

ENABLING FACTORS FOR SUCCESSFUL BUSINESS INTELLIGENCE SYSTEMS: A REVIEW

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Abstract

Business Intelligence (BI) systems have continually been one of the top priorities of CIOs for almost a decade. BI systems provide the ability to analyze information in order to support management decision making process. In context of Malaysia rural development, BI can potentially be the driving force that enable major transformation to take place. Currently, studies on success factors of BI systems have been well research, yet many organizations are still struggling to make use of the information in their BI systems implementation. The aim of this paper is to provide a better understanding of the enabling factors for successful BI systems for the appropriate needs of the organizations. This paper reviews success factors of BI systems and outlines the factors according to the need of organization. The review contributes to both academia and industry by providing analysis of success factors that direct and indirect support the organization decision making process.

Keywords: business intelligence, success factors, transformation

1.0 INTRODUCTION

Business intelligence (BI) refers to the process of turning data into information that are used to enhance organizational decision making [1]. Today's the deployment of business intelligence (BI) applications in organizations is also increasing. More than 38% of the IT executives surveyed indicated that they are willing spend their IT dollars on business intelligence [2]. This shows that organizations realize the capabilities of BI to improve outcomes in ensuring organizations' future.

In context of Malaysia, BI can potentially provide opportunities for organization transformation. It has been suggested that organizations can take advantage of BI analytics to improve outcomes and decision making [3]. With the current economic challenges, Malaysian government should explore the potential of BI to improve the government services through effective management. BI potentially can be the driving force that enable major transformation to take place.

Studies on success factors of BI systems have been well research, yet many organizations are still struggling to make use of the information for reference in their BI systems implementation. Most of previous research used Mclean and Delon's IS Success Model [4] as the framework in assessing BI success. While the findings based on this model able to identify common success dimensions, yet few have attempt to analyze the factors in order to provide a better understanding of the applicability to the need of organization.

This paper, thus brings new insights regarding the success factors of BI systems and consequently outlines the factors according to the need of organizations.

The structure of the paper is as the following. The paper starts with the motivation for the review. In the next section presents the definitions of critical success factors (CSF) used in BI research as the field is still rapidly evolving. Then, BI success dimensions are presented. This is followed by a section on review technique and results. A summary analysis of CSF from other previous studies. Next, the discussion section and finally the conclusion.

2.0 MOTIVATION

Today's the utilization of BI applications in organizations is increasing and the demand for BI is stronger than ever before. It is not surprising that 59% of organizations intended to improve their decision making capabilities and invest in BI in 2014 [5]. BI can potentially be the driving force that enable major transformation to take place in organizations.

Unfortunately, BI systems often fail to realize intended business benefits; failure rates that ranged between 30% and 59% were reported in the literature between 2007 and 2012 [6]. Given the potential value that BI brings to an organization, thus, it becomes crucial to improve the success rates of BI implementation in organizations.

2.1 CRITICAL SUCCESS FACTORS (CSF)

The CSF concept was first identified in the 60's where organizations would be reliant on three to six factors as indicators of success or failure. In the end of 70's, CSF concept was further developed by Rockart [7]. He

introduced the concept of “things must go right.” He argued that if any organization are to be successful, organization need to satisfy and focus on few key main areas.

Table 1 below summarizes BI CSF definitions by different authors.

Table 1 BI CSF Definitions

Authors	BI CSF Definitions
Isik <i>et. al</i> , 2011 [8]	BI capabilities are identified as BI success.
Wieder & Ossimitz, 2013 [9]	Quality management of the whole process is the main determinant of BI success.
Yeoh & Koronios, 2010 [10]	Business orientation factors are determining the success of BI systems.
Dinter <i>et. al</i> , 2011 [11]	System implementation success factors effect BI success.
Olbrich <i>et. al</i> , 2012 [12]	BI system implementation and maintenance project influence BI system success.

Factors which contribute to the success of BI systems implementation and other associated benefits are usually referred as critical success factors or CSF [13]. BI success is often associated with positive value an organization can gained from its BI systems [14]. It is a management term for an element that is essential for an organization to achieve its mission.

2.3 BI SUCCESS DIMENSIONS

Wixom and Watson's BI success model measured BI success from implementation success to system success, as shown in Figure 1 [15]. The model attempted to show interrelationship between various factors and impact on BI implementation success leads to BI system success.

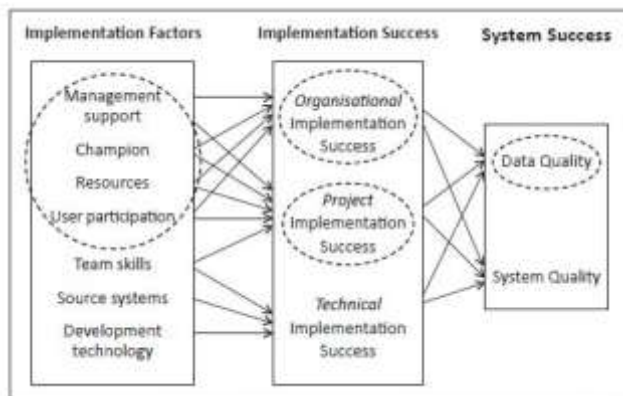


Figure 1 BI Success Model [15]

Although implied in the model other authors have also emphasized the importance organizational alignment, defined business objectives, and an

enterprise approach as success factors in a BI system [16].

In addition, literature has also shown that to be successful BI systems must meet the requirements of end users and meet organization objectives [17, 18]. Organization objectives are organization goal usually from the view of top management. User requirements, on the other hand, are end user decision goals which specific information should lead to organization goals.

The three BI success dimensions identified above are (1) system success, (2) organization objectives, and (3) user requirements. These dimension are used as the basis for the reviewed of articles analysis in this paper. Hence, providing a better understanding of the enabling factors for successful BI systems to meet the needs of the organization.

3.0 REVIEW TECHNIQUE

In order to examine the current state of research on BI CSF, articles from 2010 to 2016 are included in the analysis. Using google scholar, research articles are selected by searching the titles and abstracts using phases such as “business intelligence” and “success factors” or “CSF” or “critical success factors.” Any result of book review, editorial review or books are not included in the analysis. Figure 2 below is the review process in this paper.

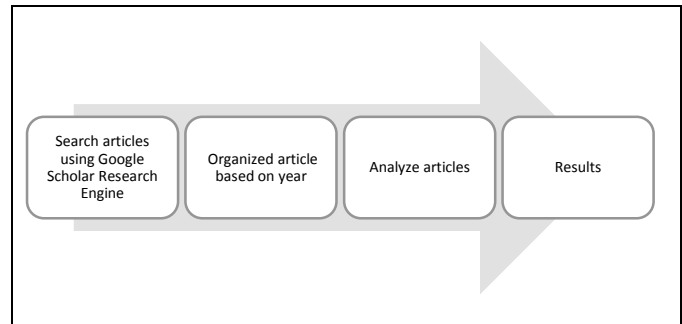


Figure 2 Review Process

Identified articles are arranged by the year the articles are published. A total of nine articles are selected. Table 2 shown the number of articles per year in our review.

Table 2 Numbers of BI articles per Year

Year	#	Articles
2016	1	Journal of the Association for Information Science and Technology
2015	1	European Journal of Information Systems
	1	AMCIS2015
2014	0	n/a
2013	1	Communications of IBIMA
	1	International Conference on Management and Information Systems
2012	1	Interdisciplinary Journal of Information, Knowledge, and Management

2011	1	Journal of Intelligence Studies in Business
2010	1	Journal of Computer Information Systems
	1	ACIS 2010 Proceeding

3.1 ARTICLES REVIEWED RESULTS

Based from the nine articles selected, success factors and approaches of identifying CSF by the authors are extracted. Analysis of research findings by Yeoh and Koronios (2010) indicates that organizational and process related factors are more important for BI success [10]. In another research, management support, user participation and team skill were noted by Hawking and Sellitto (2010) as critical for success [16].

According to Adamala and Cidrin (2011), non-technical and non-technological CSF play a dominant role in BI success [18]. Olszak and Ziemba (2012), on the other hand, classified success factors into three perspective: organization, process and technology [19].

On the other hand, Wieder and Ossimitz (2013) confirm that BI organization quality has a positive effect on data quality and information quality [9]. The scope of BI solutions translate into a positive effect on the quality of managerial decision making. Lee, Phooi and Yeoh (2013) study reveals that success factors generally fall into four categories, namely, security, technology, system content and quality, and organizational support [20].

Bakersalaw & Cha (2015) [21]. Audzeyeva & Hudson (2015) [22]. Yeoh, & Popovič (2016) [23] Table 3 below summarized the approaches associated with BI success factors.

Table 3 Success factors and Approaches

References	Success Factors	Approaches
Yeoh & Koronios (2010) [10]	Management support, Clear vision and business case, Business champion, Balanced Change management, Suitable technical framework, Data quality	Organizational, Process Factors
Hawking & Sellitto (2010) [16]	Management support, Champion, resources, Team Skill, User participation, Source system, Development technology	Management, User, Team
Adamala & Cidrin (2011) [18]	End-user, Project scope, Strategic vision, Funding	Technical factors, Non-technical factors
Olszak & Ziemba (2012) [19]	Senior Management Support, Leadership, Vision, Adequate Budget, Skilled team,	Organizational, Process, Technology

	Change Management, Information Requirements Data Quality, System Integration, Flexibility, Appropriate user tools and technology, User friendly system.	
Wieder & Ossimitz (2013) [9]	Data and information quality, Quality Decision-making	Data quality , Information Quality
Lee, Phooi & Yeoh (2013) [20]	Security, Technology, Right content, Timely, Management support, Skills	Security, Technology, System Content & Quality, Organizational
Bakersalaw & Cha (2015) [21]	Sensing, Learning, Coordinating, Integrating, IT infrastructure, Information repositories, IT capability, Information capability.	Organizational process, organizational asset, organizational history
Audzeyeva, & Hudson (2015) [22]	Core beliefs and values, Organizational structures, Distribution of power, Control systems	Multidimensional organizational
Yeoh, & Popovič (2016) [23]	Management support, Clear vision and business case, Business champion, Balanced Change management, Suitable technical framework, Data quality	Organizational, Process, Technology

4.0 DISCUSSION

Based on the above, in order to provide a better understanding of the factors for successful BI systems for the appropriate needs of the organization, BI success dimensions proposed for the analysis are related to (1)Organizational factors, (2) User factors, and (3) Systems factor. The scale from high, medium and low are used to represent the dimension emphasis in the studies being evaluated.

As indicated previously, there are various studies on identifying success factors of BI systems from many perspective. Yet, many organizations fail to apply the

information to their business intelligence systems. The review aim to provide a better understanding of the factors for successful business intelligence systems for the appropriate needs of the organization.

Table 4 below report on analysis on studies of BI success using the three BI success dimension, namely organizations, systems and users. The scale from high, medium and low are used to represent the dimension emphasis in the studies being evaluated.

Table 4 Analysis studies of BI success factors

	Organizations Related	Systems Related	Users Related
Yeoh & Koronios (2010) [10]	HIGH	LOW	MEDIUM
Hawking & Sellitto (2010) [16]	HIGH	LOW	HIGH
Adamala & Cidrin (2011) [18]	LOW	MEDIUM	HIGH
Olszak & Ziemba (2012) [19]	HIGH	MEDIUM	HIGH
Wieder & Ossimitz (2013) [9]	LOW	HIGH	LOW
Lee, Phooi & Yeoh (2013) [20]	MEDIUM	HIGH	LOW
Bakersalaw & Cha (2015) [21]	HIGH	MEDIUM	LOW
Audzeyeva, & Hudson (2015) [22]	HIGH	LOW	LOW
Yeoh, & Popovič (2016) [23]	HIGH	HIGH	HIGH

5.0 CONCLUSION

In this paper, we have presented previous works on success factors of BI. The approaches for analysing the studies are discussed. As a result, all studies reveals its own strengths and weaknesses in emphasis the BI success factors dimension. In order to avoid any drawbacks of choosing a single study to review BI success factors, we have compare a number of recent studies. However, limited numbers of articles are included in this review. In future study, more articles from various databases will be included.

The aim of this paper is to provide a better understanding of the enabling factors for successful business intelligence systems for the appropriate needs of the organization. The review contributes to both academia and industry by providing analysis of success

factors that direct and indirect support the organization decision making process. In addition, the outline captures in the analysis will also be a value to both the academic and practitioner communities.

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