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Research Article

Assessment of Contribution of Business Intelligence to Risk Detection and Management in Academic Institutions

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Abstract— To provide planners and decision-makers with competitive, advanced information, business intelligence combines operational data with analytical skills. Enhancing the promptness and caliber of inputs used in the decision-making process is the aim. Through the lens of business intelligence, the company's capabilities, the state of the art, trends, and future directions in the markets, technology, and regulatory environments in which it competes, as well as the competitor's actions and the results of those actions, are all understood. Advances in data purification, web architecture, better hardware and software capabilities, and the emergence of the data warehouse as a repository have all contributed to developing an improved business intelligence environment. This paper explains the main features and advantages of Business Intelligence (BI) in the university's revenue administration and increasing. It also explores whether the UTB received the anticipated benefits from BI before using it. The population represented by the sample size of twelve UTB staff in this study is determined by empirical research that has produced results using both qualitative and quantitative methodologies. Because of its unique data format and presentation features, the SPSS application software was used for data collection and analysis. This study mainly aimed at revealing the benefits of using Business Intelligence in a higher learning institution ie. UTB. Based on the study's objectives, we went through numerous theoretical analyses and the research findings revealed that the study reached its goal.

Keywords—*Assessment, Business Intelligence, Database, Data Warehouse, Risk Detection, University Management.*

1. Introduction

Businesses use risk management as a proactive strategy to safeguard their assets and increase revenue. All business operations risks must be appropriately identified, evaluated, and analyzed as part of this process. Organizations can develop measures to reduce the likelihood of these risks occurring and the related expenses by having a clear awareness of them. Common risk categories include financial, strategic cyber security, operational, and compliance-related risks. An organization may suffer greatly due to these dangers [1].

Risk management's use of Business Intelligence entails gathering information from both internal and external sources to use predictive analytics to spot risk trends. This facilitates the diagnostic evaluation, allowing strategies for optimal resource allocation and maximum performance efficiency to be put into practice. Employing such technology for efficient risk management would help companies reach their desired goals and objectives faster.

Utilizing technology Business Intelligence gives firms the precise and timely information they need to make wise decisions. In light of this, BI consists of four essential components:

- Data collection
- Examination
- Reporting
- Information exchange

Together, these four components provide a comprehensive picture of an organization's current situation. This kind of data-driven decision-making is becoming more and more significant across industries as it enables businesses to recognize trends, demonstrate advancement, or warn them of possible problems before they become an issue. Businesses should take proactive measures to safeguard their consumer reputation and financial line by identifying patterns of activity that may indicate possible threats and taking corrective action using BI technologies like predictive analytics [2].

In short, Business Intelligence is essential to the subject of education. Through the effective use of data, educational institutions can improve student performance, make well-informed judgments, allocate resources efficiently, and establish long-term plans. Data quality, privacy, and change

management are just a few of the difficulties that come with integrating business information in organizations, universities for example. Educational institutions may fully utilize business information TO provide beneficial results for both students and institutions by tackling these issues and embracing emerging trends [3].

I.2. Problem Statement

In general, business intelligence (BI) is crucial to the performance of any organization, but it's especially important for higher education institutions. Few educational institutions appear to believe in BI as a strategy for success and sustainability, particularly in this era where data speaks, as evidenced by the fact that not all BI initiatives have been executed successfully globally.

Before implementing BI, UTB was unable to develop a risk management plan that would work in situations where the necessary data and information were not accessible. The lack of consolidation across the various Management Information Systems (MIS) led to inadequate identification. Furthermore, such MIS does not assist staff members in understanding how their present work is perceived. Therefore, it's possible that staff members, project managers, and senior management won't be open to learning how to improve their performance. This has a direct effect on your operation's productivity, adding to the delays and expenses.

To determine whether a university staff has broken rules; administration criteria, compliance, and visibility are essential. The business may have hundreds or even thousands of compliance standards to meet, depending on the industry it operates. The university may mistakenly assume that its staff are complying with these restrictions while in fact, they are breaking them due to a lack of business knowledge. For example, outdated data lacks BI because it ignores how current tasks and activities affect compliance. A lack of BI tools causes departmental disarray and misunderstanding. This separation will also result in subpar risk management and identification.

It is necessary to combine data from numerous sources. Users will be able to make better judgments as a result of having access to more data. Additionally, users will save a ton of time because they won't have to squander it traveling outside of university in search of data or retrieving data from different sources. BI systems are made up of several subsystems that are physically isolated from one another and developed on several platforms. Because of this, analyzing the data becomes challenging because it requires comparing several data sets and sources. To address this issue, some universities chose to leverage BI and data warehouses to integrate and centralize various data sources that were already in use.

We must determine whether the university increases the likelihood of discovering resource evasion after implementing Business Intelligence, given the effectiveness and efficiency of using BI on risk detection and management as well as the detrimental effects of not using it.

This paper consists of the following sections: Section 2 presents Related Work. Research Design and Methodology of the Study is discussed in Section 3. We present Result and Discussion in Section 4. Section 5 addresses the conclusion.

2. Related Work

The modern world is marked by complexity and a rapidly evolving global commercial landscape. This is mostly due to the ongoing advancement of technology which likewise produces and stores an increasing amount of data. The cost of obtaining and keeping data has decreased dramatically in recent years which has increased organizations' desire to collect vast amounts of data to obtain a competitive advantage over rivals. Businesses are looking for methods to make the most of this priceless asset now that they are aware of the potential value that exists in data. This is where the idea of Business Intelligence, or BI, has gained importance. Giving insightful information that facilitates risk identification, decision-making, and performance enhancement.

To help users make better decisions, the authors in [4] chose to adopt the term "business intelligence" (BI) as a catch-all to describe the tools, processes, and programs that are often used to gather, store, retrieve, and analyze data. In a nutshell, business intelligence (BI) is a technology that helps firms make better business decisions, which in turn increases their competitiveness.

Furthermore, according to authors in [5], it is difficult to find a successful company nowadays that hasn't integrated BI into its daily operations. As prior research has concentrated on examining the application of Business Intelligence in the private sector, this research work investigates the use of it in higher learning institution’s controlled businesses. This assertion gives a good indication of how relevant BI is in today's business environment. This decision-making process is also driven in [6] who highlighted that although decision support systems are a proven technology with established applications in the corporate sector, the academic community is still embracing this relatively new field of study.

The author in [7] writes: The use of Business Intelligence on risk management and decision-making in various private institutions has been to a great extent, however to date, there hasn't been much focus on it in scholarly journals. Currently, there is enough knowledge to gain a grasp of the subject in the academic era, therefore this is somewhat misleading. For instance, the literature has addressed the effects of BI on organizational performance [8]. However, it has not yet been thoroughly investigated how BI affects positively risk detection.

With the support of the necessary infrastructure, Africa will see faster technological transformation, trade, integration, and development. A strong ICT and digital economy will also be necessary for this to be a stimulus for manufacturing, skill development, technology, research and development, integration, intra-African trade, investments, and tourism [9].

By aiming for a 15% increase in broadband penetration and a 30% increase in broadband connectivity by 2025, the continent will be on par with the rest of the world as an information society and integrated e-economy where all governments, businesses, and citizens have access to reliable and affordable ICT services. The continent will also give students access to ICT and venture funding to young, ambitious ICT innovators and entrepreneurs. [10].

Therefore, African higher learning institutions from changing technologies are substantial, and continue to unfold. There are many ways in which IT is being used to improve revenue in various academic institutions in Africa, and not only in advanced economies. Further technological opportunities will doubtless emerge, Biometrics, for instance, is a possible replacement for manual systems in some African countries, with the potential for improving staff and student services (by for instance reducing the time needed for checking their identity in communicating with them) and limiting the opportunities for identity theft to be used to create various student claims [11].

In Rwanda, as planned[12], ICT will provide productivity and better decision-making and these services will be available and easy to get no later than 2025. Therefore, the University of Tourism, Technology and Business Studies (UTB) always seek to perform its operations through modern ICT systems and infrastructure for an effective use of IT that will help the university improve revenue and decrease non-compliance with late student payment and other services owed to students. Cost reductions and revenue gains make an important contribution to the overall smooth service provided to staff and students which finally results in the overall university profitability. In this way, as IT evolved, UTB started to use it to bring the capability to unlock the hidden potential within this organization while creating data transparency and enabling decision-making in a way that enhances day-to-day activities. Because of this innovation, the greatest way to help this technical university achieve efficiency is through Business Intelligence, or simply BI. As a result, productivity has increased.

3. Research Design and Methodology of the Study

3.1 Introduction

This chapter deals with the methodology we used in this research work. It covers research design, sampling methods, sample size, source of data, data management, collection of data, and data analysis.

3.2 Research Design

We utilized the research design to refer to the overall approach we decided to combine the numerous study components in a logical and cogent manner to make sure we would successfully answer the research challenge. We used it as a guide to gather, measure, and analyze data. The explanatory design, which is predicated on variables that have been measured and statistically evaluated through a quantitative approach, was employed. In this research study, the experimental design employs the scientific method to ascertain the cause-and-effect relationship among several factors. In addition to the variable they were modifying, the independent variable, we made an effort to account for all other variables**.**

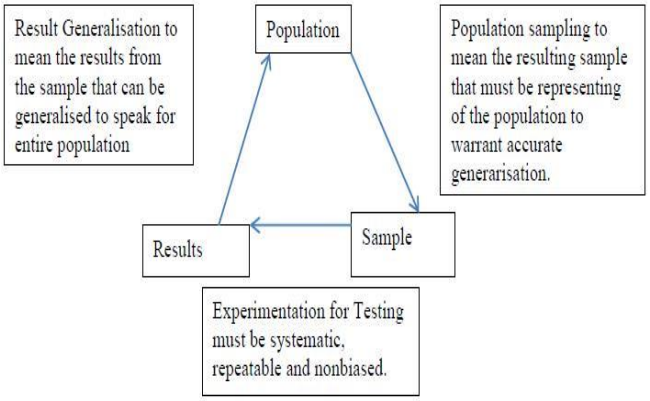

Figure 1. Research design

3.2 Target Population

A population is a group of people, things, or occurrences from which conclusions are sought. The population in this study is drawn from specific departments of the University of Tourism, Technology, and Business Studies where business intelligence is required [13].

3.3 Sample size and selection of sample

A sample is a subset or smaller group of the total population. The sample is selected to ensure that the data collected is representative of the total population under study. Twelve UTB staff members who often use BI were examined [14].

3.4 Research instruments

This study used questionnaires for data collection. It was created based on the objectives of the research study. In this regard, interview questions had been set out for the concerned staff members.

3.4.1 Data collection

3.4.1.1 Source of data

Among all the employees on the main campus, 12 staff collaborated in this research survey. Those are either academic or management staff who use BI and have the knowledge or skills to answer the questionnaire according to the objectives set of this study.

3.4.1.2 Methodology of Data Collection

When gathering data, empirical research was done as a result of initial data collection. Furthermore, this study included several graphs and presentations and included both qualitative and quantitative research (Kothari, 2004). Given the two methodologies used and the emphasis placed on quantitative data, this proves that the study is based on a sequential explanatory design (Baskerville, Richard, and Pries, 2010). The questionnaire that was thought to be utilized and the questions we reserved for interviews were determined by the study's purpose.

3.4.1.3 Data analysis techniques

We used SPSS to analyze the data since it makes it simple to build attractive charts and offers more flexible function usage. As a result, it was determined to be the best tool for managing time and achieving study objectives while analyzing data. It is possible to draw links between different categories of data from the questionnaire and observations by specifying the analysis and categorizing the data. Seventy of the completed surveys were examined and further examined.

3.4.2 Data Management

Effective data management facilitated the organizing of data from the point of introduction into the research cycle to the dissemination and preservation of significant findings. For this study, research data are an expensive and highly significant output of the entire research process in all domains; therefore, the data generated was preserved in an easily readable manner. In this way, valuable information sources might be shared with other researchers as needed. Sound research data management techniques provided us with accurate findings verification as well as the creation of fresh, creative studies based on pre-existing data.

4. Background Information

4.1 Aptitude of the UTB staff concerning BI

As presented in table 1, 33.3% of respondents, during the interview interactions have confirmed of having less than a year's experience in knowing and using Business Intelligence. These respondent are either office or teaching staff. This indicates that many of the university employees or users lack BI experience, some did not even know the term 'BI', so managers should expand training.

Table 1. Experience of Responders of Using BI

	Frequency	Percent	Valid Percent	Cumulative-ve Percent
Less than 1 year	4	33.3	33.3	33.3
1-5 years	8	66.7	66.7	100
Total	12	100	100	

Table 2. Knowledge of respondents about BI

	Frequency	Percent	Valid Percent	Cumulative Percent
Less than 1 year	4	33.3	33.3	33.3
1-5years	8	66.7	66.7	100
Total	12	100	100	

The results presented in Table 2 depict the responders who have knowledge about BI. It was revealed that 33.3% of the have knowledge of BI in a duration less than one year while 66.7.0% did not which can also negatively affect the university's overall performance due to poor employees' productivity.

Table 3. Training attended by responders about BI

	Frequency	Percent	Valid Percent	Cumulative Percent
Enough	4	33,3	33,3	33,3
Not Enough	8	66,7	66,7	100,0
Total	12	100,0	100,0	

The results presented in Table 3 depict **the responders who attended the training**. The results indicate that 33.3.0% of the respondents attended the BI Training while 66.7% did not Which can also negatively affect the university's overall performance. More trainings about BI are needed for all the university's staff.

4.2 Key success factors for the implementation and use of BI

In Table 4, we present **the results about facilities of knowledge**. It is revealed that 33.3%of the respondents believed that the understanding of users about BI is enough while 66.7% disapproved it.

Table 4. Users' knowledge about BI

	Frequency	Valid Percent	Cumulative Percent
Enough	33.3	33.3	33.3
Not Enough	66.7	66.7	100
Total	100	100	

As seen in Table 5 which depicts results about facilities of Internal Data accessibility. It is revealed that 100% of the respondents have enough facilities for Internal Data accessibility. Combining two sources would be a typical scenario. Because, if client maintains their operational data in more than one system, this would always be part of the BI project task to combine those datasets before loading them to the DW or data model. This would be a huge work to detect incoherence among different data to match data from different databases to detect any potential risk.

Table 5. Internal Data are available and accessible to users

Frequency	Percent	Valid Percent	Cumulative Percent
12	100	100	100

Table 6. BI improves risk detection and management

	Frequency	Percent	Valid Percent	Cumulative Percent
Agree	12	100	100	100

The results in Table 6 above indicate that 100% of the respondents agree. This implies when senior managers detect non-compliance of staff or violating some university rules and regulations.

Table 7. Network accessibility problems as a major factor limiting BI adoption

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	8	66.7	66.7	66.7
	Disagree	4	33.3	33.3	100
	Total	12	100	100	

As seen in Table 7, Network accessibility problems as a major factor limiting BI adoption has been discussed. 66.7% of respondent stated that BI adoption in the university may be limited by poor network distribution due to the perceived usefulness and technical influence of network while 33.3% or respondent disagreed as they said that the BI adoption may be limited by various factors and can be adopted with or without network availability in the university.

Table 8. Lack of support of BI technicians affects the use of BI

	Frequency	Percent	Valid Percent	Cumulative Percent
Agree	8	66.7	66.7	66.7
Disagree	4	33.3	33.3	100
Total	12	100	100	

The findings in Table 8 above demonstrate how using BI is impacted by a technician's lack of support. According to the data, 33.7% of respondents disagree and 66.3% of respondents agree

Table 9. BI improves relevant decision-making

	Frequency	Percent	Valid Percent	Cumulative Percent
Agree	12	100	100	100

The outcomes in Table 9 above demonstrate how decision-making is enhanced by BI. The findings show that all respondents—100% of them—agreed.

Table 10. BI improves risk detection and management

	Frequency	Percent	Valid Percen	Cumulative Percent
Agree	12	100	100	100

The results in Table 10 above indicate that 100% of the respondents agree. This implies when senior managers detect non-compliance of staff or violating some university rules and regulations.

Table 11. BI improves relevant decision-making

	Frequency	Percent	Valid Percent	Cumulative Percent
Agree	12	100	100	100

The outcomes in Table 11 above demonstrate how decision-making is enhanced by BI. The findings show that all respondents—100% of them—agreed.

Table 12. Computers for users

Frequency	Percent	Valid Percent	Cumulative Percent
12	100	100	100

Table 12 depicts the results which revealed th**e facilities of computers to various university's users**. The results indicate that 100.0% of the respondents were satisfied and confirmed that **the facilities of computers** are enough for the whole university.

5. Conclusion and Future Scope

5.1 Conclusion

The primary goal was to evaluate business intelligence's role in academic institutions' risk detection and management. The study was carried out as a survey, with primary data being gathered by the administration of a 12-question questionnaire. To address the research problem, the information gathered via the questionnaire provided answers to the research questions. SPSS was used to examine the gathered data.

Advanced analytics technologies have been proven to facilitate more in-depth understanding and discoveries that go against conventional business wisdom. Additionally, they provide business users and analysts with access to information and have a large potential for generating competitive advantage and commercial value.

BI may therefore simply allow UTB to raise the risk detection and management to deliver more efficient overall university operations management. Among many other benefits, using data can help institutions save a lot of money and improve their risk management efficiency.

Better company decisions, more employee happiness, improved data quality, and quicker and more accurate reporting, analysis, and planning are all made possible by business intelligence (BI). The benefits that are most seldom realized include cost savings, revenue growth, and headcount reductions in IT. Increasing access to data and improving operational tasks were the results of connecting disparate departments' data throughout UTB through networked business intelligence. 6% of UTB staff members use business intelligence (BI) in their day-to-day work, based on data gathered, a review of the literature, and the interpretation of theoretical viewpoints. This suggests that there is a tiny percentage of UTB employees who are not utilizing business intelligence (BI), and UT top managers should pay attention to this and do their utmost to encourage BI use. With the use of BI, UTB has significantly increased its revenue, especially in the areas of risk management and future prediction.

5.2 Future Study

Some limitations should be considered when interpreting the results of this study. The investigation is hampered by the small pool of business intelligence specialists. Due to this restriction, the researcher's data collection method became a laborious undertaking. This may have an impact on how broadly the results can be applied.

Thus, expanding the sample size to a bigger one may yield more reliable results that support further generalization. Additionally, the study's tiny sample size might support a qualitative methodology that calls for in-person interviews with respondents.

Second, the study solely considers the education sector, with a focus on universities, leaving out other companies or sectors like distribution and IT. For further information on how

business intelligence impacts university sustainability and success, it is highly recommended to include these sectors.

Authors' Contributions

Author 1 was involved in primary data collection, gaining ethical approval, and data analysis.

Author 2 Researched literature and conceived the study and wrote the first draft of the manuscript.

All authors reviewed and edited the manuscript and approved the final version of the manuscript.

Conflict of Interest

The authors of this research study do not have any conflict of interest.

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