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RESEARCH ARTICLE **Open Access**

A Model of Evaluating the Agile of Health care Institute using a Stable Balanced Score Card (Case study: selected Hospitals in Gilan province)

Faeqheh Saharkhiz Roshandel [1], Jalal Haghighat Monfared [2*], Hossein Adab [3]

Abstract

Organizations face many challenges in the current unpredictable and changing business. In this trend, the field of production has moved towards "Agile Production". An agile hospital, it can respond when faced with internal and external changes and compete with other hospitals and provide appropriate and fast services to patients. Today, hospitals are currently trying to continuously evaluate their performance due to the increasing advancement of technology. To evaluate the performance of the organization, the Balanced Score Card (BSC) approach is a method in which indicators measure the goals of the organization in four aspects of internal process, Growth and Learning, Financial and Customer. However, in this approach, aspects of sustainable development are ignored, there for, the developed method of Sustainable Balanced Score Card (SBSC) is used to evaluate the performance, which also takes into account the environmental index. This study identified the factors that can be important for evaluating agility in the hospital and then classify them based on the perspectives of SBSC perspectives. In the next step, using a questionnaire and statistical hypothesis test, the effectiveness of these factors was confirmed. Then, the importance of each perspective in the field of agility was determined by hierarchical analysis, and this model was presented using the scoring method. Regarding the innovation of this research, we can refer to the evaluation of agility from the perspective of the scorecard by considering the criterion of stability (SBSC) in the hospital.

***Key words**:* Agile, Evaluation, Stability Balanced Scorecard, Hospital, Health Care Institute

Introduction

With the beginning of the 21st century, service organizations, including hospitals, have seen drastic changes around them. The intensity of these changes has been such that it has faced these organizations with new challenges and not paying attention to them severely affects the survival and success of the organization. In these complex, variable, rapidly growing and unpredictable situations, competitive advantage is also one of the main goals of organizations. In line with this trend, hospitals, as one of the most important health cares, should be like learning organizations, they to be able to faster, cheaper, more up-to-date and more effective to meet the demands patients respond. Improving the quality of treatment methods and achieving the highest standard is one of the most important goals of healthcare organizations (Mahmoudi, 2018). In such situations, the slightest negligence can sometimes lead to irreparable failures and losses, because their organizational capabilities do not respond to environmental changes. To this end, organizations make great efforts to increase organizational speed and flexibility. One of the paradigms proposed for this purpose is organizational agility. Therefore, hospitals need to be agile, and an organization

[1,2,3] Department of Management, Central Tehran Branch, Islamic Azad University, Tehran, Iran
[2*] Corresponding Author: Email:jhm1847@gmail.com

that wants to be agile must shorten the workflow of the process and provide the conditions to save time. In the agile approach, eliminating waste and optimal use of resources is always one of the important goals. Process re-engineering, product development teams, staff development programs, moving to virtual organizations, increasing the ability to respond effectively to customer needs, and market analysis to respond effectively to change are some of the activities we do in this regard. In addition, organizations need to think beyond adaptation to change in order to cope with new change, and seek to seize potential opportunities. In this study, the aim is to achieve a model for assessing agility in the hospital.

Background

Confusion and uncertainty in the business are some of the main causes of failure in the service organizations. Different institutions experience different changes that are unique to them. Some of these changes are (Abdi Talarpashti, 2017):

- The emphasis of organizations on introducing new services and focusing on their marketing
- Customers' need a wide variety of services
- Customers' desire to satisfy their demand individually
- Globalization of markets and market position of organizations

These and other factors have led to service organizations today operating in an environment where change is the most important feature. To cope with the new change, organizations need to think beyond adaptation to change and seek to seize potential opportunities. To recognize this trend, the paradigm of "Agile Production" increased flexibility, speed, and quality (Hamidi, 2019). Agility means flexibility and the ability to react to environmental changes (Yusuf, 2000). In an agile environment, any organization must be able to produce or perform different products or services simultaneously in a short time, redesign products, change capabilities to be referred to that agile organization. Reducing production costs, increasing customer satisfaction, eliminating value-added activities, and increasing competition are some of the benefits that can be achieved through an agility strategy. In the business market, agility is created in a variety of ways (Jafarnejad, 2017). By examining the conceptual models and various frameworks about agility, the criteria for measuring agility in the organization can be listed. The use of information technology (IT) tools that have been mentioned in all models (Sharifi, 2001). Information technology is one of the important facilitators in the activities of today's organizations, so that more than half of the capital of current organizations is based on it (Navaie, 2013). Kuroupalil (2018) referred to the components of staff, technology, information system, and production as elements of agility. Agarwal et al. (2007) also focused more on market-related variables, including market sensitivity, new product introduction, customer satisfaction, and trust-building (Kuruppalil, 2018). Charles (2010) describes humans, processes, products, and partners as elements of agility. Dischler and Hogg (2011) believe that most models of the field of agility focus on attention to human resources, creating virtual networks, attention to environmental variables and factors that occur in the organizational environment, and finally strategic variables such as risk, change, and Culture (Abdi, 2017). Overall, the most important capabilities of agile organizations to handle change, uncertainty, and unpredictability in the workplace: Speed, Competence, Responsiveness, and Flexibility (Rajabzadeh Qatari et al., 2015). According to the review of various researches, finally, the most important cases for assessing agility in the organization can be listed in Table 1.

Table 1.
Classification of organizational agility assessment indicators

Index	Definition	Components	Resources
Speed	Ability to perform operations in the shortest possible time	Quickly learn to perform new tasks	Aghaei, et al, 2014, Dahmardeh, et all, 2010, Doz, et al, 2010, Ebrahimian Jelodar, et al, 2011, Farzaneh, et al, 2014, Fathian, et al, 2009, Hamidi, et al, 2019, Hormozi, 2001, Ibrahim Nejad, et al, 2009, Iranzadeh, et al, 2013, Jafarnejad, et al, 2017, Khorshid, 2010, Mullah Hosseini, 2017, Sayadi Turanlu, et al, 2017, Sharifi, et al, 2001, Tseng, et al, 2011, Yaghoubi, 2010, Yusuf, et al, 1999, Zanjirchi, 2017, Zitkiene, et al, 2018, Zhang, at al, 2000
		Speed during operation	
		Fast delivery and timely service	
		Time to adapt to change	
Competence	A set of abilities to achieve goals with productivity activities	Multi-risk capability	
		Difficulty copying business methods developed	
		skills, knowledge, and competence of individuals	
		Appropriate hardware and software technologies	
		Forming a quick partnership	
		Multiple services	
		Quality of service provided	
		Effectiveness and efficiency of operations	
		Customer satisfaction	
		Cooperation to increase competitiveness	
Responsiveness	Recognize changes and respond quickly to the ability	Responding to changes in demand	
		Responding to changes in the business and market environment	
		Responding to changes in social-environmental achievements	
		Degree of adaptation of business goals to changes	
Flexibility	Ability to produce and provide different services and achieve different goals with the same resources and equipment	Flexibility in service volume	
		Flexibility in service diversity	
		Create new teams	
		People flexibility	

At the beginning of the 21st century, service organizations have seen intense changes around them that have posed new challenges, and a lack of attention to these challenges has severely affected the survival and success of organizations. Hospitals likewise, if they do not pay attention to the implementation of new management approaches such as agile approach in planning and improving work processes and continuing activities based on previous methods, unintended consequences such: increased medical errors, death, and the length and duration of hospitalization, patient and staff dissatisfaction, costs and reduced productivity (Mahmoudi, 2018). Full attention to the efficiency of the hospital as the largest and most cost-effective unit of the health system is of particular importance (Latifian, 2018). In the last few years, this idea has spread in many healthcare centers and has been able to make significant improvements in the provision of quality services, which has not been achieved except with proper culture building and gradual and continuous improvement. According to the

results of Abdi et al.'s research on Agile Hospital, responding to rapid changes in patients' needs has become a successful strategy in competitive markets, and the faster patients and their companions are treated, the greater the satisfaction and it has a positive effect on hospital agility. According to this study, continuous monitoring of patients' expectations can facilitate the provision of hospital services and increase the desirability of the services provided and improve the quality of services and patient satisfaction (Mahmoudi, 2018). Employee skills development, application of information technology, process integration, market sensitivity and responsiveness, appropriate planning, new product introduction, cost reduction, customer satisfaction, product quality have been significantly related to the agility-dependent variable. Therefore, knowing the factors affecting agility is essential for hospital officials to compete with other hospitals and provide services to patients (Bani Hashemi, 2018). Hospitals need to develop new strategies and improve their infrastructure, including establishing a flexible organizational structure, outsourcing supply and services, professional development of staff, and preparedness for environmental change to increase agility capabilities (Tolf, 2015). In the current situation, due to the competitive nature of the surrounding space, we conclude that hospital customers can also choose other service centers.

Lack of evaluation and control system in a system means not communicating with the internal and external environment of the organization, the consequences of which are aging and ultimately the death of the organization. Individuals or organizational units are only a part of the whole system and the conditions of other components must be considered. In the past, financial metrics were the basis for evaluating the performance of organizations, but now, on the one hand, the limitations of the old methods and, on the other hand, the new approaches, lead to a change in attitudes in the performance evaluation method (Soleimani, 1397). Approach Balanced scorecard (BSC) is one of the methods used to evaluate the performance of the organization, which was proposed by Kaplan and Norton in 1996 to demonstrate the strategy. This approach can determine the best strategies for the goals of the organization and in four ways, Growth and Learning, Financial and Customer and Internal Process in a balanced way to measure the evaluation of the organization (Valmohammadi, 2017). In this approach, aspects of sustainable development are ignored, which is why Figee et al. Conducted development studies in 2002 and defined a new method called Sustainable Balanced Score Card (SBSC) that combines environmental and social performance perspectives (Rabbani et al., 2014). This approach states that organizations, in addition to economic performance, need to participate in activities that have a positive impact on society and the environment. (Figue et al., 2002). This framework is shown in Figure 1. Protecting the environment and ensuring its sustainability is one of the serious challenges in the international community that environmental concerns have grown to such an extent that environmental crises are objectively embodied (Abbasi Bastami, 2020).

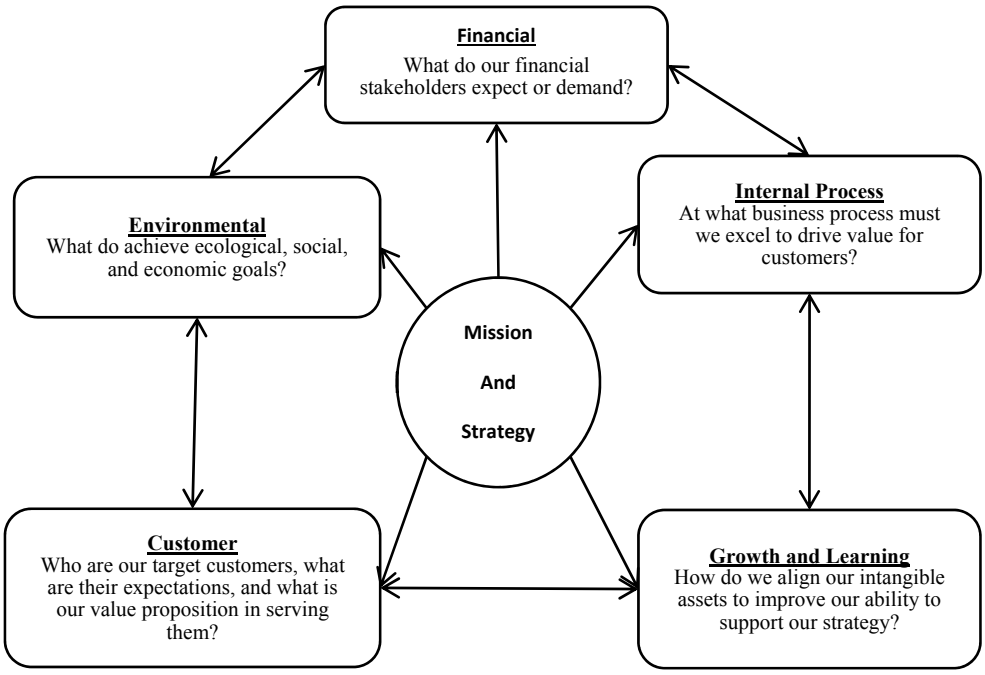

Figure 1. A structure of SBSC elements (Figge, 2012)

Literature Review

Some foreign and domestic researches in this subject of research are as follows. In 2018, Bani Hashemi et al., In their research, ranked the factors and examined the situation of agility and its promotion strategies in Birjand hospitals. They used the A.T. Kearney model to measure agility. According to the results of mean tests (t-test) in three hospitals and the level of significance obtained, agility criteria were determined in each of the three hospitals (Bani Hashemi, 2018). Mahmoudi & et al. In 2017, in a study, used agility to respond effectively to the changing and unpredictable environment and the opportunity for organizational progress and pointed to the ranking of factors affecting the supply chain of agility in Iranian hospitals. Finally, the introduction of a new product, market sensitivity and responsiveness, cost reduction, and integration of organizational processes, gained better ratings for hospital agility (Mahmoudi, 2018). In 2015, Tolf et al. Conducted a study to help increase understanding of the concept of agility and its potential for hospital managers to optimize the design of organizational structures and processes. They showed agility as a "new model" for pure and complementary follow-up in combination strategies to design processes to meet the real needs of medical centers and optimize hospital design and meet various changes in demand and establish good patient management (Tolf, 2015). Irajpour and Haji Lou in 2016, in a study aimed at identifying the dimensions and prioritizing the performance evaluation indicators of the organization based on the Sustainable Balanced Scorecard (SBSC). In this study, using the fuzzy network analysis process (FANP), they performed performance evaluation indicators in Pushineh Plastic Industries Company. To design the model, first, a list of related indicators was extracted and then reviewed by the company's experts, and the final model was proposed (Irajpour, 2016). In 2015, Moradi and her colleagues used the Stable Balanced Score Card approach to evaluate the performance of the organization and identify the performance indicators and used the fuzzy network analysis process to analyze the indicators (Moradi, 2015). In 2014, Rabbani and

his colleagues evaluated the performance of manufacturing companies (oil) in Iran using a stable balanced scorecard approach and multi-criteria decision making (Rabbani, 2014). According to the researches, there is no model for agility evaluation in the field of the hospital (one of the most important service organizations in the field of health) in Iran, and the researcher, in this case, to design a model of agility evaluation from the integrated approach of multi-criteria decision making and used the Stable Balanced Score Card (SBSC) approach to examine, in addition to the four common perspectives, the environmental perspective.

Method

Based on the model, 5 hypotheses can be formulated as follows:

1) The criteria of the internal processes affect the performance of hospital agility.

2) Customer criteria affect hospital agility performance.

3) Economic criteria affect the performance of hospital agility.

4) Growth and learning criteria affect hospital agility performance.

5) Environmental criteria affect the performance of hospital agility.

According to this, Figure 2 showed the hierarchical chart of indicators and agility perspectives in the hospital.

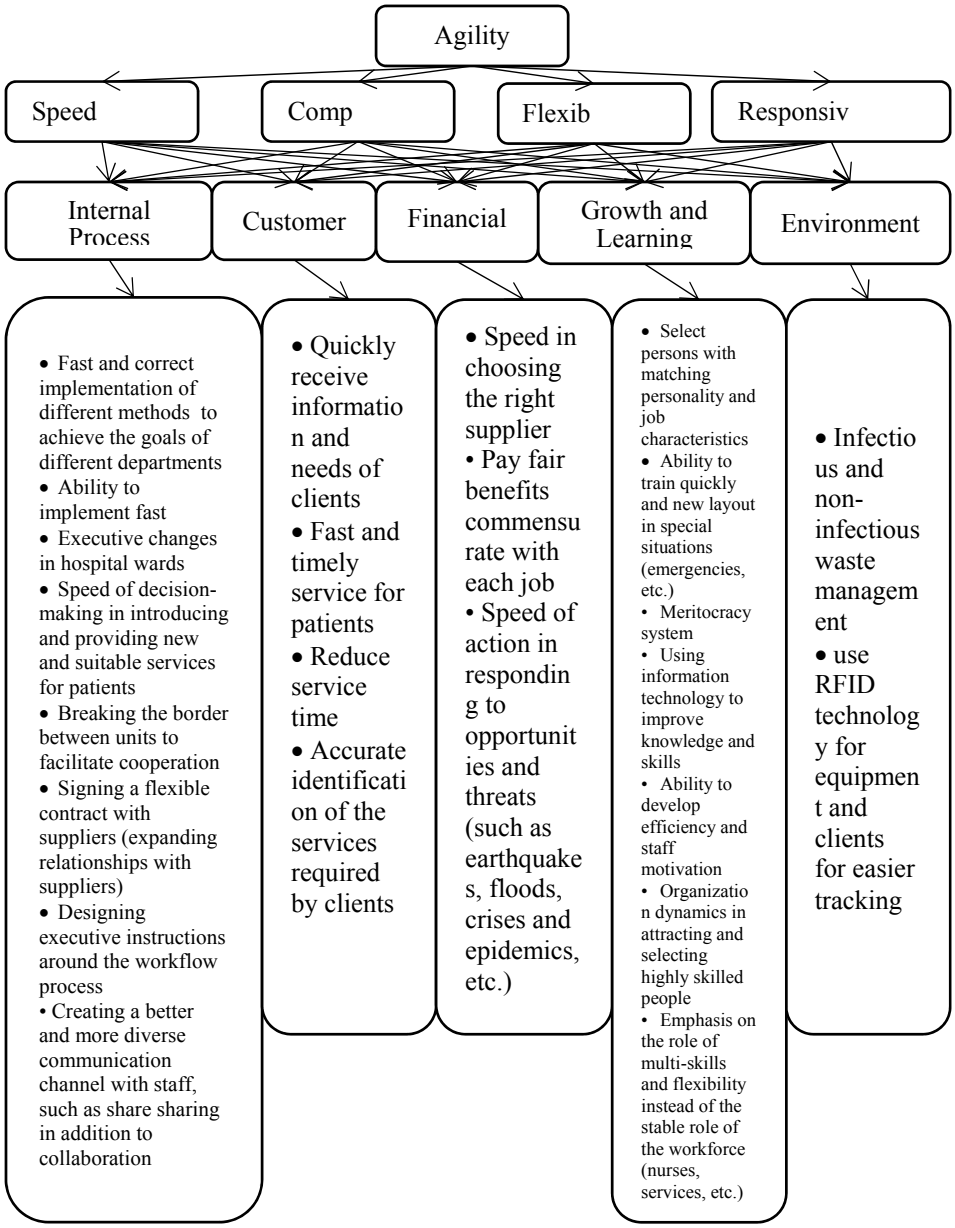

Figure 2. Diagram of the hierarchical for the model of agility indicators and perspectives in the hospital

Finding

This research is descriptive and in terms of method of data collection, it is a survey. In terms of purpose, the data and the type of data are quantitative. In this study, a closed questionnaire was used to test the research hypotheses and a pairwise comparison matrix was used to prioritize the criteria. The statistical population of the study is managers and experts working in three hospitals in Gilan province. To test the research hypotheses, a sample of 90 people consisting of 30 people from each hospital was selected. In the pairwise comparisons section, the statistical sample was selected based on the following 5 conditions and in a non-probabilistic method, and this number is up to 8 people.

1- At least 10 years of activity in various medical departments

2- A minimum bachelor's degree

3- Familiarity with the concepts of agility based on the researcher's explanations
4- Having at least one management or supervision position
5- Willingness to cooperate in research work

The questions of the questionnaire were adapted from different sources, but despite this, 8 experts were used to validate the content with the help of the CVR index (based on the values of the table Lavshe). Questions with a size below 0.75 were deleted and the rest were approved. Cronbach's alpha coefficient and combined reliability were used to determine the reliability of the responses. The closer the alpha value is to one, the higher the reliability. The acceptable value of this parameter is 0.7 and above which is presented in Table 2.

Table 2.
Cronbach's alpha table of values

Agility factor	Number of questions	Cronbach's alpha coefficient
Internal process	7	0.895
Customer	4	0.891
Economical	3	0.871
Growth and learning	6	0.808
Environmental	2	0.867
Function	5	0.766

To perform statistical analysis of data and information and their graphical representation, frequency tables and graphs and SPSS software have been used Kolmogorov-Smirnov (K-S) and Shapiro-Wilk tests were used to evaluate the normality of the distribution of variables, which were considered normal because since that the amount of error observed was greater than 0.05 which is presented in Table 3.

Table 3.
The results of Kolmogorov-Smirnov and Shapiro-Wilk tests

	Kolmogorov-Smirnov test		Shapiro-Wilk test	
Agility variables	Significant Level	Outcomes	Significant Level	Outcomes
Internal process	0.063	Normal	0.11	Normal
Customer	0.073	Normal	0.71	Normal
Economical	0.075	Normal	0.088	Normal
Growth and learning	0.2	Normal	0.13	Normal
Environmental	0.157	Normal	0.056	Normal
Function	0.502	Normal	0.121	Normal

To determine the correlation of the independent to the dependent variable, the correlation coefficient was calculated to be equal to 0.583. Also, with the Durbin -Watson statistic, the independence of the errors was measured, which should be between two numbers 1.5 to 2.5. In the analysis of the variance table, since the significance level was less than 0.05, then linear regression is significant which is presented in Table 4, 5, 6.

Table 4.
Model summary

Correlation coefficient	Determination coefficient	Modified coefficient of determination	Durbin - Watson
0.583	0.34	0.318	1.597

Table 5.
Analysis of variance

Source	Total Squares	Squared Mean	F Statistic	Significant Level
Regression Model	3.096	3.096	15.950	0.000
Residual	6.017	0.194		
Total	7.113			

Table 6.
Regression coefficients

	Non-standard coefficients		Standard coefficients	T Statistics	Meaning Level
	B	Standard Error	Beta		
Fixed	2.506	0.372		6.737	0.000
Internal process	0.646	0.209	0.685	5.205	0.000
Customer	0.607	0.424	0.622	2.748	0.000
Economical	0.662	0.323	0.702	3.478	0.000
Growth and learning	0.632	0.111	0.672	4.441	0.000
Environmental	0.575	0.409	0.592	3.423	0.000

To prioritize the factors, the hierarchical analysis method and Expert Choice software were used. At first, according to the pairwise comparison questionnaires, which by each of the eight experts, agility factors were prioritized separately, finally, the opinions of eight people were combined and became the basis of the evaluation model. The final prioritization is shown in Figure 3.

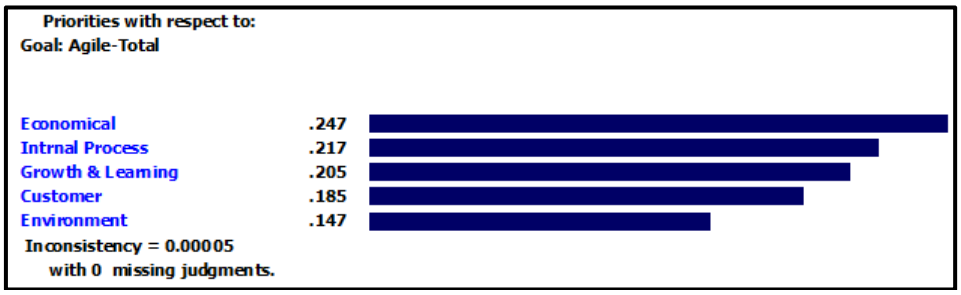

Figure 3. Paired comparisons and general prioritization of agility

According to the above pairwise comparisons, the importance and weight of each of the 5 criteria of a stable Balanced Score Card were calculated for 5 sections and an agility measurement model was obtained. This model is shown in Figure 4.

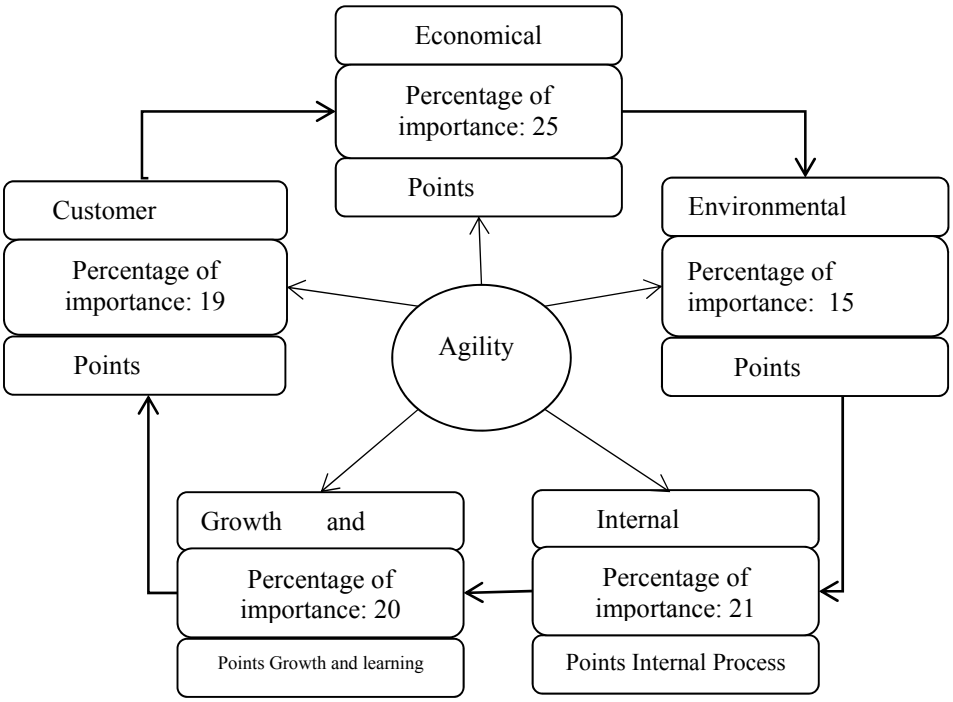

Figure 4. Model evaluation of Agility

The score provided for each of the factors is based on the table of indicators, which is a number in the range of 0-1. Explain that using a questionnaire related to agility evaluation, points are calculated for each section. The sum of these points is the total score of the unit being evaluated, which is obtained from 100.

Conclusion and Suggestion

Agility is the ability to use resources to respond to comprehensive internal and external changes and to identify opportunities and threats promptly on time, and this requires flexibility and effective and effective execution of processes. To succeed in this approach, managers of organizations must provide the appropriate infrastructure. In this study, the agility assessment model in the hospital is defined as described. The general steps of this research are summarized in Figure 5.

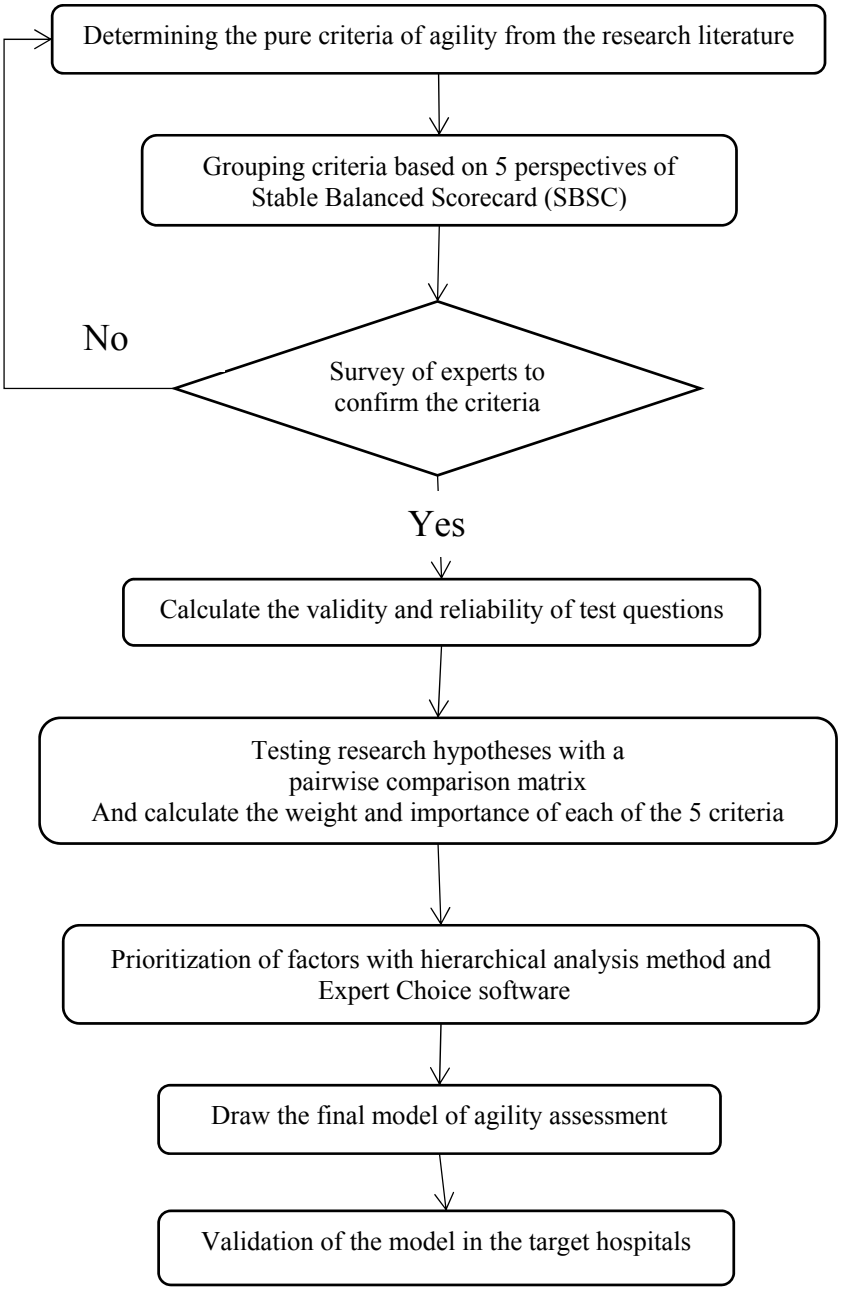

Figure 5. Steps to design an agile evaluation model in the hospital

According to the findings of the present study, the results of the hypotheses and the impact on performance are shown in Table 7.

Table 7.
Summary hypotheses and impact on performance

row	Variable	error rate	Significant level	Result	Impact rate	priority	convergence of the two methods
1	Internal process	0.05	0.000	it is affect	0.685	2	convergence
2	Customer	0.05	0.000	it is affect	0.622	4	convergence
3	Economical	0.05	0.000	it is affect	0.702	1	convergence
4	Growth and learning	0.05	0.000	it is affect	.0672	3	convergence
5	Environmental	0.05	0.000	it is affect	0.592	5	convergence

The main research proposal is to use this model in evaluating agility in the healthcare centers, which an assessment and improve the performance of this field. As mentioned, the effect coefficient based on regression equations is exactly based on the prioritization of the hierarchical analysis method, so the accordingly, the "Economic" index had the highest priority and the "Environmental" index had the lowest priority. Due to the high importance of the economic index, suggestions were made, the most important of which are the use of long-term loans for the promotion and development of hospitals, effective cooperation and the use of various insurance services of insurance organizations, considering inventory and tools, Equipment, essential devices in the warehouse for greater efficiency. To evaluate the degree of agility in each other hospitals, the process shown in Figure 6 can be used.

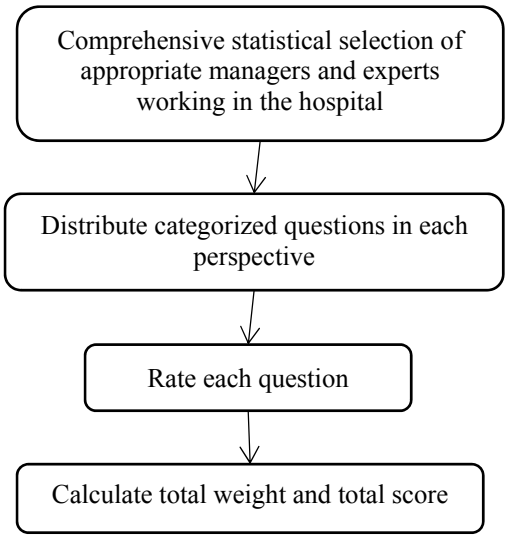

Figure 6. How to assess the degree of agility in each hospital

Some of the limitations of the research are:
1. Existence of other variables that were not identified in this study and may affect the evaluation of agility.
2. Evaluation of the model of this research is based on a Stable Balanced Score Card.
3. This research has been done in three hospitals of Gilan province.

Accordingly, it is recommended to the following researchers:
1) Identify and consider other variables and factors that can be effective in evaluating agility.

2) Providing evaluation models in the field of resilient and green performance
3) Using basic evaluation models such as 6-point scorecard, performance pyramid, EFQM…
4) Conducting such research in other provinces of the country

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