

IMPROVING THE CRM SYSTEM IN HEALTHCARE ORGANIZATION

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ABSTRACT

The CRM system in the health care organization leads to getting important customers' information and utilize this information to improve the business. Health care sectors are now trying to use an appropriate Customer relationship management framework to create a trust between hospital and customers. The competitive situation enforces private hospitals to compete with each other to achieve as much market share as possible. Increase in the level of customer satisfaction and customer loyalty in health care services can increase the chance of winning in market share among the other health care organizations. In this paper report, a framework will be identifying to determine the main factors that cause to improve the management of customer relationship in the health care using a multivariate measurement system.

KEYWORDS: CRM, HEALTHY CARE, CUSTOMER, TRUST, SERVQUAL.

1. INTRODUCTION

The recent rapid increase in the amount of medical information has pushed hospitals to confront an essential issue which is how to utilize healthcare information technology to improve healthcare services quality. Customer relationship management system (CRMS) is an innovative technology which facilitates the process to acquire, develop, and maintain customer relationships more efficiently and effectively.

Customer relationship management (CRM) for healthcare providers is an approach to learn all they can about their customers and prospects, to communicate relevant, timely information to them, and to track results to make program adjustments necessary [1].

The rapid increase in the amount of medical information has pushed hospitals to confront a critical issue, which is how to utilize information technologies to manage large amounts of customer information and then improve the quality of customer services. The adoption of a customer relationship management system (CRMS) thus is increased globally among hospitals. The percentage of hospitals which utilize Web sites for sales and marketing purposes has increased 2.47 times from 1995 (17%) to 2000 (59%) in the US [2].

Also, customer satisfaction is measured by healthcare providers as a key factor of strategy and an important determinant of long term feasibility and success under competitive situation [3]. In addition, maintaining and increasing customer loyalty level is essential for any service company's long term success [4]. Creating a conceptual framework for the CRM health care system using multivariate measurement system such as factor analysis or principal component analysis causes improvement in business by increasing the level of customer satisfaction and customer loyalty.

2. CRM LIFE CYCLE

The CRM lifecycle commences with combination of organization's system and centralization of customer information. The first phase of lifecycle is integration and the advantageous of this phase is the improvement of front office efficiency and productivity. When this phase completed the result is

the centralized source of related customer information. In this phase understanding about the company's customer will not be clarify, however the customer value is identified in this phase[7].

The second phase of the customer relationship management life cycle is the analysis phase which is most critical to conduct the CRM to success. For making an strategic decision for the organization the analysis phase helps to discover the casual relationships and figure out the customers behavior and identifying the trend and patterns of buying by the customers[7].

The last phase of the CRM life cycle is action where the strategic decision carries out. Business processes caused to improved customer understanding through analysis. And it will be revised across customer facing activities including sales, marketing, and customer service. The action phase is very close to the CRM loop, and let organizations to reach to the valuable issues through analysis which is shown in Figure 1 [7].

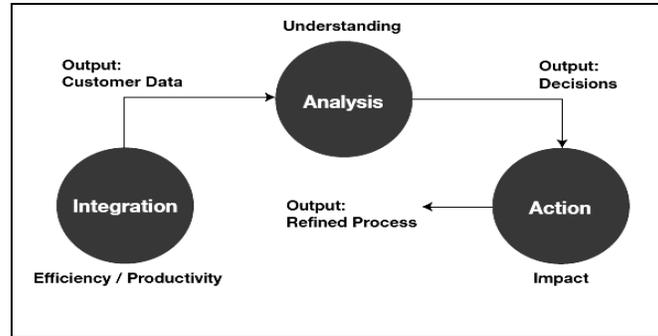


Fig. 1. CRM Lifecycle

3. CRM IN HEALTHCARE ORGANIZATION

The Figure 2 depicts how a CRM application can be customized to enable patient relationship management within health organizations. Taking a patient relationship management approach, healthcare providers can move beyond treating episodes of illness to enabling proactive care by establishing productive, long-term relationships with patients. Patient relationship management systems can cause the following improvement:

- Increase patient satisfaction. Analyzing the performance of usual processes by passing time can omit the unnecessary tasks and cause improvements and increase customer satisfaction.
- Coordinate the delivery of care. modified workflows can be developed to automate care coordination activities between provider organizations, which can help improve patient outcomes while increasing operational efficiency and reducing costs[.
- Proactively manage chronically ill patients. Clinicians can flag patients with specific chronic illnesses and automate targeted, proactive communications to inform them of upcoming educational offerings and remind them of ways to manage their illnesses.



Fig. 2. CRM to Manage Patient Relationships

4. PROBLEM BACKGROUND

Increase in the service quality in health care organization is a key component to attract the customer and raise the customer satisfaction and customer loyalty. SERVQUAL is an empirical tool that can be used by service organization to improve service quality. The original methodology is based on the following factors which are, Tangibles, Reliability, Responsiveness, Assurance and Empathy[5]. The Majority of hospitals information systems applications (hospital automation, electronic database, patient information and so force) consist of the information which is identified by the hospital staff or from viewpoints of hospital staff but do not consider their customers' requirements.

Increase in the usage of information technology (IT) in healthcare organizations provides the customers with convenience and speedy information delivery in recent years. Hospitals must control the technological reformation and utilize it to do their mission to provide access to information when the users need it but one of the essential problems that the users face to it is the requirements of factors which causes raise the customer satisfaction and loyalty[6].

One major problem in CRM system is that it has different meaning to different users. For some, CRM means direct emails. For IT consultants into complicated technical slang related to terms like OLAP(on-line analytical processing) and CICs (customer interaction centers). The most important question that manager face to it is: which factors are important for the users to develop a CRM system?

According to IT consultants' views, the factors and variables that affect the customer's satisfaction must be identified. In healthcare organizations the patients do not have technical information to assess the technical quality, thus in this research, Analytical Hierarchy Process method will be applied to do the assessment.

In health care organization the patients do not have technical information to assess the technical quality so for measurement perceived service quality from the original dimensions of SERVQUAL[5]. In this project report by using multivariate measurement system that includes the variables which are important for the users to increase their satisfaction and loyalty will be identified and the conceptual frame work with IT viewpoint will be conducted.

5. PROBLEM STATEMENT

In term of problem statement, for developing the customer relationship management by using a multivariate measurement system in health care organization following question can be considered.

- What are the factors that affect the customer relationship management in healthcare organizations?
- How classify the effective variables using multivariate measurement system?
- How to prioritize the critical factors that cause the improvement in CRM in private hospitals?
- What is the conceptual framework which causes the development in CRM system in hospitals?

6. OBJECTIVES OF RESEARCH

In order to solve the problems mentioned in section 1.3, the following objectives should be followed respectively to improve the customer relationship in healthcare organization.

- To Identify the variables that affect the CRM in healthcare organization
- To cluster the effective factors using multivariate measurement system
- To Prioritize the critical factors that lead to improvement in CRM in private hospitals
- To Create a conceptual framework to improve the CRM system in healthcare organization

7. SCOPE OF PAPER

This project covers information system in 5 private hospitals in Tehran to develop their customer relationship management by using a multivariate measurement system such as principal component analysis. All necessary information will be gathered from the questionnaire which will be dispatched to the staff and patients of the mentioned hospitals in Tehran. And the names of the hospitals are as follows: Mehr, Aria, Sasan, Milad, Mehrad.

8. SIGNIFICANT OF PAPER

By identifying the variables which affect the customer relationship management in healthcare organization the customer satisfaction and customer loyalty will be increased. In hospitals the loyalty of the customers is very important to develop the business and improve the market. So the proposed conceptual framework will help the managers to make reliable decisions based on the variables and factors that are identified by the multivariate measurement system. And the criteria that affect the customer satisfaction and customer loyalty are identified using AHP which is applied by experts.

9. CASE STUDY

For having an accurate analysis we should understand the case study and find the problems that organization face to them. The case study which is selected for this project are building construction projects from south of Iran. The information of weather of Kish Island in which the case study is located gathered from meteorological organization.

10. DATA ANALYSIS

In data analysis the data which are gathered from customer and expert will be analyzed by principal component analysis and then the outcome analyzed by the analytical hierarchy process. Then the framework will be delivered.

11. METHODOLOGY PHASES

Figure 3 shows Methodology for CRM in health care organization.

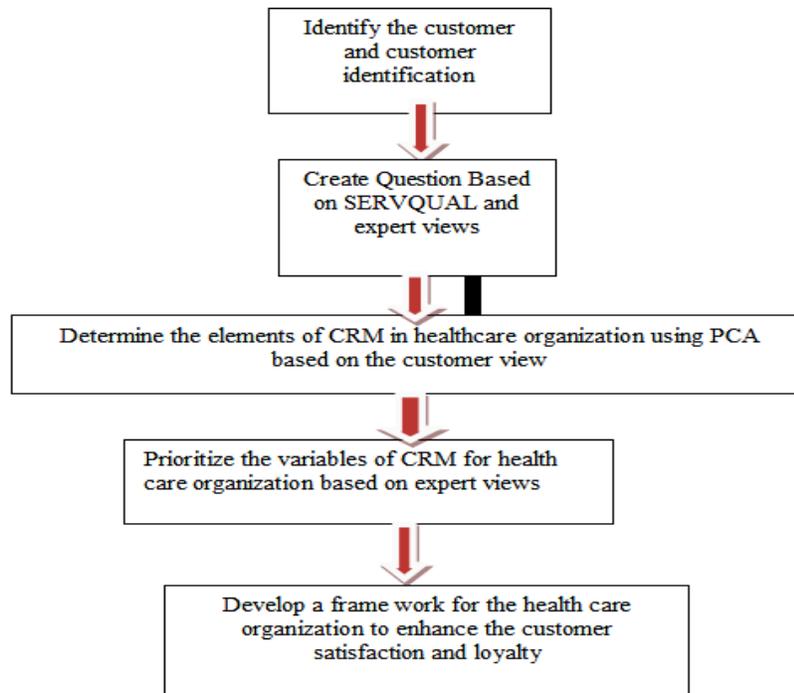


Fig. 3: Methodology Steps

12. QUESTIONNAIRE CONSTRUCT AND DISTRIBUTION

A questionnaire will be distributed to the customer of private hospitals to gain the important information about the customer satisfaction and the customer loyalty with regard to usage of information technology. However a questionnaire will be distribute to the personnel of hospital or experts to make better framework using the expert knowledge. In this especial case many information cannot be gathered only from the customer because they do not have enough knowledge about them. . The principal component analysis will be applied in the selecting the appropriate variables based on

the SERVQUAL framework. The draft questioner will be distributed to the patients and then PCA will determine and categorize the variables based on the answers of customers to enhance the efficiency of final framework.

13. DETERMINING THE CRM ELEMENTS OF HEALTHCARE ORGANIZATION

In this step by analysis the questionnaire using principal component analysis the elements of CRM will be identified in these private hospitals. By using PCA the questionnaire will be categorize and the factors will be reduce to make a better strategy for developing the customer relationship management in the private hospitals.

14. QUESTIONNAIRE BASED ON THE SERVQUAL MODEL AND EXPERT VIEW

Please fill up the form to help us improve our system to make a better communication with the patients:

The purpose of designing this questioner is to define the main factors that affect the management of customer relationship in the healthcare organization. Also the relevant factors will be summarized in one variable that shows all features of similar factors. In other words similar factors will be summarized in a category, due to the fact the dimension of our study will be reduce. So the suitable features will be identify from all possible features in the above questioner and the analysis of information will be more accurate in reduced space than in original space. Finally the quality of healthcare organization will be measured by principal component analysis. The questionnaire distributed to the 540 patients of 5 private hospitals.

15. DATA ANALYSIS

The statistical package SPSS (version 19.0) is used for data analysis. The factor analysis was performed to extract the essential factors that affect the customer satisfaction and customer loyalty in healthcare. The second stage is about performing the analytical hierarchy process to prioritize the essential factors with respect to customer loyalty and customer satisfaction. As it is mentioned earlier the extraction results are as Figure4:

	Extraction
Q1	.671
Q2	.825
Q3	.753
Q4	.753
Q5	.695
Q6	.797
Q7	.761
Q8	.751
Q9	.799
Q10	.816
Q11	.919
Q13	.801
Q14	.833
Q15	.669
Q16	.893
Q17	.785
Q18	.822
Q19	.805
Q12	.572

Fig. 4: extraction results of customer loyalty and customer satisfaction

All the extraction values are more than .5 thus all factors remain in the principal component analysis and the screen plot of all extracted component will be as follows and from the figure 4 the first component represents around 29% of total variances and the second component represents about 17% of total variances until the fifth component that represent more than 76% of cumulative of total variances in the other word from first to fifth component more than 76% of variances will be described and all the factors can be categorized in only 5 components. In default the initial value is 1 and the first fifth components' values are more than 1 so the total components that extract from the factors will be five.

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.444	28.654	28.654	5.444	28.654	28.654
2	3.252	17.118	45.772	3.252	17.118	45.772
3	2.435	12.817	58.589	2.435	12.817	58.589
4	2.246	11.821	70.411	2.246	11.821	70.411
5	1.241	6.531	76.942	1.241	6.531	76.942
6	.766	5.613	82.555			
7	.621	3.270	85.825			
8	.474	2.496	88.320			
9	.426	2.240	90.560			
10	.347	1.828	92.388			
11	.328	1.724	94.112			
12	.270	1.421	95.533			
13	.222	1.171	96.704			
14	.165	.867	97.571			
15	.143	.754	98.325			
16	.123	.649	98.974			
17	.089	.471	99.445			
18	.054	.286	99.731			
19	.051	.269	100.000			

Extraction Method: Principal Component Analysis.

Scree Plot

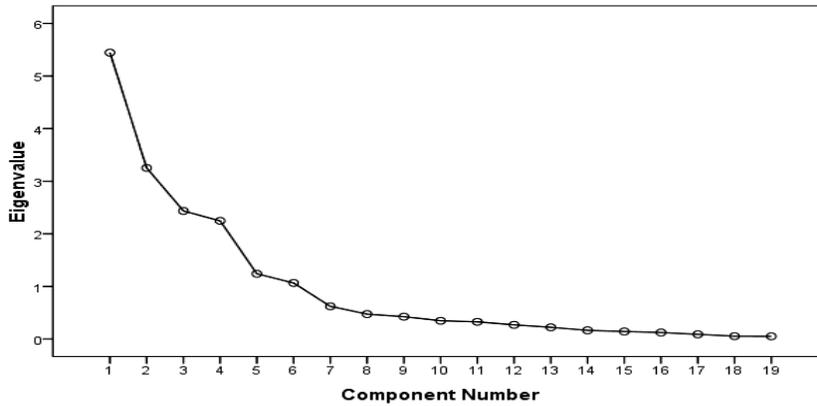


Fig. 5: component matrix the highest score of each question

The Figure of above allocates the similar factors to a specific component by extracting method. It is clearly seen that in component matrix the highest score of each question determine the component of that factor without respect to the negative part; it means that the absolute value of each score will be considered.

	Component				
	1	2	3	4	5
Q1	-.075	-.050	-.085	.094	.504
Q2	.087	-.153	-.147	.164	-.244
Q3	.079	-.146	.056	.159	.358
Q4	.004	.134	.136	.299	.031
Q5	.045	.248	.285	-.102	.048
Q6	-.064	-.187	.044	.115	.215
Q7	.072	-.183	-.085	.161	-.224
Q8	.100	-.126	.173	-.084	.218
Q9	.106	.092	.218	.125	-.108
Q10	.163	.039	.000	.038	.068
Q11	-.170	.009	.004	.099	-.094
Q13	-.041	-.126	.212	-.228	-.189
Q14	.109	-.013	.184	-.229	.106
Q15	.146	.022	-.033	.053	.081
Q16	.124	.174	-.114	.072	-.088
Q17	-.062	.244	.154	.044	.204
Q18	-.107	.201	-.059	-.076	.024
Q19	.091	.179	-.170	-.023	-.171
Q12	.048	-.112	.009	.209	-.078

Fig. 6. component score coefficient matrix

The above Figure 6 indicates that which factor belong to which component. The following correlation matrix's table classifies the factors into five different components which are Reliability, Tangibles, Assurance, Empathy and responsiveness respectively based on the SERVQUAL frame work.

16. PRIORITIZING CRITICAL FACTORS TO ENHANCE THE QUALITY OF CUSTOMER RELATIONSHIP IN HEALTHCARE ORGANIZATION

The AHP method is applied to prioritize the effective factor in service quality in healthcare organization with respect to the experts' view. The analytical hierarchy structure in health care organization to improve the customer relationship management is as figure 7:

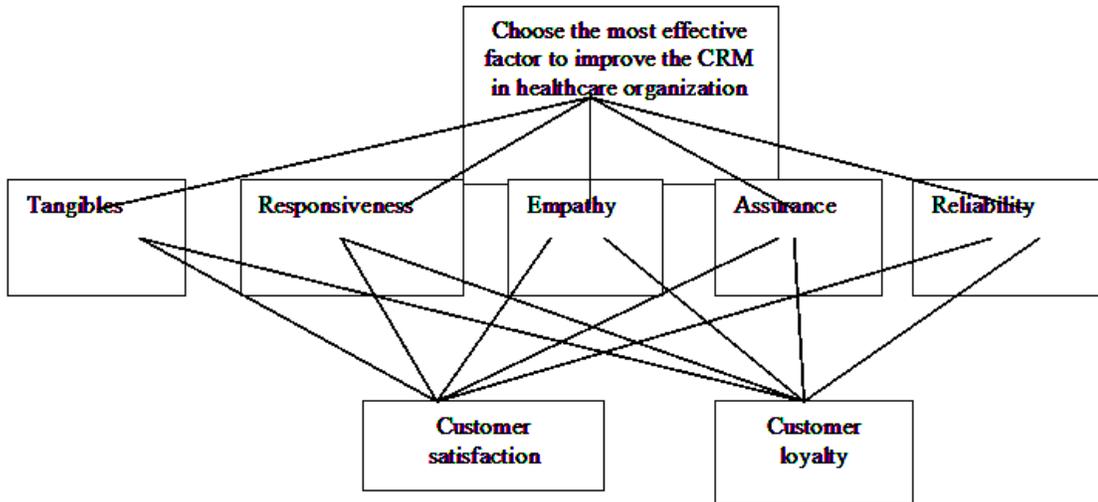


fig.7. analytical hierarchy structure of quality of health care organization with respect to the customer satisfaction (CS) and customer loyalty (CL).

As it is mentioned earlier in the literature review to determine the overall weight, each entry is divided by the sum of the column it appears in. And then each entry is expressed as a percentage of this sum. table1 shows weights of factors.

Table1. Ranks an Weights of factors

	Tangibles	Responsiveness	Empathy	Assurance	Reliability	Weights
Tangibles	0. 209059379	0. 168537954	0. 307692	0. 448660658	0. 16	0. 25879
Responsiveness	0. 627178137	0. 505618918	0. 512821	0. 269196395	0. 36	0. 45496
empathy	0. 069685763	0. 101123784	0. 102564	0. 179464263	0. 16	0. 12257
Assurance	0. 041811876	0. 168539471	0. 051282	0. 089732132	0. 28	0. 12627
Reliability	0. 052264845	0. 056179874	0. 025641	0. 012946552	0. 04	0. 03741

	Priority sore	Rank
Tangibles	0.25879	2
Responsiveness	0.45496	1
empathy	0.12257	4
Assurance	0.12627	3
Reliability	0.03741	5

17. CONCLUSION

The purpose of this research was to identify the characteristics of organizations which would influence the adoption of CRMS in hospitals. Theoretically, a review of prior literature provided support for the proposal of an empirical model of CRMS adoption, and this model has been

empirically verified by the results of a survey of hospitals in Iran. The results showed that factors in this paper have significantly affected the CRMS adoption. The critical factors identified by this research can hopefully provide substantial aids and advices for academics and practitioners.

In short, this paper aims to make a conceptual framework for the healthcare information system to develop the customer relationship management using multivariate measurement system. Based on a multivariate measurement system, the researcher intends to develop a CRM system in hospital using a conceptual framework.

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