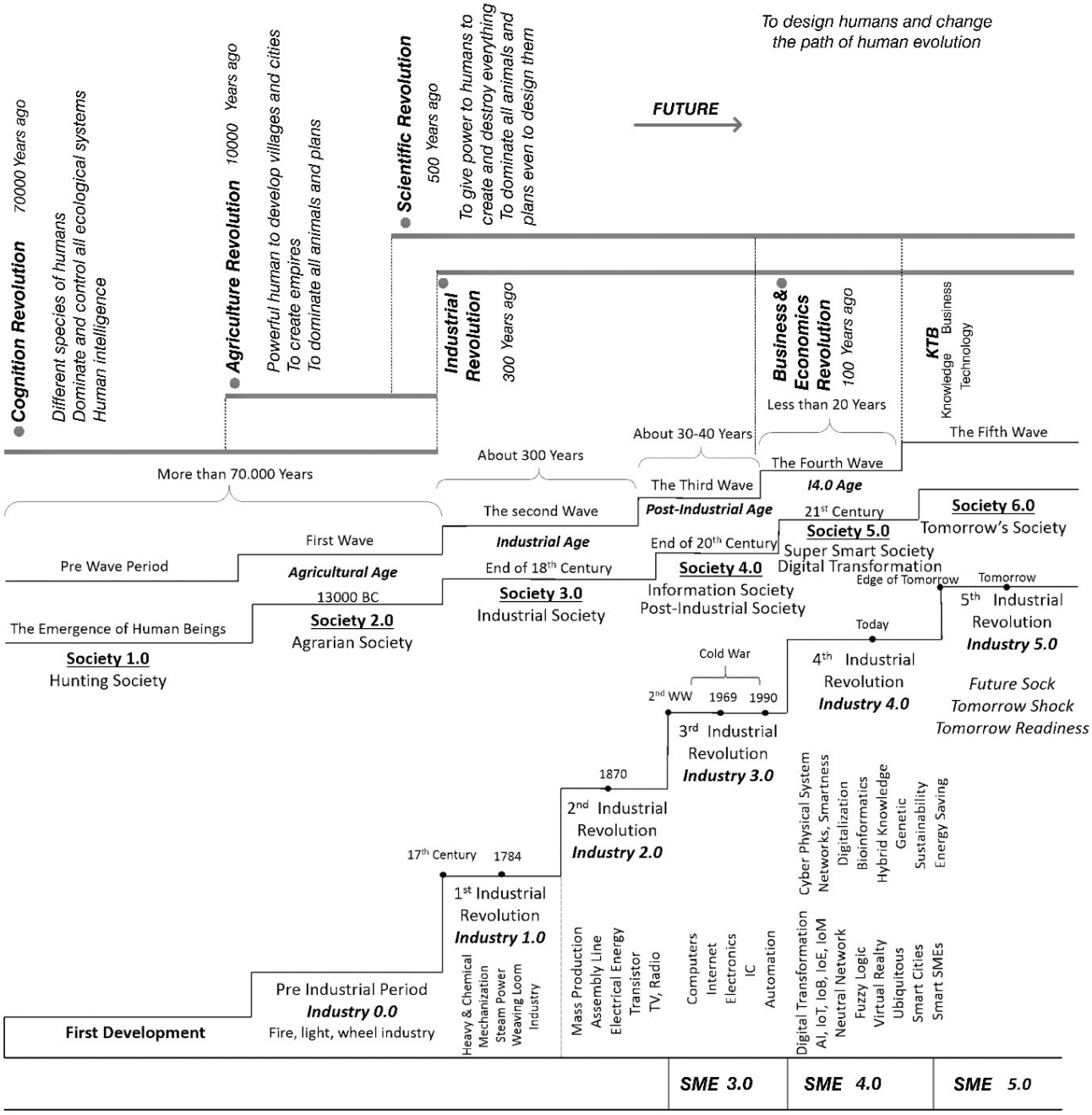

Figure 2. The 5th Wave/Tomorrow Age Theory.[6,39,43,51,52,55–57]

Table 1: Educational sustainability measurement[37,38]

Row	Description	Index
1	Sustainability for each pillars	Si
1	Probability for each pillars	Pi
3	Impact for each pillars	Ii
4	Normalized ratio for each pillars	ri Normal

Effective educational Si = ∑ (Pi * Ii * ri Normal)

SUSTAINABLE Educational SMEs called educational SME 5.0. Based on this theory, education, has a very important vital role in reaching social educational responsibility, CSR strategies (CSR 1.0 and CSR 2.0), and environmentally friendly could improve quality of livability and life based on 7PS model to reach sustainable development.[51] Also, Figure 5 presents the 3D Socio-Eco-Environment SMEs model.[46]

Environmental perspective

First, due to nature's ability to regenerate itself, the existing damage was not considered to be the result of human impact on the environment. However, the emergence of some problems, including the limitation of

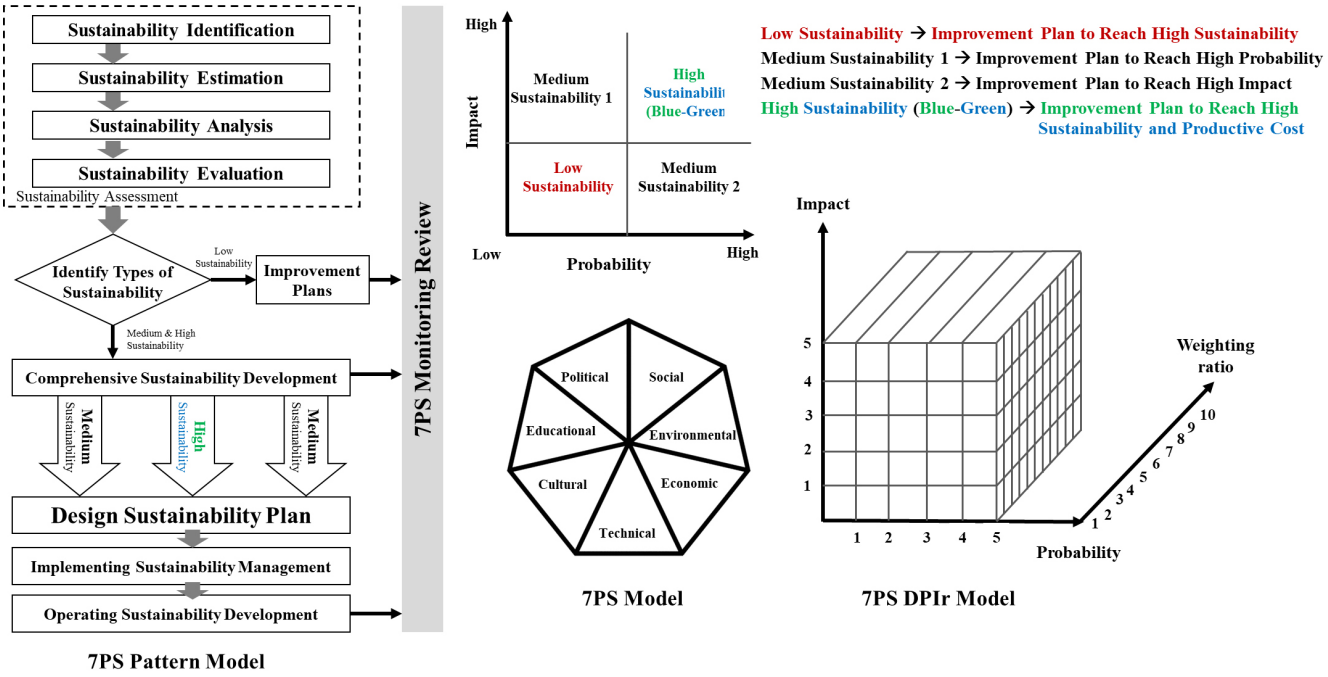

Figure 3. 7PS package model, 7PS Pattern and DPIr Models. [58,59]

natural resources and environmental pollution, in recent years has affected the economic, social and environmental aspects and has led to a rethinking of humans in their approach to the environment; In the last ten years, more attention has been paid to the environment and the environment has been considered as an important phenomenon around the world.[61] Has endangered the creatures of the planet.[62]

Environmental concerns have been raised in many industries, so much so that today, one of the most important factors in the activities of companies-from the supply of raw materials to the production process of new products in the factory and issues that arise during consumer use of the product-attention to environmental issues. Preventive behaviors, in addition to preventing the occurrence of potential environmental problems, allow companies to take advantage of new opportunities. [63]

Human capital, entrepreneurship and small and medium business development

The role of knowledge, especially learning and striving to find new knowledge, are important elements of understanding the creation of entrepreneurial businesses. The key to successful businesses is to build new knowledge and maintain a competitive advantage. Creating new businesses requires unique skills and knowledge. And human capital plays the most important role. Education, training, and work experience are important by common standards. But are these the most important types of knowledge and skills that an entrepreneur should pay attention to? In addition, do organizations want a different set of skills to grow their entrepreneurial businesses?

Egon *et al.* [64] describe two types of human capital. Professional human capital and entrepreneurial human capital were identified and their role in economic development was stated. Professional human capital refers to learning based on conventional education or managerial experience, while entrepreneurial human capital specifically refers to entrepreneurial experience. Their model suggests that both types of human capital are necessary for economic development.

Entrepreneurial human capital

Entrepreneurial human capital is related to the broader concept of human capital. Clearly, entrepreneurial human capital is a set of knowledge and skills that individuals bring with them to create and exploit market opportunities. Jimno team experimented with the subject and used a survey of more than 1, 500 entrepreneurs. [65] They found that human capital affects the economic performance of a firm. The most important criteria of human capital are: education, managerial experience, supervisory experience, experience in a similar business and experience in previous jobs, all of which are general forms of professional human capital. This means that they are known to increase productivity in most business environments and are not specific to an entrepreneurial environment. This is consistent with the findings of Lerner *et al.*[66]that managerial skills have a very strong relationship with the performance of a new business.

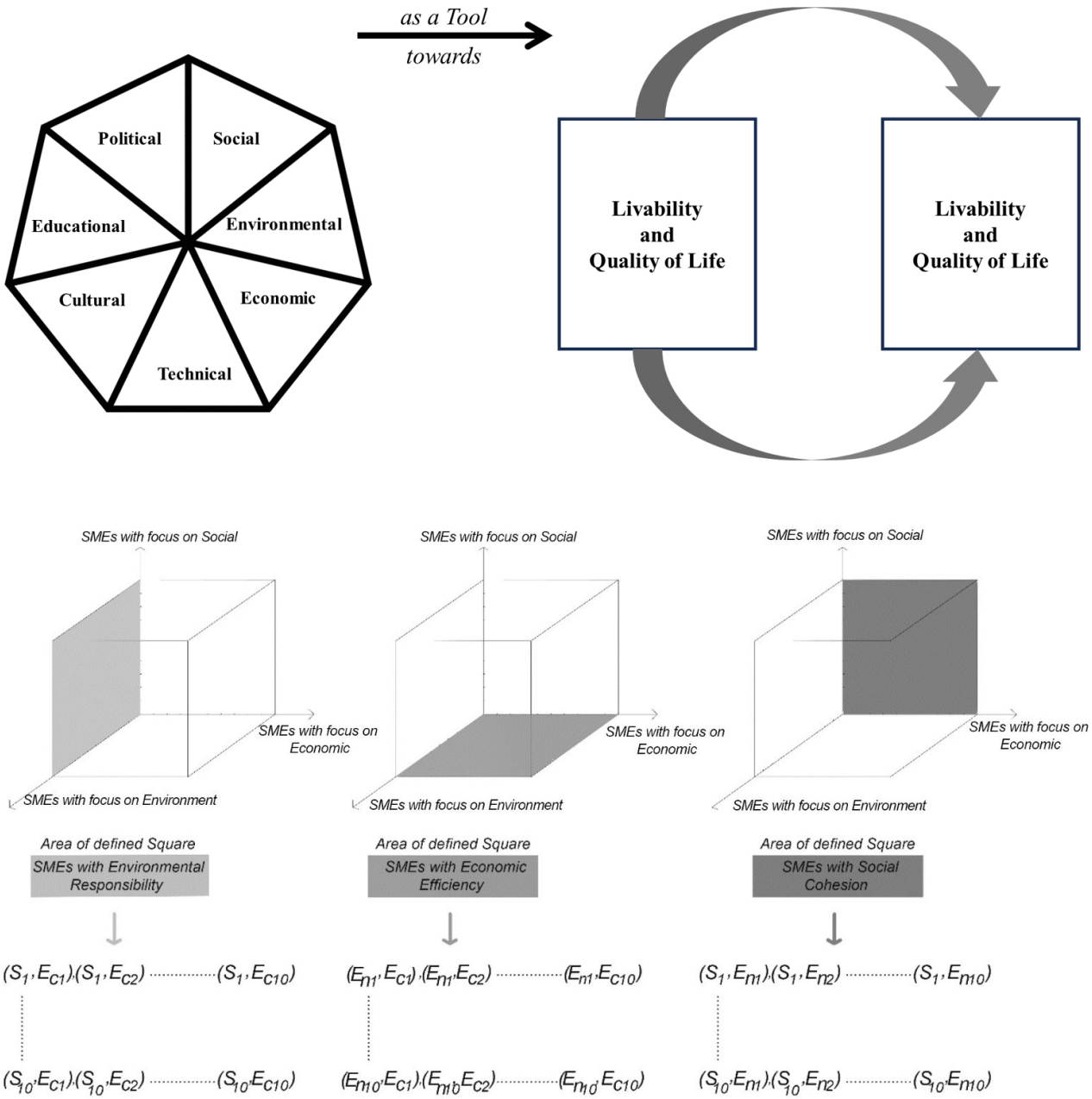

Figure 4. Relation among Quality of Livability and Life & 7 Pillars of Sustainability. [58,59]

Using 7PS model to evaluate sustainability of an educational SME for nurses

Numerous factors affect the sustainable performance of companies. It should be noted that small and medium companies will not be able to improve all factors at the same time. Therefore, to be more successful, identifying and prioritizing these factors will greatly help the company's ability to improve sustainable performance. The purpose of this study is to prioritize effects of 7PS model on sustainability of an educational SME for nurses. A structured questionnaire survey was conducted. To rank the pillars, multi-criteria decision-making method, best-worst method, which is one of the best multi-criteria decision-making methods, was used.[67]

Decision making usually refers to the ranking of alternatives based on the preferences of the decision maker with respect to a set of criteria. In multi-criteria decision-making (MCDM), a set of alternatives with respect to an array of criteria are evaluated in order to identify and select the most desirable alternative.[68] An important aspect in this field refers to the weighting of different criteria. Various MCDM methods have been developed, which try to estimate the weights of the criteria close to

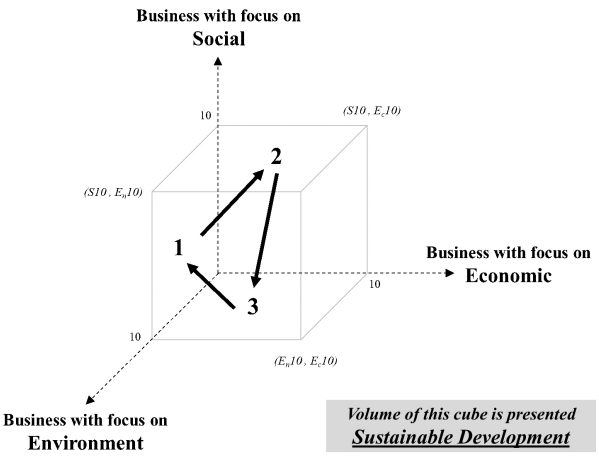

Figure 5. 3D Socio-Eco-Environment SMEs indexes model.[46]

the preferences of the decision maker. As the latest MCDM method, the best-worst multi-criteria decision-making method (BWM) was proposed by Rezaei in 2015,[69] which can obtain the weights of criteria and alternatives with respect to different criteria based on pairwise comparisons with the need of less compared data. Meanwhile, the BWM can effectively remedy the inconsistency derived from pairwise comparisons. Different from the analytic hierarchy process (AHP), the BWM employs a 1–9 scale to perform the pairwise comparisons. Moreover, quite different from AHP, BWM only executes reference comparisons, which means it only needs to determine the preference of the best criterion over all the other criteria and the preference of all the criteria over the worst criterion by using a number between 1 and 9. This procedure is much easier, more accurate and at less redundant because it does not execute secondary comparisons.[69]

RESULTS

The questionnaire was e-mailed to 180 nurses in Iran, from which 126 filled ones were valid for the analysis. Respondents determined probability, Impact and weight of 7PS of educating nurses using E-learning systems provided by an educational SME in the questionnaire. The best-worst method of MCDM has been used to rank the pillars based on nurses' feedback. The result of study is presented in Table 2 which shows that Technical, Educational and Cultural aspects have the most effect on sustainability of educational SMEs for Nurses in Iran, respectively. Economic, political and environmental aspects are placed in a lower degree of importance, and social image has the least impact on sustainability of educational SMEs for Nurses in Iran.

DISCUSSION

The authors of this research tried to find a roadmap for educating nurses in Iran using E-learning systems by mapping 7PS model to educational SMEs. Therefore, sustainability of seven pillars including technical, educational, cultural, economic, political, environmental and social, have been ranked using best-worst method of MCDM technique based on structured questionnaire filled by a sample of nursing society. Several factors have affected rank of each pillar from the nurses' point of view which will be discussed as followed:

Technical pillar- accessing to educational content and analysis enables nurses deepen their knowledge and provide improved care to patients. Technology allows for interactive learning experiences that engage learners through visual, auditory, and tactile methods[70] without geographical restrications. Moreover, technology facilitates access to information, collaboration and networking opportunities. Augmented reality, virtual reality[71] and simulation technology provide a safe and controlled environment for nurses to practice clinical skills and procedures allowing them gain confidence before working in real world with real patients.[72] It should be mentioned that many research focuses on the technology acceptance model (TAM) in educating nurses using E-learning systems. The result shows that usefulness, good design, compatibility, personalization, conveniencem user engagement, ease of use, self-management and self-awareness are the most important factors of technical aspect.[73]

Educational- equal access to education, exchange of experience, individualization of education and high learning productivity are the major factor of educational aspect in the opinion of nurses. However, stable connection to the Internet and having ICT skills to use computers were the common challenges of SMEs in educating nurses using E-learning systems.[36]

Cultural pillar- nurses' beliefs about using electronic systems have changed after the emergence of COVID-19 pandemic like other groups of professional in healthcare sector. For example, before COVID-19, phyicians were not very willing to write prescriptions electronically in Iran, but after that, this issue was accepted as a culture in the medical community. The desire to strengthen family relationships and changing lifestyles after the emergence of COVID-19 led to more use of virtual education tools for nurses. Of course some studies revealed using E-learning tools may not be welcomed by nurses due to family conflicts resulted from culture.[74]

Economic pillar- tele-education and E-learning tools have great impact on decreasing education cost for both nurses and content providers such as universities. Moreover, some nurses mention the effect of tele-education and social network tools on improving their

Table 2: Effects of seven pillars on sustainability of educational SMEs for Nurses in Iran

7 Pillar	Pi	Ii	Ri Normal	Si
Political	2.71	3.09	0.663	**5.550**
Social	2.41	2.24	0.516	**2.786**
Environmental	2.59	3.73	0.536	**5.177**
Economic	2.88	4.08	0.736	**8.645**
Technical	4.88	4.91	0.855	**20.496**
Cultural	4.06	3.76	0.871	**13.293**
Educational	4.12	4.23	0.980	**17.076**

Effective educational Si = ∑ (Pi * Ii * ri Normal)

social capital which may lead to more income.

Political pillar- Iran's foreign policies, which have led to more sanctions by the international community, as well as internal policies in order to use the national Internet and limit international messenger applications, some of which provide electronic content to nurses, have increased concerns to apply E-learning systems for nurses.

Environmental pillar- although mitigating traffic and air pollution was important for nurses, the emergens of the coronavirus pandemic, which affected the lives of all people in the world, highlighted the role of environmental factors. In other word, the COVID-19 virus greatly increased the willingness of nurses to use virtual systems and E-learning tools.

Social pillar- improving the social image and extending the network of social relationships are the most important motivations for nurses to use the Internet and social tools of E-learning systems.

CONCLUSION

In this article, effects of seven pillars of 7PS model including environment, economic, social, educational, cultural, technical, and political aspects on future sustainability of educational SMEs for nurses have been investigated using the multi-criteria decision-making method. The results showed that Technical, Educational and Cultural aspects have the most effect on sustainability of educational SMEs for Nurses in Iran, respectively. Accessing to educational content and analysis enables nurses deepen their knowledge which makes the technical and educational aspects of 7PS more highlight for nurses. respectively. Economic, political and environmental aspects are placed in a lower degree of importance, and social image has the least impact on sustainability of educational SMEs for Nurses in Iran.

DECLARATIONS

Author contributions

Alijani O: Project administration; Supervision; Data curation; Mohammadian HD: Methodology; Validation; Resources; Saadat PK: Data curation; Resources; Writing – original draft; Moghadam MR: Formal Analysis; Investigation; Visualization; Conceptualization.

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Conflict of interest

Mohammadian HD is the editor-in-Chief of the journal, and Alijani O is an editorial board member of the journal. The article was subject to the journal's standard procedures, with peer review handled independently of this editor and his research groups.

Data sharing

No additional data.

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