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AN EXAMINATION OF EFFECTS THE BUSINESS INTELLIGENCE ON STRATEGIC DECISIONS

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ABSTRACT

Nowadays, scientific management organizations need to make good use of ICT tools such as business intelligence systems. The main objective of this study was to investigate the relationship between systems, business intelligence and strategic decision support systems. Business Intelligence is a tool and not as a product or a system, but as a new approach in enterprise architecture based on speed in data analysis, to make strategic decisions and accurate business intelligence in minimal time and with maximum quality possible. In this research, conceptual model of the impact of strategic decisions designed business intelligence and with questionnaire prepared and distributed among the business intelligence experts in the ICT Department of the Ministry of Industry, Mine and Trade and the Association of Iranian e-commerce, the validity of the model was evaluated. To analyze the results of the assessment factor analysis, correlation analysis and structural equation LISREL and SPSS software were used. Results show that business intelligence to improve strategic decisions and strategic decisions on aspects such as efficiency, effectiveness, agility, flexibility and integration. At the end of the study based on hypotheses, suggestions for extending the use of business intelligence in organizations as well as future research are done.

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INTRODUCTION

The term Business Intelligence was revived by Gartner Group in the mid-1990s. However, the term has become very popular recently and is rooted in the 1970 MIS reporting systems. At that time, reporting systems, static, two-dimensional analytical capabilities were lacking. In the early 1980s, the concept of executive information system (EIS) was emerged. This concept reached computer support systems to senior managers and executive board level. This systems have dynamic and multi-dimensional reporting (Ad- Hoc or based on demand) forecasting, trend analysis, detailed examination, access to the key elements. By the mid-1990s, many of commercial products had these features. Then some new products under the name of business intelligence were emerged. Nowadays, all point concluded that all information needs of executives in an information system is based on business intelligence [1]. Therefore, the original concept of executive information system was changed to Business Intelligence. By 2005, business intelligence systems have the capabilities of artificial intelligence and high analytical capabilities.

Problem Statement

In this study aimed to investigate the effect of **BI** on an enterprise's strategic decisions. Organizational strategic decisions are decisions that are made in low number and long period, but are associated with high volumes of data and processes. The decision taken at these level of issues are non-structured and often done by senior managers and results are long-term impact of macro path [2]. According to what was said business intelligence is an umbrella concept including the architecture, tools, databases, applications and business performance management methodology and make better decisions. Therefore, in this study we examined the effect of BI on organizational strategic decisions.

In order to evaluate the impact of business intelligence on strategic decision making in the organization, the press - Response - Support in business was used.
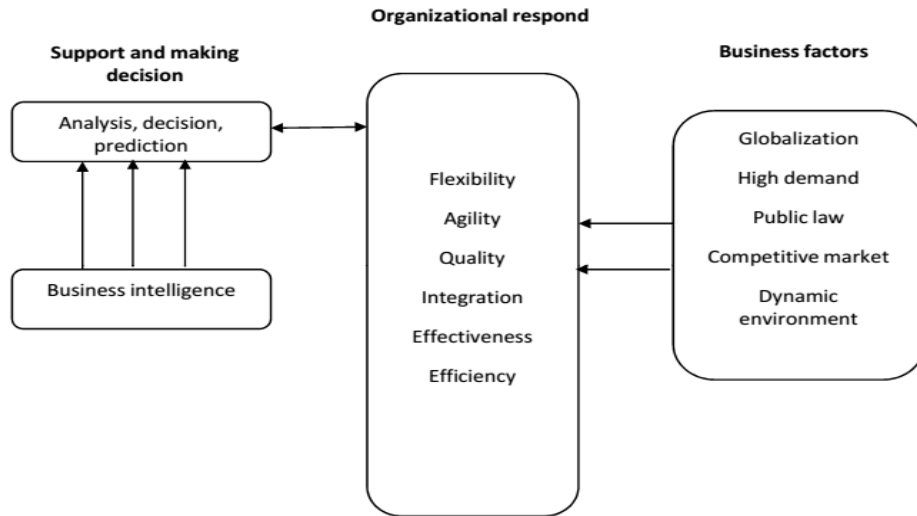
Fig: 1. Pressure – Respond-Business support Zaman, 2005

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According to this model because of the dynamics of the environment, there is a pressures on the organization and provides opportunities for them to influence the strategic decisions. Business Intelligence Systems acted as automated and intelligent systems to support organizational decisions and improve the organization's response and can affect the flexibility, alignment with the objectives of decision, speed and accuracy of decisions, agility, integrity, effectiveness and efficiency of decision-making [3]. The term Business Intelligence was emerged by Gartner Group in the mid-1990s. However, the term has become very popular recently and rooted in MIS reporting systems in the 1970s. At that time, reporting systems were lack of static, two-dimensional and analytical capabilities. In the early 1980s, the concept of executive information system was emerged. This concept reached computer support systems to senior management and executive board level. These systems are dynamic and multi-dimensional reporting capabilities forecasting, trend analysis, and access details and status were key success factors.

By the mid-1990s, many of these features were commercial products. Then some new products under the name of business intelligence was emerged. Nowadays, they have concluded that all information meet the needs of executives in a business intelligence-based information system [4]. Thus, the original concept of executive information systems, changed to business intelligence. By 2005, business intelligence systems had artificial intelligence capabilities and analytical abilities [3]. The modern approach to business intelligence in organizations is so that organizations must act wisely and pay attention to aspects of management and business intelligence organization has become necessary.[5]

LITERATURE REVIEW AND RELATED WORKS

To review the literature review, internal and external research examined the results in **Table- 2**, are provided. **Table- 2** history of study

Author	Explanation
Internal history	
Abolghasem Zadeh, Fereidoon (2010)	Business Intelligence is not a tool or a product, or system, but also as a new approach to enterprise architecture based on intelligent, accurate and fast data analysis for business decisions in the shortest time possible is raised and a set of skills, technologies and systems is applied that for gathering, storing, analyzing and providing efficient access to the data warehouse is used to help organizations correct decision. Thus, the BI can empower us to determine all the factors affecting the organization.

Dehghani, Mohammad Javad, Jadidi, Laleh (2011)	Use of Business Intelligence at a strategic level can kind of process optimization to enhance the overall efficiency of the organization and contribute together. These systems on some important features of financial and other important parameters are focused on increasing the efficiency of the organization.
Hosseini, Seyyed Mehdi, Rostami, Fatemeh (2011)	Business intelligence strategy for making strategic decisions and leads to decisions and increase their quality is integrity.
External history	
Moss & atre (2003)	We also have a set of consolidated business intelligence and decision support databases that provide access to business data to enable business communities.
Chang ,E. (2006)	Business intelligence improves the accuracy of decision-making and operation of the information contained in the business territory to the optimum.
Ariyachandra, T., & Watson, H(2006)	Business intelligence system used for the extraction of structured data and unstructured knowledge is used and efficiency and effectiveness of decision.
Williams and Williams (2007)	Business Intelligence continuously improves performance and increases the profits of the results of decisions.
Wise, L. (2007)	Business Intelligence broadly includes data warehouse and reporting, analytical processing, performance management and predictive analysis that will increase and improve decision-making quality decisions as well.
Oracle. (2007)	Business intelligence tool to support decisions that lead to improved decision-making at all levels of management will be results.
Olszak and ziemba (2007)	Business Intelligence is a set of concepts, methods and processes that are aimed at not only improving business decisions, but also supports the realization of the strategy of the organization.
Hostmann, B. (2007)	Business Intelligence organized and systematic processes for obtaining, analyzing and disseminating information to support effective decision-making and strategic.
Jourdan et al.(2008)	Business intelligence and forecasting the development of enterprise information and improve decisions in tumultuous global business environment can be helped.
Inmon, B. (2008)	Management philosophy and business intelligence tool that helps management and monitoring information aimed at effective decision-making.

Research Model

Many models in business intelligence applications, business intelligence tools that any impact of architecture and business intelligence strategic decisions not examined. According to the above in the background check, as well as business intelligence model, the model based on the model of pressure - response Toyota was designed. Conceptual model, which was explained to evaluate the offer and assumptions is shown in **Figure- 2**. Based on the model pressure - response Toyota due to the dynamic environment pressures entered the organization and provides opportunities for them to influence the strategic decisions. Business Intelligence Systems is an automated and intelligent systems support organizational decision-making and improve accountability organizations are and can affectflexibility on alignment with the objectives of decision, speed and accuracy of decisions, agility, integrity, effectiveness and efficiency of decision-making and improve strategic decision-making [3].

Figure 2 illustrates the conceptual model, which is based on the Pressure - response Toyota model designed the show, structural equation modeling to verify the validity of this model is that a new method for checking and validation, is used in the results section.
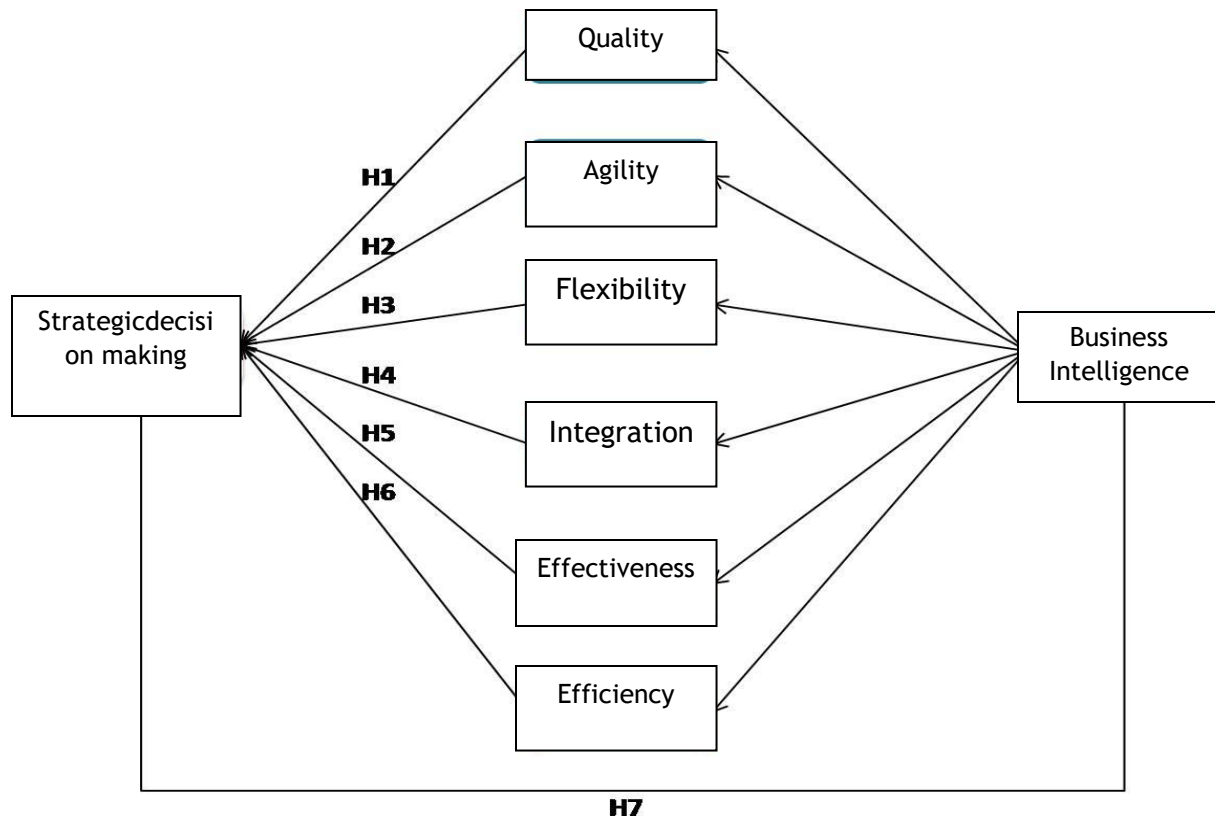
Fig:2. Model of Study
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Anatomical models and variables
Based on the model the conceptual model Pressure - response Toyota and was designed by reviewing previous studies. Components and variables in this model are:
Independent variable

• **Business Intelligence:** Business Intelligence is a concept of umbrella including architecture, tools, databases, applications and business performance management methodology in the covers and make better decisions.

Dependent variable
• **Strategic decisions:** decisions that it cannot adopt and implement independent and independent of the environment carried out in a vacuum. In fact, funds that strategic decisions are distinguished from other decisions include: [6]
1. Eccentricities and lack of structure
2. The importance and special
3. High Complexity
4. Visit a few
From the definition of strategic decisions and to compare it with other decisions, it is clear that these decisions over other types of decisions need to decide their creativity and creative directors the power to plan and deliver the environmental conditions are unknown, they can make those decisions as well. [7] It is obvious that strategic decisions are unconventional and unstructured. [8]
Moderating variable: This variable relationship between independent and dependent variables are affected.
• **Quality:** That more favorable decision quality and increase the satisfaction of all stakeholders. •
Flexibility: flexible decisions adapted with their environment in a variety of conditions and aligned with other organizational decisions.

• **Agility:** Agility decision in the sense of making a decision with speed, accuracy further.
• **Integration:** integration decisions using common resources reduces complexity and makes it easier to achieve goals.
• **Performance:** effective decision resulted in the decision making process has been shortened and costs reduced decisions.
• **Effectiveness:** the effectiveness of decisions leading to optimal decisions and achieve its objectives. [3]

Validity and reliability of the questionnaire

Its purpose is to assess the validity of the problems and possible ambiguities in question and discovered the structure of the questionnaire and so on. First, the validity and accuracy of inventory items, was distributed among a number of experts and after assurance the results of the experts, a questionnaire was distributed in the population studied. (Association of Iranian e-commerce and Technology Department of the Ministry of Industry, Mine and Trade)

In this study, validity or reliability of the questionnaire using Cronbach's alpha. Cronbach's alpha reliability coefficient ranges from zero usually means lack of positive lasting until full reliability are a means and whatever resulting number is closer to a positive number increases the reliability of the questionnaire. SPSS software was used to calculate the Cronbach's alpha reliability calculated for the sample of 20 was estimated to be 0.889, which recognizes reliability. **[Table-3]**

Reliability Statistics	
Cronbach's Alpha	N of Items
0.889	28

METHODS

Research is based on objective, is applied research and the research method was correlational method.
According to the study, the analysis of the effect of BI on an organizational strategic decisions and because there are many experts in Iranian Scientific Society of e-commerce and also the implementation of business intelligence projects Technology Department of the Ministry of Industry, Trade and Mines make up the population of this study. The number of members of this community of 650 people.
In this study, the sampling of simple random sampling method is used. Also sample volume of the sample was used to determine the sample size estimate was 242.
Due to widespread population and consequently the complexity of the sample and for faster access to the data in this study, a questionnaire was used to collect data.
Based on the model research hypotheses raised in this study include the following:
1. Business Intelligence to improve the quality of strategic decisions effectively.
2. Business Intelligence causing agility to make strategic decisions.
3. Business Intelligence to provide flexibility to make strategic decisions.
4. Business Intelligence led the integrity strategic decisions.
5. Business intelligence improves the effectiveness of strategic decisions.
6. Business intelligence improves the efficiency of strategic decisions.
7. Business intelligence to improve strategic decisions.

RESULTS

Research results are presentedin both descriptive and inferential statistics results. Descriptive statistics were part of the community in terms of frequency, mean and standard deviation is paid. Inferential statistics to analyze the results using correlation analysis, factor analysis and structural equation is discussed. Factor analysis confirm or refute the model's components.Correlation analysis of the relationship between the variables studied and it gives strength and weakness. Structural equation, the general structure of the model, the relationship between and goodness of fit in both the standard and the significant estimates are reviewed and analyzed. The following is a summary of research results.

Summary Results of descriptive statistics, demographic data
In this study, 242 samples were examined demographic data in table format given below.

Table: 4 Summary Results of descriptive statistics, demographic data

Percent	Frequency	Variable	
60.7	147	Men	Gender
39.3	95	Women	
4.1	10	21-25	Age
66.9	162	26-30	
28.9	70	30 and more	
29.3	71	BA	Education
57.9	140	MA	
12.8	31	P.H.D	

Summary Results of descriptive statistics research variables

The following table summarizes the results of descriptive statistics variables shown.

Table: 5. Results Descriptive statistics research variables

Standard deviance	Average	Number of question	Variable
1.44	3.02	3	Integration
1.03	2.90	2	Flexibility
1.43	2.34	3	Agility
1.40	2.87	2	Quality
1.29	3.50	2	Effectiveness
1.10	3.64	2	Efficiency
1.90	2.98	6	Business intelligence
1.41	3.22	6	Strategic making decision

Summary results of inferential statistics

It should be noted that in order to reduce variables and consider it as a latent variable, load factor must be greater than 0.3 is obtained. Exploratory factor analysis results are shown in the table below.

Table: 6. Summary results of exploratory factor analysis

Results	Factorial loading	Variables	Dimension	Questions
Questions measure related variables correctly	0.621	Cost	Efficiency	1
	0.761	Process		2
Questions measure related variables correctly	0.630	Objective recognition	Effectiveness	3
	0.596	Optimization		4
Questions measure related variables correctly	0.501	Desirability	Quality	5
	0.698	Satisfaction		6
Questions measure related variables correctly	0.714	Speed	Agility	7
	0.643	Accuracy		8
	0.668	Accuracy		9
Questions measure related variables correctly	0.721	Alignment	Flexibility	10
	0.537	Compatibility		11
Questions measure related variables correctly	0.730	Resource	Integration	12
	0.602	Complexity		13
	0.584	Accessibility		14
Questions measure related variables correctly	0.565	Efficiency	Business intelligence	15
	0.587	Effectiveness		16
	0.711	Quality		17
	0.866	Agility		18
	0.711	Flexibility		19
	0.850	Integration		20
Questions measure related variables correctly	0.612	Efficiency	Strategic decision making	21
	0.766	Effectiveness		22
	0.669	Quality		23
	0.516	Agility		24
	0.757	Flexibility		25
	0.575	Integration		26

The following table approve or reject the results of the relationship between variables shows:

Table: 7. Confirmatory Factor Analysis Summary

Results	Confirmatory factor	Standard confirmatory factor	Apparent variable	Hidden variable
Confirming the relationship	2.87	0.43	Cost	Efficiency
Confirming the relationship	5.80	0.59	Process	
Confirming the relationship	3.99	0.48	Objective recognition	Effectiveness
Confirming the relationship	3.04	0.41	Optimization	
Confirming the relationship	4.87	0.76	Desirability	Quality
Confirming the relationship	8.93	0.86	Satisfaction	
Confirming the relationship	6.87	0.56	Speed	Agility
Confirming the relationship	7.87	0.55	Accuracy	
Confirming the relationship	6.94	0.87	Accuracy	
Confirming the relationship	2.87	0.75	Alignment	Flexibility
Confirming the relationship	5.80	0.43	Compatibility	
Confirming the relationship	4.98	0.46	Resource	Integration
Confirming the relationship	5.23	0.76	Complexity	
Confirming the relationship	6.29	0.65	Accessibility	
Confirming the relationship	3.04	0.34	Efficiency	Business intelligence
Confirming the relationship	4.57	0.57	Effectiveness	
Confirming the relationship	4.19	0.49	Quality	
Confirming the relationship	6.62	0.32	Agility	
Confirming the relationship	6.82	0.41	Flexibility	
Confirming the relationship	7.81	0.43	Integration	
Confirming the relationship	2.43	0.39	Efficiency	Strategic decision-making
Confirming the relationship	3.54	0.61	Effectiveness	
Confirming the relationship	4.33	0.44	Quality	
Confirming the relationship	6.54	0.57	Agility	
Confirming the relationship	4.93	0.54	Flexibility	
Confirming the relationship	4.90	0.45	Integration	

In the following figure the final research model in standard mode and a significant number (t-value) and also summary results of structural equation modeling to hypotheses shown.

As the following table shows the results of path analysis, business intelligence, direct and positive impact on performance.(r = 0.34, t = 6.78) Also the results the analysis of the data shows that business intelligence has a direct and positive impact on effectiveness. (r = 0.45, t = 9.43) Business Intelligence is a significant direct effect on the quality. (r = 0.46, t = 7.33)

Path analysis results between business intelligence and agility shows that this effect is significant. (r = 0.34, t = 9.42) The results also show the impact of flexible business intelligence (r = 0.43, t = 8.32) and impact on integrity business intelligence (r = 0.63, t = 10.32) is significant.

Performance direct and positive impact on strategic decisions. (r = 0.43, t = 7.63) Also efficacy direct and positive impact on strategic decisions. (r = 0.47, t = 6.37) Results of the analysis path between two variable quality and strategic decisions show that this is not a positive and significant impact and there is no relation between quality and strategic decisions. (r = 0.21, t = 1.22)

The results also show the impact of strategic decisions agility (r = 0.38, t = 8.31) and the impact of strategic decisions is significant flexibility. (r = 0.55, t = 10.51) Structural equation modeling results show that integrity is the direct and positive impact on strategic decisions. (r = 0.58, t = 11.30)

Table: 8. Summary results of structural equation modeling

direct impact	Coefficient in standard level	Significant level	Approve or rejection
The impact of strategic decisions on the performance of business intelligence	0.34	6.78	Approved
Business Intelligence effect on the effectiveness of strategic decisions	0.45	9.43	Approved
Business Intelligence effect on the quality of strategic decisions	0.21	1.22	Rejected
Business Intelligence Agility effect on strategic decisions	0.34	9.42	Approved
Business Intelligence flexibility effect on strategic decisions	0.43	8.31	Approved
The effect on integrity business intelligence strategic decisions	0.63	10.32	Approved
The effects of business intelligence to improve strategic decisions	0.56	9.83	Approved
$\chi^2 = 77.54$, Df = 27, P-Value = 0.00162, RMSEA = 0.063, GFI= 0.902, AGFI= 0.939, NFI= 0.959			

The results of structural equation analysis shows that all hypothesis confirmed and only business intelligence effect on the quality of strategic decisions have been rejected. The final version of the research results is shown in the following figure.
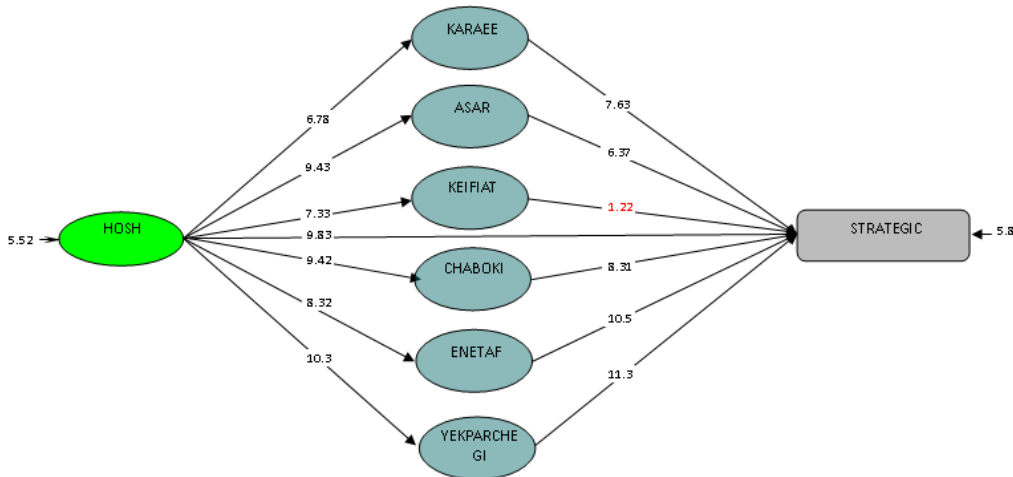

Figure 3: Final model of research

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CONCLUSIONS AND RECOMMENDATIONS

Make decisions that are consistent with organizational goals, is possible only by having the right information. The purpose of business intelligence solutions to provide access to useful information, at the right time, to help better decision-making. Amount of preparation the organization is an important factor for decision-making regarding the use or non-use of business intelligence. Business Intelligence to help extract the appropriate information from the data collected by different software systems design.

In this study we sought to evaluate the effect of BI on an organizational strategic decisions. In order to evaluate the impact of business intelligence on strategic decision making in the organization of the press - response - Support business and we bounce, according to research requirements, the conceptual model was developed.

Parts of the model that will measure the impact of business intelligence on strategic decisions include six component that include: efficiency, effectiveness, quality, flexibility, integrity and agility. A questionnaire designed to assess the models and the members of the IT Department of the Ministry of Industry, Mining and Scientific Association e-commerce, with business intelligence projects and projects of this deal were distributed, and the results were analyzed.

Use of Business Intelligence at a strategic level can be a way to help increase overall efficiency and process optimization together. These systems on some important features of financial and other important parameters are focused on increasing the efficiency of the organization. It is obvious that the system in these areas should be extended processes outside the organization.

Business intelligence through the influence of the decision, including efficiency, effectiveness,agility, flexibility and improved integrity with the organization's strategic decisions. After the analysis consisted of seven that hypothesis, six hypotheses have been approved and only a hypothesis was rejected. The following suggestions to develop hypotheses based on the use of business intelligence in making strategic decisions to the managers recommended:

First hypothesis: business intelligence improve the quality of strategic decisions effectively

Quality strategic decisions can be monitored through two variables compliance and satisfaction. Based on the result of factor analysis of these two variables well measure the quality of decision-making, effects of business intelligence to improve the quality of strategic decisions have been rejected. For this reason, it is recommended:
1. Business Intelligence concepts training courses for senior executives and other employees.
2. The use of customer relationship management, data mining and online analytical processing to improve the quality of strategic decisions.

Second hypothesis Business Intelligence causing agility to make strategic decisions

Agility strategic decisions are monitoredthrough three variable speed, accuracy and precision. Based on the result of factor analysis to measure these variables as well as agility decisions. The effects of business intelligence to improve agility strategic decisions approved. For this reason, it is recommended:
1. Pervasive use of business intelligence across the organization in order to make optimal decisions at the executive and operational levels.
2. The use of data warehouse tools to enhance agility and base-line analysis of organizational decisions.

Third hypothesis: business intelligence provide flexibility to make strategic decisions
Flexibility strategic decisions through the convergence of two variables placed to monitor conformity. Based on the result of factor analysis of these variables as well as the flexibility to weigh decisions. The effects of business intelligence to improve the flexibility of strategic decisions approved. For this reason, it is recommended:
1. Using the Balanced Scorecard to enhance organizational flexibility.
2. The use of data mining, text mining, business intelligence tools to identify challenges, opportunities and adapt to environmental changes.

Fourth hypothesis: business intelligence led to the integrity strategic decisions
Integrity strategic decisions through share common resources change, complexity and placed monitored access. Based on the analysis of the measured variable as well as integrity decision. The effect of improving the integrity business intelligence on strategic decisions is confirmed. For this reason, it is recommended:
1. The use of enterprise resource planning systems (ERP), to develop integrity in the organization.

Fifth hypothesis: business intelligence improve the effectiveness of strategic decisions
Strategic decision-making efficiency and efficiency goals through two variables can be monitored. Based on the result of factor analysis of these variables as well as measure the effectiveness of decision-making.The effects of business intelligence to improve strategic decision-making efficiency is approved. For this reason, it is recommended:
1. Analysis of institutional position and use some of the tools needed according to preference and an organizational need.
2. Monitoring purposes and smart decisions in order to align an organizational goals and strategies.

Sixth hypothesis: business intelligence improve efficiency strategic decisions

Strategic decisions to achieve cost and process efficiencies through two variables can be monitored.Based on the result of factor analysis to measure these variables as well as the efficiency of decision-making. The effect of improving the efficiency of business intelligence on strategic decisions is confirmed. For this reason, it is recommended:

1. Analysis of cost - benefit organizations deploy business intelligence systems.
2. Reengineering business processes to improve organizational processes.
3. Identify the key success factors in the implementation of business intelligence across the organization.

Seventh hypothesis: business intelligence to improve strategic decisions

Business intelligence through the impact on the efficiency, effectiveness, flexibility, agility, integrity and quality of decision-making improves strategic decision-making. Factor analysis and structural equation illustrates this issue. For this reason, it is recommended:

1. The use of business intelligence approach to an organizational strategic decisions.
2. The development of business intelligence applications within the organization in order to improve decision-making

CONFLICT OF INTEREST
Authors declare no conflict of interest.

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