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BUSINESS INTELLIGENCE USAGE MODEL FOR HIGHER EDUCATION INSTITUTIONS

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ABSTRACT

Higher education plays a substantial role in the political and socio-economic development of a country. Developing countries experience several challenges when it comes to higher education programs. Therefore, Information and Communications Technology (ICT) tools can bridge the gap of poor higher education services. Business Intelligence (BI) is a system that uses analytical techniques to obtain knowledge from large amount of data. Business Intelligence can assists higher education organizations to make effective decisions, improve teaching and learning services, competitiveness, and to devise or produce new strategies and policies. However, BI implementation is often plagued with many complex processes, challenges, issues, risks, and drawbacks making it difficult to achieve BI benefits. Nevertheless, the number of successful BI implementation in Higher Education Institutions (HEIs) is still inadequate. Considering the challenge and need of implementing BI system, this research aims to contribute by determining the factors that influence BI usage for Malaysian Higher Education Institutions (HEIs). The study used literature review to find the factors of BI usage. The literature revealed nine factors which promote the usage of BI system. These factors are organized into three dimensions: organizational, process and technological dimension. This study deploys a questionnaire survey method to collect data from BI users and descriptive statistics to validate the data. Based on the result obtained after the validation, it indicated that all the factors can be used by Malaysian HEIs as the factors that helps in realizing the success of BI usage. As a result, findings from this study can contribute in boosting the universities systems to obtain important patterns and predictions to formulate strategies, generate knowledge and decision-making processes that allow the achievement of institutional objectives.

Keywords: *Business Intelligence, Usage, Case study, Factors*, *Higher Education Institutions.*

1. INTRODUCTION

Business Intelligence (BI) is an imperative concept, receiving an extensive interest in both academia and industry, BI systems are mostly employed in areas of businesses which involves decision-making to get value. Business intelligence is the usage of specialized tools and information for making decision in various environments of the organization. Today the BI system is the broadly used IT solution, this is due to growing importance of BI system. The overall aim of business intelligence system is to improve decision making process based on quality data which are displayed in a clear and understandable manner.

Numerous studies have shown that higher education is very important to countries' prosperity and economic development and data are crucial for large organizations particularly the higher education, to make effective decisions. With, educational institutions having a large number of students, staffs and activities, it means that a lot of data can be analyzed using BI tools to predict students' academic behavior, performance, retention or withdrawal. These data are important to decision making process as they can be used to show the need for change and improvement which result to increase in the overall academic standards of the institution [1][2]. BI tools provide the services and solutions that assist top management to thoroughly analyze complex business situations, and streamline the processes of decision making [3][4].

For decades BI systems have been of essence to organizations, but there is insufficient knowledge on

how to manage these systems successfully beyond the implementation stage [5]. Thus, BI implementation is often plagued with many complex processes, challenges, issues, risk, and drawbacks making it difficult to achieve BI benefits. For instance, integration of data from several sources or systems into the organization's data warehouse is a serious issue in implementing BI as it requires huge amount of effort.

Regardless of BI benefits, academicians and practitioners observed that BI system is costly, complex, resource-intensive and challenging to deal with [6], [7]. BI system implementation does not only involve the purchase of hardware and software; rather, it is a complex undertaking demanding appropriate resources and infrastructure for a long period of time to support management decision-making [8]. Several studies indicate that BI systems consume billions of currencies yearly. Yet, more than half of these BI projects are resulting to no benefit [1]. [9]asserts that benefits of BI system can be realized only when it is implemented successfully. Meanwhile, a number of researches shows that it is essential to understand the factors for BI system implementation because they believe that the high rate of BI failure is due to low understanding of the factors of BI implementation, and by what means these factors contribute to realizing the benefits of BI system [10].

In Malaysian HEIs context, huge volume of data is produced daily and these data comes from several information systems or databases, where it might be ambiguous and conflicting with each other [11]. Using and managing data from different sources could be really challenging as there is need to get the right data at the right time within a short period of time, therefore having a successful BI system implementation will be an effective solution to the problem [10]. However, universities face challenges in implementing BI. As discovered by [12], first problem is the amount of academic data in the institution. Meanwhile, these academic data continuously change from time to time. Hence, will make the procedures of filtering the valuable data to become more complex to carry out. Second problem is the cost of implementing BI system in a university. BI systems are complex, and their implementation is time consuming and involves high risks, effort and financial resources. There are other issues that affect the outcome of BI usage such as; the level of support from senior managers, skills of the technical resources, and quality of the data sources [13]. Therefore, to have a successful BI usage an understanding of the factors is essential for an organization [14].

[15] mentioned that it is crucial to recognize the factors that affect BI usage so that all the data in HEIs can be handle effectively. Considering the challenge and need of BI, this study aims to identify the antecedents of BI usage in HEIs so as to serve as guide for decision makers to manage all the data efficiently since each data has different requirement and it is very important for the university performance results.

2. LITERATURE REVIEW

2.1 Definition of Business Intelligence (BI)

BI system is a stack of methods, architecture, processes, and technologies which convert raw data into relevant information for business analysis functions. This definition encompasses data warehouse, data integration, data quality, text and content analysis, data management, and the main aim of Business Intelligence (BI) system is to make the interpretation of huge amount of data easier and faster [16][17]. Successful BI systems allows decision makers to access valuable information, which will allow them to know where the organization was and where it needs to be in the future [9].

2.2 Business Intelligence (BI) in HEIs

Numerous studies have shown that higher education is very important to countries' prosperity and economic development and data are crucial for large organizations particularly the higher education, to make effective decisions [18]. Business Intelligence is necessary for any kind of organizations including HEIs due to the fast growth of data [1]. Presently, due to the changing environment of educational process, HEIs requires a large volume of information to support any educational related process as private and public universities are competing to identify their own exceptionality by choosing the most appropriate solution to be the worldwide leading educational institute, and for better management and improved performance [10][2].

According to [18], Business Intelligence can help HEIs to quickly discover market demands so as to improve the employment of graduates and shape educational goals. Using BI solutions, HEIs staffs

and management will be able to take part in decision-making which will improve the general performance of the HEIs [19]. According to [20], Business Intelligence (BI) system can help higher education institutions (HEIs) to:- (a) Identify recruitment trends and also assess the success level for its programs; (b) Effectively control the finances from tuition fees by keeping records of the transactions between students and university; (c) Present the correct information to government bodies in due time, so that they can fulfil compliance requests and increase their rank; (d) To know student's enrolment trends in different programs and to evaluate the value of courses offered; (e) Provide the university's decision makers with opportunity to accurately analyze operational data, across faculties and functional areas.

Even though, there are enormous benefits from successful implemented BI system, many studies mentioned that the usage and implementation success of BI systems in academic environment is inadequate especially for HEIs [21].

2.3 Issues of Business Intelligence

A lot of organizations struggles to manage their BI projects because it is complicated [7]. [11][13] mentioned that, among the problems of implementing BI system is the organization's readiness for BI adoption and implementation. Another problem for BI implementation, is the organization's low level of knowledge regarding the benefits and opportunities of BI system along with BI success factors [22]. Likewise, [23] states that, despite the bright market of BI and the complexities surrounding it implementation, the success factors of BI system implementation remain inadequately understood. Several research was conducted on BI implementation, and it was discovered that highest percent of the failure cases for BI system implementation are due to lack of readiness awareness to adopt BI system in many organizations [24][25].

However, [10] noted that, another challenge for BI implementation is experts view, since experts sees BI in different ways. For example, data warehouse experts may view BI as a supplementary system while statisticians may understand BI as a predictive analysis-based tool and data mining experts may regard BI system as an advance support system with data mining techniques and algorithm. With different views of experts, organizations struggle to invest in BI. Moreover, there are other external and internal factors that affect the outcome of BI solution such as; the level of support from senior managers, skills of the technical resources, the types of industries in which the organizations compete with, quality of the data sources, and the investment funding[26]. Additionally, integration of data from several sources or systems into the organization's data warehouse is a serious issue in implementing BI as it requires huge amount of effort [10]. This means managing the data warehouse is complex. Although BI system has a lot of benefits, there are still a quite number of issues regarding its implementation and usage.

2.4 Factors of BI in Different Organizations

Several factors of BI implementation have been synthesized from different organizations such as financial, engineering, Vietnamese companies etc. Thus, that helped to identify the most commonly used and recommended factors in achieving a successful BI implementation in various organizations. The list of BI implementation factors from various organizations can be seen in Table 1.

Based on the literature, organizations are expected to identify the factors that will influence the success of their BI system [26]. Depending on the type of organization, some factors will have a greater influence on the BI implementation than other factors [28]. As shown in Table 1, several success factors from various resources have been identified through literature review activity. Then, these factors have been clustered based on the same definition and meaning that eventually came out with the appropriate terms to represent each of the factors as shown in Table 2. Hence, that can help in better comprehension and determination of the examined factors. As illustrated in Table 2, the list BI implementation factors were highlighted along with the articles that discussed the factors.

Table 1. BI Implementation Factors from Different Organization

Authors	Organizations	Adopted Framework	Factors
[27]	Engineering asset management organizations.	[27]	• Committed management support and sponsorship, • A clear vision and a well-established business case. • Championship and a balanced team composition, • Business-driven and iterative development approach, • Scalability and flexibility • Data quality and integrity
[22]	Small and Medium Enterprises (SMEs)Upper Silesia, Poland	[27]	• Senior management support • Clear business vision and plan • Competent BI project manager (leadership) • Skilled and sufficient staff/team/managers • Well defined users' expectation (information requirements) • Users' involvement • Integration between BI system and other systems (e.g. ERP) • User-friendly (usability) BI system • Data quality • Flexibility
[9]	People with IS and BIS experience.	[27]	• Clear vision and mission • Committed management support • Top management support • Effective teamwork • Users training. • Suitability of hardware and software • Data accuracy and integrity • Flexibility and Reliability. • Perceived usefulness
[26]	Financial services sector.	[27]	• Management support • User participation • Champion • Data Quality
[14]	Small and medium enterprises in Lebanon.	[28]	• BI awareness encompassing the existence and Use of BI specific approaches and tools. • Awareness of the potential benefits and competitive advantage that is conditioned by BI use. • Development of user BI skills • Practical testing of those skills. • Advanced BI technology, • Flexible and easy to use.
[6]	Vietnamese companies (Vietnam).	[28]	• Committed management support and sponsorship • A clear vision and a well- established business case • Championship and a balanced team composition. • Business-driven and iterative development approach. • Scalable and flexible technology framework.

			• Sustainable data quality and integrity.
[28]	Engineering asset management organizations.	[27]	• Committed Management Support and Sponsorship • Clear vision & well-established business case. • Championship & Balanced team composition • Business-driven & iterative development approach • Scalable & Flexible Technical Framework • Data Quality & Integrity.
[23]	Organizations	[28]	• Top Management Support • Clear vision • Organizational Structure • Empowerment • Championship & Balanced team • User Participation. • System Flexibility • System Integration.

Table 2: BI Implementation Factors

S/N	FACTORS	AUTHORS
1	Top management support and sponsorship	[6], [22], [26], [27], [29]
2	Clear vision	[6], [9], [22], [23], [27], [29]
3	Organizational structure	[9], [23]
4	User empowerment	[14], [23]
5	Data quality	[9], [14], [29],
6	Championship and balanced team	[6], [23], [27], [29]
7	User participation	[23], [26]
8	System quality	[6], [9], [14], [22], [29]
9	Service quality	[14], [22], [29]
10	Business-driven and iterative development approach.	[6], [29]

Depending on the type of organization, some factors will have a greater influence on the BI implementation than other factors [28]. As shown in Table 1, several factors from various resources have been identified and reviewed through literature review activity.

Meanwhile in this study, out of the ten (10) factors identified in Table 2, only the first nine (9) factors were included as the factors that can be considered for BI implementation in HEIs, as this study concentrates on the BI implementation from the perspective of BI users. So any factors that is focusing on the technical aspect (i.e the design of the system) is excluded. Thus, business-driven and iterative development approach factor was excluded.

2.5 Categorization and Mapping of the Factors into Dimensions

Through literature review, a list of factors was identified and summarized as illustrated in Table 2. Consequently, the selection of categorizations of the factors into three dimensions namely organizational, process and technological dimensions are described.

A number of studies identified the significance of organizational, process and technological dimension of BI implementations [22][6][30]. The main model that addressed the categorizations of success factors of BI implementation was done by [27].

Therefore, [27] model was the most cited and referenced model in previous studies relevant to BI implementation and categorization. As a result, this study adopted the previous researchers' classifications of dimension to categorize the factors that influence the usage of BI in HEIs. Table 3 presents the mapping of factors into dimensions.

Table 3: Mapping of Factors into Dimensions

Dimensions	Description	Factors	References
Organizational	Organizational dimension defines the soft infrastructure that involves the organizational structure, strategies, objectives, goals, policies as well as the organizational rules. It also focuses on top management support and encouragement, user confidence-building and data quality related activities.	Top management support and sponsorship	[9], [14], [21], [23], [27], [29], [31]
		Clear vision	
		Organizational structure	
		User empowerment	
		Data quality	
Process	Focus on the competences of the BI project team in terms of leadership's skills and knowledge and the engagement of users in all the stages of BI implementation from different levels of the organization.	Championship and balanced team	[6], [23], [27], [29], [32]
		User participation	
Technological	Technological dimension focuses on the BI system characteristics and capability in terms of efficiency, effectiveness and the service it provides to individuals and the organization. Additionally, system quality measures the desired characteristics of a BI system and service quality describes the overall support delivered by the BI system.	System quality	[6], [9], [14], [22], [27], [29]
		Service quality	

Table 2 describes the mapping of the identified factors into the three dimensions that were most reported in the literature based on the descriptions of each dimension. Firstly, the factors mapped into the organizational dimension, concentrate on the soft infrastructure such as the organization's strategies,

policies, goals and organization structures and also comprises the management level and its activities.

Secondly, the factors mapped into the process dimension focuses on the competences of the BI project team in terms of leaderships skills and knowledge and the engagement of users in all the stages of BI implementation from different levels of the organisation. Thirdly the factors mapped into the technological dimension, focuses on organization's technology with technical knowledge and technology capabilities. Thus, Table 2 refers to the factors categorized within the three main dimensions supported by previous researchers.

3. RESEARCH METHODOLOGY

This study adopts the quantitative research methodology. Questionnaires were distributed and analysed as we intend to find out the opinion of the respondents based on the identified factors for BI usage. The respondents of this study were BI users as the aim is to get feedback from BI user's perspective not from BI developers . This study has undertaken one of the higher education institutions in Malaysia as the case study. The examined case study institution has already developed and implemented its own BI system and used by the top management.

3.1 Methodology Framework

The research methodology framework was considered as the roadmap to conduct any research. The outcomes for each phase was considered as an input for the following phase. Moreover, research methodology framework includes the instruments that have been involved throughout developing this study. A research framework is constructed in order to describe the research in a more organized and logical manner. In this study the framework is divided into seven (7) phases as illustrated in Figure 1.

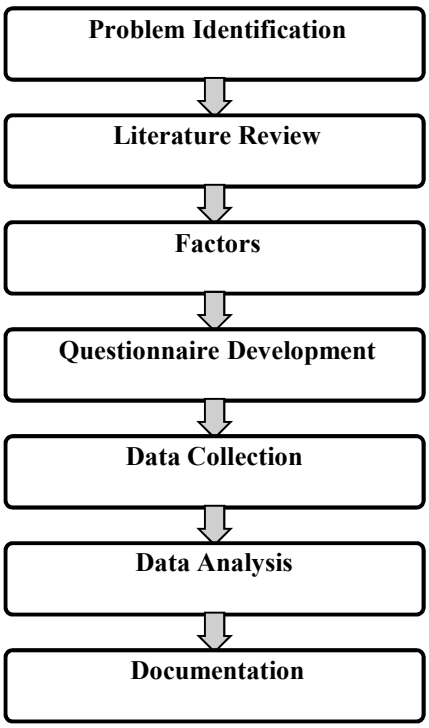

Figure 1: Research Framework

3.1.1 Problem Identification

This phase explains the identification of problem in the area of business intelligence system implementation. Currently, in the previous studies there are research gaps that needs to be filled up. One of the problems is the request to discover BI usage factors which can be applicable to higher education institutions (HEIs). To provide solution to the problem, this study has identified three objectives. The first objective is to identify the factors that influence the success of BI implementation in different domains. Second objective is to identify the factors that promote the usage of BI in Malaysia HEIs. The third objective is to validate the propose factors that promote the usage of BI in Malaysia HEIs.

3.1.2 Literature Review

This phase focuses on finding and selection of scholarly articles to obtain the adequate information required to execute this research effectively in respect to the scope and objectives. This study's main source of information and knowledge are journal papers and conference proceedings. Journals and articles sources included in this study, were acquired from several online databases such as IEEE, Springer Link, Scopus, Science Direct, Emerald and Google Scholar. Resources were selected from year 2010-2020. The BI success factors from different organizations were identified in this phase which delivers the first objective as shown in Table 1.

3.1.3 Identifying the Factors for HEIs

After the review of literatures, this study proposed the list and categorization of success factors of Business Intelligence (BI) system for Higher Education Institutions in Malaysia. The factors include top management support and sponsorship, clear vision, organizational structure, user empowerment, data quality, championship and balanced team, user participation, system quality and service quality. These factors were than mapped into three dimensions namely organizational, process and technological dimensions based on the description of each factor. This delivers the second objective of the study.

3.1.4 **Development of Questionnaire**

A literature review was conducted to identify previous measures and items of the constructs, and existing measures proven to be reliable were adapted. Each question was measured on a five-point Likert scale, ranging from strongly agree (5) to strongly disagree (1). All constructs were measured with multiple items. The final survey consisted of 30 measurement items and 2 demographic questions.

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This phase focuses on questionnaire development. To evaluate the proposed factors for HEIs in Malaysia, quantitative analysis method was employed for this study. The purpose of the questionnaire is to discover the opinion of the BI users based on the proposed factors. The questionnaire consists of four (4) sections. The first section was the demographic information containing two (2) questions. Demographic information is needed for this study for gathering background information of the respondents. For the second section, it focuses on organizational dimension of the success factors consisting of eighteen (18) questions. The third section focuses on the process dimension of the success factors consisting of five (5) questions. And the fourth section which is the last focuses on the technological dimension which consists of seven (7) questions. For questionnaire sample [Refer to online questionnaire link]. For questionnaire structure, this questionnaire was constructed based on the concept of self-administered questionnaire.

In preparing the questionnaire, it went through three stages. These stages are:

(a) Construct of questionnaire: Past studies related to areas of BI implementation were accessed. In order to develop the questions for this study, the questions on factors for BI implementation from previous work was rephrased in an appropriate way to fit the context of this research.

(b) Pre-test the questionnaire (questionnaire validation). Questionnaire was evaluated by three (3) expert reviewers in order to ensure that the content is suitable and understandable, in line with the context of this study. This pre-test stage is important to make sure that respondents can understand all questions with clarity of wording and in terms of measurement.

(c) Modifying survey questionnaire: After the questionnaire has been validated, some modification was made based on comments of the experts and the final questionnaire was developed.

3.1.5 Data Collection

In this phase, the questionnaire was then distributed to the BI users using a face-to-face approach to extract their opinion concerning factors that promote the success of BI usage. The advantage of distributing the questionnaire face to face is the opportunity of meeting the targeted respondent to respond to the questions, which makes it more accurate and precise. This study applied the concept of self-administered questionnaire which is respondents can complete the questionnaire on his/her own, at their convenience. The targeted respondents are the users of BI.

3.1.6 Data Analysis

After data collection, the next phase is to perform data analysis. The data collected from the questionnaires was converted into a set of meaningful variables and then analyzed using descriptive analysis. Simple descriptive analysis, such as frequency counts and percentage has been used for this study. Descriptive statistics includes the measure of variability (variance and standard deviation) and measure of central tendency (mode, median and mean). The respondents for this study were eight (8) persons. To analyze the result, excel data analysis was used to produce the result because of the small number of respondents. The purpose is to look for the high average level of the listed factors that influence the success of implementing BI. This delivers the third and last objective of the study which is to validate the proposed factors and can be found in Table 5.

3.1.7 Documentation

This is the most important phase in this research, since all the activities that were carried out were clearly reported and compiled. The results obtained from both the literature review and the questionnaires of the respondents were reported and documented. At the end discussion, limitation of the study and conclusions are drawn from the work presented in this study.

4. RESULT AND DISCUSSION

4.1 The Case Study

The data has been gathered from the survey through questionnaire to validate the factors. Descriptive analysis has been used to examine and interpret the data.

A case study is a research method involving a detailed examination of a subject of study (the case). In a case study research, the "case" being studied may be an individual, organization, event, or action, existing in a specific time and place.

With respect to the scope of this research, a single case study has been chosen to validate the proposed factors. The chosen institution has already developed and implemented its own BI system and used by the top management for about 4 years. In that institution, BI solutions are provided by Data Management and Business Intelligence Division which is under Centre of Information and Communication Technology (CICT). The main objectives of this division are: to govern business intelligence and data management infrastructure, to provide a coherent picture of using data, to deliver intelligence behind the data and to facilitate a well-informed decision making. The CICT performs certain functions to achieve the aforementioned objectives. These functions are: provide reporting, analysis, statistics and projections systematically, provide fast and reliable access to information and provide services of preparing, developing and monitoring Business Intelligence in the institution.

4.2 BI users

As illustrated in Figure 2, BI users consists of 3 types as follows: (a) Technical users are the users who manipulate the BI programming, system analysis and requirements and tools; (b) Decision makers who are responsible of taking the decisions based on the BI reports such as vice chancellor, deputy of vice chancellor, director of undergraduate studies etc. (c) Staff and students are the third type of BI users. They can only visualize the data related to each individual and

their faculties. For this study, only the decision makers were used as the respondents as they are the ones that make the decisions. Table 4 shows the respondents' departments and numbers.

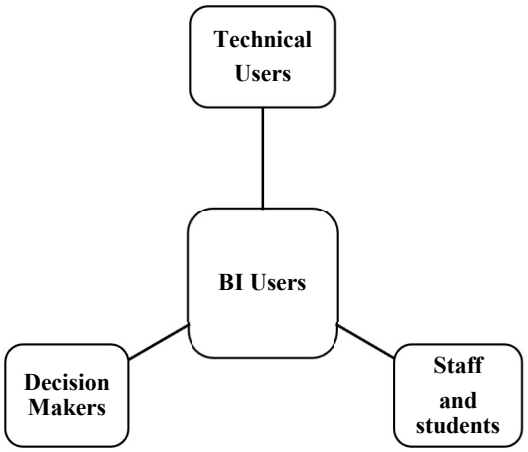

Figure 2: BI users.

Table 4: Department and Number Respondents

Departments/Units	Number of Respondents
Unit A	4
Unit B	2
Unit C	2

In this study, Unit A, Unit B, Unit C, were the respondents available as shown in Table 3. As the remaining units' representative of BI were not available at the time of data collection. Thus, making the respondents number to be eight. Next section discusses the respondents' feedbacks analysis.

Descriptive analysis is a brief description of a given set of data, which can either represent an entire population or a sample of the population. Descriptive analysis can be illustrated in both numerical and graphical form which are the fundamentals for any quantitative analysis. Using descriptive analysis, one can easily describe what the data is in a clear and understandable way [33]. The purpose of this study analysis is to look for the "high mean level" of the listed items of each factors that influence the usage of BI. Therefore, any question with mean (average) score above 3.0 is positively acceptable and below 3.0 is rejected in this study [34].

For demographic data, it is important to prepare the specific demographic questions for respondents to answer. This is to recognize the respondents background. Respondents were asked 2 demographic questions; their years of experience using BI system and their level in the organization.

Respondent that have experience with BI system for more than 4 years has 38%, followed by those between 1 to 2 years with 38%, then those with less than 1 year with 13% and finally, the respondents between 2 to 3 years has 13%. Based on the above analysis most of the respondents work with BI system for a long time. They have a better understanding of the BI system. Therefore, respondent's feedback in this study can be taken into consideration.

For the oorganizational level, respondent who are at the executive level has 25%, and at middle management level has 38% and clericals with 38%. Based on the analysis, this shows that personnel from different levels of the organization uses the BI system rather than a specific level. Figure 2 shows the summary of the respondents' feedbacks based on their levels for question 03 to 32.

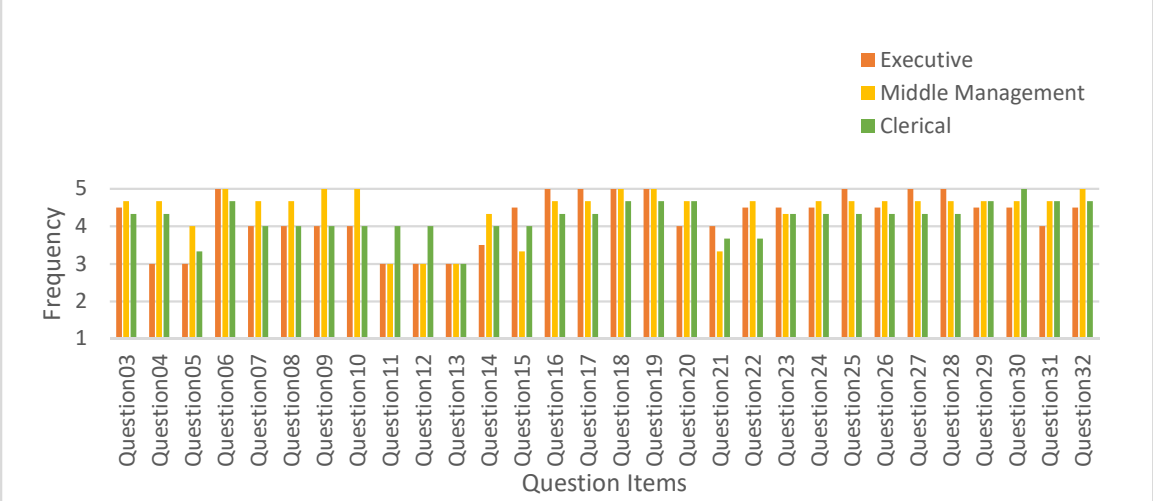

Figure 3: Summary of all the Questionnaire Items Based on the Levels of BI Respondents

Figure 3, shows the summary of the frequencies of the answers (Strongly Disagree 1, Disagree 2, Neutral 3, Agree 4, Strongly Agree 5) according to the roles/positions of the BI users' respondents. The respondents for this study were eight (8) persons and they were clustered into three groups according to the respondents' level in the organisation namely Executive, Middle Management, and Clerical. Executive staffs are relating to or having the power to put plans or actions into effect. Middle management is the intermediate management of a hierarchical organization that is subordinate to the executive management and responsible for at least two lower levels of junior staff. Clerical staffs are concerned with or relating to work in an office, especially routine documentation and administrative tasks.

To analyse the result, excel data analysis was used to produce the result. Returning to the respondents' answers, all questions were answered with either strongly agree (5) or agree (4), only very few respondents answered Question11, Question12, Question13 with scale "2" meaning "disagree" as the items are new in the field of BI so not all respondents have enough experience regarding the impact of organisational structure factors [23].

Based on the results from the analysis conducted, all the factors are positively accepted for this study. Therefore, all the identified factors are validated, acceptable and can be considered in this study as factors that helps in realizing the success of BI usage. As a result, this will help the Universities, to obtain important patterns and predictions to formulate strategies, generate knowledge and decision-making processes that allow the achievement of institutional objectives.

presented in Table 5.

Table 5: BI Usage Model for HEI

FACTORS
Organizational Dimension
Top management support and sponsorship
Clear vision
Organizational structure
User empowerment
Data quality
Process Dimension
Championship and balanced team
User participation
Technological Dimension
System quality
Service quality

5. LIMITATIONS

Any research has limitation; therefore, this study has no exception. This study has four limitations. First, even though results have indicated that factors were supported by the respondents, this result cannot be generalized because the sample size is not large enough to represent a larger population. Second, the study was conducted in a small to medium higher education organization. As a result, the respondents

who work with BI were few, which give the potential to have selection sample bias. For further investigations, factors could be examined with larger sample and other analysis tools like SmartPLS and SPSS for data analysis as descriptive analysis was used for this study. Third, this study proposed the most applicable dimensions and subfactors in BI implementation. However, this study did not include hypothesis development and testing to study the integration between the factors. Further research can focus on investigating the relation and hypothesis between factors. Fourth, demographic data such as age, the level of education, economic status, gender, etc, were ignored in this study because scope of study is to identify and categorize potential BI factors for HEIs. Nevertheless, more research can be done to study the relation between the factors and some demographic indicators.

6. CONCLUSION

Based on the result obtained after the evaluation, it's indicated that the factors identified can be used by HEIs as the factors that will help in achieving the success of BI usage. This study is important as it raises the awareness of the factors that will influence the usage of BI in HEIs and can be considered as a guide to follow when planning to implement BI initiatives in any higher education institutions (HEIs). These factors could also help in reducing the rate of unsuccessful BI systems in HEIs and in turn will derive all the potential benefit of the system. In addition, will help the Universities in generating knowledge, obtaining important patterns and predictions for formulating strategies and decision-making processes that allow the achievement of institutional objectives.

7. ADDITIONAL MATERIAL

Link for the online Survey that was distributed: (https://docs.google.com/forms/d/e/1FAIpQLSeNufzm4wRu8RUc2ILy4VYvC-I6Q2TEKkYIWq2FLGgmPU9jKw/viewform)

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