

Predicting the performance of Iran Khodro agencies managers based on business intelligence (case study: Fars, Bushehr and Kohgiluyeh and Boyer Ahmad provinces)

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ABSTRACT

The present research was designed and conducted to predict the performance of Iran Khodro managers based on business intelligence. The statistical population of this research consisted of all the managers of Iran Khodro Company in Fars, Bushehr, and Kohgiluyeh and Boyer Ahmad provinces and 80 individuals were selected by the census method as the sample of the research. The questionnaire of Popovič et al. was used as a data collection tool for the business intelligence variable and the questionnaire of Paterson was used to assess managers' performance, that these questionnaires were confirmed in terms of validity and reliability. Data analysis was performed using SPSS 11 software at two descriptive and inferential levels and the Pearson correlation coefficient and multivariate linear regression were used to investigate the relationships. Findings showed a significant and positive relationship between managers' business intelligence and their performance.

Keywords: Business Intelligence, Popovič's Questionnaire, Managers' Performance, Iran Khodro Company

Introduction

Nowadays, one of the tools for assessing success in realizing the goals of the organization is managers' performance and consequently the performance of the organization (Pourdarvishi, Donighi & Dehkharghani, 2011). Business intelligence is a comprehensive concept by which the whole organization decides to use provided information systems in the most effective way, with the aim of obtaining timely and high-quality information for decision making, in a way that the competitive advantages are created. Such a concept should be supported by senior organizational managers and developed throughout the organization in order to improve performance (Chen and Chiang, 2012). Despite considerable evidence indicating the high importance of business intelligence for the organizations, Wickson and Watson have

stated that the benefits of business intelligence have not been adequately investigated, and therefore need more attention (Popovič et al., 2012).

Gartner's (2006) investigation showed business intelligence is the hottest issue of information technology because these systems are focused on projects in a way that enable users to affect financial and business performance very well (Rahnamay Roudposhti et al. 2013).

Business intelligence systems are actually the application of information and analysis technology to support decision making in the business. Nowadays, the need to use new tools in analyzing and building information systems is not hidden to anybody. Using analysis tools in the framework of a rational model can facilitate the path to achieve the goal for the organization. One of the frameworks is the pyramid of the value-added creating process according to the figure that expresses the business intelligence process in simple words (Nazemi & Aghaie, 2012).

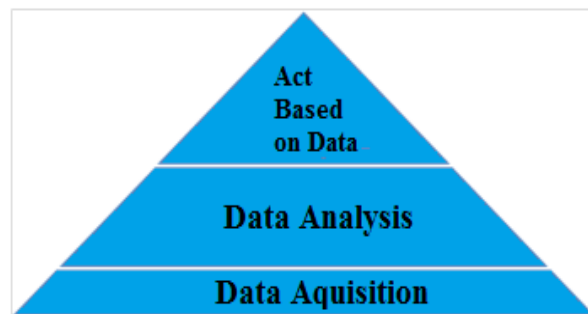


Figure 1: The Pyramid of Value-Added Creating Process in the Business Intelligence (Nazemi & Aghaie, 2012)

Jalali Aghdam et al. (2018) in their research entitled "The Importance of Business Intelligence, Organizational Resources and Knowledge Management in Promoting an Organization and Creating Competitive Advantage" stated that knowledge management and business intelligence are of particular importance in any organization. But this issue has more importance in the knowledge-based organizations whose existential philosophy is the production and dissemination of knowledge. Nowadays, due to the intensification of the competitive space, countries and also enterprises do not rely only on the limited internal organizational resources or random information obtained from the surrounding space in decision making and adopting their competitive strategy, and in fact having accurate, effective and up-to-date information from the surrounding space is considered as one of the tools of power at the national and enterprise levels. Therefore, organizations try to achieve the best sources of information in the business environment of their activity and to use them effectively in their strategic planning.

Garshasebi et al. (2018) in the research entitled "Investigating the Application of Business Intelligence System in Banking Industry: Case Study: Saman Bank" claimed that using business intelligence solutions can increase the competitiveness power of an organization and differentiate it from other organizations. This solution enables organizations to exploit existing information to reap the benefits of competitiveness and advancement, and to better understand customer demands and needs and manage their relationships..

Zareie et al. (2018) in a research entitled "The Effect of Business Intelligence on Financial Performance of the Iranian Banks (with Emphasis on Financial Health Indicators of the Banks)" showed that business intelligence during the time period of 2006-2014 with annual frequency on the return on asset and loan-to-asset ratio has a positive and significant effect and also provides the context of a return on capital increase with a one year pause. On the other hand, this technology can reduce the cost-to-revenue ratio.

Richardson et al. (2018) in research entitled "Business Intelligence and Business Analysis in Management Accounting Researches: Future Status and Focus" showed that executive managers know executives, technology, data and analysis as a transformative force in the business. Many organizations use business intelligence and analytics (BI&A) technologies to support reporting and decision-making. Traditionally, management accounting is the main support component for decision making and control in

an organization. As a result, it has a clear link with business intelligence and analysis technologies and can also benefit from the application of these new technologies. This represents an interesting research area for accounting and Academic Information System (AIS) researchers. Andrea Nespeca (2018), in a research entitled "The Impact of Smart Business Systems on Management Accounting Systems from the Experts' (Consultants') Point of View" concluded that the application of BI can affect the expertise of management accountants and not only can create the final changes in the existing management accounting methods but with the support of new and advanced management accounting methods can also create more changes. By identifying the existing changes in the management accounting system and the factors that can follow or prevent the specific relationship between business intelligence and management accounting systems, this study can be useful for both consultants and customer-oriented companies in business intelligence management projects effectively.

Yang Sui (2018), in a research entitled "An integrated management system for occupational health and safety and environment in an operating nuclear power plant in East China and its management information system", shows that this system has been helpful in statistical sharing and analysis of OHSE data and information from IMS, interaction improvement among the organizations, increasing management efficiency and taking licenses of ISO 14001 and OHSAS 18001; this system has also helped to create OHSE integration management at the nuclear power plant.

Piera Centobelli (2018) conducted a research entitled "Adaptation of Organizational Knowledge Systems and Knowledge Management for Efficiency Improvement and Performance Effectiveness: A Fuzzy-Based Three Dimensional Support System"; the results show that the proposed DSS allows the managers to evaluate knowledge management processes and specify which content management system works to improve the alignment with the nature of their organizational knowledge, as well as to increase the level of managers' performance and their efficiency.

The present research was conducted aiming to predict the performance of Iran Khodro managers based on business intelligence components. In this research, the dimensions of business intelligence were defined based on the theory of Popovič et al. (2012) and based on the five parts of business intelligence system, maturity, quality of information content, quality of information access, the use of information in business process, and decision making culture; and the job performance was determined based on the score the employees participating in the research acquired in response to the 16-item questions of Paterson's Job Performance Questionnaire (1970).

Research Method

The present research is applied in terms of purpose and it is descriptive of the survey-analytical type in terms of data collection method that has been in line with research goals and hypotheses. The statistical population of the research consisted of the managers of Iran Khodro agencies of the three provinces of Fars, Bushehr and Kohgiluyeh and Boyer Ahmad, as 80 individuals of which 6 people have been female and 74 people have been male. In this research, in order to increase the precision and correctness of the results, as well as the accessibility of all the members of the target population, the sampling has been as census method. Also, according to the sample size determination formula and the sample size sampling method, 80 people were determined. Business intelligence was the independent variable and the job performance of managers was the dependent variable of the present project. According to the research variables, questionnaire and interview tools were used for data collection. For this purpose, a questionnaire (Popovič et al., 2012) was used which consisted of 31 items that have been scored based on the Likert's 7-degree scale, and its purpose is to investigate and assess the business intelligence ratio. The validity of this questionnaire has been reported desirable by Popovič et al., and its reliability has also been mentioned according to the Cronbach's alpha method higher than 80 (Popovič et al., 2012). But in order to assess the reliability of this questionnaire domestically, a primary sample including 30 questionnaires was pretested. Then, using the data obtained from the questionnaire, the reliability coefficient was calculated using Cronbach's alpha method as 0.96, and the validity of the questions was calculated by confirmatory factor analysis method as 0.94, which is, of course, significant (Bakhshandeh et al., 2016).

Calculating the ratio of managers' performance was performed through the Managers' Job Performance Assessment Questionnaire (Paterson, 1970), which consisted of 15 items and they were located in 4 categories based on the Likert scale. The reliability of the managers' job performance scale was calculated using Cronbach's alpha method as 0.91, and since this value is higher than 0.70, hence it has had proper reliability.

Discussion and Conclusion

Since the purpose of the present research is to predict the performance of Iran Khodro managers based on business intelligence, a multivariate regression analysis method to identify the predictive power ratio of managerial business intelligence in estimating and explaining the ratio of managers' performance seemed appropriate for this project. Therefore, this method was used which the results generally showed that the research hypothesis regarding that the prediction of the performance of Iran Khodro Company managers was confirmed at statistical level ($P < 0.05$) and the business intelligence variable has had valid predictive power to explain and estimate the performance of Iran Khodro Company managers.

The demographic characteristics of the target population of the research are according to Table 1. In this research, to calculate the weighted average and standard deviation of the scores (Table 2), the sum of the scores of each component's questions was added and divided into the number of its items so that the range of all the components become equal.

Table 1: Demographic Characteristics Related to the Research Sample Members

Demographic Characteristics	Variable	Frequency	Percentage
Gender	Female	6	7.5
	Male	74	92.5
	Total	80	100
Age	Under 30 years	11	13.75
	30 to 40 years	29	36.25
	41 to 50 years	21	26.25
	Over 50 years	19	23.75
	Total	80	100
Education	Diploma	4	5
	Associate	9	11.25
	Bachelor	47	58.75
	Master	17	21.25
	Ph.D.	3	3.75
	Total	80	100
Work Experience	Less than 5 years	9	11.25
	5 to 10 years	19	23.75
	10 to 15 years	21	26.25
	15 to 20 years	19	23.75
	Over 20 years	12	15
	Total	80	100

Table 2: Mean and Standard Deviation of the Scores of Subjects in the Business Intelligence and the Performance of Iran Khodro Managers Variables

Variable	Number	Mean	Standard Deviation	Variance
Business Intelligence	80	3.6512	1.11175	1.234
Managers' Performance	80	3.1138	1.13899	1.298

Table 3: Kolmogorov–Smirnov Test for Investigating the Data Normality

Variable	Number	Mean	Standard Deviation	k-s Statistics	Significance Level
Business Intelligence	80	3.65	1.11	1.55	0.062

According to the results of Table 3, it is concluded from the k-s test that, since the values of the significance level for the questionnaire data are higher than the level of the test, that is $\alpha = 0.05$, so the data of both questionnaires have a normal distribution. Therefore, parametric tests are used to test hypotheses.

According to the results obtained from the investigations, the business intelligence system (maturity, quality of information content, quality of information access, the use of information in business process, and decision making culture) has the ability to predict the performance of Iran Khodro managers. In order to perform analysis on the data obtained from the questionnaires, each one of the dimensions of the independent variables of the research was preferably considered as a separate independent variable, and the analyses about them were performed, and at the end, the analyses summary of all dimensions of each variable was presented.

Table 4: Results of the T-Test Group Statistics of One-Sample Research Hypothesis

Group Statistics Test of One-Sample Test				
First Minor Hypothesis	Number	Mean	Standard Deviation	Standard Deviation from Mean
Maturity	80	3.69	0.361	0.43
Quality of Information Content	80	3.54	0.453	0.48
Quality of Information Access	80	3.71	0.327	0.46
Using Information in the Business Process	80	3.57	0.512	0.45
Decision Making Culture	80	3.63	0.398	0.49

At inferential statistics, the regression analysis results for the research hypothesis are as the following table:

Table 5: Regression Test Related to the First Minor Hypothesis of the Research; Model Summary Table

First minor Hypothesis	Correlation Coefficient (R)	Determination Coefficient (R ²)	Adjusted	Standard Estimation Error
Maturity	0.440a	0.194	0.184	1.06453
Quality of information content	0.357a	0.128	0.118	1.11549
Quality of information access	0.393a	0.155	0.145	1.16002
Using information in the business process	0.370a	0.137	0.127	0.98230
Decision Making Culture	0.439a	0.193	0.183	1.00371

Table 6: Results of Multivariate Regression Analysis for Predicting Job Performance through the Dimensions of Business Intelligence; Table of Coefficients

First Minor Hypothesis	Not Standardized Coefficient		Standardized Coefficient	T	P (sig)
	B	Beta	Error (SE)		
Fixed	1.730	0.374		4.625	0.000
Maturity	0.461	0.104	0.415	4.442	0.000
Fixed	1.708	0.352		4.603	0.000
Quality of Information Content	0.439	0.082	0.393	4.420	0.007
Fixed	1.744	0.388		4.639	0.000

Quality of Information Access	0.475	0.118	0.429	4.456	0.005
Fixed	1.930	0.574		4.825	0.000
Using Information in the Business Process	0.661	0.557	0.615	4.642	0.011
Fixed	1.808	0.452		4.703	0.000
Decision Making Culture	0.539	0.182	0.493	4.520	0.013

The results of the regression test between the independent variable of maturity (data integrity and analytical capabilities) and the dependent variable of the performance of Iran Khodro managers showed that there is a positive and significant correlation between these two variables. The significance level obtained from the test is less than 0.05 ($p\text{-value} < 0.05$) and the obtained beta value is 0.415, indicating that with one unit change in maturity variable, 0.415 change in the variable of the performance of Iran Khodro managers is created. The determination coefficient is also 0.194, indicating the impact of maturity on the performance of Iran Khodro managers. Thus, with 95% confidence, it can be said that the first minor hypothesis of the research, indicating that maturity affects the performance of Iran Khodro managers, is confirmed.

The results of the regression test between the independent variable of the quality of information content and the dependent variable of the performance of Iran Khodro managers indicate that there is a positive and significant correlation between these two variables. The significance level obtained from the test is less than 0.05 ($p\text{-value} < 0.05$), and the obtained beta value is 0.139, indicating that with one unit change in the quality of information content variable, 0.139 change in the performance of Iran Khodro managers variable is created. The determination coefficient is 0.128, indicating the impact of the quality of information content on the performance of Iran Khodro managers. Thus, with 95% confidence, it can be said that the second minor hypothesis of the research, indicating that the quality of information content affects the performance of Iran Khodro managers, is confirmed.

The results of the regression test between the independent variable of the quality of information access and the dependent variable of the performance of Iran Khodro managers indicate that there is a positive and significant correlation between these two variables. The significance level obtained from the test is less than 0.05 ($p\text{-value} < 0.05$) and the obtained beta value is equal to 0.429, indicating that with one unit change in the quality of information access variable, 0.429 change in the performance of Iran Khodro managers variable is created. The determination coefficient is 0.155, indicating the impact of the quality of information access on the performance of Iran Khodro managers. Thus, with 95% confidence, it can be said that the third minor hypothesis of the research, indicating that the quality of information access affects the performance of Iran Khodro managers, is confirmed.

The results of the regression test between the independent variable of the use of information in the business process and the dependent variable of the performance of Iran Khodro managers indicate that there is a positive and significant correlation between these two variables. The significance level obtained from the test is less than 0.05 ($p\text{-value} < 0.05$) and the obtained beta value is equal to 0.615, indicating that with one unit change in the use of information in the business process variable, 0.615 change in the performance of Iran Khodro managers variable, is created. The determination coefficient is 0.137, indicating the impact of the use of information in the business process on the performance of Iran Khodro managers. Thus, with 95% confidence, it can be said that the fourth minor hypothesis of the research, indicating that the use of information in the business process affects the performance of Iran Khodro managers, is confirmed.

The results of the regression test between the independent variable of decision making culture and the dependent variable of the performance of Iran Khodro managers indicate that there is a positive and significant correlation between these two variables. The significance level obtained from the test is less than 0.05 ($p\text{-value} < 0.05$) and the obtained beta value is equal to 0.493, indicating that with one unit change in the decision making culture variable, 0.493 change in the performance of Iran Khodro managers variable is created. The determination coefficient is 0.193, indicating the impact of decision making culture on the performance of Iran Khodro managers. Thus, with 95% confidence, it can be said that the fifth minor

hypothesis of the research, indicating that the decision making culture affects the performance of Iran Khodro managers, is confirmed.

In general, the results obtained from this research showed that by the business intelligence the performance ratio of managers can be explained and predicted. Regarding the research hypothesis, the results of regression test between the independent variable of business intelligence (maturity, the quality of information content, the quality of information access, the use of information in business process, and decision making culture) and the dependent variable of the performance of Iran Khodro managers show that there is a positive and significant correlation between these two variables. The significance level obtained from the test is less than 0.05 (p-value <0.05) and the obtained beta value is 0.469, indicating that with one unit change in maturity variable, 0.415 change in the performance of Iran Khodro managers variable is created. The determination coefficient is 0.161, indicating the impact of maturity on the performance of Iran Khodro managers. Thus, with 95% confidence, it can be said that the research hypothesis, indicating that business intelligence affects the performance of Iran Khodro managers, is confirmed.

Therefore, according to the findings of the present research and similar researches, Iran Khodro Company can obtain accurate economic and financial information and analyses from the customers, market and the internal environment of the organization in order to develop and promote its market by exploiting business intelligence and by making the right decisions while developing relationship with the customers, also add the added value to its products and services. Therefore, if business intelligence capabilities are utilized and the organization could mobilize and direct its business intelligence abilities to solve problems and issues, then by creating new opportunities it can create capacity and promote its ability and capabilities in the money market with the full intelligence and governance on the internal and external environment.

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