Original Article

Presenting avalue chain model for the consumer in the healthcare industry using a mixed method of systematic review and grounded theory

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ABSTRACT

Introduction: Considering the importance of the subject of health, treatment, and patient and the very high impact of health and its direct and indirect impact on the quality of life, community health, and the health of future generations, and also the lack of a coherent model in the field of the value chain, we decided to identify the factors affecting the patient value chain and present a model following Iranian culture in this field by investigatingprevious studies and interviewing with the experts of industry andlocalization. **Methods:** The present study is a systematic review consisting of 3 various stages. In the first stage, using the systematic review method, previous researches (without time limit) were investigated; 834 initial articles were found and based on the 50-point Rubric scale, a preliminary investigation was performed, 234 final articles wereinvestigated, and the factors affecting the value chain were extracted. In the second stage, the obtained factors were localized through the Delphi method and interviewing with the healthcare industry and university experts. In the third stage, using the grounded theory method and through an interview with the healthcare industry and university experts, the results were identified. To measure the reliability of the model, the Kappa index was used and its value was calculated to equal to 0.95, which was located at anexcellent level. Besides, the content validity of the model was confirmed by university professors using the relative coefficient of CVI and CVR with an excellent level and number 1. For analysis and designing the model, NVIVO10 software was used. **Results:** The main result is to achieve a value chain model in the healthcare industry, including causal, contextual, intervening criteria, and strategies with 15 criteria and 73 sub-criteria. **Discussion and Conclusion:** According to the findings of the study, the value chain in the health industry was investigated as a case study,and a comprehensive model was presented that can help patients, medical staff, and healthcare provider organizations to create structured value for the patient, and structural processes are created to present these models.

Keywords: Model, Value chain, Systematic review, Grounded theory

Introduction

To understand how to do a business value chain analysis, we must first know what a value chain is. A value chain encompasses the full range of activities, including design, production, marketing, and distribution that businesses undergo. For

companies that produce products, the "customer delivery" chain begins with the "concept" of a product or service of the value with raw materials used to make their product and includes whatever is added to it before it is sold to the customer. The process of actual organizing all these activities so that they can be properly analyzed is called value chain management. The purpose of value chain management is to ensure that thosewho are in charge at each stage of the value chain communicate with each other and help the product reaches the customer in theright process and in the fastest possible time [1].

Michael E. Porter, aprofessor of the Harvard Faculty of Business was the first person who introduced the concept of the value chain. Porter invented the 9-ForceModel, which many

businesses and companies use to understand how much competitive advantage they have [1].

From the point of view of the final consumer, the existence of complete healthcare services is among the primary and very vital principles for the people of a society, and all governments and countries are trying to create suitable contexts in this field. The existence and provision of appropriate and high-quality healthcare services strongly affect the health of healthcare services consumerand having a healthy and empowered society, and since the health of society is the basis for progress and increasing the welfare of society, it should be one of the main priorities of any country [2].

Healthcare services through the value created for the consumer of these services can be identified and evaluated, and this issue is important that to what extent the provided services have created value for the consumer. The evaluation of this created value depends on identifying and evaluating the indicators affecting it, so identifying and presenting the value chain model of indicators and factors affecting the value created for the consumer of healthcare services areessential. This research has been conducted to present a value chain model by a mixedmethod of a systematic review and grounded theory. In the following, the theoretical literature in the field of the value chain is investigated, and then by introducing the method of this research, the value chain model and its components will be presented. The research intends to answer the following questions [3]:

Main Research Question:

What is the value chain model in the healthcare industry ofIran? To answerthe above main question, the following sub-questions should be followed.

1. What are the causal factors affecting the value chain in the healthcare industry ofIran?
2. What are the contextual factors affecting the value chain in the healthcare industry ofIran?
3. What are the intervening factors affecting the value chain in the healthcare industry ofIran?
4. What are the strategies affecting the value chain in the healthcare industry ofIran?
5. What are the expected consequences of establishing a value chain model in the healthcare industry ofIran?

Methodology

In this research, the meta-combination method and systematic review have been used to design a value chain model. In general, there are two categories of article review: Narrative review 2. Systematic review. In cases that there is not that much evidence and data, the narrative review will be valuable. In topics that large amounts of data are available, personal opinions are not that much important and with the help of a systematic review, the evidence can be carefully examined and evaluated (Hall,

2003). In this study, to perform the systematic review method accurately, the 9-stage model of Okoli and Schabram (2010) has been used, which has been shown in Figure 1 [4].
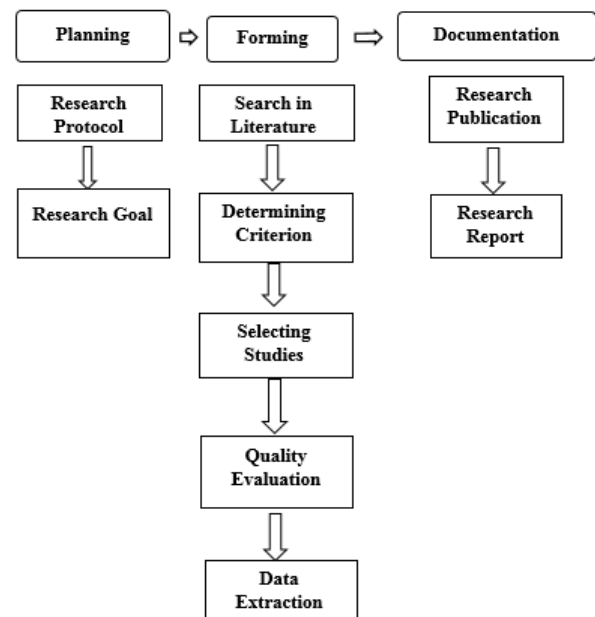
Figure 1: Stages of Systematic Review of Okoli, and Schabram (2010)

The meta-combination method is used to integrate several studies to create comprehensive and interpretive findings (Beck, 2002). In general, meta-combination is a kind of qualitative study that investigates information and findings extracted from other qualitative studies with related and similar topics. As a result, the desired sample for meta-combination is selected from qualitative studies and is made based on their relationship with the research question (Noblit, 1988). To investigate the meta-combination method, Sandelowski and Barroso's seven-stagemethod has been used, the summary of these stageshas been shown in Figure 2. To reach the value chain model, the seven steps in the following diagram should be followed [5].
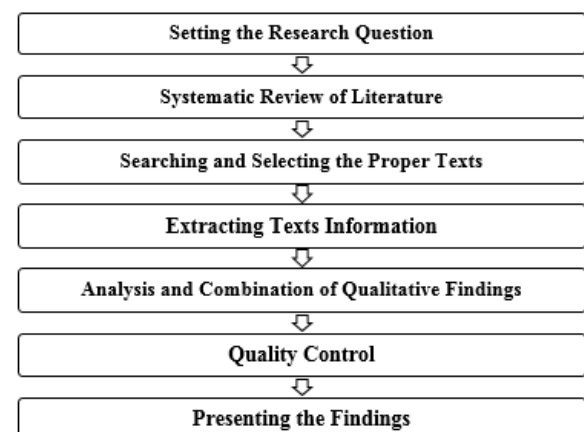
Figure 2: The Meta-Combination Sandelowski and Barroso's Seven-StageMethod (Sandelowski &Barroso, 2007)

Results

Step 1: Setting the Research Question

Various parameters such as the case study population, what, when, and how the method is applied, are usedto set the research question.

What are the components of a value chain model?

Step 2: Literature Review in aSystematic Way

At this stage, a systematic search was focused on articles published in various journals, and the relevant keywords were selected, which have been presented in Table 1. The present review study was conducted systematically. The studies published during the ADyears ending in 2020 havebeen collected from the following databases in Persian and English languages:

ISI-SIENCEDIRECT-SPRINGER-JSTOR-CAMBRIDGE-OXFORD-TAYLOR & FRANCIS-MAGIRAN-SID-GOOGLE SCHOLAR-IRANMEDEX-PUBMED-ELSEVIER-PROQUEST-EMERALD-IRANDOC-SCOPUS

The articles have been organized in the form of 234 folders, and have been investigated and compared. To facilitate the search with the value chain according to the Table below, the expressions specified in the databases have been used for a systematic review. In the next step, the systematic review of the inclusion and exclusion criteria of articles to the present study was performed. Reviewing the articles finally led us to a specific number of articles to extract the model.

The inclusion criteria of the present researches are 1. Use of terms determined for the title, 2. Completeness of research report, 3. The relevance of research contents to topics related to the classification of value chain studies,and 4. Use of value chain models.

The exclusion criteria of the study include 1. Studies that have only published the abstract of the study, 2. Published in languages unfamiliar to the researcher. According to Diagram 1, from among the 819 articles found, 234 articles have been investigated using keywords.

Table 1: Search Keywords in Research

No.	Persian	English
1.	ارزش	Value
2.	زنجیره	Chain
3.	زنجیرهارزش	Value Chain
4.	مدلزنجیرهارزش	Value Chain Model
5.	شاخصهایزنجیرهارزش	Value Chain Indexes
6.	عواملزنجیرهارزش	Value Chain Factors

Step 3: Searching and Selecting the Proper Texts

At the beginning of the search process, it was specified whether the texts fit the research question or not, and to achieve this goal, the selected set of studies was reviewed several times and at each stage, articles and texts that did not match the topic were eliminated, that ultimately a limited number of articles was sufficient. As soon as the articles were reviewed to fit the study parameters, in the next step, the methodological quality of the studies was evaluated. The purpose of this step was to delete articles that their presented findings could notbe trusted. Therefore, evaluation skills are essential tools commonly used to evaluate the quality of initial research qualitative studies.

The CASP method is 10 questions that help you to understand the concept of qualitative research. This tool helps the researcher to specify the accuracy, validity, and importance of research qualitative studies. These questions focus on the following cases: 1. Research goals, 2. The logic of the method, 3. Research plan, 4. Sampling method, 5. Data collection, 6. Reflectivity which includes the relationship between the researcher and the participants, 7. Ethical considerations, 8. Accuracy of data analysis, 9. Clear and obvious expression of findings,and 10. Research value. At this stage, the researcher gives a quantitative score to each of the questions and then creates a form. So he can sum up the scores he gives to each article and easily and concisely investigatesthe collection of articles and observesthe evaluation results. Based on the 50-point Rubric scale, the researcher proposes the following scoring system and eliminates any article that is lower than the score "good" (less than 30), "excellent" (40-50), "very good" (31-40), "good" (21-30), "moderate" (11-20), and poor (0-10) (Finfigeld, 2003). Based on the score given to each article, the minimum average given to articles has been 25 and the maximum score has been 46. As a result, in the evaluation process, the researcher deleted 585 articles out of 819 articles and finally, 234 articles remained for data analysis. The process of revewing or selecting the desired articles has been shown in figure 3 [6].
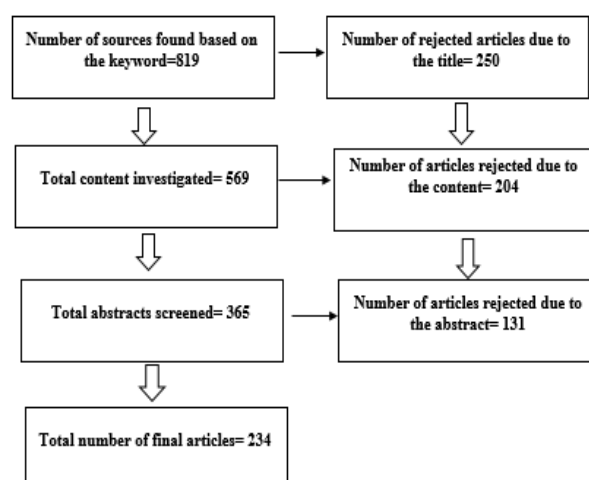

Figure 3: The Process of Reviewing or Selecting the Desired Articles

Step 4: Extracting Text Information

Throughout the meta-combination, the researcher continuously reviews the selected and finalized articles several times to achieve the findings within the separate content in which the original and primary study is performed. In the present research, the information of the articles has been classified in the form of 46 folders. Then the reference of each article is recorded (author's name and surname, year, article name, and folder name have been classified). Then the folders that are located in the main components of the value chain and are referred to are mentioned by page number.[7]

Step 5: Analysis and Combination of Qualitative Findings

Throughout the meta-combination, selected and finalized articles were reviewed several times to achieve the findings within the separate content in which the main and initial studies are performed. The criteria and sub-criteria of the model havealso been determined. The goal of meta-combination is to create an integrated and new interpretation of findings. This methodology has been accepted to clarify concepts and modelsand results in refining existing states of knowledge and the emergence of operational models and theories (Finfengeld, 2003). Throughout the analysis, themes are searched that have been emerged amongthe meta-combination studies. This title is known as a thematic investigation. Once the themes have been identified and specified, the reviewer forms a classification and places similar and relevant classifications into a theme that describes it in the best way. They provide fundamental themes for creating explanations of models and theories or working hypotheses (Sandelowski, 2007). First, all the factors extracted from previous models (criteria) that can be observed in the previous step were consideredas codes. Then using the Delphi method and semi-structured interview with the healthcare industry and university experts, identified factors were examined and the ratio of alignment with the country's culture was examined and localization occurred. In the next stage through the grounded theory method and interviewing with the healthcare industry and university experts,the contextual, causal, intervening factors, strategies, and consequences were identified [8].

Step 6: Quality Control

In this research, to maintain the quality of the study, the Kappa index has been used; the method of calculating the Kappa index is as follows. Since in the stages of designing the model, the previous model criteria were considered as code, and by taking into account the semantic similarities between codes, the concepts have been integrated and created. In this way, another person from the elites of management and health sciences without knowing how to integrate codes and concepts created by the researcher, have categorized the codes into concepts. Then the concepts were presented by the researcher with

conceptscreateddifferentlyand the Kappa index has been calculated. As it is observed in Table 2, the researchers are of a common concept.As it has been shown below, the Kappa index value was calculated to equal 0.9, which is at an excellent level according to Table 3 [9].

Table 2: Reliability of the Meta-Combination Method

Researcher's Opinion		Researcher's Opinion		
Total	No	Yes		
14	B=0	A=14	Yes	Another Expert's Opinion
1	D=0	C=1	No	
N=15	0	15	Total	

Observed Agreements= A+D/N= 15.14+0.22=0.93

Table 3:Kappa Index Situation

(A+B/N) *(A+C/N)*(C+D/N)*(B+D/N)=

(14+0)/15*(14+1)/15*(1+0)/15*(0+0)/15=0 =Chance Agreements

Numerical Value of the Kappa Index	Status of Agreement
Less than 0	Poor
0-0.2	Insignificant
0.2-0.4	Moderate
0.41-0.6	Appropriate
0.61-0.80	Valid
0.81-1	Excellent

K=Observed Agreements -Chance Agreements =Chance Agreements-0.1
K=0.93

Step 7: Presentation of Findings (Through Grounded Theory Method)

Data Coding

There are three coding techniques in the grounded theory method: open coding, axial coding, and selective coding [10].

• Axial Coding

Axial coding is the process of linking categories to subcategories and linking categories at the level of features and dimensions. This coding is called axial because the coding takes place around the axis of a category. In this stage, the categories, features, and dimensions obtained from open coding are compiled and are placed at their position, so that the growing knowledge about relationships is created. In the axial coding stage, Strauss discusses several key actions shown in Table 4 below [11].

• Open Coding

At this stage, the grounded theorist selects an open coding stage category, and places it at the center of the process under investigation, and then relates the other categories to it. The other categories are "causal conditions", "intervening conditions", "contextual conditions", "strategies", and "consequences". This stage involves drawing a diagram called the "coding model". The coding model shows the relationships

between causal conditions, strategies, contextual conditions, intervening conditions, and consequences [12].

According to figure 4 and By examining this model, you observe that there are six categories of information:

1- "Causal conditions" are categories related to conditions that affect the axial category;

2- "Context" is specific conditions that affect strategies;

3- "Main category" is a mental form of the phenomenon that is the basis of the process;

4- "Intervening conditions" are general contextual conditions that affect strategies;

5- "Strategies" are specific actions or interactions that result from anaxial phenomenon;

6- "Consequences" are the outputs resulting from the implementation of strategies [13].
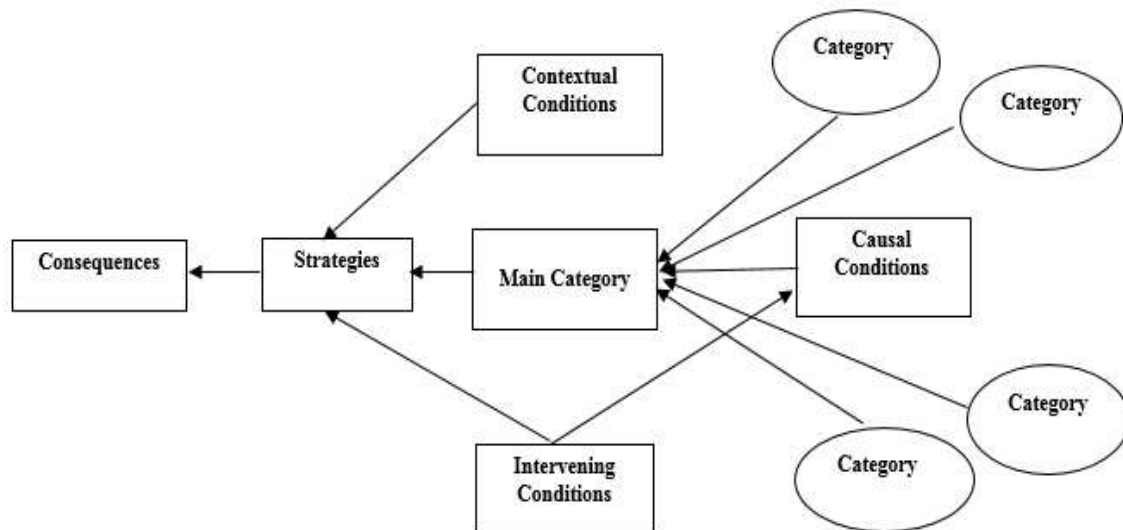
Figure 4: Coding of Grounded Theory from Open Coding to Axial Coding Model [13].

Using Selective Coding and Creating a Theory

In this stage of the research, the findings obtained from the previous stages are presented; 234 selected articles were carefully investigated during 9 months and the required information was identified based on the main purpose of this article, which is to design a value chain model. At the next stage of the research, in order to localize the initial model of the value chain in the healthcare industry, 7 experts from this industry and the university were interviewed, and based on the available findings, the specified factors were confirmed and recognized in line with the country's culture. In the third stage of the research using the grounded theory methodand through a semi-structured interview with 7 experts in the healthcare industry and the university, the factors affecting the value chain were examined. In the text obtained from the interviews and investigating previous researches, 401 codingshave been performed. The process of identifying the codes was reciprocal.The next step after coding the texts is to analyze, combine, and integrate the codes in the form of concepts. In this step, the identified codes were classified and combined based on the ratio of conceptual similarity and the concept was extracted. Appendix 2 contains examples of concepts identified in the excerpted text of a sample interview, that have been classified in the subthemes.Such an action was done for each of the interviews, and if there were some sections with similar themes in the text of the previous interviews, the same previous codes were allocated and used as their markers. Then based on all sub-themes identified in the whole research, a more general classification was performed, which led to the identification of 15 criteria including contextual factors, causal factors, intervening factors, strategies and consequences, and 73 sub-criteria, and finally,the value chain model was designed. value chain model in healthcar industry as the main result of this article is shown in figure 5.
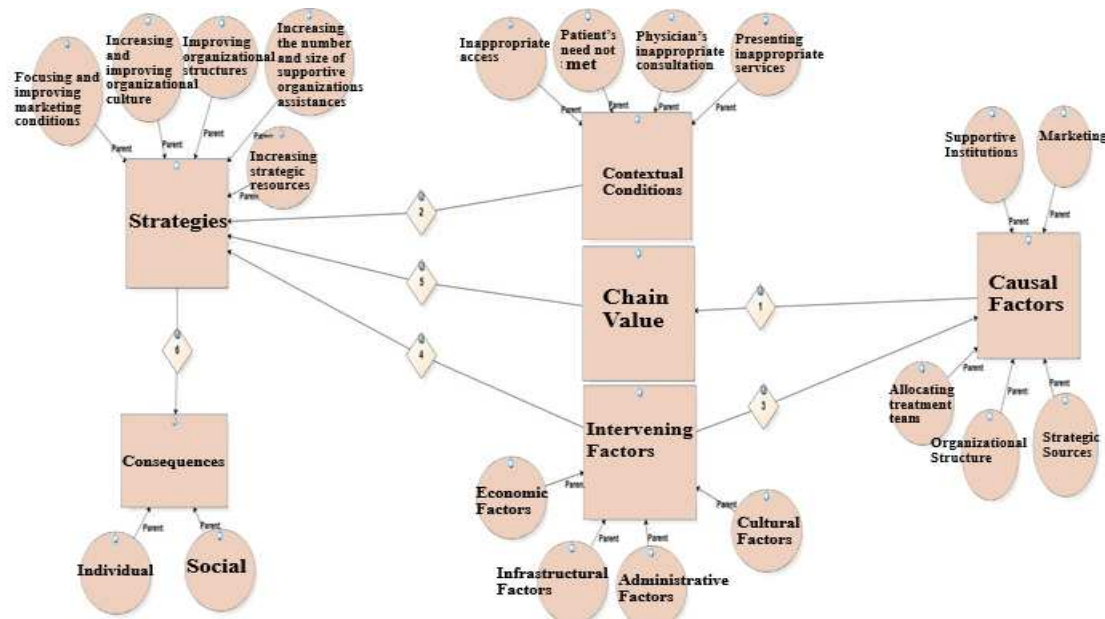
Figure 5-value chain model in healthcar industry

Table 4: Questions of Interviewwith Healthcare Industry Experts

The main research question in an interview with excellence experts and managers in the field of healthcare is as follows:

What is the value chain model in the healthcare industry of Iran? And what are the dimensions and relationships of this model?

1- In your opinion, what are the causal conditions affecting the value chain model in the healthcare industry of Iran? And does it have dimensions and components?

2- In your opinion, what are the contextual conditions for the implementation of the value chain model in the healthcare industry of Iran?

3- In your opinion, what are the intervening factors in the implementation of the value chain model in the healthcare industry of Iran?

4- In your opinion, what strategies can be adopted in implementing the value chain model in the healthcare industry of Iran?

5. In your opinion, what are the consequences of implementing the adopted strategies for the healthcare industry?

In the final stage of the work, the model was provided to the healthcare industry and the university experts to investigate it scientifically to be finalized. To evaluate the content validity from the experts' point of view about the ratio of content coordination, the measurement tool, and the research purpose are used. For this purpose, to investigate the components'validity, the relative coefficient of content validity (CVR) has been used. Each component was examined based on a four-part irrelevant spectrum, the need for serious review, relevant but requiring review, and completely relevant; and finally the experts' opinions about the final model were asked in three spectra ofgood,requiring modification, and bad [14].

Then the answers are calculated according to the following formula:

$$CVR = (ne-N / 2) / N / 2$$

In this equation, ne is the number of experts who have answered to the "necessary" option and n is the total number of experts. If the calculated value is greater than the value of Table 5, the content validity of that item has been accepted [15].

Table 5: Relationship Between Validity and the Number of Experts

Number of Panel Experts	Minimum Validity Value
5	0.99
6	0.99
7	0.99
8	0.85
9	0.78
10	0.62
15	0.49
20	0.42
25	0.37
30	0.33
40	0.29

For the CVI index, the aggregation of agreed scores for each item that has gained relevant score but needs to be reviewed and fully relevant is calculated by dividing the total number of experts. Considering that the number of experts has been 7, if the CVR score is 0.99, the content validity of the scale is confirmed. In this research, the obtained value was equal to 1 and finally, the validity of the research model was confirmed by experts. Finally, the model with 15 criteria and 73 sub-criteria was designed (Table 6 shows this classification) [16].

Table 6: Factor Analysis Result of the Chain Value Model [1, 2, 11-15, 17-22].

Contextual Factors	Providing Inappropriate Services	Availability of equipment
		Physician-patient relationship
		Patient satisfaction
		Clinical activities
		Service continuity
		Residential activities
	Patient's Needs Not Met	Nursing services
		Pain relief and management
		Getting help from specialists
		Treatment management
		Sensitivity to the patient's symptoms
	Inappropriate Access	Hospitalization or outpatient facilities
		Facilities for the treatment of acute or chronic disease
		Urban or rural location
		Private or public services
	Physician's InappropriateConsultation	Expressing empathy with the patient
		Agree to start treatment
		Correct diagnosis
		Explaining the treatment process
		Optimal interaction with the patient and companion
		Patient education
		Specifying the patient's next visits
Causal Factors	Marketing	Identifying the target market
		New service
		Ability to update with patient need
		Service development
		Communication programs
		Making a service package
		Distribution of services
		Provision of services
		Proper pricing
		Brand positioning
		Advertising
	Organizational Structure	Executive system
		Structural flexibility
		Management and planning
		Organizing human resources
	Strategic Sources	Information
		Technology
		Human resources
		Financial
	Supportive Institutions	Health insurance
		Medicine and vaccine
		Financial aid
	Treatment Team Specialty	Skill and experience of the treatment team
		Up-to-date scientific and specialized information

Intervening Factors	Economic Factors	The education level of the treatment team
		Patient's economic conditions
		Economic conditions of the treatment team
		Economic conditions of the treatment organization
		Economic conditions of society
	Administrative Factors	The flexibility of administrative rules
		Administrative bureaucracy
	Infrastructural Factors	Cultural infrastructures
		Therapeutic infrastructure
		Communication infrastructures
	Cultural Factors	Common values
		Behavioral forms
		Common assumptions
Strategies		Improving organizational structures
		Increasing and improving organizational culture
		Increasing the number and volume of assistances from supportive organizations
		Increasing strategic resources
		Focusing onand improving marketing conditions
Consequences	Social	Increasing the quality of community health services
		Increasing the quality of life of the community
		Creating and increasing awareness about the disease and the treatment system
		Creating job security and a suitable working environment for the treatment team
		Changing community attitudes from treatment to health and prevention
	Individual	Increasing the value perceived by the patient
		Enhancing the quality of treatment
		Reducing patient treatment costs
		Reducing treatment time

Discussion:

In this section, the explanations of cases regarding the innovation of this research aredeclared:

1- This research has used the mixed method of a systematic review and grounded theory, which are considered as innovative cases in this regard.

2- No research has been conducted to present a value chain model so far, and for this reason, this research has innovation.

3- Previous researches conducted inside and outside the country have examined limited aspects of the value chain, but this research has comprehensively considered various aspects and factors, which is another innovative aspect of this research.

Suggestions:

It is suggested thatother researchers develop this model with more interviews and more experts and add other factors to the model, and it is also suggested that the value chain model for other industries isexamined and developed.

Limitations:

One of the limitations existing in the research has been the difficulty in finding the healthcare industry and university experts for cooperation.

There have also been time and space restrictions to access experts.

There are other limitations tothis research. Considering that indicators were used for quality control, but this limitation still exists that an article has been entered into or excluded from the research by mistake.

Conclusion

This research has sought to answer the question: What model does exist in the healthcare industryfor the value chain for the patient? In this research, a primary model was designed for the value chain model with a systematic review and grounded theory. For this purpose, 819 articles were searched and investigated and finally, 234 final articles were selected for review. In the next step, using the Delphi method the found factors were localized. In the next step, using the method of grounded theory and interviewing the experts, the factors affecting the value chain, including the contextual factors, causal factors, intervening factors, strategies, and consequences were

specified and 15 factors and 73 sub-factors were specified for designing thecode, and finally, the value chain model was presented. Contextual factors affecting value chain establishmentwere specified as providing inappropriate services, not meeting patient's needs,inappropriate access, and physician'sinappropriate consultation. Causal factors affecting the value chain include marketing, production, organizational structure, supportive institutions, treatment team specialty, and strategic resources. Intervening factors were specified as including administrative, economic, infrastructural, and cultural factors. Value chain establishment strategies were specifiedas including increasing the number and volume of supporting organizations' assistance, increasing volume and quality of production, increasing strategic resources,increasing and improving organizational culture, improving organizational structures, and focusing and improving marketing conditions. The consequences of establishing a value chain model were also specifiedas including individual and social consequences.

Acknowledgments:

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