Chapter 27
Critical Barriers to Business Intelligence Open Source Software Adoption

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ABSTRACT

Over the past few years, managers have been hard pressed to become more data-driven, and one of the prerequisites in doing so is through the adoption of Business Intelligence (BI) tools. However (1) the adoption of BI tools remains relatively low (2) the acquisition costs of proprietary BI tools are relatively high and (3) the level of satisfaction with these BI tools remain low. Given the potential of open source BI (OSBI) tools, there is a need for analyzing barriers that prevent organizations from adopting OSBI. Drawing a systematic review and a Qualitative Survey of BI Experts, this study proposes a framework that categorizes and structures 23 barriers to OSBI adoption by organizations including 4 that were identified by BI Experts but not explicitly found in the literature. This paper contributes to OSS and Information Systems (IS) research literature on BI adoption in general and provides specific insights to practitioners.

INTRODUCTION

Over the past two decades or so, business intelligence (BI) and analytics have grown into a more and more important phenomenon for both academic and business communities (Chen, Chiang, & Storey, 2012). For instance, a special issue on BI published by the last authors in the journal *Management Information*

Systems Quarterly (MISQ) highlights the increasing importance of BI research in academia. Based on an 11-year survey (from 2004 to 2014) of senior IT executives from 2552 organizations located all over the world, Luftman et al. (2015) reported that, from a business perspective, analytics/business intelligence ranks first among the five most influential technologies. Another survey of over 4000 IT professionals from 93 countries and 25 industries identified business analytics as one of the four major technology trends in the 2010s (IBM, 2011). In fact, managers are hard pressed to become more data-driven (Kiron, Prentice, & Ferguson, 2014) while many scholars have underscored a broader new phenomenon qualified as "data-driven economy" (Mandel, 2012) or "analytics paradigm" (Delen & Zolbanin, 2018). In this context, the adoption and use of BI tools are considered one of the first prerequisite for organizational competitiveness that includes but is not limited to data-driven decision-making culture (McAfee, Brynjolfsson, Davenport, Patil, & Barton, 2012). In fact, apart from the fundamental data processing and analytical technologies included in BI and associated tools, they "include business-centric practices and methodologies that can be applied to various high-impact applications such as e-commerce, market intelligence, e-government, healthcare, and security" (Chen et al., 2012, p. 2).

However, despite the recognition of the importance of BI tools, their high potential in generating business value at both operational and strategic levels (Fink, Yogev, & Even, 2017), the rate of their adoption remains low. It is estimated that only 30% of all employees are using BI tools (Gartner, 2017a), and that penetration levels would increase to over 50% percent only "if cost, technology and other institutional challenges were not barriers to increase use" (Datamation, 2013, p. 1). The high costs associated with BI tool licenses and maintenance are echoed by Sallam, Richardson, Hagerty, and Hostmann (2011) who, in addition, underscore the complexity and low ease of use of proprietary BI tools. Another fact worth mentioning is the low level of satisfaction with BI tools and initiatives experience (Advaiya, 2017; Sallam et al., 2011).

Although most organizations have adopted proprietary BI tools that dominate the BI market, Sallam et al. (2011) reported an increasing interest in low-cost options, including open source BI tools as credible alternative solutions. A survey by Clutch revealed that 83% of business users and 88% of data scientists are likely to use open source software —as opposed to paid, proprietary solutions—in the future (Peacock, 2017).

In summary, considering (1) the struggles faced by organizations with their proprietary BI tools (Advaiya, 2017; Sallam et al., 2011) (2) the low adoption rate of BI tools (Datamation, 2013; Gartner, 2017a) (3) with the recognition of OSBI as a credible alternative to proprietary BI tools as well as the availability of OSBI tools with capabilities comparable to that of proprietary tools (Thomsen & Pedersen, 2009), there is a need to better understand the most critical barriers that prevent organizations from adopting OSBI tools.

Furthermore, a systematic review of BI studies included in this study reveals three major weaknesses in the current literature. First, the majority of studies are normative and lack empirical or theoretical foundations. Second, none of the studies focus on the perspective of BI experts. Third, as for the literature on business value creation from BI (Trieu, 2017), the body of knowledge on barriers associated with the adoption of BI tools is fragmented, thus it's lacking an all-encompassed, integrated framework. Such a framework is important, as it will facilitate knowledge accumulation (Hammersley, 2007), as well as evidence-based practices.

This study addresses the above-mentioned gaps in the literature by first providing a framework derived from a systematic review that identifies barriers to the adoption of BI tools by organizations. Building on the framework, this research – using a Qualitative Survey design – compares the barriers

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