

THE IMPACT OF BUSINESS INTELLIGENCE ON DECISION MAKING: AN APPLIED STUDY ON COMMUNICATION COMPANIES IN TABUK PROVINCE

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Abstract

This study aimed at identifying the impact of business intelligence on decision making: an applied study on communication companies in Tabuk province. The study used the analytical descriptive approach, where a questionnaire was developed for collecting data from the study sample individuals. The study population consisted of those working in middle administrative jobs with a total of (175) employees. The researcher also used the method of Comprehensive Survey, where (175) questionnaires were distributed. and (155) questionnaires valid for statistical analysis were returned. The data were analyzed and the study hypotheses were tested using (SPSS). The results revealed that the perceptions of the employees concerning business intelligence with its dimensions (data resources, data mining, processing) as well as their perceptions about decision-making were high. The results revealed that there is a statistically significant impact for the reality of business intelligence on making administrative decisions in communication companies in the province of Tabuk, where the value of interpretation coefficient was (45.3%). In the light of the results, the study recommended the necessity of urging the communication companies in the province of Tabuk to pay more attention to coping with technological developments and encouraging employees to provide more creative ideas and suggestions related to developing work as well as adopting and implementing the appropriate ideas.

Key words: business intelligence, administrative decision-making.

INTRODUCTION:

Business environment has become more complicated, and thus organizations are required to respond to the continuous changes by developing more creative methods in doing the various tasks, including the rapid adaptation and decision-making concerning work tactics and processes. In order to be able to make the accurate decisions, organizations should have access to a great deal of relevant information and data and interpret them (Turban, et al, 2015). Accordingly, investment in information technology gained more and more importance in order to acquire the competitive advantage and enable organizations to work more effectively (Rezaie, et al, 2018).

(Turban, et al, 2010) demonstrated the relationship between the most complicated work environment (markets, customers' demands, community technology) and the organizational response considering them as constantly changing factors. Indeed, these factors impose more pressure on organizations and provide them with more opportunities to adapt well and respond to the changing environment by using computerized support systems –since the mid 1990s, these factors were set within an equation related to the term of business intelligence that enable organizations to respond effectively to the changing events (Turban, et al, 2015). Accordingly,

there has been an urgent need to replace the traditional methods for decision making with new tools of information technology, such as business intelligence.

There is no one standardized and accepted definition of business intelligence; therefore, each author defined the term individually. However, the general understanding of the term and its components are quite similar among the various definitions. Here are three examples of that:

(Watson and Wixom, 2016) defined business intelligence as " a wide range of techniques, applications and processes related to collecting, storing and analyzing data in order to help users in the process of optimal decision-making. (Yoon, et al) defined business intelligence as the innovative tools used for data analysis in order to prepare reports that allow data access and processing which, in turn, enables users to have valuable visions and support the process of administrative decision making through a wide range of commercial activities. (Hannula and Pirttimaki, 2003) defined business intelligence as organized and systematic processes used to acquire, analyze and publish the important information for their commercial activities, and then companies use the generated data to support making their operational and strategic decisions Loshin, David (2013), Kasasbeh, Emad Ali (2021).

THE THEORETICAL BACKGROUND AND THE STUDY PROBLEM:

The impact of business intelligence:

Business intelligence plays an important role in organizations by providing beneficial visions, supporting decision-making and improving performance (Ramakrishnan, et al, 2018). Some researchers argue that it is difficult to measure the benefits or effect of business intelligence on work, since most of its benefits are intangible and include more speed in preparing reports, accuracy in information and more improvement in the processes of decision making and customer service. Indeed, this is why some managers find it difficult to justify investing in business intelligence (Turban, et al, 2015). The conclusion reached by (Ramakrishnan, et al, 2010) agreed with (Jones, 2005), who suggested that business intelligence facilitates the work of organizations which, in turn, contributes to transforming the required data into real valuable ones to organizations. Furthermore, (Hou, 2016) suggested that business intelligence indirectly and positively affects financial performance by improving the performance of internal processes, customers as well as improving learning and growth. Also, a research shed light on a negative relationship between the investments of information technology and organizational performance (Arham, A. (2014); Bader Ahmed Bader, (2017). The same finding was suggested by (Laudon, K. (2014).) who urged that it could be not appropriate to use a scale, such as the organization's profitability when measuring the impact or value of the system of business intelligence, since these measures don't usually cope with the organization's intention to use technology and don't manifest the complete effect of those systems on organizations. Most previous researches relevant to the impact of business intelligence on organizational performance focused on measuring its effect financially by increasing the revenues, while the impact on operational performance was measured based on the increase of efficiency in the value chain. However, some researchers concluded more

restricted results concerning business intelligence and its effect on the process of decision making Veidal & Korneliussen.(2013).

(Wieder and Ossimitz, 2015) suggested that business intelligence and supporting the systems of business intelligence have a positive effect on the quality of data, the quality of information and the range of business intelligence (the number of business jobs or processes that are supported by the tools of business intelligence).

All these factors are manifested in the form of a positive effect on the quality of the process of decision making. More specifically, the management of business intelligence has a great impact on decision making by collecting high-quality data (Weider and Ossimitz, 2015). Indeed, this is logical– if companies managed the system of business intelligence using an obvious and transparent strategy and determined the way of implementing and maintaining this system, the result will be reflected in collecting high quality and trustworthy data (Weider, et al, 2015). (Rezaie, et al, 2018) suggested that the systems of business intelligence invest in time, and increase the efficiency in decision making by allowing the systems of business intelligence to obtain information and knowledge based on big data. This finding agreed with (Weider and Ossimitz, 2015) which suggested that high quality information has a positive impact on the quality of the process of decision making – if you have an access to great amount of information and were able to deal with it based on a research-system company, you will have more opportunity to obtain more relevant data that lead to making better choices in less time.

In the same vein, (Hou and Papamichail, 2017) suggested that business intelligence has positive effects on decision making, since the enterprise resources planning system supported by business intelligence provides the organization with more ability in making decisions as opposed to the organizations that only adopt enterprise resources planning system. This means that the performance of decision making is enhanced by integrating business intelligence in their systems.

The improvement in the process of decision making was evident in several domains, such as reducing the required time to make trustworthy decisions, providing more solutions, determining problems more quickly and using additional information resources.

(Bader, 2017) conducted a study which aimed at designing a model to measure the extent to which institutions in Gaza strip are ready to implement the program of business intelligence. The results revealed that the organizational factors were in the first place, followed by applied factors, while the technological factors were in the third place with a percentage of (12.1%). The results revealed that the ministry has a readiness of about (17.4%) to support the senior management, the skills of development team and data quality. However, the following weaknesses were evident: the institution's vision and planning, the ability to customize resources, the governance of information technology, and the culture of continuous improvement which requires more attention to promote the adoption and implementation of business intelligence programs.

(Uncapher, Philip (2013).) conducted a study which aimed at identifying the impact of business intelligence as a tool for knowledge management. The results revealed that the systems of

knowledge management has an important role as a tool for knowledge management, where they provide a benefit for the financial sector that is characterized by speed and big data. Business intelligence has an important role in the administrative work due to its positive effects on all the sectors – it contributes to data collection and analysis, management of business performance as well as improving the general atmosphere for decision making, supporting the competitive situation and provoking innovative ideas. Therefore, organizations had to develop their work procedures and update their systems in order to improve the process of decision-making by making advantages of resources and finding out opportunities based on flexible organizational structures (Ji et al, 2015). Accordingly, this study aimed to identify the impact of business intelligence on making decisions.

THE STUDY HYPOTHESES:

The main hypothesis: there is no statistically significant impact at ($\alpha \leq 0.05$) for business intelligence with its dimensions (data resources, data mining, processing) on achieving decision-making in communication companies in the province of Tabuk. The following hypotheses are derived from this main hypothesis.

The first sub-hypothesis: there is no statistically significant impact at ($\alpha \leq 0.05$) for business intelligence according to the dimension of data resources on achieving decision-making in communication companies in the province of Tabuk.

The second sub-hypothesis: there is no statistically significant impact at ($\alpha \leq 0.05$) for business intelligence according to the dimension of data mining on achieving decision-making in communication companies in the province of Tabuk.

The third sub-hypothesis: there is no statistically significant impact at ($\alpha \leq 0.05$) for business intelligence according to the dimension of processing on achieving decision-making in communication companies in the province of Tabuk.

The study objectives:

1. Identifying the impact of business intelligence with its dimensions (data resources, data mining, processing) on achieving decision-making in communication companies in the province of Tabuk.
2. Identifying the impact of business intelligence according to the dimension of data resources on achieving decision-making in communication companies in the province of Tabuk.
3. Identifying the impact of business intelligence according to the dimension of data mining on achieving decision-making in communication companies in the province of Tabuk.
4. Identifying the impact of business intelligence according to the dimension of processing on achieving decision-making in communication companies in the province of Tabuk.

5. Providing a number of recommendations and suggestions that help decision makers in communication companies in the province of Tabuk to improve using the systems of business intelligence and promote the levels of decision-making.

The study importance:

From a theoretical domain, this study is considered as one of the new studies that addressed the relationship between business intelligence and making administrative decisions in communication companies in the kingdom of Saudi Arabia, particularly in the province of Tabuk. Therefore, the study provides the Arabic library with a new study that enriches the theoretical knowledge and fill the cognitive gap in this domain. Also, the topic of business intelligence gained a great importance amongst the scientific scholars, where this topic is dependable to face the challenges of competition, globalization and technological development that characterize the current era.

From the practical domain, this study attracts the attention of the investigated organizations towards a relatively new topic, contributes to determining the reality of using business intelligence and demonstrates the level of achieving decision-making. Therefore, it contributes to achieving the competitive advantage sought by all organizations.

The study methodology:

The study used the analytical descriptive approach either descriptively or by reviewing the theoretical literature and previous studies that addressed the topics of business intelligence and administrative decision making in order to construct a theoretical framework about the dimensions of business intelligence. The analytical domain was represented by developing a questionnaire by the researcher in order to collect data from the individuals of the study sample about the impact of business intelligence on making administrative decisions in communication companies in the province of Tabuk.

The study population and sample:

The study population consisted of all the workers in middle administrative jobs in communication companies in the province of Tabuk with a total of (172) employees according to the statistics of human resources in those companies in 2022. Due to the small size of the study population, the researcher used the method of complete census. (155) questionnaires were valid for analysis and their data were adopted to generalize the study results.

The validity and reliability of the study instrument:

The questionnaire was introduced to a number of specialized faculty members, where they gave their opinions about the suitability of the questionnaire's items, their clarity and the validity of paraphrasing. Based on these opinions, some modifications were made to the questionnaire's items. The internal consistency was calculated using Pearson correlation coefficient, where all the items had a strong correlation coefficient that ranged between (0.55- 0.822). The reliability of the study scale was verified using Cronbach alpha coefficient, where alpha coefficient value for decision making was (0.89), for business intelligence (0.92), and for the total degree (0.91); indicating that the questionnaire had a high degree of reliability.

The results of the responses of the study sample individuals in all the study domains.

Table (1)The results of the responses of the study sample individuals in all the domains of business intelligence and decision-making

Domain	Mean	SD	Degree
Data sources	4.91	0.71	High
Data mining	4.83	0.69	High
Processing	3.90	0.68	High
Decision making	4.00	0.64	High
The overall degree of the first axis	4.41	0.68	High

Table (1) showed that the overall mean for the variable of business intelligence with all its items and dimensions was (4.54), which is more than the average medium (3), with a standard deviation of (0.693), which means that the responses of the study sample individuals are significantly non-distracted and that the overall axis is statistically significant.

The domain of decision making had a mean of (4.00), which is more than the average medium (3), with a standard deviation of (0.693), which means that the responses of the study sample individuals are significantly non-distracted and that the overall axis is statistically significant. Based on the above table, we can conclude that communication companies in the province of Tabuk have a highly efficient systems of business intelligence, in terms of their ability to collect and analyze data, manage the companies' work in a way that matches with the right scientific principles.

Testing the study hypotheses:

The main hypothesis: there is no statistically significant impact at ($\alpha \leq 0.05$) for business intelligence with its dimensions (data resources, data mining, processing) on improving decision-making in communication companies in the province of Tabuk.

Table (2)The results of simple regression analysis for the impact of business intelligence on decision making

Business intelligence	Regression coefficients P	t-test value	Sig. level
Constant	1.213	3.038	0.004
Data sources	.2351	6.052	0.002
Data mining	.5820	6.402	0.001
Processing	570.4	7.845	0.000

Table (2) revealed that there is a statistically significant impact at ($\alpha \leq 0.05$) for business intelligence with its dimensions (data resources, data mining, processing) on achieving decision-making, where the value of (R^2) was (45.3%), and demonstrates the ratio of variance in the dependent variable that the independent variables accounted for. (Watson-Durbin) was (1.83), and ($F=22.59$); indicating the significance of the model. Also, the significance level was less than (0.05), which implies the existence of an effect. Accordingly, we reject the main hypothesis (null hypothesis) and accept the alternative hypothesis: there is a statistically

significant impact at ($\alpha \leq 0.05$) for business intelligence with its dimensions (data resources, data mining, processing) on achieving decision-making in communication companies in the province of Tabuk.

Testing the first sub-hypothesis: there is no statistically significant impact at ($\alpha \leq 0.05$) for business intelligence according to the dimension of data resources on achieving decision-making in communication companies in the province of Tabuk.

Table (3) The results of simple regression analysis to test the impact of data sources on decision making in communication companies in the province of Tabuk

Variable	Regression coefficients	t-test value	Sig. level
Constant	1.308	5.315	0.001
Data sources	0.537	6.664	0.001

Table (3) revealed that there is a statistically significant impact at ($\alpha \leq 0.05$) for the dimension of data resources on achieving decision-making, where the value of (R^2) was (35.6%), and demonstrates the ratio of variance in the dependent variable that the dimension of data resources accounted for. ($F=34.40$); indicating the significance of the model. Also, the significance level was less than (0.05), which implies the existence of an effect. Accordingly, we reject the first sub-hypothesis (null hypothesis) and accept the alternative hypothesis.

Testing the second sub-hypothesis: there is no statistically significant impact at ($\alpha \leq 0.05$) for business intelligence according to the dimension of data mining on achieving decision-making in communication companies in the province of Tabuk.

Table (4) The results of simple regression analysis to test the impact of data mining on decision making in communication companies in the province of Tabuk

Independent variable	Regression coefficients	t-test value	Sig. level
Constant	1.823	5.315	0.001
Data mining	0.426	6.664	0.001

Table (4) revealed that there is a statistically significant impact at ($\alpha \leq 0.05$) for the dimension of data mining on achieving decision-making, where the value of (R^2) was (23.4%), and demonstrates the ratio of variance in the dependent variable that the dimension of data mining accounted for. ($F=22.58$); indicating the significance of the model. Also, the significance level was less than (0.05), which implies the existence of an effect. Accordingly, we reject the second sub-hypothesis (null hypothesis) and accept the alternative hypothesis.

Testing the third sub-hypothesis: there is no statistically significant impact at ($\alpha \leq 0.05$) for business intelligence according to the dimension of data processing on achieving decision-making in communication companies in the province of Tabuk.

Table (5) The results of simple regression analysis to test the impact of data processing on decision making

Independent variable	Regression coefficients	t-test value	Sig. level
Constant	0.447	1.261	0.213
Data processing	0.835	9.865	0.001

Table (5) revealed that there is a statistically significant impact at ($\alpha \leq 0.05$) for the dimension of data processing on achieving decision-making, where the value of (R^2) was (33.9%), and demonstrates the ratio of variance in the dependent variable that the dimension of data processing accounted for. ($F=31.40$); indicating the significance of the model. Also, the significance level was less than (0.05), which implies the existence of an effect. Accordingly, we reject the third sub-hypothesis (null hypothesis) and accept the alternative hypothesis.

A summary of the study results:

The reality of implementing business intelligence in communication companies in the province of Tabuk was high with a mean of (4.54), which is higher than the average mean (3), with a standard deviation of (0.693), which means that the responses of the study sample individuals are non-distracted and that the overall axis is statistically significant. The domain of decision-making had a mean of (4.00), which is higher than the average mean (3), with a standard deviation of (0.64), which means that the responses of the study sample individuals are non-distracted and that the overall axis is statistically significant. Based on the results, we conclude that the communication companies in the province of Tabuk recognize the importance of the system of business intelligence, where this system requires the adoption at all work levels, either at the organization level or the individuals level. Such a system also requires a high cost investment, in terms of the human resources and equipment. In case the companies decided to invest in this technology, the success of this system should not be only measured based on the direct financial viability, since the intangible benefits could pass the direct financial value. The results revealed that there is a statistically significant impact at ($\alpha \leq 0.05$) for the impact of business intelligence with its dimensions represented by (data resources, data mining, processing) in making administrative decisions in the communication companies in the province of Tabuk, where the value of interpretation coefficient (R^2) was (45.3%)

Recommendations:

The study recommended the necessity of urging the communication companies in the province of Tabuk to cope with the technological advances and encourage workers to provide innovative ideas and suggestions related to developing work as well as adopting and implementing the suitable mechanisms.

The necessity of conducting further studies about business intelligence, since there is a paucity in the studies that addressed this topic in the kingdom of Saudi Arabia, particularly in the province of Tabuk, with the possibility of applying this study to other organizations.

Promoting the safety of companies' data in case of extending the adoption of business intelligence system, while ensuring the non-violation of data or the limited access to information only by the qualified individuals.

The necessity of developing flexible organizational structures, so that companies and organizations would respond to the continuous changes and adopt steps that would, in turn, enhance the implementation of business intelligence to improve the process of decision making.

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