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Hasan Dincer
Serhat Yüksel *Editors*

Management Strategies to Survive in a Competitive Environment

How to Improve Company Performance

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Contents

Developing Strategies for Hospitals from Patient and Personnel Perspective with DEMATEL

Erman Kedikli, Emre Yılmaz, Yeter Demir Uslu, and Pakize Yiğit

Abstract In this study, it is examined that how to improve hospital performance was examined. In this context, because of the literature review, 12 different Balanced Scorecards Performance Indicators are selected, which may be effective for developing strategies. DEMATEL method used for determining more important indicators. According to the results, rate of patient complaints, staff satisfaction rate, patient's satisfaction percentage are the most important indicators. However, the rate of patient complaints and staff satisfaction rate rank the first and the second, while the cause degree of them are effect and cause, respectively. Thus, managers need to pay more consideration and developing strategies to increase staff satisfaction, so it will be possible to reduce the percentage of patient complaints, second important criteria. Consequently, increasing to staff satisfaction rate can help the improving total performance.

1 Introduction

Strategic management is a set of activities and decisions determined by business management with the participation of all management levels to determine the long-term activities of businesses. The first stage of this is strategic planning (Arslan, 2010). Strategy development and strategic planning have become required efforts to achieve medium- and long-term goals for almost any institution. Within the scope of strategic management while, "internal factors" can develop under the control of institutions, "external factors" are shaped under the influence of the future "environmental conditions." The environmental conditions are constantly changing, and it

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will naturally not be the same as those for the current environment. Based on this fact, institutions and need to have information about risks and how the future will be shaped (Cesmeci, 2012).

Managers provide information about the internal and external environments that used in the strategy formulation with situational analysis in order to develop strategic alternatives and select strategies for the organization. Internal environment analysis identifies the strengths and weaknesses by determining whether they are the source of short- or long-term competitive advantages or disadvantages. External environment analysis identifies important general and opportunities and threats, including a comprehensive service area competitor analysis (Swayne, Duncan, & Ginter, 2006).

The main purpose of healthcare organizations is to develop strategies and methods that will provide the best service to society in the most efficient and effective way and thus to reach the goals and objectives. This is only possible if healthcare organizations have a long-term vision in order to keep up with the very rapid changes of today, and the necessary strategies are determined and implemented with this long-term perspective (Soylu & Ileri, 2014). In this perspective, organizations need to effectively manage change in dynamic environmental conditions. One of the biggest challenges faced by healthcare organizations is identifying and planning the most likely changes to occur (Koumpouros, 2013). Healthcare organizations can use different tools to analyze the current situation. Especially, achieving the standards determined in measuring the performance of the institution can be tested with different arguments. The idea of measuring performance is not only to identify the current performance of businesses, therewithal to make it possible to perform better and also to create resources for new strategies (Kairu, Wafula, Okaka, Odera, & Kayode Akerele, 2013; Okwo & Marire, 2012). Performance evaluation is a model used to compare the implementation of past strategies, the activities of organizations with executive skills, the rates of employees and the competitive rates. Additionally, this assessment model helps organizations to plan future strategies to achieve their ultimate goals, and set employees' performance goals (Yin, 2014). Additionally, measurement of nonfinancial performance, which is the source of financial performance, improved performance will be better. Therefore, organizations need comprehensive performance measurement systems that can provide evidence for alternative strategies and minimize weaknesses (Setiawannie & Rahmania, 2019).

Thus, erroneous managerial decisions in any industrial establishment result in the greatest decrease in production or monetary loss; but, in health management result in a decrease in the quality of human life and a deterioration in the health level of the society (Soylu & Ileri, 2014). In addition, the cost of errors in health institutions is mostly related to human life or quality of life, which cannot be compensated, and that many services with different features such as hotel management, outpatient clinic, operating room, X-ray, and laboratory are required together. Also, healthcare organizations, especially hospitals, are positioned as vulnerable and naturally the first place to deal with natural and man-made disasters, due to their unique missions, size, complexity, types of machinery and equipment used, and the types of patients and diseases they encounter (Ginter, Duncan, & Abdolrasulnia, 2007). In the

perspective of these important criteria, performance measures are a very significant tool for achieving goals and planning new strategies for hospitals. Hospitals have programs that add value to patients, staff, and society, and support regional and national economic growth. Comprehensive performance evaluation of the hospital affects the successful implementation of these programs (Setiawannie & Rahmania, 2019). The main feature of an effective performance evaluation system is the accuracy of its results. Therefore, it is very important to identify and select appropriate methods and reasonable indicators for the purpose of performance evaluation (Li & Yu, 2013). So, the Balanced Scorecards (BSC) can be considered as one of the best alternative performance measurement tools for hospitals thanks to its features.

Strategy development phase can directly affect managers' decisions in connection with performance measures. In organizations using the BSC or any performance measurement tool, the managers need to be knowledgeable about the basic strategies of the organization. As, the manager's inability to understand the strategy makes the performance measurement tools useless (Banker, Chang, & Pizzini, 2004). The BCS can help to comply with legal regulations if designed in accordance with the characteristics of hospitals. In hospitals, the four perceptions of the BSC modified to concentrate on patients and to stimulate a patient-centeredness. Thereby, the BSC encourages the effectual clinical coordination, refine processes and outcome indicators, and advance leadership (Jones & Filip, 2000; Lin, Yu, & Zhang, 2014).

In this chapter, DEMATEL method was used to examine the cause-and-effect relationship between the key performance indicators of only two of the four perspectives (Customer, and Learning and Growth Perspectives) of the BSC. As, some of the most intangible assets that a business can have are relationships with customers and employees. Employee and customer (patient) loyalty are strongly related and achieving both is essential for success (Kairu et al., 2013). As a result of the literature review, 12 indicators were determined for this study. In this way, health facility managers can determine the priority and superiority criteria in decision-making mechanisms while developing strategies.

2 Performance Measurements for Hospitals

Performance is a concept that qualitatively and quantitatively indicates what an organization can achieve for the intended purpose of that business. In general, it is a model that determines what is obtained as a result of a purposeful or planned activity quantitatively or qualitatively (Tengilimoglu, Isik, & Akbolat, 2012).

Performance management consists of determining the degree of achieving goals and targets using pre-determined performance indicators, as well as revealing the success of the personnel, and evaluating the results obtained (Koseoglu, 2007). Specifically, hospital performance can be defined as achieving determined goals set in clinical or administrative context. So, targets do not only include operational or conventional administrative objectives, but they may also be related to hospital

functions, which are; education and research, as well as diagnosis, treatment, care and rehabilitation (Tengilimoglu & Toygar, 2013).

In the literature for assessing the hospital performance, there are many different tools. One of them and has been widely used in the health sector especially in recent years is the BSC. The BSC was developed in 1992 by Kaplan and Norton for performance measurement and strategic management which include nonfinancial indicators. Nonfinancial indicators are, in fact, important intermediaries for financial performance. Financial and nonfinancial performance measurements can be combined with the BSC performance measurement methodology, which links all aspects of performance to the company's strategies (Kairu et al., 2013).

It is very important to developing a true strategy map in order to obtain health information about the performance of employees, departments, and organization with the BSC method and to perform self-evaluation. In order to develop the strategy, the most important basic activities of the organization should be taken into consideration. For example, while developing a strategy for producing services or products, it is of great importance in terms of reaching the whole by producing a strategy on issues such as management, public relations, personnel, and patient royalty and finding and maintaining balance in the performance measurement process in organizations (Murby & Gould, 2005).

The BSC makes it easy to compare across departments and guides the prioritization of resources. The BSC is composed of four perceptions: financial, internal process, learning and growth, and customer (Koumpouros, 2013; Rababah, 2014; Teklehaimanot, Teklehaimanot, Tedella, & Abdella, 2016; Yin, 2014). To measure and report health system performance the BSC is often used. Thanks to having four perspectives this method makes available a balanced assessment of performance and leads strategic decisions at the health facilities (El-Jardali, Saleh, Ataya, & Jamal, 2011; Yin, 2014). The BSC allows the managers to develop true and most suitable strategies and promote the sensibility to patient focus. In this method, the financial indicators involve profitability, growth, and risk. The internal businesses indicators concentrate on creating value and how can be improve those processes. The customer indicators focused on market share and customer satisfaction in order to assess performance from the customer side. And finally, learning and growth are related to organizational change, growth, staff satisfaction, etc., which are focusing to make easy to sustainable improvement (Banker et al., 2004; Mehralian, Nazari, Nooriparto, & Rasekh, 2017).

3 Developing Strategies in Hospitals

Organizations must face some of the cost types. These are estimated economic cost, financial cost, and nonfinancial cost also can be call opportunity (Manzi et al., 2008). In order for organizations to compete in the long term and ensure sustainability, the most important cost type is actually the nonfinancial costs. If the opportunities are evaluated under constantly changing environmental conditions, these elements can

be realized successfully. The most important way to achieve this is undoubtedly to analyze the situation and determine the position of the business itself. Moreover, in the light of this information, it will be possible to develop the best strategies.

Performance measurements can be expressed as a tool that helps determine the progress of the organization in line with its predetermined strategic goals and objectives, the strengths and weaknesses of the institution, and the future priorities of the institution (Yenice, 2006).

In the health sector, especially when hospitals are considered, there is no standard measurement method for quality improvement and performance measurement (Esatoglu, 2007). Hospital performance can be defined as achieving clinically or administratively determined goals. The quality and performance level of the service provided in hospitals is important for controlling costs and ensuring sustainability (Tengilimoglu & Toygar, 2013). So, there are many performance measurement systems for hospitals. But the most effective are designed to make cause–effect relations between managers' endeavor and generate evidence for strategies. The BSC can be defined as the best and most used tool in this context. Therefore, the BSC explain the relationship between the performance of hospitals as a strategy map. This is a strategy map that is correlated to financial and nonfinancial fulfillment (Banker et al., 2004; Kaplan & Norton, 1996; Young & O'Byrne, 2001). So, the strategy can be thought of as being central to the BSC. The advantages of the BSC can be listed as follows (Kaplan & Norton, 1996):

- Provides clarity on strategy and helps to reach consensus.
- Strategy communication is provided in the organization.
- Aligns department and personal goals with the strategy.
- Associate strategic goals with long-term goals and annual budgets.
- Helps to identify strategic initiatives.
- Periodically and systematically conducts strategic reviews.
- Provides feedback to learn and develop new strategies.

The hospital performance indicators demonstrate the performance in different fields. These indicators disclose to performance, current, and situations. With this evidence, developing strategies easier by managers. Customer attitudes are essentially significant as there is competition between hospitals in the fact of patients' loyalty, reduction of medical costs, and increasing profitability (especially for private hospitals). Thus, it is obligatory to get better by selecting customer perspective as the pinnacle (Gholamzadeh Nikjoo, Jabbari Beyrami, Jannati, & Asghari Jaafarabadi, 2013; Kaplan, 2001). Additionally, the missions and visions of government and nonprofit organizations differ from those of nongovernmental organizations. Therefore, financial success is not the main goal in such organizations. Therefore, it is difficult to create and implement a balanced scorecard perspective from a financial perspective. For this reason, it is necessary to choose the customer perspective first. In fact, nonprofits should consider setting their BSC's core strategies to cover all indicators from the BSC's perspective (Aujirapongpan, Meesook, Theinsathid, & Maneechot, 2020; Kaplan, 2001; Martello, Watson, & Fischer, 2008). For developing strategy for organizations, the DEMATEL can help managers

in decision-making process. Especially with combine the BSC and DEMATEL for developing strategy represents the relationship between perspectives and indicators (Golcuk & Baykasoglu, 2015; Leksono, Suparno, & Vanany, 2019).

4 Literature Review

In this study, hospital performance indicators were categorized into four groups like finance, internal process, learning and growth, and customer which are categorized according to the BSC. This classification was made in the same way in previous studies (Nasiripour, Kazemi, & Izadi, 2012; Raeisi, Yarmohammadian, Bakhsh, & Gangi, 2012; Rahimi, Kavosi, Shojaei, & Kharazmi, 2016). Each hospital should set its goals separately. Targets should be adjusted according to past performance. They should be accessible. Goals clearly show what a company wants to achieve and the desired outcome of a measure of performance (Niven, 2007). The number of indicators in the BSC is not considered to be the key norm, but it is also crucial to carefully select important and vital indicators. So, different indicators are included in the same classification in each study. An example of this is shown in Table 1.

The results of the literature review demonstrate that the BSC has been used extensively to measure performance and developing strategy for health systems, especially hospitals. Although the performance indicators in health-related studies differ, it is seen that they have a lot in common. The reason for these differences is the variety of health systems, ownership of hospitals (public, private, etc.), working in a private area, etc. elements can be listed.

In this study, 12 performance indicators of customer and learning and growth perspectives were selected. For learning and growth perspective; staff satisfaction rate, staff turnover, training expenditures per capita, key jobs contains substitute, the amount of the electronic medical record, number of days of sick leave of total employees, and employee absenteeism rate; for customer perspective; the facilities for families and visitors, patient satisfaction percentage, rate of patient complaints, other stakeholders' satisfaction, and social satisfaction were selected. Seven indicators measures learning and growth; the others measures customer dimensions. A different number of performance indicators have been determined in the literature for these perspectives. Most authors agree with 7–9 indicators. For example, El-Jardali et al. (2011) were selected 4 (just for learning and growth perspective), Nasiripour et al. (2012) 9, Grigoroudis et al. (2012) 12, Rahimi et al. (2016) 7, Setiawannie and Rahmania (2019) 7, Leksono et al. (2019) 9, and Aujirapongpan et al. (2020) 9.

Table 1 Performance indicators of BSC which is used in different studies

References	Indicators	
	Customer perspective	Learning and growth perspective
El-Jardali et al. (2011)		Staff satisfaction rate Staff turnover rate Employee absenteeism Rate of employee sick leave
Nasiripour et al. (2012)	Patient satisfaction Rate of patient complaints Mean waiting time in the emergency department	Training expenditures per capita Sickness absence rate Employee satisfaction Percutaneous injuries Training expenditures Information technology efficiency
Grigoroudis, Orfanoudaki, and Zopounidis (2012)	Patient satisfaction index Number of patient complaints Average waiting time Hospital beds per 1000 people Percentage of cases transferred to other hospitals Percentage of readmissions Average duration of hospitalization	Number of projects with other organizations Percentage of budget used for purchase of new technology Resource allocation to information technology/capital Percentage of employees trained Percentage of medical staff participating in conferences
Rahimi et al. (2016)	Patients' satisfaction percentage Rate of patients' complaints The facilities for families and visitors	Staff satisfaction rate Staff turnover Training expenditures per capita Employee absenteeism rate
Setiawannie and Rahmania (2019)	Customer satisfaction Follow up on customer complaints	Employee satisfaction Employee productivity Implement continuation of hospital accreditation Increased use of technology Empowerment of human resources
Leksono et al. (2019)	Customer satisfaction Patient loyalty Stakeholder satisfaction Quality of service delivery	Capacity and professionalism Innovation training and education Research and development Health and safety Organization behavior
Aujirapongpan et al. (2020)	Rate of patient complaints Patient satisfaction percentage Inpatient satisfaction percentage Outpatient satisfaction percentage Outpatient waiting time	Staff satisfaction rate Staff turnover Number of studies

5 An Evaluation for Hospital Performance Measurement by the Balanced Scorecards

Firstly, selected indicators based on the literature review will be explained under this section. After that, the significance of these factors will be identified by DEMATEL approach.

5.1 Selected Indicators

Similar studies in the literature are analyzed to understand the significant issues of performance indicators for hospitals. Therefore, 12 indicators are identified to measure the performance of learning and growth and customer dimensions past studies: staff satisfaction rate (C_1), staff turnover (C_2), training expenditures per capita (C_3), key jobs contains substitute (C_4), the amount of the electronic medical record (C_5), number of days of sick leave of total employees (C_6), employee absenteeism rate (C_7), the facilities for families and visitors (C_8), patient satisfaction percentage (C_9), rate of patient complaints (C_{10}), other stakeholders satisfaction (C_{11}), and social satisfaction (C_{12}). The first seven criteria measures learning and growth; the others measures customer perspectives.

5.2 Methodology

There can be many main and sub-criteria that have interrelationships between them and can influence the result. There are many alternatives or decision points that should be evaluated taking into account these criteria. None of the criteria alone is for reaching the result. In other words, it is not enough at the point of choosing the best among the alternatives. Therefore, all evaluation criteria should be considered at the same time in order to solve the problem at hand. DEMATEL method visualizes the problem for decision makers in such complex problems and helps to understand the problem better (Aydin & Uludag, 2020; Qiu, Dinçer, Yüksel, & Ubay, 2020; Zhang et al., 2020).

DEMATEL is a comprehensive method for building and analyzing a structural model involving causal relationships between complex factors (Wu, 2008; Wu & Lee, 2007). Apart from the other multicriteria decision-making techniques, DEMATEL assumes that there is a casual relationship between criteria. DEMATEL is based on graph theory and solves problems with directed graphs, known as digraphs. They visualize factors into cause group and effect group and represent a communication network (Wu & Lee, 2007; Zhou, Zhou, Yüksel, Dinçer, & Uluer, 2020).

Through the DEMATEL method, the value of "four degrees" of each factor, including "*R*," "*C*," "*R* + *C*," and "*R* - *C*," can be calculated to identify the criteria (Tseng, 2009; Tzeng, Chiang, & Li, 2007; Zhang, Sun, & Xue, 2019). Here, "*R*" indicates the degree of influence exerted on other factors, and "C" represents the degree of influence received from other factors. "*R* + *C*" denotes the degree of relation with other factors, and "*R* - *C*" means the influence strength, which can be divided into dispatchers or receivers (Du, Dinçer, Ersin, & Yüksel, 2020; Wang, Ha, Kalkavan, Yüksel, & Dinçer, 2020; Zhang et al., 2019).

5.3 Analysis Results

Firstly, a questionnaire was developed based on the twelve criteria. Then, it was answered by 3 decision makers at least 15-year experience who had a managerial position in hospitals. The decision makers make evaluations by considering 5 different scales that are none (N), low (L), medium (M), high (H), and very high (VH). The computation of DEMATEL was calculated upon these three experts' opinions. Then, DEMATEL method was used to determine relationships among indicators, separate to effective and important factors for developing strategy. Firstly, the integrated matrix is created by taking the average values of 3 expert opinions. Details of the integrated matrix are included in Table 2.

Next, in this step the values in the direct effect matrix are normalized using the smallest value in the rows and columns of this matrix, and a normalized direct relation matrix is formed. Details of the normalized direct relation matrix are summarized in Table 3.

After, the total relationship matrix (T) is formed by using Eq. $T = N(I - N) - 1$. In this equation, I symbolizes the identity matrix (Table 4).

Table 2 Integrated matrix

Criteria	*C*1	*C*2	*C*3	*C*4	*C*5	*C*6	*C*7	*C*8	*C*9	*C*10	*C*11	*C*12
*C*1	0.00	3.33	2.00	3.00	1.67	2.33	3.33	1.00	3.67	3.67	3.00	2.67
*C*2	2.67	0.00	2.67	2.67	1.67	3.00	3.00	1.00	3.00	3.00	2.33	2.33
*C*3	2.67	2.00	0.00	2.00	1.67	2.33	2.00	0.33	2.00	1.67	1.67	1.67
*C*4	1.33	1.00	1.67	0.00	1.00	1.33	1.67	0.33	2.33	2.33	1.33	1.67
*C*5	1.00	1.00	1.00	1.00	0.00	1.00	0.67	0.00	2.67	2.00	2.33	1.00
*C*6	2.67	2.67	3.00	2.00	1.33	0.00	2.33	0.67	1.67	1.67	1.00	1.00
*C*7	2.33	2.00	1.33	1.33	1.33	1.67	0.00	1.33	3.00	3.33	2.00	2.00
*C*8	1.33	0.33	0.33	0.00	0.00	0.00	0.00	0.00	3.67	3.00	0.67	2.33
*C*9	2.00	2.00	0.67	0.67	0.00	0.00	1.00	3.00	0.00	4.00	2.33	3.00
*C*10	3.33	3.00	2.33	2.00	1.33	0.33	0.67	3.00	4.00	0.00	1.67	2.67
*C*11	1.67	1.67	1.00	2.00	2.33	1.00	0.67	1.67	1.67	1.67	0.00	1.67
*C*12	2.00	1.67	1.00	1.00	0.33	0.67	1.33	3.00	3.00	3.00	2.00	0.00

Table 3 Normalized direct relation matrix

Criteria	*C*1	*C*2	*C*3	*C*4	*C*5	*C*6	*C*7	*C*8	*C*9	*C*10	*C*11	*C*12
*C*1	0.00	0.11	0.07	0.10	0.06	0.08	0.11	0.03	0.12	0.12	0.10	0.09
*C*2	0.09	0.00	0.09	0.09	0.06	0.10	0.10	0.03	0.10	0.10	0.08	0.08
*C*3	0.09	0.07	0.00	0.07	0.06	0.08	0.07	0.01	0.07	0.06	0.06	0.06
*C*4	0.04	0.03	0.06	0.00	0.03	0.04	0.06	0.01	0.08	0.08	0.04	0.06
*C*5	0.03	0.03	0.03	0.03	0.00	0.03	0.02	0.00	0.09	0.07	0.08	0.03
*C*6	0.09	0.09	0.10	0.07	0.04	0.00	0.08	0.02	0.06	0.06	0.03	0.03
*C*7	0.08	0.07	0.04	0.04	0.04	0.06	0.00	0.04	0.10	0.11	0.07	0.07
*C*8	0.04	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.12	0.10	0.02	0.08
*C*9	0.07	0.07	0.02	0.02	0.00	0.00	0.03	0.10	0.00	0.13	0.08	0.10
*C*10	0.11	0.10	0.08	0.07	0.04	0.01	0.02	0.10	0.13	0.00	0.06	0.09
*C*11	0.06	0.06	0.03	0.07	0.08	0.03	0.02	0.06	0.06	0.06	0.00	0.06
*C*12	0.07	0.06	0.03	0.03	0.01	0.02	0.04	0.10	0.10	0.10	0.07	0.00

Table 4 Total relation matrix

Criteria	*C*1	*C*2	*C*3	*C*4	*C*5	*C*6	*C*7	*C*8	*C*9	*C*10	*C*11	*C*12
*C*1	0.22	0.30	0.22	0.26	0.17	0.20	0.26	0.20	0.39	0.38	0.28	0.29
*C*2	0.28	0.18	0.23	0.24	0.16	0.21	0.24	0.18	0.35	0.34	0.25	0.27
*C*3	0.23	0.20	0.11	0.18	0.14	0.16	0.18	0.12	0.26	0.24	0.19	0.20
*C*4	0.16	0.14	0.14	0.09	0.10	0.11	0.14	0.10	0.23	0.22	0.15	0.17
*C*5	0.13	0.13	0.11	0.11	0.06	0.09	0.09	0.08	0.21	0.19	0.17	0.13
*C*6	0.24	0.22	0.21	0.18	0.13	0.09	0.19	0.13	0.25	0.24	0.17	0.18
*C*7	0.23	0.21	0.16	0.17	0.13	0.14	0.11	0.17	0.30	0.31	0.21	0.22
*C*8	0.13	0.10	0.07	0.07	0.04	0.04	0.06	0.08	0.23	0.21	0.10	0.17
*C*9	0.20	0.19	0.12	0.13	0.07	0.08	0.13	0.21	0.19	0.30	0.20	0.24
*C*10	0.28	0.25	0.20	0.20	0.13	0.11	0.15	0.23	0.35	0.23	0.21	0.26
*C*11	0.17	0.16	0.12	0.16	0.14	0.10	0.11	0.14	0.21	0.21	0.11	0.17
*C*12	0.20	0.18	0.13	0.14	0.08	0.10	0.14	0.21	0.28	0.27	0.19	0.14

The values of "*R*," "*C*," "*R* + *C*," and "*R* - *C*" were calculated as shown in Table 5. "*R* - *C*" measures the impact on other factors. Days of sick leave to total employees' ratio (C_6), staff satisfaction rate (C_1), staff turnover (C_2), employee absenteeism rate (C_7), training expenditures per capita (C_3), the amount of the electronic medical record (C_5), were cause group in order. Also, six criteria have negative "*R* - *C*" values. Key jobs contain substitute (*C*4), The facilities for families and visitors (C_8), Patients satisfaction percentage (*C*9), Rate of patient complaints (C_{10}), Other stakeholders' satisfaction (C_{11}), and Social satisfaction (C_{12}) were in the effect group. "*R* + *C*" means the importance of each criteria in the overall analysis structure. The prominence of the 12 criteria rank from the largest to the smallest as follows: Rate of patient complaints (C_{10}), Staff satisfaction rate (C_1), Patients satisfaction percentage (C_9), Staff turnover (C_2), Social satisfaction (C_{12}), Employee absenteeism rate (C_7), Training expenditures per capita (C_3), Other stakeholders satisfaction (C_{11}), Key jobs contains substitute (C_4), Number of days of sick leave to

Table 5 Cause and effect values of DEMATEL

Criteria	*R* (effect degree)	*C* (affected degree)	*R* + *C* (prominence)	*R* - *C* (casual degree)
Staff satisfaction rate (C_1)	4.17	3.49	7.66	0.68
Staff turnover (C_2)	3.93	3.28	7.21	0.65
Training expenditures per capita (C_3)	3.21	2.82	6.03	0.39
Key jobs contain substitute (C_4)	2.77	2.91	5.68	−0.15
The amount of the electronic medical record (C_5)	2.50	2.35	4.85	0.15
Number of days of sick leave to total employees' ratio (C_6)	3.24	2.43	5.67	0.81
Employee absenteeism rate (C_7)	3.37	2.79	6.15	0.58
The facilities for families and visitors (C_8)	2.31	2.85	5.16	−0.54
Patients satisfaction percentage (C_9)	3.04	4.25	7.30	−1.21
Rate of patient complaints (C_{10})	3.61	4.15	7.76	−0.55
Other stakeholders satisfaction (C_{11})	2.81	3.22	6.03	−0.41
Social satisfaction ($C12$)	3.05	3.45	6.50	−0.40

total employees ratio (C_6), The facilities for families and visitors (C_8), and The amount of the electronic medical record (C_5).

6 Conclusion and Discussion

Determining the performance indicators of hospital offers managers the opportunity to identify vital points with lower cost and time. So, for hospitals improvement areas could be recognized. With using the BSC managers evaluate and compare the performance of health facilities (Rahimi et al., 2016). The BSC indicators of perspectives should donate the cause-and-effect relationship in the realization of the hospital's strategies (Kaplan, 2001). Evaluating and comparing provide evidence to developing strategies for hospitals managers. All the BSC perspectives must be interrelated and integrate all strategies to achieve the success.

In the term of the value of "*R* + *C*" for each criterion, rate of patient complaints (C_{10}), staff satisfaction rate (C_1), and patient's satisfaction percentage (C_9) are the most important indicators. In contrast, number of days of sick leave to total employees' ratio (C_6), the facilities for families and visitors (C_8), and the amount of the electronic medical record (C_5) are lowest important indicators. But rate of patient complaints (C_{10}) and staff satisfaction rate (C_1) rank the first and the second, while the cause degree of them are effect and cause, respectively. Also, in study results learning and growth perspective indicators, out of key jobs contains substitute (C_4), effects the customer perspective indicators. According to Rahimi, Bahmaei, Shojaei, Kavosi, and Khavasi (2018) state that learning and growth perspective

affects the other perspectives powerfully. So, this perspective determined as the main cause factor. Also, in other studies the indicator state as; influence on staff approach to patients, clinical job, and patients' results (Cai, Cai, Deng, Cai, & Yu, 2016; Listyowardojo, Nap, & Johnson, 2012). But in other studies, for instance; in Jiang, Shi, Lin, and Liu (2020) study, patient satisfaction, patient complaint, and patient medical expenses indicators were determined as the most importance indicators. Whereas, in other study patient satisfaction has the lowest affect (Si, You, Liu, & Huang, 2017). Thus, managers need to pay more consideration and developing strategies to increase staff satisfaction, so it will be possible to reduce the percentage of patient complaints, second important criteria. Consequently, increasing to staff satisfaction rate can help the improving total performance.

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New Approach to A Disruptive Business Model with Dynamic Capability Under the Blockchain Technology

Arafat Salih Aydiner

Abstract This chapter aims to develop a holistic view of the blockchain business model framework with the role of dynamic capability. The study conceptualizes a dynamic capability framework with blockchain properties and business model understanding. The traditional approach to a business model with new technological improvements is the lack of defining the necessary business values that are captured and created from the digital environment. Specifically, blockchain technology generates additional properties that can even disrupt digital business processes. Therefore, it is necessary to build a new business model framework other than digitalization for blockchain technology to disclose disruptive values for guidance on business strategy. The study explains the detailed properties of the blockchain and classical business model and its logic. Later, a dynamic capability framework is combined with these views to establish a new business model for blockchain. This framework is the beginning for businesses that invest in blockchain to understand holistically how to extract the disruptive values out of blockchain technology and applications. Therefore, the study contributes to the businesses that invest in blockchain technology to realize the new benefits by changing traditional processes and distinctive capability which they will gain with the blockchain technology.

1 Introduction

The business environment and the way of making business have been evolving with the advancement of new technologies. The ideology of centralization of power keeps the classical structure of management in position with these new platforms. On the other hand, these new platforms and technologies enforce organizations to change their behavior on business models toward a more decentralized way. Clashes

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between tradition and contemporary approach disrupt business ecosystems without considering any market and sector. Brick and mortar retail companies are adopting their model partially to digital business models. Start-up companies build their model based solely on digital perspectives. Infrastructure companies create a digital marketing environment while constructing different structures and buildings. At the same time, internal and external relations of the companies are transforming from traditional to the digitalized environment. So, digitalization keeps pushing every segment of the business model to transform somehow into the new age of doing business to create and capture values with new approaches.

Traditional business models aim to produce and distribute better products/services efficiently with the help of closed-innovation, brand management, and minimum cost structure (Viswanadham, 2018). Even though the defense of the traditional way of doing things is prevalent, disruptive technologies adduce changing all structures of business ecosystems. Still, the aim is to create value for customers and create a profit for companies, however, agility, distribution, and openness arise as the new characterization for businesses. These characters are initiated with vast profound new information systems (IS) platforms. Companies that cannot achieve to establish platforms and change their business model will not be able to gain sustainable competitive advantage (VanAlstyne, Parker, & Choudary, 2016). Blockchain is one of the most promising IS platforms, which offers revolutionary changes socially and economically for the business ecosystem among new IS platforms (Filipova, 2018).

Blockchain is a technology that is famous for its cryptocurrency applications and services. Cryptocurrency product Bitcoin is more popular than the technology, which is a blockchain application like many others. The financial industry seems to focus more on the cryptocurrency part and attract more attention from the public. However, Blockchain technology is more than a financial application and service. It is the technology that creates an underlying platform for different businesses. The nature of this technology has the promise to disturb some structures of organizations. Thus, Blockchain defenders claim to revolutionize business models with decentralization, speed, security, and auditable properties (Risius & Spohrer, 2017). Davos, Group of the 20s are some of the most influential policy-making platforms in the world considers Blockchain as a game-changer and has been debating the underlying effect for the businesses and relations with governments because of these claimed disruptive properties of the technology. In addition, the World Economic Forum has surveyed that 10% of global GDP would be stored in blockchain technologies by 2027 (Carson, Romanelli, Walsh, & Zhumaev, 2018). Millions of dollars are being spent by giant technology companies to initiate Blockchain for their technological platforms like the Internet of Things (IoT), Industry 4.0, artificial intelligence, and others (Carson et al., 2018). Start-ups are implementing and developing applications and platforms with blockchain technologies for extensive business ecosystems. However, there are not many well-known applications and implementations rather than cryptocurrencies so far, which form hype around the technology. Although there are ongoing implementations of the technology, uncertainty of developed

systems creates a lack of understanding of how blockchain defines and disrupts business models to generate and capture business value (Risius & Spohrer, 2017).

The promise to change the traditional business model with blockchain technology implementation and applications are scarce and limited. Hence, our study compares the traditional business models and proposes a model with blockchain technology to address whether the technology is applicable to all sectors generally. Thereby, the study addresses the research question: What would be the necessary model with blockchain technology to maintain the foundation of businesses to create and capture values without making mystical promises? To answer this question, the study offers a new framework to have a holistic blockchain business model.

The remainder of this study is organized as follows. Next, the theoretical background of blockchain technology and its underlying concept are provided. Then, the literature review of the business model is discussed. Afterward, a new suggested framework is introduced concerning the research question. Finally, a discussion and conclusion are argued along with the managerial implications and future research suggestions.

2 Literature Review

2.1 Theoretical Background of Blockchain

Blockchain technology is always explained by cryptocurrency applications even though the technology exists way before cryptocurrencies became popular (Filipova, 2018). Instead of focusing on financial applications, this study nails down the facts, properties, and values of the technology itself.

The main characteristics of Blockchain are cryptographically captured, stored, distributed, transparent, and immutable digital a kind of database or ledger that is shared through a public and private networks (Carson et al., 2018; Risius & Spohrer, 2017). Conte de Leon, Stalick, Jillepalli, Haney, and Sheldon (2017) claim that these characteristics are desired and emergent properties of the blockchain. Conte de Leon et al. (2017) add that the characteristics of Blockchain are to be ordered, incremental, sound, and digital. Blockchain combines software engineering, game theory, and cryptography science fields. The game theory part is related to the mathematical models of conflict and cooperation between decision makers. The cryptography part of the blockchain is focused on securing the whole chain and the system (Mougayar, 2016). Blockchain behaves like a database as well. Distributed database behavior places the data into a container (blocks). Everyone knows that the data is yours but cannot see inside the container in the ecosystem (Mougayar, 2016). However, unlike database systems, Blockchain does not allow to store the data into a centralized mechanism. The immutability of blockchain prevents to delete, rewrite, and revise the data. In essence, blockchain cannot be merely claimed as a database (Furlonger & Uzureau, 2019). The explained identifiers of blockchain technology disrupt the way of doing business by changing the business value perception.

Technical Background of the system: Each computer is considered a node in a network. This network type is defined as peer-to-peer networking structure (Oh & Shong, 2017). Each node holds cryptographically chained of blocs consist of data that prevents failure (Carson et al., 2018). Blocks include components that are a set of messages or multiple transactions of data with a hash function, the previous blocks' hash values which are called timestamp, and a nonce which is a random number that verifies hash values (Conte de Leon et al., 2017; Nofer, Gomber, Hinz, & Schiereck, 2017). Hash values assure the integrity of the data in the blocks and the chains. When data is changed from a block, related hash values are also regenerated. The majority of the nodes in the chain should agree on the validity of the data and block, then a block and data can be added. Without a consensus between the nodes, a block cannot be updated or created, and the transaction cannot be completed. Blocks hold the historical background of transactions as well. The data is stored at specific points in time and kept track of these transitions. Thus, blockchain is considered as an immutable state machine (Mougayar, 2016). The state machine characteristics of blockchain facilitate two different types of which are called public and private networks. The public type of Blockchain is open to everyone and no access limitation. However, private ones are only limited to a certain ecosystem for which the blockchain network is built on.

The critical and important part of blockchain technology is the protocols. There are a variety of protocols with a set of conditions is being implemented for different industrial sectors and purposes. The important part of these protocols is algorithms that establish robust tools and middleware technologies (Mougayar, 2016). These algorithms construct trust services that can be categorized based on proof types. These proof types are proof in a consensus, proof as a service, and proof in a service (Mougayar, 2016). The most known protocol is proof of work (PoW) that is an algorithm mostly used for cryptocurrencies in which stands on proof of state consensus protocol. More than one miner work on the problems to create a block with PoW algorithm. It requires a high volume of energy resources, but it assures consistency and protection against any forgery without trusted intermediation (Risius & Spohrer, 2017; Zamani & Giaglis, 2018). PoW assures that all the transactions are copied identically to all networks. Especially in a public blockchain, everyone can join the environment, and able to vote to evaluate each transaction with PoW consensus protocol if the given problem is solved. All transactions are transparent but the enablers are anonymous (Filipova, 2018; Nofer et al., 2017). However, the critical part of PoW is gradually growing cost and time per block, transaction (Conte de Leon et al., 2017). There is a proposed alternative consensus protocol which is called proof of stake is less costly and uses less computer power than PoW. Each stake is either rewarded or punished depending on their transactional achievement or failure (Kang et al., 2018; Puthal & Mohanty, 2019). Another way of having a consensus is the proof of value (PoV) algorithm. This type of consensus determines the perceived value of the contribution of each node. Also, the system evaluates each contribution and its reputation in the ecosystem, then ascribes the influence accordingly. Proof of authority and proof of existing protocols are also

Table 1 Proof in a service and proof as a service categories

Proof as a service	
Proof of asset	Proof of ownership
Proof of identity	Proof of physical address
Proof of authenticity	Proof of provenance
Proof of individuality	Proof of receipt
Proof in a service	
Wedding registry	Counterparty transactions
Land registry	Accounting audits
Supply chains	Voting
Assets registrations	Deed transfer

Source: Mougayar (2016)

included in proof in a consensus type. Additional proposed protocols exist and are called Proof as a service and proof in service types which are depicted in Table 1.

2.2 Smart Contract

Blockchain technology promises to digitize the tangible assets with its capability of trust and distributed ledger technology with other promising applications that affect business models. A smart contract is a very well-known blockchain application that opens a new venue for the contractual agreements for all sorts of businesses that might change the traditional business models. Even though the smart contract idea introduced by Nick Szabo a long time ago (Giancaspro, 2017; Mougayar, 2016), it became popular recently with the implementation of Blockchain principles. The advantage of using a smart contract is to create a peer-to-peer agreement where every participant is agreed on the content of the digital contract and fulfills their obligations accordingly (Carson et al., 2018; Macrinici, Cartofeanu, & Gao, 2018).

The smart contract provides clear opportunities to reshape the business values stream by increasing efficiency, reducing transaction, and legal cost (Giancaspro, 2017). Moreover, triggering the automation of blockchain when the contract's content is met simplifies the business processes by reducing the infrastructure cost. Also, transparency and anonymity of the Smart contract build trust among all blockchain participants for that environment (Carson et al., 2018; Giancaspro, 2017). These functional elements of blockchain applications and their properties change traditional business processes by constructing new business value linkages. Eliminating traditional business creates an innovative business model. Therefore, this study proposes to implement the necessary holistic view of the business model to gain maximum benefits out of blockchain technology in an organization.

2.3 Business Model Innovation and Blockchain

New customer expectations, requirements, technologies, and regulations are forcing to establish a new form of business model. Also, not every element of the existing models fits with different technologies as well as blockchain properties. The model approach creates an understanding of overall business strategy with the guidance of related components that affect the way of doing business in a variety of sectors. Identifying operation issues and solving them is one of the characteristics of business model thinking. There are different models for different purposes, however, the common elements of which define business logic are the way values are created and captured for customers (Heikkilä, Bouwman, Heikkilä, Solaimani, & Janssen, 2016). Business models are conceptual perspectives that define the framework to capture the values and show how these values can be transformed into a profit (Ugray, Paper, & Johnson, 2019). It is a system-level approach to explain business operations. There are conventional methods to define business models for companies. However, digital technologies are transforming business models into an innovative type of approaches. Obviously, traditional business models will be disrupted by blockchain technology as well as value streams that are captured and created (Morkunas, Paschen, & Boon, 2019).

The well-known traditional business model is CANVAS was introduced by Osterwalder and Pigneur that contains nine principles with the concept of simple, relevant, and understandable ways of defining the functionalities of companies (Urban, Klemm, Ploetner, & Hornung, 2018; Wrigley & Straker, 2016). The firm level of the business concept is considered and asked the question of "what of doing business" while establishing the model with factors (Keane, Cormican, & Sheahan, 2018). The nine elements are; customer segments, value proposition, channels, customer relationships, revenue streams, key resources, key activities, key partnerships, and cost structures, which analyses capabilities for efficiency and value for stakeholders (Aagaard, 2019; Morkunas et al., 2019). The missing part of this model is not capturing the data and the trust as a part of the value for a model (Aagaard, 2019).

Business model literature does not have a set of common components that describes how the models should be. Therefore, the St. Gallen Business model navigator develops the questions to define a business model. The model asks, "who is the customer?", "what is offered to target customer?", "How to build and disseminate the value proposition?", and "why the business model is financially viable" to apprehend the value of a business (Aagaard, 2019; Böhm et al., 2017; Gassmann, Frankenberger, & Csik, 2013). The other suggested models, the value design model is composed of value drivers, nodes, exchanges, and extracts that interacts interchangeably with one another. The ecosystem is the main driver of the value design model to create a holistic view between building blocks to identify the values (Aagaard, 2019). Business DNA (design, needs, aspirations) model works within three blocks of values that interact with elements of given systems. Interaction occurs by answering "How?", "What?", and "Why?" questions to define each

element in DNA blocks. D blocks consist of key partners, resources, and activities. N block contains channels, customer relationships, and segments. A block deals with a value proposition, revenue, and cost (Sun, Yan, Lu, Bie, & Thomas, 2012). When these models define the elements of blocks, they always see the value through some additional intermediaries to explain the business model. However, blockchain promises to eliminate an intermediary from the business structures. These commonly used business models seem that they are not capable enough to define blockchain used business properties and values because of their static approaches.

The physical boundaries are expanding, and data is broader than ever. Created platforms are interacting with external entities as well. The relationships of the systems are like a symbiotic type of dependence between internal and external of the companies which creates an ecosystem. Lean and agile types of structures with these new technological grounds create new opportunities to capture and create new distributed and decentralized values for businesses (Krco, van Kranenburg, Loncar, Ziouvelou, & McGroarty, 2019). Therefore, the whole system and the contributors of that ecosystem need to be considered to innovate a value-driven dynamic model. A linear and traditional type of business model is evolving to a more dynamic network type of structure because of new technological advancement with hypoconnectivity. Building dynamic capabilities help to create contingency plans to integrate business strategies with dynamic business models that consider digitalization. New business model innovation implements sensing, seizing, and transforming capabilities to establish digital models. Digital business models with these dynamic capabilities will be constructing a new approach to business strategy, design, and also creates understandable business models that captures the competitive advantage (Warner & Wäger, 2019).

Sensing capability provides to capture external ecosystem opportunities to find out the value creation for the digital business models (Warner & Wäger, 2019). Sensing the value for external and internal ecosystem would provide more dynamic models to operate businesses. Seizing capability is to grab the opportunity by allowing disintermediation, decentralization, and agility (Chong, Lim, Hua, Zheng, & Tan, 2019; Warner & Wäger, 2019). The result of this disintermediation, decentralization, and agility with customers, partners, and operations help to seize the value for businesses. Transforming capability is to share created and captured values among the ecosystem in which designed for digital dynamic businesses (Chong et al., 2019; Warner & Wäger, 2019). Thus, this capability supports active engagement among participants to innovate inside the value co-creation and fits the blockchain environment.

3 Blockchain Business Model with Dynamic Capabilities

The nature of blockchain technology has the power to transform traditional business models. Changing the classical structure with blockchain draws a new concept of business model innovation. There are case studies that layout current business