Business Intelligence Capabilities and Critical Success Factors in Public Sector Company of Malaysia

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https://doi.org/10.20428/jst.v27i1.1985

Abstract:

The study's objective is to investigate the business intelligence (BI) capabilities of public sector organizations as well as the essential success variables associated with those skills. The research was carried out due to the fact that there has been a growth in the usage of BI, and a large number of the tools that are utilized in its operations are not reviewed, despite the fact that the influence of the user is considered to be one of the primary concerns associated with it. The study used a quantitative research method to look at Malaysian organizations and come up with some hypotheses to test the variables related to BI's capabilities in the public sector of an organization. There were good, reasonable samples of people who took part in the research. A questionnaire was used to get the information. When examined, the findings confirmed the correctness of every hypothesis made. Therefore, there is a connection between elements involving infrastructure, teams, data, top-level support, and user participation in data quality. The findings of this study helped determine whether or not there is a correlation between data quality and the speed with which business data is updated across geographies, the precision with which data is captured, the timeline with which it is processed and reported, and the ease with which key performance measures can be established at various operational levels within the company.

Keywords: Integrated Information Systems, Information Systems Management, Performance Measures

https://doi.org/10.20428/jst.v27i1.1985

1. Introduction

The skills of business intelligence and the vital success criteria in the public sector are important challenges for a Malaysian organization. It is quite important to get a handle on the issue when it comes to the implementation of information management at each of the department levels of an organization. In addition to this, it is useful to the advancement of business in each firm in terms of the efficiency with which information management can effectively serve the purpose of the organization's goals. This research may be able to assist top management in planning the acquisition of information and managing it. This is because information management can be categorized as important as several aspects of business components such as financial management in Ministries, departments, and agencies themselves. BI refers to the methodologies and technology that are implemented by businesses for the purpose of doing data analysis and managing corporate information [1].

The capabilities of business intelligence systems make it possible to conduct retrospective as well as prospective evaluations of the activities of a company. Business intelligence technologies' most popular applications include online analytical processing, data mining, reporting, analytics, process mining, business performance management, complex event processing, text mining, benchmarking, prescriptive analytics, and predictive analytics [2]. Business intelligence (BI) systems can process massive volumes of data, both organized and unstructured, to help companies discover, cultivate, and create novel strategic business possibilities. With this, they hope that massive data may be understood with relative ease. Businesses can gain a competitive market edge and long-term stability by identifying new opportunities and adopting an effective plan based on insights [3].

One of the crucial problems associated with BI is data management; this is because proper data management and information storage may facilitate strategic data collecting [4]. The most important aspect is that many reports may analyze and produce accurate, quick, and Internet-accessible reports such as the capital of assets, inventory, financial statement, and other reports [2]. It is possible that research findings should study what is applicable to the practices of businesses whose information management systems use approaches conceptually similar to those examined here.

Many businesses now see BI as essential to their operations. Many academics, government agencies, and NGOs have devoted considerable time and energy to studying what makes BI implementations successful. In this light, it became clear that many businesses' inability to implement successfully BI systems is attributable to a general lack of understanding about when they are ready to adopt such a system [5]. The ever-increasing interest in BI among customers serves as a driving force behind scientists' determination to carry on their comprehensive research in the field [6]. The use of business intelligence (BI) software and systems have become ubiquitous in numerous industries, the mobile phone industry included [7]. Because of its capabilities and versatility in performance management, data mining, and monitoring company activities, as well as more conventional decision support, planning, budgeting, and reporting, business intelligence (BI) is an investment system that is highly valued.

As a direct result of the constant progression and improvement of technology, the development of executive information systems as well as business intelligence systems is extremely important at this point. These developments have come as a direct result of the rapid advancements in computing technologies. The research community came up with a standard for the industry to follow in order to research the impact of business intelligence over time in a variety of complex situations, as well as complicated problems that need to be solved. This was done as a response to the ever-increasing demand for sophisticated data BI systems. For this reason, this research has embarked upon an empirical study to investigate the state of affairs as it currently stands.

2. Related Works

Business Intelligence allows reaching a huge number of customers / users at a time resulting in a variety of data with hidden knowledge. In addition, advertising, marketing, and cost saving can be achieved. There are many previous research studies on BI adoption and success rate. The article [1] delved into the pattern of business intelligence (BI) uptake and maturity. The organization successfully extracted the factors that led to a better knowledge of the process of developing and testing the BI platform. It also demonstrated how the utilization of information and communication technology (ICT) tools was closely tied to the adoption of business intelligence. The study also demonstrated that business intelligence was

https://doi.org/10.20428/jst.v27i1.1985

successful for businesses when users were able to make the most effective use of their data. A technology company and a production company took the highest in BI adoption. This was concluded according to the findings of a study. For understanding this fact, an investigation has been approached to identify BI adoption trends for companies using BI. This investigation revealed that technology companies took the highest in BI adoption. It has recently come to light that the "Likelihood of a triumph" and "Growing optimism about success" were the two effects that cooperated in organizational preparation for Business Intelligence (BI) Implementation [5]. According to the findings of the study, they exhibited a beneficial mediation influence on teamwork in relation to businesses' preparation for the implementation of BI systems. The study was motivated by the fact that despite the fact that some attempts had been made to address the peculiarities of the factors that influence the implementation of BI by the findings of many research studies, some controlling variables that influence the factors of successful implementation of BI were not neglected by the research communities. This fact served as the primary impetus for the study. Because of this, the study was carried out.

According to Olszak and Zurada [8], various information technology tools for BI have many issues. The various ages of BI development are the most important things in order to establish the strengths and weaknesses. In addition, Olszak and Zurada [8] found that the most important thing to do in order to establish the strengths and weaknesses was to establish the various BI development ages. The problem with BI was revealed while researching the different BI development tools. Then, the most crucial pieces of software for creating BI were covered. Finally, the advantages and disadvantages of the various methods discussed were illustrated. Literary criticism, original thought, and an interpretive stance formed the backbone of the research. IT and business executives can utilize the findings of this study to inform the design of internal BI tools.

Business intelligence has made significant strides, thanks to the increased capacity of data collecting and the expansion of storage capacity. In today's world, businesses employ business intelligence (BI) to store a massive amount of data at a lower cost. This may take place in a variety of ways, such as through activities on social media platforms, the technology found in cellphones, or recordings uploaded to the Internet.

It was said, "Business Intelligence is able to search through all of these data in order to identify patterns and trends" [9]. Every piece of information is revealed in some way, whether it is through the company's internal services, its advertising, its customers, its suppliers, its goods, the economy, etc. Eleven different histories have been made available, and problems for all of the practical and economic challenges as well as the economic management of the installation and decision-making processes [10].

In a study of 111 organizations that used arrangements for information distribution Centers, Watson and Haley [11] discovered that successful criteria included administration support, satisfactory assets, change management, and metadata management. Besides, according to Farley [12], a good technique of information distribution Center should have rapid execution, the ability to adapt to changing business requirements, valuable data, and a straightforward navigational structure. In a survey of 42 end customers, Rozalia et al. [13] discovered that providing satisfactory service to those customers was crucial to the successful operation of an information distribution Center. Sammon and Finnegan [14] advocated the use of contextual analysis as a method for dealing with and recognizing the authoritative needs for successful information stockroom operation. They identified the fruitful hierarchical variables associated with successful execution as follows: business-driven approach, administration support, sufficient resources including budgetary and abilities, information quality, adaptable venture show, information stewardship, technique for mechanized information extraction strategies/apparatuses, incorporation of the information distribution Center with existing frameworks, and equipment/programming confirmation of idea.

Wixom and Watson [15] looked at 111 different companies and concluded that both of the quality of the information and the framework had an effect on the success of the information stockroom, with the quality of the framework being four times more important than the quality of the information. They also acknowledged that the quality of the system was affected by administration support, proper resources, customer participation, and a talented project crew.

https://doi.org/10.20428/jst.v27i1.1985

3. Conceptualization & Development of Research Hypothesis

Within the context of this research, seven distinct research variables were conceptualized. These seven variables were divided into two primary groups: the first group was referred to as dependent variables, and the second group was called independent variables. The theoretical foundations of the inquiry were broken down into a conceptual manner as presented in Figure 1. There are five (5) Independent Variables and two (2) Dependent Variables. The Independent Variables can be classified as Infrastructure Related Factor, Team Related Factor, Data Related Factor, Top Level Support, and Technical People. For the dependent variables, they are "System Quality and Analysis" and "Success" of Business Intelligence.

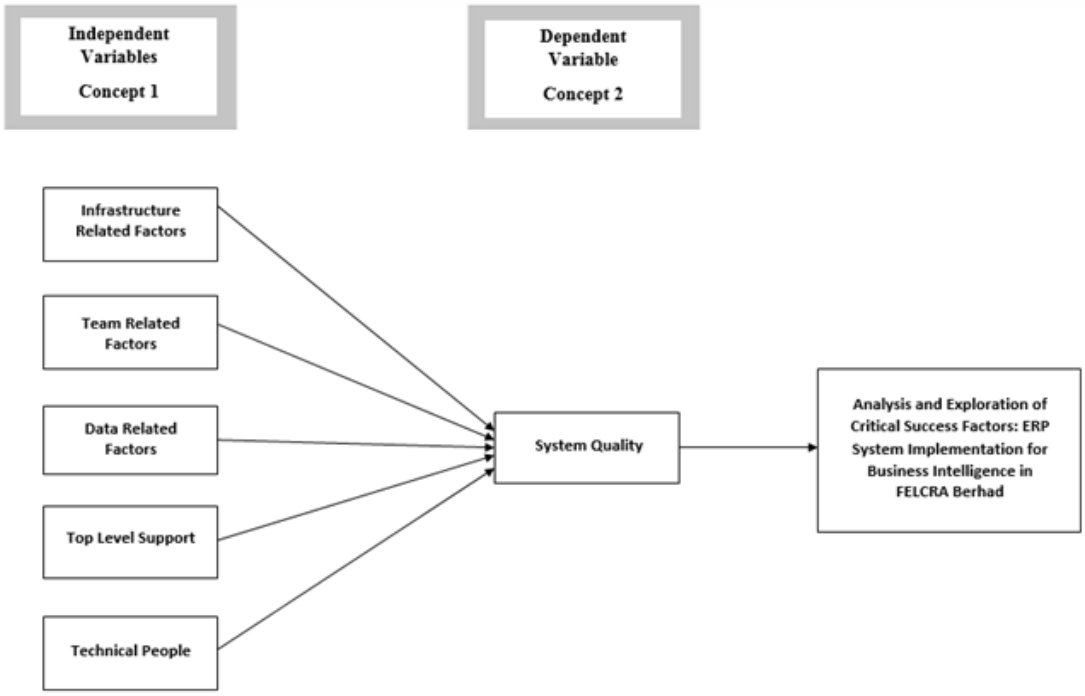

Figure 1: The Proposed Conceptual Framework

Within the scope of the first concept, there are a total of five (5) independent variables that are connected to one another. Infrastructure-related factors, team-related factors, data-related factors, top-level support, and technical people are the components that make up these factors. Each of these aspects makes a unique contribution to the overall quality of the system. In order to reach the desired level of Business Intelligence System Quality, each one of them must function correctly and without incident. Analysis and Exploration of Critical Success Factors: System Quality findings according to how well they operate and how much effect they have on those results The implementation of an ERP system for use in business intelligence.

Business Intelligence (BI) plays a crucial part in enterprises of all kinds and types, regardless of the sector they are operated in. It performs the function of a system that reveals historical, current, and prospective views of the activities of the firm. In addition to that, it seeks to facilitate the improvement of decision-making in commercial enterprises. Because of this, the business intelligence system may also be referred to as a decision support system (DSS) in certain companies. Comparatively, competitive intelligence acquires, analyses, and disseminates information with a thematic focus on firm competitors, whereas business intelligence utilizes technology, procedures, and applications to examine mostly internal, structured data and business processes.

4. Research Methodology

A quantitative research methodology was adopted for this study. There were 130 employees that answered the questionnaire in which 35 of them were from FELCRA Berhad which consists of several departments that are the strength of BI users, 23 employees were from Malayan Banking Berhad, 17 employees were from Petronas Dagangan Berhad, 35 employees were from Sime Darby Plantation Berhad, and 20 employees were from FELDA Global Berhad. In terms of that, 97 employees were chosen as the sample to become a respondent. The sample was chosen according to the table of sample sizes for a given population size by Krejcie and Morgan [17]

The instrument used for data collection was a Questionnaire to determine the interest in Business Intelligence success factors. The research of questionnaires consists of seven sections. Section A consists of

https://doi.org/10.20428/jst.v27i1.1985

demographic questions about respondent's personal particular that are related to them. Sections B to G consist of questions that seek each respondent's opinion about both dependent variables and independent variables. The questionnaire includes questions on Business Intelligence success factors for infrastructure-related, team-related, data-related, top-level support, user involvement, and business intelligence success. In terms of the questionnaire method, the researcher used 5 Likert scale which produced a survey scale (Likert scale) as a means of measuring all the success factors related.

The method used to collect the data for this research study was by using a questionnaire. The type of questions used was a close-ended questionnaire. Close-ended questions are proven more precise and easier to manage. All questions asked the respondents entirely, and the respondents were required to act by choosing among the sets of alternatives given by the researcher. For this study, all secondary data were collected from many sources such as books, previous research, company reports, journals, and Internet publications. These sources strongly contributed to this study with a bulk of information for research and problem-solving. As for the actual distribution process, the researcher was using the Delphi Study in the first place as a study sampling method where the researcher used the list of Business Intelligence expert implementation users in the Information Technology Department at FELCRA Berhad in Kuala Lumpur. The entire respondent was selected from the actual list. There were three (3) methods of analysis used in this study, which were Descriptive Analysis, Reliability Analysis, and Pearson's Correlation Analysis. Descriptive Analysis of demographic variables was used to figure out the frequency and percentage of the respondents' profiles. The Descriptive Analysis also was used on independent and dependent variables to figure out the mean and standard deviation for the counts of the variables. The reliability Test was used to determine how far the questions in the questionnaire were reliable to be asked to the respondents. Pearson's Correlation Analysis was used to figure out the value for the strength of the relationship between the desired variables.

5. Analysis and the Presentation of the Result

This research analyzed the data collected and discussed the results obtained from the analysis of data and its interpretations obtained for the research topic of "Critical Success of Business Intelligence Effects in an Organization, Kuala Lumpur.". All of the data were taken from the questionnaire that had been distributed earlier. A total of 241 sets of questionnaires were distributed to several companies that currently use the Business Intelligence and ERP software package for their daily business run. All the departments including Information Technology Department, Human Resource Department, Finance Department, Bio-Technology Department, Plantation Department, and Top Management level support were using business intelligence as the main tool to analyze the data on daily basis. This is specially used in organizations in Kuala Lumpur such as Sime Darby Berhad, FELCRA Berhad, FELDA Global Ventures, and Vantage Point Consulting Sdn Bhd. Out of the total questionnaire distributed, only 208 sets were returned. The percentage of total returned questionnaires was about 86.3 percent in Maybank Malaysia Berhad and Petronas Dagangan Berhad.

5.1 Descriptive Analysis of Demographic Variables

The result from the questionnaire showed that 51.9% of the feedback came from Male respondents, which was almost more than half of the total correspondents. Meanwhile, another 41.8% of the feedback was contributed by Female correspondents. A majority of the respondents were in the range of age between 25-34 years old, which consisted of 61.1%. Furthermore, the lowest percentage of the respondents was from the age of 55 and above, which contributed only 1.4%. Literally, most of the correspondents were from Bachelor's Degree level, which contributed 40.9% of the 208 correspondents. Followed by the second highest percentage that came from a correspondent in the Diploma level, which was 38%. While the rest of it contributed moderately by Master's Degree level by 13.9% and 5.3% from SPM/ 'O' levels. The lowest respondent percentage came from correspondents form the STPM/ 'A' level, which only contributed about 1.9% of the total.

It was concluded that almost half of the total of correspondents, which was 49.5%, were from the Executives level. Besides that, the lowest percentage of the correspondents among the others was contributed by Subordinates and others position, which was 3.4%. The rest of the

https://doi.org/10.20428/jst.v27i1.1985

correspondents were in the position of Senior Management with 3.8%, Managerial with 24.5%, followed by Clerical level with 12%, and finally, Technician with 6.7%. A majority of the correspondents were permanent, which consisted of 93.3% which was equivalent to194 correspondents out of 208 correspondents. On the other hand, both correspondent with the employment status of Temporary and Others each contributing 1.9% of the total. Finally, 2.9% of the correspondents were Contract staff. Based on the total of 208 correspondents, 26% of them were using other systems for their reporting purpose. Meanwhile, 41.8%, which included most of the correspondents were using the SAP system for their business reporting. Last but least, 67 correspondents, which equalled 32.3%, were using the Tableau system as their reporting mechanism. The statistics were shown in sum and mean for each category of demographic questions. Education showed the highest degree of sum and mean compared to other categories, and employment status showed a very low degree with a sum of 238.00 and a mean of 1.1442. There were no missing data stated for the entire respondents.

5.2 Descriptive Analysis of Dependent Variable

The descriptive statistics of the dependent variable, which is Business Intelligence Success, showed the following: Item five (5) had the highest mean, which was 2.1683. The question for item 5 was "the process time is reduced by the use of Business Intelligence system". It showed that the respondents agree that the Business Intelligence Success implementation in their company and it is very important for the user and the company itself. The lowest mean was item six, which refers to the question "the accuracy of process transactions is improved by the use of Business Intelligence system?" with 2.0192. It showed that the respondents do not feel that their working areas are suitable to distribute for business intelligence success.

5.3 Descriptive Analysis of Independent Variable

Item number 1 had the highest mean with 2.1202. The question for item number 1 was "Aligning business case with the strategic Business Intelligence vision." It showed that the respondents agreed that the infrastructure-related factors are really useful for them to align the business case with the strategic business intelligence vision. Item number six, with the statement "having an extensible framework to stabilize source/back-end systems", had the lowest mean with 1.8750. It showed

that the respondents feel neutral to have an extensible framework to stabilize source/back-end systems in infrastructure-related factors.

5.4 Reliability Test

N of items shown in the table indicated the number of questions given in all sections mentioned earlier. The Cronbach's alpha value for the dependent variable, which is business intelligence success, was 0.922, which indicates that the reliability is very good, and the number of questions asked in this section was six. The Cronbach's alpha for the first independent variable, infrastructure-related factors was 0.891, which means that the reliability of these questions is also very good, and the number of questions asked in this section was six. For the variable team-related factor, Cronbach's alpha value was 0.913, which means that the reliability of the questions for this variable is very good, and the number of questions asked in this section was seven. The following variable was data-related factors. The Cronbach's alpha value was 0.910, which means that the reliability of these questions is very good, and the questions asked for this section were four. The next Cronbach's alpha value for top-level support was 0.934. It shows that the reliability of the question for this variable is very good. Last but not least, for the fifth independent variable, which was user involvement, Cronbach's alpha value was 0.922, which means that the reliability is also very good, and the number of questions asked in this section was six.

5.5 Interpretation of the Results

When the findings were investigated, it becomes abundantly evident that each one of the hypotheses that were proposed was accurate. This suggests that there is a connection between the factors relating to the data, the elements relating to the team, the factors relating to the data, the top-level support, and the engagement of the users in the data quality. Additionally, this indicates that there is a connection between the elements relating to the infrastructure. As a result of this, the research helped determine whether or not improving data quality can only improve the rate at which business information is updated from various locations, the accuracy with which information is captured, and the efficiency with which quality information is processed and reported, and whether or not it can assist in the establishment of key performance measures for the company's operational levels.

https://doi.org/10.20428/jst.v27i1.1985

There were largely many levels of position contingent upon the measure of organization in Kuala Lumpur. In this investigation, the specialist utilized the regular position levels, which were senior administration, administrative, officials, administrative level, professionals, and subordinates and others. The survey was conveyed by utilizing stratified inspection of every individual in any case of their position in the organization. This might turn into a limitation because specialists could not distinguish whether the factors were more appropriate to be applied to top-level administration or low-level administration.

Variables studied are limited, there are five (5) independent variables and one dependent variable studied in this research study, which are an infrastructure-related factor, team-related factor, data-related factor, top-level support, technical people and system quality, whereby there are many optional variables that could positively impact the Business Intelligence Success in Malaysia Organization. However, the researcher only focused on those five (5) variables throughout the entire study after the variables went through the evaluation process by the suitable situation according to the Malaysia organization exercise, and the researcher believes that the chosen variables are more important and significant to the dependent variable to be use.

The example measure got only 208 respondents. This number is neither too small nor very vast, which means the outcome might be in direct outcomes. The outcomes may not mirror the association in general, but rather it is just reflected in a gathering of business insight and ERP clients of workers. A greater specimen size can be gotten, yet in anyway, it would affect, and a prompt resistance is normal. There will be an issue to get full collaboration from the representatives on the off chance that they are chosen as respondents.

For the future researcher, it is advised to continue this study in order to determine any other factor that could influence and contribute to the Business Intelligence Success in Malaysia Organization. According to the literature review and the findings, it can be classified that many other factors could affect and influence Business Intelligence Success. Therefore, further research needs to be conducted accordingly.

It is highly recommended for future researchers to use a bigger sample size because a moderate sample size will lead to moderate findings and limited information. The future researcher could also conduct research on other variables that could influence business intelligence success by using another variable that was used in this study. When the future researcher is able to overcome all of the constraints and limitations, the expected result could be improved.

6. Conclusion

The main research objective is to examine the client conduct and client acknowledgment of utilizing a Business Intelligence System in an association. In light of Pearson's Correlation, there was a sure critical connection between the User's contribution and Business Intelligence Success, and the connection between them was highly positive and noteworthy. The second target is to order diverse classifications of client impression of the framework as per the examination demonstrates. In view of Pearson's Correlation, there was a sure noteworthy connection between Team Related Factor and Business Intelligence Success, and the connection between them was directly positive and huge. To wrap things up, the third research objective is to guarantee that business insight framework usage has the capacity to strongly and proficiently encourage the clients on working reason for a consistent schedule. In light of Pearson's Correlation Analysis, there was a certain noteworthy connection between Infrastructure Related Factors and Business Intelligence Success, and the outcome demonstrated the direct positive relationship between them. On alternate hand, these destinations were replied through the relationship table got from Pearson's Correlation Analysis utilizing programming SPSS form 24. Obviously, the independent variable that had the most influence on the system quality in Business Intelligence Success in Malaysia Organization was user's involvement. This is because, according to Pearson's Correlation Analysis table, user involvement showed the highest relationship among other independent variables. Although data-related factors had a low positive significant relationship, business intelligence success has an interest in the variables.

https://doi.org/10.20428/jst.v27i1.1985

7. Acknowledgment

This paper was supported under FRGS15-226-0467, International Islamic University of Malaysia (IIUM).

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