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The diffusion stages of business intelligence & analytics (BI&A): A systematic mapping study

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Abstract

Business intelligence & analytics (BI&A) has evolved to become a foundational cornerstone of enterprise decision support. Since the way BI&A is implemented and assimilated is quite different among organizations is important to approach BI&A literature by four selected diffusion stages (adoption, implementation, use and impacts of use). The diffusion stages assume a crucial importance to track the BI&A evolution in organizations and justify the investment made. The main focus of this paper is to evidence BI&A research on its several diffusion stages. It provides an updated bibliography of BI&A articles published in the IS journal and conferences during the period of 2000 and 2013. A total of 30 articles from 11 journals and 8 conferences are reviewed. This study contributes to the BI&A research in three ways. This is the first systematic mapping study focused on BI&A diffusion stages. It contributes to see how BI&A stages have been analyzed (theories used, data collection methods, analysis methods and publication source). Finally, it observes that little attention has been given to BI&A post-adoption stages and proposes future research line on this area.

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1. Introduction

In the latest years, business intelligence and analytics (BI&A) has emerged as an area of decision support systems (DSS) research, with a tremendous interest among academics and researchers [1, 2]. In the era of Big Data, BI&A can help to improve organizational performance as a result of improvement on business decision making [1, 3].

BI&A born from the success of Business Intelligence (BI) in the 1990s and the introduction of Business Analytics (BA) in the 2000s, a key data analysis element in BI [3]. In the context of this paper, “business intelligence & analytics”, “business intelligence” and “business analytics” may be used as inter-changeable terms. Today’s definition of BI&A embraces all the positive attributes of BI and BA. Hence, BI&A can be defined as “the techniques, technologies, systems, practices, methodologies, and applications that analyze critical business data to help an enterprise better understand its business and market and make timely business decisions” [1]. BI&A enable firms to enhance the existing organizational applications, providing business-centric practices and methodologies that could provide competitive advantage [1, 3].

Although some literature reviews have been made about BI&A [1, 2, 4-7] none of them focus on the categorization of the different stages of BI&A diffusion: adoption, implementation, use and impacts of use. Many are the reasons that provide the motivation for this paper. First, BI&A constitute a dynamic, attractive and highly relevant field of research [8]. Second, the extended BI&A research needs to be reviewed in order to identify critical knowledge gaps and motivate researchers to close the breaches [9]. Third, a recent study called for research of BI&A diffusion stages [10]. Hence, in order for research to advance, this study analyzes the BI&A literature and then proposes an agenda for future research opportunities.

Mapping studies can make researchers save time and effort, providing baselines to support new research efforts [11]. The purpose of this study is to provide an updated review of the literature of BI&A research. A set of 30 papers published in various conferences and journals between 2000 and 2013 is analyzed. Adapted from a diffusion process approach [12], we aggregate those studies and enhanced the literature by categorize among four selected stages of BI&A. These diffusion stages were defined based on Esteves [12] process. We find this approach to be suitable since it was used in a previous study conducted by the authors [13].

The remainder of the paper is organized as follows. Section 2 describes the research method approach to the analysis of BI&A research. Next, we provide the bibliography, the overview of the articles and analysis of BI&A research. Finally, in Section 4, findings, implications and conclusions with future research opportunities are presented.

2. Background

Six review articles have been written on BI&A prior to this article. The first was made by Jourdan [4], where 167 articles published from 1997 to 2006 categorized by research strategy and BI&A category. The conclusions point to the need of BI&A researchers shift to other research strategies like survey. In the year after, Bose [5] investigate some BI&A technologies in terms of how they are used and the issues that are related to their effective implementation. A range of recently published research literature on BI&A is reviewed to explore their current state, issues and challenges learned from their practice. Later, a concept analysis from a managerial perspective made by Shollo [6] analyzed 103 articles related to BI in the period 1990 to 2010. Also, Fitriana [7] reviewed the BI&A approaches in 60 journals of business intelligence from 2000 to 2011. While half of the articles found adopt a single approach to design BI&A systems, the other half is divided by and integrated approach between BI and: Data Mining, Supply Chain Management (SCM), Customer Relationship Management (CRM), Artificial Intelligence (AI), Knowledge Management (KM), Decision Support Systems (DSS), Strategic Management, and others. Next, Chen [1] conducted a bibliometric study analyzing relevant literature, major BI&A authors, disciplines and publications, and key research topics based on the past decade (2000-2011) of related academic and industry publications. Lastly, Kowalczyk [2] conducted a literature analysis to characterize the current state of research related to BI&A systems, decision support technologies in general and their effects on decision processes.

3. Research methodology

In this article we have applied a systematic mapping study approach, different from the most common systematic research [14]. This approach usually aims to classify the relevant literature and aggregates studies with respect to the defined categories [11].

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