

Business Intelligence Of Small And Medium-Sized Enterprises (SMEs) In Saudi Arabia

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Abstract: Business Intelligence (BI) systems are key to deal with information in an organization and decision support. The study aims to examine BI adoption within Small and Medium-Sized Enterprises (SMEs) in Saudi Arabia. A survey targeted executive management from the SMEs selected for the research. The result of the study was "Improvements in data support" as the most BI benefit factors and "interfaces" as the most challenging factors on SMEs.

Index Terms: Business Intelligence (BI), IT adoption, small and medium-sized enterprises (SMEs), Saudi Arabia

1 INTRODUCTION

Business intelligence has different definitions accordingly to different field experts. Then they confirmed influence BI in decision-making applications [1]. Focusing on fundamentals, a list of essential components that make a robust and reliable BI system. In addition, there are critical success factors to be considered to ensure the successful implementation of the BI system in an organization. This paper has been organized as First, literature review. Second, methodology and discussions. Eventually, conclusions of the study.

2 LITERATURE REVIEW

2.1 Business intelligence (BI) definition

There are numerous definitions of business intelligence that can be found in the literature. There is no commonly agreed definition of BI, but there several efforts towards the definition. [2] There is another issue with definitions of BI; it changes every period; depends on the fact and factor they consider. Initially, Whitehorn and Whitehorn (1999) as an IBM umbrella term of a multi of procedures and tools define business intelligence; it provides solutions to many organization problems by extracting valuable information from the database [3]. BI is also defined as the process of capture of data, storing, accessing, analyzing that data, and visualize reports [4].

2.2 Small and Medium-Sized Enterprises (SMEs)

There is no universal definition of the SEMs. For this study, a category of micro, small and medium-sized enterprises (SMEs) is defined by the following factors: those that employ fewer than 250 persons. Financial assets are also used to define SMEs, the turnover of medium-sized enterprises (50-249 employees) should not exceed 200 Million SR; that of small enterprises (10-49 employees) should not exceed 40 Million SR while that of micro firms (less than 10 employees) should not exceed 3 Million SR [5].

Saudi Arabia has gradually developed a vision for increase enhance of SMEs that contributed positively to its economy. There are already several studies on BI success factors. Nevertheless, in Small and Medium-Sized Enterprises, it is often the ignore the BI systems due to many business owners think that SMEs don't need to analyze their data. In addition, BI systems often require lots of costs [6].

2.3 Components of business intelligence

Although definitions vary, all business intelligence systems require, at least, three specific components to run: data warehouses, OLAP techniques, and data mining [7].

- Data warehouse: The data warehouse is an important component of BI. The data warehouse means different things. Some definitions are limited to data. Other definitions include people, processes, tools. Data should be defined, consistent, and nature. In addition, data should be large for data analysis and reporting [8].
- Data mining: The term data mining refers to the finding of information from databases [9]. Data mining is the process of discovering hidden patterns via classification, estimation, prediction, time series analysis etc. [10].
- OLAP (On-Line Analytical Processing): refers to techniques of data analysis. OLAP is an improvement to earlier single-dimensional analysis tools. It presents a multidimensional, summarized view of business data and is used for reporting, modeling, and planning for optimizing the business. It is hence called a multidimensional database or data cube. [8]

2.4 Business intelligence benefits

Initially, business intelligence can help businesses improve their competitive edge via turn data into actionable information [11]. In general, BI reduces costs by remove duplicate data and saves time which increases performance. Also, BI to improve management decision-making [1].

2.5 Successes factor of BI adoption

The Business Intelligence system can't be achieved benefits without considering the success factors. In a survey was conducted by Adamala, & Cidrin (2011) the findings confirm BI capabilities should focus on several non-technological factors to increase the success. Such as: making sure that the BI solution is built with end-users, that the BI solution is closely tied to organizational objectives and project scoped

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[12] According to Dawson, & Van Belle (2013) those factors that organizations need to success BI systems. Committed management support, business vision, user involvement and data quality as the most critical for BI success [13]. Saudi Arabian organizations have incorporated BI into their processes. According to Alarifi (2014) there are factors that impact the implementation of BI in the telecom sector. Explain the factors that impact BI in several sectors helps understand the whole picture [14]

3 METHODOLOGY

3.1 Research design

The aim of this study was to explore the factors that affect BI implementation in SMEs. To achieve this aim, a survey questionnaire, collecting data from a sample of 15 SMEs in Saudi Arabia, using a 5-point Likert scale. Exploratory factor analysis (EFA) is a tool for reducing complexity by "summarizing relationships in data sets" [15]. Identify BI adoption by (1) the recognize of BI benefits (2) challenges encountered. The study following the tools applied by Scholz, et al. (2010) [16]

3.2 Data collection

The sample used was targeted via an online questionnaire. The survey was during in April 2020. Each section used a 5-point Likert scale. The answers ranged from 1 ("Strongly disagree") to 5 ("Strongly agree"). The survey included several categories of SMEs, distributed as shown in "Fig. 1". The response shows the highest percentage for enterprises having between 6 and 49 employees (50 percent), then enterprises having between 1 and 5 employees (31 percent), at least (19 percent) for enterprises having between 50 and 249 employees.

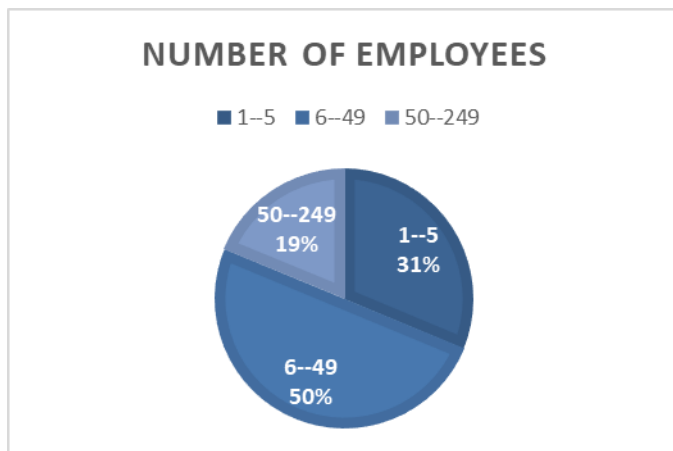


Fig. 1: Number of employees

The economic activity included several categories of SMEs, in "Fig. 2" show the "Arts, entertainment and recreation" and "Accommodation and food service activities" as the highest frequency. Then "Administrative and support service activities" and "Mining and quarrying".

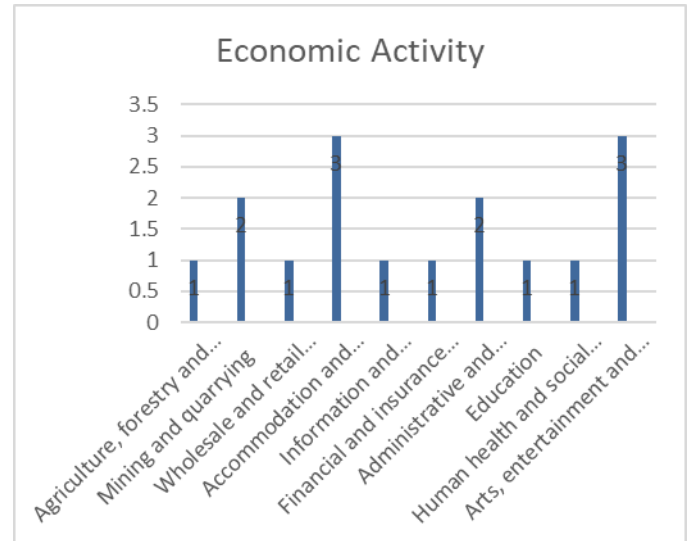


Fig. 2: The economic activity

As mentioned in Section 3.1, the study conducted two-factor analysis: benefit factors of implementation BI and challenges encountered by SMEs applying BI. In Table (1) discussion, the benefit factors and measure the impact of the factors.

TABLE I. BENEFIT FACTORS

Factors	Measure the impact of the factors
Improvements in data support	<ul style="list-style-type: none"> Reduce the effort of data analysis. Reports are available faster. Reduce the effort of reporting. Reports are of better quality.
Improvements in decision support	<ul style="list-style-type: none"> Employees have easier access to information. Achieved time savings. Improvement of data visualization.
Savings	<ul style="list-style-type: none"> Improvement company results. Achieve competitive advantages. Achieve cost savings in IT.

Challenges for BI adoption in SMEs. The three general factors are shown in Table 2.

TABLE II. CHALLENGES FACTORS

Factors	Measure the impact of the factors
Challenges depending on usage	<ul style="list-style-type: none"> A complex process of BI report building. A complex created report.
Challenges depending on data quality	<ul style="list-style-type: none"> Data is low structured. The conflation of data.
Challenges with interfaces	<ul style="list-style-type: none"> Very few IT staff have knowledge of BI Software errors occurred frequently.

4 DATA ANALYSIS

A total of participants was 15 when asking them about their use of BI they prefer Graphing, Data Mining. Then used to reports. Results varied between Dimness queries, BPM, Bench Marking, General Analytics, and Text Mining.

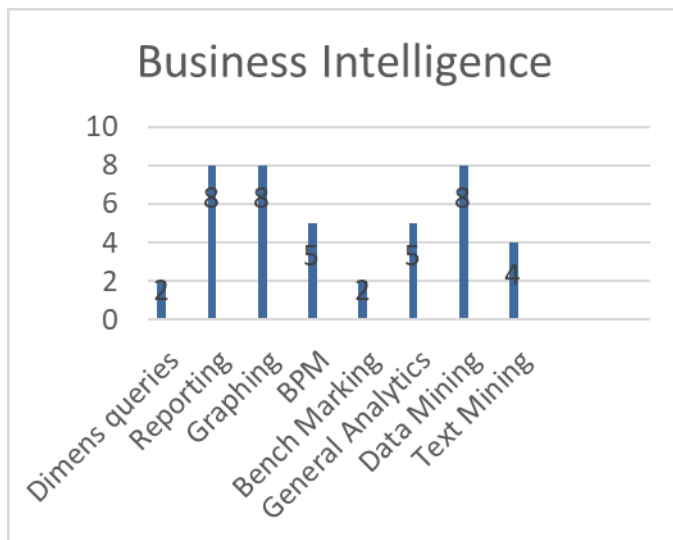


Fig. 3: BI used

Participants who strongly agree with reducing the effort of data analysis 53.3% while 46.7% have agreed. 66.7% strongly agree with BI reduce the effort of reporting. 13.3% they disagree that BI achieve cost savings in IT. Table 3 shows descriptive statistics for factors of benefit and challenges implementation BI from which we find that the highest average was awarded to the Improvements in data support: with mean 4.483333, followed by Improvements in decision support with mean 4.311111 So, consider a High level: since the interval of level as follows:

Low level: [1- 2.59].

Moderate level: [2.60 -3.39].

High level: [3.40 - 5].

TABLE III. BENEFIT FACTORS

Factors	Mean	Std.	Minimum
Improvements in data support	4.483333	0.504149	3.500000
Improvements in decision support	4.311111	0.635793	3.000000
Savings	4.066667	0.936050	2.666667

TABLE IV. CHALLENGES FACTORS

Factors	Mean	Std.	Minimum
Challenges depending on usage	3.400000	1.088905	1.500000
Challenges depending on data quality	3.700000	0.921954	2.000000
Challenges with interfaces	4.033333	1.076812	2.000000

5 DISCUSSION

The study has limitations because the SEM doesn't aware of the benefits of BI, it is not possible to generalize the results and judge if that affects the use of BI or not. Most respondents were recognized using BI benefits. So, the survey focused on the SEMs adoption BI in Graphing, Data Mining, Reports, Dimness queries, BPM, Bench Marking, General Analytics, and Text Mining have been identified to study their use. The results of the analysis of this question showed that there are several factors, in benefits as "Improvements in data support" and in challenges was "Challenges with interfaces".

6 CONCLUSIONS

The goal of the presented study was to identify general BI benefit factors and challenge factors on SMEs. Improvements in data support, decision support, and savings as general BI benefit factors. BI challenges are related to usage, data quality, and interfaces. The results of the study can create value for enterprises that plan to implement BI solutions.

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