

The Impact of Business Intelligence Adoption on Organizational Performance Among Higher Education Institutions in Malaysia

Shahrizal Nazri*
Graduate School of Business
Universiti Sains Malaysia
Penang, Malaysia
shahrizal@usm.my

Mohamed Azlan Ashaari
Graduate School of Business
Universiti Sains Malaysia
Penang, Malaysia
azlan@usm.my

Yulita Hanum P. Iskandar
Graduate School of Business
Universiti Sains Malaysia
Penang, Malaysia
yulita@usm.my

Hazrieffandy Bakri
Graduate School of Business
Universiti Sains Malaysia
Penang, Malaysia
hazrieffandy@usm.my

Abstract—Business Intelligence (BI) ideally provides organizations that embrace them with immense impact. Very few researches have empirically assessed these claims. There are limited studies of its impacts on organizational performance in the context of higher education institutions (HEIs) in developing countries. The study aims to develop a conceptual framework for the impacts of BI adoption on organizational performance among higher education institutions. A conceptual framework was developed using the Kaplan and Norton's balanced scorecard (BSC).

Keywords: *business intelligence, balanced scorecard, organizational performance, higher education institutions*

I. INTRODUCTION

The adoption of business intelligence (BI) is essential to sustenance the success of the organization's strategic objectives, the provision of higher quality information, and the re-engineering of the business process. The impact of BI adoption ultimately improved provision for decision-making, which has made BI a prevalent information technology (IT) innovation [1,2]. Personnel in different positions use various components of BI to access the organizational data and analyze the data to manage the organization. BI adoption helps improve the operations of the organizations effectively. BI can also help an organization explore fresh possibilities and redevelop its operations [3]. Therefore, the literature points out that many organizations used maturity models and critical success factors for BI adoption [4,5]. As BI continues to evolve, and new instruments are continually emerging, many organizations continue to upgrade actively and employ on improving their information systems (IS).

After much investment in establishing an IT innovation that promotes new business processes and enhances business structure effectiveness, most organizations have reached the stage where adopting new IT innovation to assist decision-making has become critical [6,7,8]. Perceived as a reaction to increasing demand for data, BI can maximize the use of data and thus enhance competitive advantages [9]. BI distinguishes itself from other IT innovation from the perspective of organizational

knowledge generation and the utilitarian view on IT innovation, through the power for initiation and debate of the issue, and through data choice, addressing the diverse information requirements of decision-makers at distinct stages [10]. Such BI capacities are strategic for organizations, where decision-making is seen by strategic management as a critical success factor [11,12].

The importance of IT in higher education institutions (HEIs) operation structure has been widely acknowledged [13]. In conjunction with recent information and communications technology (ICT) trends, HEIs competition increased for student admission because of globalization, which has led to extreme HEIs rivalries [14]. The need to manage students, human resources, finance, and the infrastructure, which leads to gather vast amounts of data in HEIs have led to massive pressure on HEIs administrators, mainly how they can increase effectiveness and enhance their performance [8]. Also, to meet the information needs of the significant stakeholders in HEIs, it has been necessary to adopt IS to provide precise and reliable planning and decision making. Consequently, many HEIs have adopted some form of IT innovation to increase efficiency and improving performance. Nonetheless, the type of IT innovation embraced by these organizations was generally limited to information compilation. It was acknowledged to be limited in terms of its capacity to evaluate vast information and add essential principles for effective decision-making [11,15,16].

The study on HEIs in Malaysia is relevant for several reasons. First, BI adoption is becoming progressively common among organizations in Malaysia. For example, Gartner forecasted BI project revenue in Malaysia to achieve RM114.5 million (USD37 million) in the year 2013, an improvement of 9 percent from the year 2012, opposed to global revenue achieving USD13.8 billion, a 7 percent rise [17]. Second, as stated in Malaysia Education Blueprint 2015 - 2025 (Higher Education), there have been several reforms within the higher education sector aimed at improving the quality of education [18]. Third, the HEIs are an essential institution for producing the workforce of the country [14]. Bank Negara Malaysia [19] reported that the

percentage of youth employed in the workforce is higher among those without tertiary education as compared to the ones with tertiary education. The report also indicated that in the year 2015, there was 15.3 percent of the 405,000 youths with tertiary education were unemployed [19].

Subsequently, there are limited empirical studies in the literature on BI adoption, as many of the research concentrated on the BI implementation [20]. In the context of Malaysia, BI adoption among organizations is still in the early phases [21,22]. However, a study by Owusu [21] has shown the presence of Malaysian private HEIs adopting BI. This paper aims to evaluate the relationship between BI adoption and organizational performance in terms of balanced scorecard (BSC) perspectives among HEIs in Malaysia.

The next section presents the literature review, followed by the conceptual framework and the hypotheses. The final section was the conclusion.

II. MATERIAL AND METHODS

It is a longstanding debate in the IS literature that IT adoption has a positive impact on organizational performance [23,24,25]. Despite some promising signs of IT spending payoffs, there have been several concerns about the impact of IT adoption [26,27,28]. At the same time, researchers got a positive result from the impact of IT adoption on organizational performance [26,29,30]. In contrast, researchers have received positive results from the impact of IT adoption on organizational performance, while others have achieved non-significant and adverse outcomes [27,31]. Most of the studies attentive on financial measures in which IT spending does not necessarily match financial yields. Existing research on organizational performance of IT adoption found that the study was attentive to financial measures [32,33,34,35]. Hou [36] argued that these financial measures applied to certain earlier IS applications could not be used on some new IT innovations, such as BI. IT adoption provides many intangible advantages, including enhanced decision-making processes and enhanced business process efficiency.

A. The Balanced Scorecard (BSC) as the Underpinning Theory

The impact of IT adoption on organizational performance needs to be measured by financial and non-financial measures [37]. Kaplan and Norton [38] develop BSC to supplement the financial and non-financial measures, which included financial gain, customer satisfaction, internal process, and learning and growth perspectives [37]. Prior studies have shown that most IT innovations adoption such as enterprise resource planning (ERP), radio-frequency identification (RFID), BI, and software as a service (SaaS), the BSC used to evaluate the organizational performance [36,39,40,41,42]. Therefore, in this study, the BSC was found to be suitable in evaluating the organizational performance among HEIs in Malaysia.

B. Key studies on measuring organizational performance using BSC

The organizational performance was one of the critical variables in management research [43], but its many meanings have defined it differently over the years. In the 1950s, Georgopoulos and Tannenbaum [44] defined organizational performance as to which the organization has fulfilled its goals and assessed its performance based on jobs, individuals, and organizational structure as a social system. During the 60s and 70s, the organizational performance was defined as the ability of an organization to use its environment to access and use limited resources [45]. During the 80s and 90s, the organizational performance was defined as an organization accomplishing its goals (effectiveness) using the least of resources (efficiency)[43]. The primary definition, however, organizational performance measured as a set of financial and non-financial measures that provide information on the extent to which goals and results are achieved. The BSC's four perspectives are, learning and growth, internal process, customer satisfaction, and financial gain represent organizational performance in this study.

Given the popularity of BSC, several studies have measured the impact of IT adoption on organizational performance using BSC in various industries and countries. For example, Lee et al. [39] studied the impact of software-as-a-service (SaaS) adoption on organizational performance among SMEs in Korea, found that financial performance is causally related by employees learning and growth, internal processes, and customer management. Also, Wu and Chen [42] studied the impact of IT innovation on organizational performance among firms in Taiwan found that the IT value is realized differently in different forms of performance measures across different diffusion phases. The first two-phase (adoption and implementation) and the final phase (assimilation) have found significantly different. The finding also indicated that the four perspectives of organizational performance were well realized at the assimilation phase and concluded that the measurement method and the time-lag effect were significant determinants of organizational performance measures. Park and Rim [41] studied the impact of RFID adoption on organizational performance among firms in Korea found that RFID adoption was strongly impacted the learning and growth, internal process, and customer satisfaction. However, the results also indicated that RFID adoption does not appear to influence financial performance. Furthermore, Fang and Lin [46] studied the impact of ERP adoption among public companies in Taiwan found that ERP adoption was strongly impacted the organizational performance on financial gain, internal process, customer management, and learning and growth. Their findings also discovered that the non-financial measure had a closed relationship with financial measures [46].

III. DISCUSSION

This study's independent variable is BI adoption (see Fig. 1). Adoption is defined as accepting and using IT innovation continuously [47]. Also, Rogers [48] views adoption as a verdict for incorporating IT innovation to a full extent. Therefore, in this study, based on Rogers' [48]

definition, BI adoption denotes to the adoption, implementation, and use of BI among HEIs.

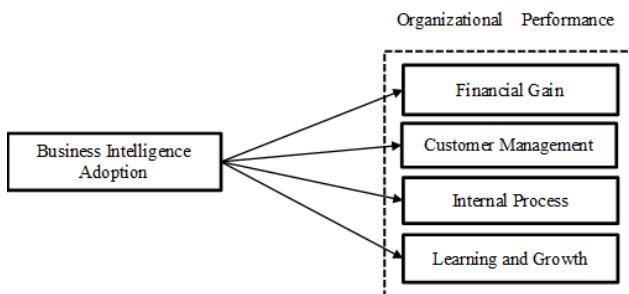


Fig. 1. Proposed conceptual framework

The impact of BI adoption in this study is organizational performance. Hou [36] argued that higher BI adoption rates would enhance employees' learning and growth, improved internal processes, and customer management dimensions (non-financial measures), and indirectly contribute to improved financial performance. Hou's [36] results provide initial evidence that financial performance increased through BI adoption. Likewise, Elbashir, Collier, and Davern [49] studied on BI adoption that gives the benefits that organizations achieved by evaluating the relationship between business process and organizational performance. Their findings have shown that BI adoption could improve the internal processes, which in turn can lead to improved organizational performance. Popović et al. [10] acknowledged that BI could enhance the business processes, improve customer satisfaction, and increased the revenue of an organization through quicker and more precise reporting. Also, Moss and Atre [50] argued that BI adoption enhances income, lower cost, and customer satisfaction. Based on these arguments, the BI adoption by HEIs in Malaysia is presumed to lead to non-financial and financial measures. Therefore, this study evaluates the relationship between BI adoption and organizational performance using the four dimensions of the BSC among HEIs in Malaysia. Therefore, the researcher hypothesized that:

H1: The adoption of business intelligence has a significant impact on improving the financial gains of higher education institutions.

H2: The adoption of business intelligence has a significant impact on enhancing customer management of higher education institutions.

H3: The adoption of business intelligence has a significant impact on improving the internal process of higher education institutions.

H4: The adoption of business intelligence has a significant impact on employee learning and growth of higher education institutions.

IV. CONCLUSION

This study establishes a conceptual framework for evaluating the impact of BI adoption on organizational performance among HEIs in Malaysia. Precisely, this study seeks to evaluate the relationship between the BI adoption and organizational performance of HEIs in terms of financial gains, customers' management, improved internal

processes, and employees' learning and growth. This study contributes to enrich the IT adoption literature by presenting a conceptual framework for the impact of BI adoption on organizational performance among HEIs in Malaysia. The findings of the empirical study were intended to help organizations in the other fields who want to embrace BI by using the Balanced Scorecard to boost their organizational performance, which offers the senior management better insight into the impact of IT adoption in their organization. Also, this will enable them to develop policies and procedures for organizations' strategic decisions, operational, and resources.

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