Original Article

Evaluation the Effect of Implementing Business Intelligence on Customer Relationship Management Success

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ABSTRACT

Today, due to advances in information technology, improving management approaches and expansion of competitive markets, markets are overloaded with excess supply. These conditions have been lead to consider clients as the real rulers of the market. In this economic climate of customer-focused, organizations have to moving from focus on the product to focus on the customers and manage their behavior, in order to provide maximum efficiency for organization and their customers. Therefore, it is important that managers should make good use of the information systems instruments, such as Business Intelligence (BI) to extract desired information form enormous data volumes quickly in order to increase the profits of their organizations. This study has tried to investigate the effect of implementing BI on improving Customer Relationship Management (CRM) in Pars Modir's Research and Scientific Center. To this end, a conceptual model has been formulated that in which information technology, knowledge management and organizational conduciveness towards BI were identified as input factors, while customer orientation was modeled as outcome factor. Our research hypotheses were examined using Partial Least Squares (PLS) technique and T-value statistic. Results supported our research model, showing that all input factors were positively and significantly affected the success of CRM.

Keywords: Business Intelligence (BI), Customer Relationship Management (CRM), Customer Orientation, Partial Least Squares (PLS).

Introduction

Nowadays, with the birth of new technologies at different levels of hardware and software and especially intelligent technologies such as Online Analytical Processing (OAP) systems and Business Intelligence Systems (BISs), it is not surprising that managers establish BISs as an important strategic goal (Safari &Babazadeh Sanger, 2009).Traditional organizations must accept that their philosophy is coercive to harsh change, and their survival does not mean merely having constant profitability, and they should seek competition and its instruments in their structures and strategies. Therefore, applying new technologies, such as Business Intelligence (BI)is seen as a necessary and inevitable factor for different organizations

to achieve their strategic goals (Golestani, 2007). In recent years, BIhas received more attention in management and organization literatures. It became a leading factor in global markets and provided important advantages in all related activities and processes (Bahrami et al., 2012). On the other hand, the implementation of Customer Relationship Management (CRM) has become a hot topic in the past five decades. CRMcan be considered as a strategy that integrate concepts of knowledge management, data mining and data warehousing (Cunningham et al., 2009) in order to support the decision-making processes to keep long-term and profitable relationships with customers. (Sathyapriya et al., 2012).Although, there are many studies that show a high rate of failure to implement CRM (Rigby, Richheld, &Schefter, 2002; Rowley, 2002; Xu& Walton, 2005).Different trends in the field of customer relationship management are emerging that promise a bright future with more profitability and cost reduction. One of the important orientations can include moving toward Business Intelligence Tools (BITs).BI is a promising research stream that has mostly been guided by IT vendors and business (Carlsson& Turban, 2002; Power, 2007).Therefore, to examine the hypothesis that implementation of BI can lead to successful customer relationship management, the present study presents a model based on BI to provide insights on how successfully manage relationship with customers in Pars Modir's Research and Scientific Center. This paper is organized as follows: After the introduction, the Second Section deals with literature review and theoretical model. The Third Section presents the research method. Results are described in Section IV. Finally, Section V is devoted to conclusions.

Literature Review

Despite the growing importance of BI, little fundamental theoretical studies have been done in this field to response to unknown issues related to BI (Fitriana et al, 2011). Some of the most important studies about BI can be outlined as follows. Gharaibeh&Fobrig (2013) provided a conceptual framework for building practical programs of business intelligence about Customer Relationship Management (CRM). Using a questionnaire and two case studies, the model described how establishes BISs to improve CRM. The first case study is concerned with the current issues of CRM and identified future opportunities and challenges about how upgrade relationship with customers. The second case study tried to exploit the principles of original reference software in order to make CRM possible. Khan et al. (2012) conducted a research entitled "The integration between Customer Relationship Management (CRM) and data warehouse". The main goal of this paper was to maximize customer satisfaction. This research paper is focused on different organizations, especially in Pakistan that replaced practical programs of CRM with data warehouse. As a result, these organizations showed different advantages, such as minimum ETL processing, real time and qualified data, line groups are guaranteed with working goals, reduce in operational costs, customer service improvement, customer retention, etc. These benefits have been measured through analyzing statistical data to show trends over the years. Dien& Douglas (2010) presented a model about Customer Relationship Management (CRM) and Business Intelligence Systems (BISs) for online retail stores. This paper suggested using IT for improving services in online retail stores and businesses. Also, this paper provided case studies about successes and failures on CRM and BI and identified these strategies, successes and failures in Fingerhut Company. Overall, results showed that business based on BI can lead to sustainable CRM, and has a key role in achieving and maintaining competitive

advantages within dynamic business environment. Rezaei (2013) used a standardized model of Dien& Douglas (2010) to analyze the effect of Business Intelligence on Customer Relationship Management among personnel who were working in Iran Khodro Company. The instrument used in this study was a standardized questionnaire that collects data from 625 professionals (240 personnel and 385customers).Results of bivariate linear regression analysis showed that there is significant relationship between BI and CRM. Using Fuzzy TOPSIS, Ghazanfari, Taghavifard, & Rohani (2012) presented a new model of Business Intelligence to evaluate organizational systems. Rezaei et al. (2011) conducted a research entitled "Performance evaluation of Business Intelligence Systems using the Group Fuzzy Analytic Hierarchy Process. This paper provides a practical framework to analyze the performance of Business Intelligence Systems using appropriate criteria and Group Fuzzy Analytic Hierarchy Process technique. Results showed that fit criteria are the most important factor to evaluate the performance of BI systems. Zarin (2010) analyzed the role of implementing Business Intelligence in Electronic Municipality. In this study, use of Business Intelligence Solutions in Electronic Municipality has been discussed. Also, it provide information about current status of Business Intelligence, using new technologies, such as the management dashboards, balanced score cards (BSCs), data mining and warehouse, Knowledge management to identify and apply key performance indicators in Electronic municipality, leveraging the benefits of BI, the road map for the implementation of the Business Intelligence Strategy, the challenges in the implementation and ultimately achievements of using business intelligence solutions in Electronic Municipality (Zarin, 2010). To our knowledge, so far, there is no study that analyzes the effect of implementing Business Intelligence Systems on Customer Relationship Management.

The concept and definition of Business Intelligence (BI)

As a new concept, different definitions for Business Intelligence is presented, therefore it cannot be integrated in the single definition. Business Intelligence is a comprehensive and umbrella term that for the first time proposed by Howard Dresner from Gartner Group in 1989 to describe a set of concepts and methods to improve business decision making processes by using computerized support systems (Nylund, 1990). The first scientific definition of BI dates back to Ghoshal and Kim (1986) that defined BI as a management philosophy and tool to help organizations manage and refine business information with the goal of efficient decision making in business environments. Howson (2008) also described BI as one strategy allows people at all levels of an organization can access and communicate data analysis to improve business management and performance, explore opportunities and make the activities to be effective (Howson, 2008). Therefore, BI can be conceptualized as processes and methods of improving decision –making; through a combination of effective business processes use IT to integrate data and information from different operational support systems with data warehouse, and apply data mining to analyze data and create report for the decision-makers in a timely and appropriate manner (Ishaya, 2012).

Technical and managerial approach to BI

Review of the literature on business intelligence shows that it can be categorized in management and technical approaches and fundamentally follows these two approaches. Managerial Approach to Business Intelligence is a process in which data will be collected from both inside and outside the organization in order to produce

integrated information for decision –making processes. As such, role of BI, here, is creating an information environment in which operational data are collected from transaction processing systems. External resources also can be analyzed in order to extract strategic business knowledge to make structured management decisions (Rohani et al., 2011).Technical approach to BI takes into consideration a collection of the tools that support managerial approach. This approach does not focus on process itself, but also focus on technologies, algorithms and tools to be able to store, retrieve, manipulate and analyze data (Petrini&Pozzebon, 2008).

The concept of Customer Relationship Management (CRM)

Customer Relationship Management (CRM), so far, has yielded different meanings and definitions, and was recognized as a key tool for business strategy in ninety decade (Ngai, 2005). Customer Relationship Management is a business strategy to select and manage best way to interact with customers. Customer orientation forms the culture and philosophy of this strategy that effectively support marketing processes, sales and after-sales services (Wikstrom, 2005).But, there is still more to be recognized about the definition or generally an acceptable conceptual model of CRM, analysis of key aspects of CRM , impact of CRM on business outcomes, barriers to successful implementation of CRM, and develop a model for successful implementation of CRM (Colgate & Danaher, 2000; Parvatiyar&Sheth, 2001; Sin, Tse, &Yim, 2005).In reviewing the literature on Customer Relationship Management (Pass &Kuijlen, 2001; Parvatiyar&Sheth, 2001; Plakoyiannaki&Tzokas, 2002; Sin, Tse, &Yim, 2005) it became clear that the conceptual framework for the success of Customer Relationship Management does not exist. Therefore, according to literature, concepts of Customer Relationship Management are

summarized as follows, to provide a new analytical framework. Customer Relationship Management can be defined as a business strategy based on the knowledge that will help to create and develop a valuable relationship with customers. Using IT as an enabler factor, Customer Relationship Management will need to redesign organization and its processes to propel them toward their client's needs. Moreover, by the personalized products and services, the company will be able to meets the needs of customers and ensures loyal relationships, mutual and long term benefits (Garrido-Moreno & Padilla Melendez, 2011).On a theoretical level, Customer Relationship Management clearly offers great advantages, but a large number of studies show that a high rate of failure to implementing these strategies (Xu & Walton, 2005).In addition,S in et al. (2005) argued that the conceptual framework integrating the concepts of Customer Relationship Management within specific organizational ties and instructions how the companies can successfully implement these strategies in practice does not exist. Moreno and Melendez (2011) analyzed the effect of knowledge management on the success of Customer Relationship Management with taking into account organizational intervening factors. Overall, we need to a comprehensive model for successful Customer Relationship Management in the context of Business Intelligence, in which main components of the model will be able to explain how successfully implement a practical strategy toward managing relationship with customers.

The success of CRM

Numerous studies have been conducted to identifyfactors affecting the success of Customer Relationship Management. Based on prior studies (Crosby & Johnson, 2001; Day, 2003; Fox & Stead, 2001; OHalloran& Wagner, 2001; Kalustian et al., 2002; Paracha&Bulusa, 2002; Ryals& Knox, 2001;

Tiwana, 2001; Sin, 2005 ; Wikstrom, 2005; King & Burgess, 2008; Mckenzie, 2007; Friedrich, 2010, Moreno, 2011) and extensive interviews with managers concerning Customer Relationship Management, Sin (2005) argued that CRM is a multi- dimensional structure that includes a focus on key customers, organizational support or organization, technology and knowledge management. To make management of relationship with customers successful, it should be located on four key areas: strategy, organizational support, technology and processes (Fox & Stead, 2001).We can achieve superior customer relationships, only when put all these four areas together (Day, 2003).Drawing upon knowledge management, Moreno and Melendez (2011) provided an explanatory model for successful Customer Relationship Management. Moreno and Melendez developed a successful model for the implementation of Customer Relationship Management and identified knowledge management as a key factor, and organization, technology, customer orientation and customer relationship management experience, as other factors contributing to successful implementation of Customer Relationship Management (Moreno & Melendez, 2011).A brief definition of each dimension is presented, as below:

Information Technology (IT)

Precise and comprehensive information about customer's are critically important for the successful implementation of Customer Relationship Management (Abbott et al, 2001). Technology, in turn, will play an important role in managing customer relationships, especially the Organizational Intelligence (Boyle, 2004). To make successful implementation of Customer Relationship Management, organization must integrate the right technology with customer relations to ensure business processes are optimized and aligned with business missions (Chalmeta, 2006).

Knowledge Management

Knowledge management plays a key role in the success of Customer Relationship Management (Dous, Kolbe, Salomann, & Brenner, 2005).The Main aspects of knowledge management include knowledge education, knowledge generation, knowledge dissemination, and response to knowledge (Sin et al., 2005).Knowledge about key customers are essential for Customer Relationship Management (Stefanou et al., 2003) and can also be used to develop training programs about how to effectively contact customers (Zahay& Griffin, 2004).

Organizational support

Customer Relationship Management requires that the whole organization move towards a common goal to build and nurture strong client relationships. In this way, design of organizational structure effectively optimizes the establishment of the customer relationship, including customer-focused and process-based teams (Sheth&Sisodia, 2001).Therefore, organizational structure strategy and business processes all are required to implement Customer Relationship Management. Also, successful implementation of Customer Relationship Management will rely on proper cooperation between the technology systems, process and people (Xu & Walton, 2005). In the present study, variables that affect implementing Customer Relationship Management were determined based on business intelligence. These variables were categorized in technical dimension, knowledge management and managerial dimension (See Table 1, attached) and their respected items were specified according to concepts of Business Intelligence.

Customer orientation

Targeting profitable customers is considered as very important to make managing the relationship with customers successful. Most of the research on Customer Relationship Management has been done in order to calculate customer profitability and develop a comprehensive model about customer profitability (Hee Lee, Chan Park, 2005).Customer orientation, clearly demonstrates that the client is located at the center of all activities of the organization to establish gradual long-term relationships (Bentum& Stone, 2005).Therefore, customer orientation can be seen as main output in the success of Customer Relationship Management. The key aspects of customer orientation include customer-centric marketing, focus on key customers, customer lifetime value and interactive marketing (Sin et al., 2005).

Conceptual model

Based on the model of Sin et al. (2005) and its adjusted model by Moreno and Melendez (2011) main factors affecting successful Customer Relationship Management can be recapitulated as follow: customer orientation, knowledge management, technology, and organizational support. Previous research has shown that technology, knowledge management and organizational support are the inputs to the success of Customer Relationship Management, while customer orientation is considered as output to measure the success of Customer Relationship Management. Therefore, in the framework of Business Intelligence, the independent variables influencing the success of Customer Relationship Management include:

Technology: Hardware and software platform.

Knowledge management: the need for clarification of information- the organizational processes that result in the data production.

Organizational support: senior management support of the project - managers and project stakeholders' familiarity with information technology - the organization's standards for process integration.

Dependent variable: Customer-orientation

Customer-orientation: Customer-centric marketing, customer lifetime value, customization and interactive marketing (long-term relationship with the customer).
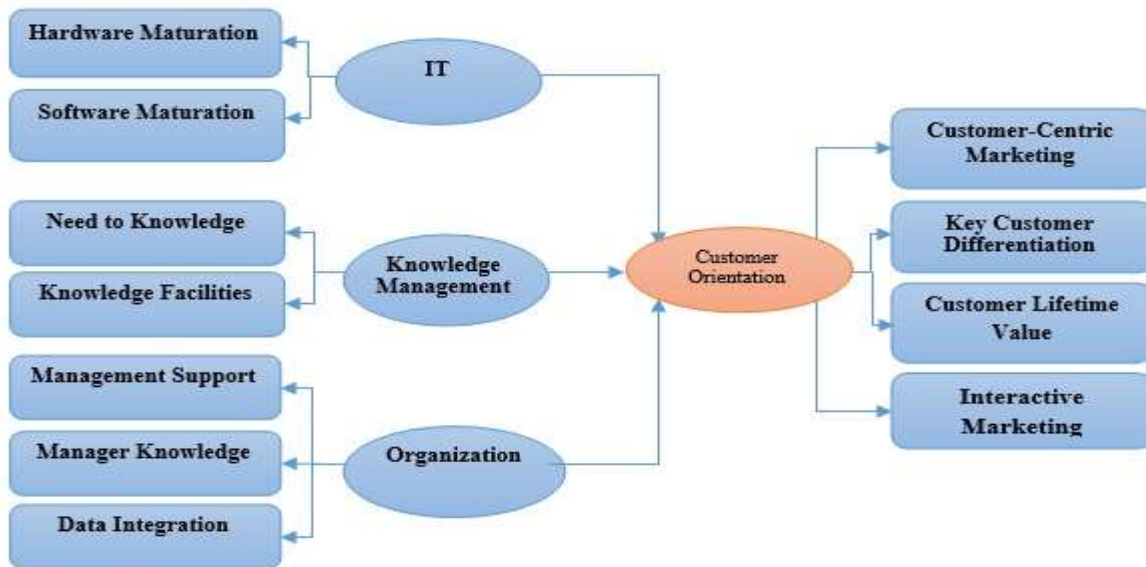

Figure 1. Adjusted model of successful Customer Relationship Management in the context of Business Intelligence (Source: Researcher's made)

Based on the conceptual model of the study (Figure 1) and the importance of implementing Business Intelligence to ensure Customer Relationship Management is successful, the following hypotheses have been proposed.

1. Information Technology (IT) based on Business Intelligence positively and significantly influences the success of Customer Relationship Management.

2. Knowledge management based on Business Intelligence positively and significantly influences the success of Customer Relationship Management.

3. Organizational support toward making Business Intelligence solutions positively and significantly influences the success of Customer Relationship Management.

Materials and Methods

The present study examines the role of using Business Intelligence solutions to the success of Customer Relationship Management. In terms of the goal type the study follows, this study can be categorized in applied research studies, since it aims to apply existing knowledge to test a structural relationship as well as assist the managers to decide on a particular field of the study. Also, the method of research the study use is descriptive-survey. According to the variables in Table (1) and (2) (see Appendix) that obtained from library studies, two questionnaires were designed to investigate the main relationship of the study, i.e. Business Intelligence and Customer Relationship Management. The first questionnaire was about measuring the variables affecting the success of Customer Relationship Management using Business Intelligence, while the second questionnaire measures different dimensions of customer orientation as the successful output of using Customer Relationship Management. Appropriate questions were designed to support the research hypotheses. Respondents were asked to respond to the questionson a five- degree Likert type scale

(strongly disagree, disagree, no opinion, agree, and strongly agree). The content validity of the questionnaire was confirmed by asking a number of experts and faculty members about how suitable questions were for analyzing the research hypotheses. The calculated Cronbach's alpha was 0.828, which showed the reliability of the questionnaire is acceptable. The staffs who were working in Pars Modir's Research and Scientific Center, including managers and experts were selected and sampled by using Snowball Sampling Technique. This sampling method applies non-random sampling method, butit also has roots in random selection. The reason behind using this method was that the members were not easily identified. Therefore, first we identified some members and receive information about them, then they introduced anyone else (Babbie, 2002). This sampling method is also used to identify individuals specializing in a particular field of the study (Macnee& McCabe, 2008). As such, 30 staffs who were working in Pars Modir's Research and Scientific Center shaped our sample of the study. After collecting the questionnaires, the general characteristics of the respondents were analyzed by using descriptive statistics, such as mean and frequency distribution. Also, Excel, Spss, Smart PLS software's were used to analyze data. Finally, to test the conceptual model of the study, Partial Least Squares (PLS) method was used. This method is based on the analysis of variance, so that the relationship between main variables of the study (Latent Variables) and items (Manifest Variables) were analyzed simultaneously. The PLS model can be tested in two models: Outer Model and Inner Model. Outer model is akin to measurement model (Confirmatory Factor Analysis; CFA), while path analysis in Structural Equation Modeling has close similarities with inner model. Therefore, we first examined the outer model, and then the inner model was examined to verify the validity of the model

and hypotheses. Overall, the steps needed to conduct the present study are summarized in Figure 2.
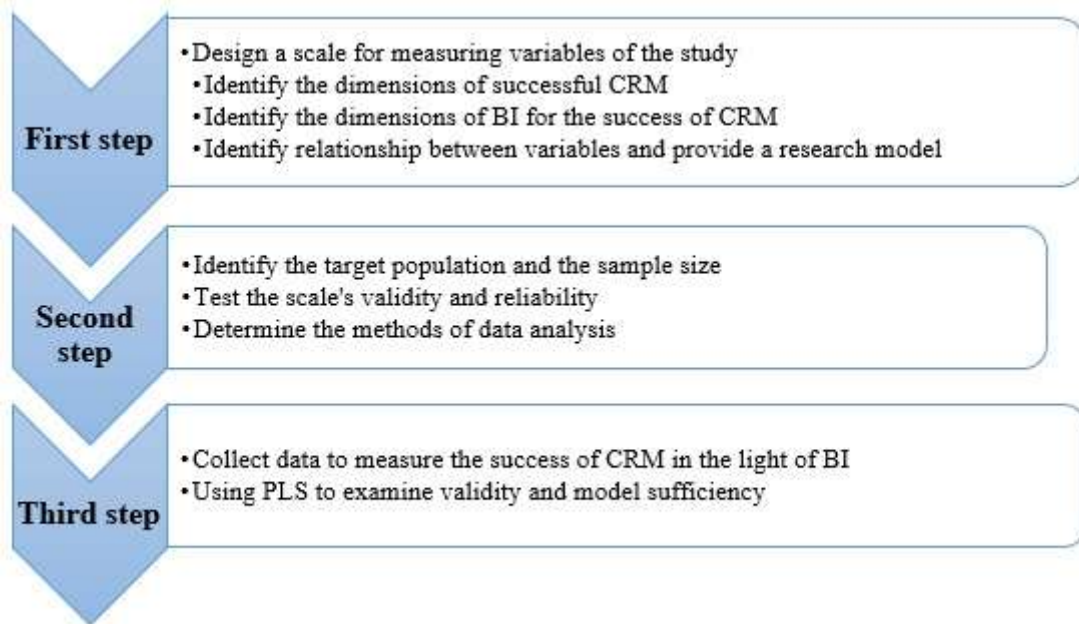

Figure 2. Steps of conducting the study

Results
Profile of the respondents
An accurate profile of the respondents can provide better background to further understand the results of the study. General characteristics of the respondents are summarized in Table 1 and 2. Descriptive statistics were used to categorize data related to these demographic characteristics.

Table 1. Frequency distribution of the respondents based on their gender criterion

Gender	Frequency	Percent	Cumulative Frequency
Male	16	59.26	59.26
Female	11	40.74	100.00

Table 2. Frequency distribution of the respondents based on their education level

Education Level	Frequency	Percent	Cumulative Frequency
B.Sc.	6	22.22	22.22
M.Sc.	16	59.26	81.48
Doctoral	5	18.52	100.00
Total	27	100.00	

Analysis of the measurement model

Anouter model comprising relationship between latent variables and their related indicators was investigated using Partial Least Squares (PLS) Technique. According to the results of CFA, there was a factor loading greater than 0.2 between all dimensions of the customer orientation (customer lifetime value, customer-driven marketing, customization and long-term relationships), and successful Customer Relationship Management based on Business Intelligence and their respected items. This indicates a

good correlation between the observable variables and their associated hidden variables. Therefore, we can say that each main variable of the study is measured correctly and loaded on their respected items. Acceptable results of the CFA allows going to the next phase of structural equation modelling, i.e. verify the hypotheses of the study**.**

Testing research hypotheses

Casual relationships in the hypotheses of the study were tested using Partial Least Squares (PLS) Technique. The overall research model is depicted in Figure 3.We averaged the responses to observed variables and then modeled these obtained dimensions as indicators to main variables of the study. The significance of the relationships was assessed by t-statistic (Figure 4). All relationships hypothesized in this study showed the standardized factor loading greater than 0.6 and t-value greater than 1.96. Therefore, according to the results of PLS, we can generally be trusted with overall model of the study.
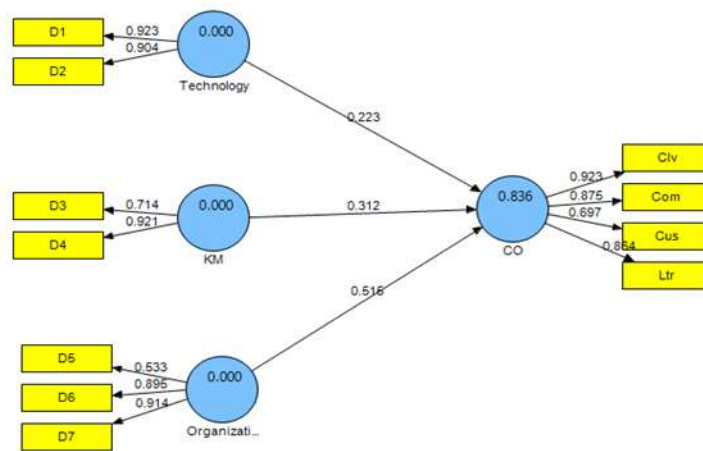

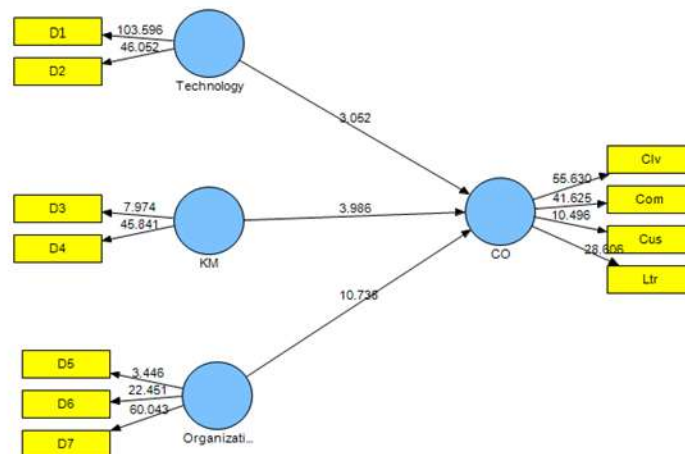**Figure 3.** PLS of the overall research model

Figure 4. T-statistic of the overall research model

Two hidden variables "Hardware Maturity (D_1)" and "Software Maturity (D_2)" was used to measure IT based on Business Intelligence. To measure the success of Customer Relationship Management (CRM), four latent variables" Customer Lifetime Value (CLV)", "Customer-Oriented Marketing (COM)", "Customization (CUS)" and "Long-Term Customer Relationship(LTR)" were used. Strength of association between IT variable based on Business Intelligence and successful CRM was0.223, which this strength can be located as below-average. Also, the t-statistic value was 3.052, which is greater than the critical value of t-statistic at 5% error level, i.e.1.96 and shows that the observed correlation is significant. Therefore, IT towards Business Intelligence was positively and significantly related to the success of the CRM, which in turn confirmed Hypothesis 1. To measure knowledge management based on Business Intelligence, two hidden variables" Need to Knowledge (D_3)" and "Knowledge Facilities (D_4)" was used. The strength relationship between knowledge management based on Business Intelligence and successful CRM was 0.312, which is considered as an acceptable value. The t- statistic value was also 3.986, indicating that the observed correlation is significant. Therefore, the second

hypothesis was supported, showing that knowledge management based on Business Intelligence was positively and significantly related to successful CRM.To measure organizational factors that affect using Business Intelligence Solutions, three hidden variables "Senior Management Support (D_5)", "Manager Knowledge (D_6)" and "Data Integration (D_7)"were used. Strength of association between organizational conduciveness towards BI and successful CRM was0.516, which is considered as a reasonable value. The t-test statistic was 10.738, indicating that the observed correlation is significant. Therefore, organizational support towards using Business Intelligence solutions positively and significantly affected the success of CRM.

Examining the segregated research model

In this section, using Partial Least Squares (PLS) technique, the separated effect of each indicator of input constructs (IT, knowledge management, and organizational context towards using Business Intelligence) was investigated along with simultaneous effects of other variables in an overall framework. A summary of these results are presented in Table 3 and 4**.**

Table 3. Results of analyzing relationships between research variables

	CLV	COM	CUS	LTR
KM1	0.117	-0.057	0.233	0.031
KM2	0.380	0.391	-0.027	0.164
ORG1	-0.032	0.035	-0.153	0.259
ORG2	0.124	-0.128	0.376	0.425
ORG3	0.091	0.190	0.370	0.195
Tech1	0.483	0.325	0.053	0.126
Tech2	-0.119	0.277	0.053	-0.148

Table 4. Significance level of relationships between research variables

	CLV	COM	CUS	LTR
KM1	0.909	0.502	1.268	0.301
KM2	2.344	2.972	0.098	1.235
ORG1	0.23	0.213	0.790	1.383
ORG2	1.175	1.010	3.168	2.518
ORG3	0.722	0.940	1.264	2.092
Tech1	3.861	2.361	0.334	1.112
Tech2	0.908	1.795	0.353	1,424

According to the results of Table 3 and 4, the hidden variable need to knowledge about using Business Intelligence was not directly related to the success of CRM, but the hidden variable knowledge facilities toward using Business Intelligence had a relatively direct effect on the success of CRM. Senior management support about using Business Intelligence strategy was not directly related to the success of CRM, while manager knowledge relatively affected the success of CRM. Data integration as third dimension measuring organizational conduciveness towards using Business Intelligence strategy had a direct effect on improving CRM. In addition, both variables hardware and software maturity based on Business Intelligence had moderate effect on improving the relationship with customers. However, software maturity had a below-average effect on the success of CRM. Therefore, with respect to the effect of components shaping the main constructs in the study, we should first give attention to organizational factors, then IT factors and finally knowledge management factors to facilitate better relationship with customers in the Pars Modir's Research and Scientific Center.

Conclusion

Customer Relationship Management (CRM) is a business strategy to select and manage best way to interact with customers.In today's competitive world,many studies find it necessary for both the organization and the clients to move towards implementation of new technologies in hardware and software surfaces, particularly smart technologies such as Online Analytical Processing (OAP) systems and Business Intelligence Systems (BISs)to avoid failure in effectiveinteraction with customers.Traditional organizations must embrace the philosophy of change, so that their survival does not mean merely having constant profitability, and they should seek competition in their structures and strategies. The present study was conducted at Pars Modir's Research and Scientific Center, aimed to build a model based on Business Intelligence to examine the effect of using Business Intelligence solutions on the success of Customer Relationship Management. In this model, information technology, knowledge management and organizational conduciveness toward BI were identified as input factors, while customer orientation was modeled as outcome factor for measuring successful Customer Relationship Management. Using Partial Least Squares (PLS) technique and t-test statistic, the overall model of study and the segregated research model were examined. Results supportedhypotheses of the study, showing that the variables IT, knowledge management and organizational support towards BI have a direct and positive effect on the success of CRM. Examining a separated model, we simultaneously investigate the effect of variables related to the main constructs in the study. Organizational factors, IT factors

and knowledge management factors, respectively should be the focus of priority in the Pars Modir's Research and Scientific Center to facilitate better relationship with customers. For future research, it is suggested that the model presented in this study should be tested and extended in other organizations to demonstrate the importance of using Business Intelligence solutions in effective communication with customers, which in turn will significantly reduce the failure in the implementation of Customer Relationship Management.

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