Business Inteligence Technology Implimentation Readiness Factors

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Graphical abstract

Abstract

Business Intelligence technology implementation can bring capabilities to making decisions faster and better for organizations. It usually faces on significant rate of failure and leads to a large wasting of time and resources. Therefore, identifying critical readiness factors of it helps IT managers in implementation successfully and prevents from failure in this issue. This study conducted in Shahrvand retail company in Iran that wants to implement BI technology successfully. The purpose of this study is to recognize potential readiness factors of business intelligence technology implementation in this organization. On the base of previous study the most important factors were distinguished and one conceptual model was designed. The quantitative method was selected to evaluate factors and totally259 questionnaires were collected among respondents. The SPSS software used to analysis of data. The result shows that robust & extensible framework as a technology's factor has positive and strong significant relationship with business intelligence technology readiness implementation. Therefore, The results show that the technology dimension factors are important in this implementation successfully. Also, findings demonstrated that the clear business visions and planning, committed management support and sponsorship, and map the solutions to the users were the important factors in this issue.

Keywords: Business intelligence technology; readiness; critical success factors

■1.0 INTRODUCTION

The concept of business intelligence (BI) technology was presented by Howard Drenser (Gartner Group) in 1989 by using computerized support systems to explain a set of methods to develop business decision making [1]. At first Ghoshal and Kim defined BI technology as a management tool that assists organizations manage and enhance business information to facilitate successful decisions [1]. The purpose of business intelligence (BI) technology is to collect data, information and knowledge and respond in a faster, more knowledgeable manner to business events in the form of decisions. Business intelligence (BI) technology was introduced as a tool for analyzing as well as presenting programmed decision making regarding business circumstances, sales and client needs [2]. Organizations require such novel tools and techniques to improve performance and profits, and ought to exceed customer expectations in order to stay competitive in today's highly aggressive business world. Decision support systems and decision making technology has important role in many industries such as retail, construction, airlines and industries [3]. Although many organizations have implemented business intelligence (BI) technology, not all business intelligence projects have been successful [4].

A large number of the BI projects do not succeed, with failure rates estimated at 50-80% [5]. The success of BI technology schemes assumed by companies depends on various factors, some of which are technological since, BI implementation relies on IT infrastructure. In addition, success dependent up organizational and process factors too, which are identified and classified according to BI technology variations among different industries [6]. With the suitable business intelligence technology implementation, firms can make accurate decisions. Without correct business intelligence solution, even well planned and effectively designed data warehouse architectures may fail. Not only is business intelligence able to provide professionals with information they need to make the most effective decisions for their organization, but it also makes organization detail data available, such as customers, products, and services. By accessing such information rapidly and easily in order to take appropriate action or make the right decisions business success is attainable [7].

For rapid decision making, organization should use business intelligence technology tools to extract valuable information quickly from the abundance of data. Risk is an unavoidable part of every decision. To make sound choices, information with the potential to reduce risks is called for. BI technology facilitates this to company directors and professionals [8]. Besides, BI technology

implementation is usually time and resources consuming, and incurs high cost often not yielding expected results or meeting expectations. Therefore, it is essential to complete BI technology implementation by time and resources to better execute business assure BI technology project supporters and prevent BI technology failure [9].

The rapid development of the retail industry has created very tight competition for companies, and their user satisfaction has of late decreased. To maintain competitiveness quickly and better, running a decision making system for this group is essential [5]. For this reason, companies necessitate appropriate support from Business Intelligence technology (BI). Implementing BI technology potentially carries high risk levels of failure and would consume large amounts of resources. In light of this, proposing a model that could identify potential readiness for BI technology implementation may be helpful in preventing this problem [10].

Business intelligence (BI) technology consists of data warehousing, business analysis tools and knowledge management. Other meaning is a set of developments and tools that transform unprocessed data to valuable information. Therefore, it avoids lack of knowledge of the enterprises by converting data to information and knowledge [10].

According to Wayne Eckerson, business intelligence (BI) technology should be able to support the production reporting, end users queries, On Line Analytical Processing (OLAP), dashboard management tools, data mining and modeling tools [11]. It uses huge database analysis, data mining and OLAP [11].

Lonnqvist and Pirttimaki definite business intelligence (BI) technology as information and knowledge of a business that it explains the business environment, the organization, the condition of the market, clients, rivals and financial subjects. In additionally, it is complete and organized processes with organizations analysis and extent the information for making decisions on business processes [12].

Various authors have put a number ideas and frameworks with respect to successfully obtain readiness implementation factors to have readiness for developing business intelligence (BI) technology. Yeoh and Koronios introduced a framework for BI technology implementation readiness and in this framework the organization, technology and process factors impact the implementation of business intelligence (BI) technology successfully [13].

In the other hand, Wixom and Watson identified the model of business intelligence (BI) technology implementation and demonstrated that some factors such as management support, champion, resources, user participations, team skills, source systems and development technology effect BI technology [4].

To attain business intelligence (BI) technology readiness for successful implementation, several factors require attention. These entail critical factors or activity essential to warranting the success of project or an organization. Since implementing business intelligence (BI) technology is beyond a typical application based on IT, developing business intelligence (BI) technology is a complex process that demands not only gaining software and hardware [14].

To name some factors that affect business intelligence (BI) technology implementation, cost should be reasonable in relation to increasing profit for instance [12]. Other factors consist of whether users observe business intelligence (BI) technology as a mission and stakeholders support business intelligence (BI) technology, as well as the percentage of dynamic users. BI technology readiness in particular, measures changes among organizations. For example, an organization may implement it to realize enhanced management, while another may employ BI technology to reach better customer service [11]. However, businesses follow their own, individual means of business

intelligence (BI) technology readiness, since by achieving readiness for BI technology they can attain a successful BI technology [15].

Through research, some of the factors affecting business intelligence (BI) technology readiness in an organization have been documented. For instance, BI technology usability is an essential index of system performance and user contentment. Other important efficiency measures are technology and communications, and management support [16]. As Yeoh and Koronios pointed out, a clear business vision emphasizes BI technology acceptance and results [13]. Also according to Yeoh and Koronios, it is important to have the right champion from the business side of the organization when implementing BI. A BI technology is a business-driven project, and making strategic decisions is crucial. From a technological perspective, the business intelligence (BI) technology is the same as an integration project system and needs the active interest of an organization's business part [13]. As a technological perspective, the business intelligence (BI) technology is the same to an integration project system and needs the active concern of the business area of the organization [13].

A large number of professionals have suggested that business intelligence (BI) technology teams should recognize and have business area specialists such as for data standardization, requirement engineering, data quality analysis and testing. Then the system would be driven for the business and ensure that the BI technology requirements compel reasonable data structuring [17].

According to Eckerson the map the solution to the users is an additional significant aspect in BI technology implementation. To influence map the solution, companies ought to recognize the wide range of business intelligence (BI) technology users in the organization. Most organizations generate four or more different types of BI technology users, such as business users including the executive positions, managers, and analytical roles, who require access to reports, queries and technical aspects [11].

This study is thus carried out to research about readiness models for implementing BI technology and to identify the critical readiness factors of BI technology implementation and evaluate them the one retail company.

■2.0 METODOLOGY AND DATA COLLECTING

2.1 Designing Model

The readiness factors with respect to implementation of business intelligence (BI) technology as mentioned by various researchers, articles, journals, periodicals, reports and executive white papers are collected and they were categorized and listed. In addition, these factors emphasized and recognized as more important factors of BI technology implementation readiness by researchers. As a result, it shows that robust and extensible framework mentioned most by different researchers as a technological part of BI technology successes although, integration BI applications emphasized just by one researcher. According by rank the variables that rank of them six first priorities of these factors were chosen for BI technology implementation readiness factors in this organization in this order: Clear business vision & planning, Robust & extensible framework, committed management support and sponsorship, data quality & management issues, map the solutions to the users, balanced team composition. Then the six factors categorized in three categories: organization, process and technology [13].

The factors for organization category included clear business vision & planning and committed management support and sponsorship and the factors for process category identified as map

the solutions to the users and balanced team composition. Finally, the factors for technology included data quality & management issues and robust & extensible framework. Totally, these six factors selected as business intelligence (BI) technology readiness factors.

2.2 Collecting Data

The quantitative method used to data collecting in this research. The questionnaires were designed. The 33 questions divided for different part of the organization such as senior managers, middle managers and IT managers. For measurement on this study, the 5-point Likert scale used on non demographical questions were 5 meant "Strongly Agree", 4 "Agree", 3 "Neutral", 2 "Disagree" and 1 "Strongly Disagree".

The population of this study from 25 branches of Shahrvand Company consists of BI users with most of them were managers that included 465 users (150 senior managers, 290 middle managers and 25 IT managers) that are BI system users in this company.

Among these numbers, the total number of 300 questionnaires distributed between managers. For choosing sample size for research activity, Morgan table was used [18]. The participants were CIO, project managers, IT managers, financial managers, executive managers and consultant in Shahrvand Company.

In conclusion, from a total of 465 related population size of this company based on Morgan table the 300 sample size was chosen for this study. This sample was chosen randomly from the list of managers and BI users in Shahrvand Company regardless age, sex and education level. Finally, from 300 questionnaires 259 of them were collected. Data entered in SPSS V.21 for data analysis.

■3.0 DATA ANALYSIS AND FINIDING

3.1 Data Analysis

This section reports the data analysis and results based on survey from respondent that were used for testing the hypothesis of the current study. This section includes these parts: data collection and data analysis included factor analysis, correlation between factors and regression analysis. Totally, 25 scale questions were selected for the next step of analysis.

The correlation analysis was done between the seven factors. The mentioned result of the correlation analysis was shown in Table 1. The avBR, avBV, avCM, avMS, avTC, avDQ and avRE refer to the averages of the questions of the business readiness, business vision and planning, committed management, map solution to the users, team composition, data quality and robust and extensible framework.

Table 1 Result of correlation table of BI implementation readiness factors in Shahrvand

Correlation	avBR	avBV	avCM	avMS	avTC	avDQ	avRE
avBR	1	.532**	.518**	.330**	.212**	.158*	.537**
avBV	.532**	1	.105	.234**	.185**	.010	.145*
avCM	.518**	.105	1	.164**	.074	.250**	.142*
avMS	.330**	.234**	.164**	1	.168**	.102	.198**
avTC	.212**	.185**	.074	.168**	1	.125*	.178**
avDQ	.158*	.010	.250**	.102	.125*	1	.010
avRE	.537**	.145*	.142*	.198**	.178**	.010	1

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

As shown in this table, robust and extensible framework, clear business vision and planning and committed management support and sponsorship were significant correlation with business intelligence (BI) technology implementation readiness by value respectively 0.537, 0.532 and 0.518. In addition, the correlation among business intelligence (BI) technology implementation readiness and these three independent factors were strong. Whereas, the correlation between business intelligence (BI) technology implementation readiness and map the solutions to the users were moderately significant. The value of this correlation was 0.330 whereas, the relation between balance team composition and business intelligence (BI) technology implementation readiness and data quality and management issue with its were rarely significant by 0.212 and 0.158 values.

The regression analysis was done, and the results were shown in the Table 2 until Table 4. For regression analysis, the linear regression analysis was done, and avBR was selected as a dependent variable and other variable like avBV, avCM, avMS, avTC, avDQ and avRE were selected as independent variables. Table 2 shows the model summary of linear regression. Adjusted R Square was calculated, and the value is 0.666 and shows the avBV, avCM, avMS, avTC, avDQ and avRE are predictors.

As can be seen in Table 2, the coefficient of determination or R^2 value is 0.674 describes that 67.4% of the variance in the dependent variable (BI technology implementation readiness) was explained jointly by the independent variables of the six factors. The Adjusted R2 is 0.666 indicates that 66.6% percent of the variance is explained uniquely or jointly by the independent variables.

Table 2 Model summary table in regression analysis

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.821[a]	.674	.666	.48279

a. Predictors: (Constant), avRE, avDQ, avBV, avTC, avCM, avMS b. Dependent Variable: avBR

Table 3 shows the ANOVA table of regression analysis. As it as illustrated the significant value = 0, and this show that there were significant relevant.

Table 3 ANOVA table of regression analysis

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	121.395	6	20.233	86.802	.000[b]
Residual	58.738	252	.233		
Total	180.133	258			
a. Dependent Variable: avBR					
b. Predictors: (Constant), avRE, avDQ, avBV, avTC, avCM, avMS					

Table 4 presents the estimated regression coefficients for the analysis of percentage BI technology readiness. In this case, coefficient of regression was tested to verify which of the six factors can predict a project implementation's success. If there were any multicollinearity the tolerance values show it [19]. The multicollinearity problem can be detected by examining the Variance Inflation Factor (VIF) [20]. Tolerance and VIF present the same information because Tolerance = 1 /VIF [19]. The finding shows that there are no multivollinearity because the tolerance values for all of variables were more than $(1-R^2)$. According to Leech if the tolerance values of variables are low than $(1-R^2)$ so there are multicollinearity [19].

Table 4 Regression analysis result

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	-.627	.216		-2.909	.004		
avBV	.387	.036	.409	10.867	.000	.913	1.096
avCM	.355	.034	.393	10.360	.000	.901	1.109
avMS	.094	.043	.083	2.181	.030	.890	1.124
avTC	.018	.043	.016	.425	.672	.919	1.088
avDQ	.048	.044	.041	1.098	.273	.920	1.087
avRE	.345	.032	.402	10.721	.000	.920	1.087
a. Dependent Variable: avBR							

3.2 Result and Discussion

The results of findings indicated that three factors include: clear business vision planning, committed management support and sponsorship and robust and extensible framework as a whole can be used to predict strongly significant readiness of implementation business intelligence (BI) successfully in this organization by coefficients based on p-value =0.00 and t>10 for them.

On the other hand, it indicated that, map the solution to the user predicted it slightly significant by p-value< 0.05 although, other two factors include balance team composition and data quality and management issue were rarely related by business intelligence implementation readiness in this study.

The test results showed that, the six readiness BI factors can be used to predict the level of BI project readiness in this organization by indication a coefficient of determination or R^2=0.674. This value indicated that 67.4% of the variance in the dependent variable was explained jointly by the independent variables of the BI readiness factors. As a result, the improved model is presented for readiness of successful implementation of BI in Shahrvand Retail Company in Iran as shown in Figure 1.
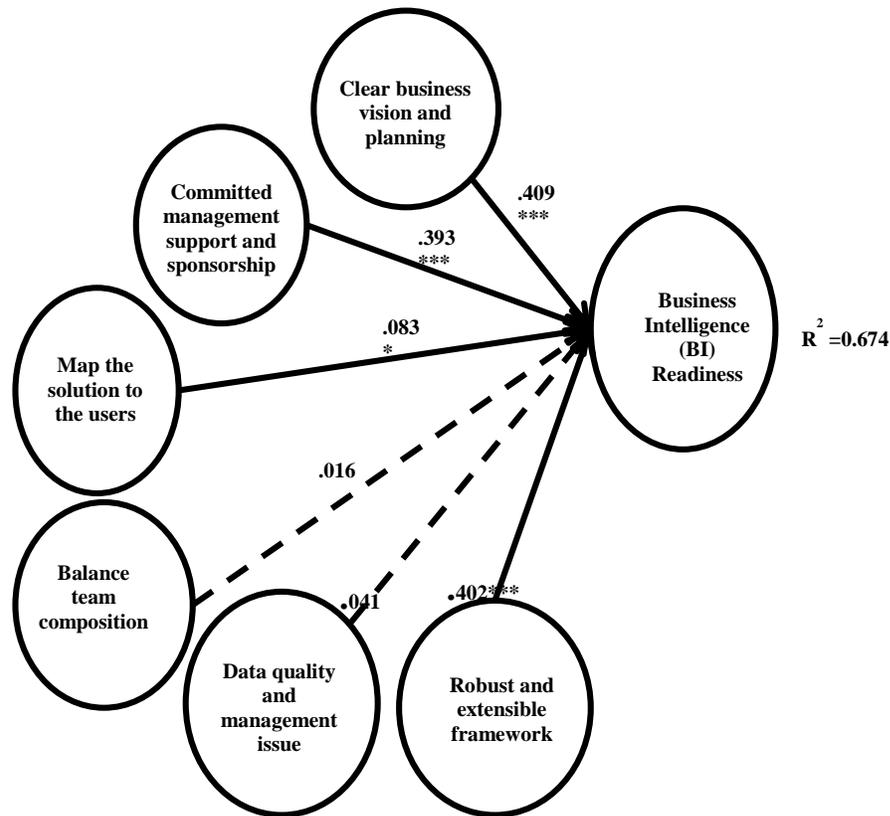
Figure 1 Final model of BI readiness in Shahrvand

■4.0 CONCLUSION

This study identified the effective readiness factors of BI technology implementation in the Iran Shahrvand Company. The finding of this study indicated that the technological factors such as robust and extensible framework were important factors in readiness of business intelligence technology implementation and strongly related in implementing BI technology successfully. Other critical factors that influence BI technology implementation were committed management support and sponsorship and clear business vision that were strongly significant factors in this issue although, map the solution to the user was slightly significant, and balance team composition and data quality were rarely related to readiness of BI technology implementation in Shahrvand.

The finding of this research helps to the organization to implementation successfully of business intelligence technology and identifies the lock of requirement that they needs to implementing successfully of business intelligent technology. The relationship of these readiness factors in implementation of BI technology and satisfactions of BI technology's users and decision makers should be addressed in feature researches.

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