Three Dimensions of Business Intelligence Systems Use Behavior

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ABSTRACT

In the Business Intelligence Systems (BIS) use context, the well-researched dimension of intensity of use is not broad enough to capture its meaningful use. The authors therefore investigate the whole spectrum of its use that encompasses effective utilization. The post-adoption research of Information System (IS) use is still under-researched; the study therefore brings novel insights to this area. The authors have conceptualized three dimensions of BIS use that capture the intensity of BIS use, the extent of BIS use, and BIS embeddedness. Confirmatory Factor Analysis (CFA) was used to determine convergent and discriminant validities proving construct validities, based on survey data gathered from BIS users in medium and large sized organizations. The results of our study provide sound evidence for apprehending these three constructs as different conceptualizations. This work adds to the literature by emphasizing the role of post-adoptive behavior that can lead to greater and effective utilization in the studied BIS environment, and potentially to a better organizational performance.

Keywords: Business Intelligence Systems (BIS), BIS Use, Embeddedness of Use, Extent of Use, Intensity of Use

INTRODUCTION

The research stream examining adoption and acceptance is one of the richest and most mature streams in the IS field (e.g. Davis, 1989, Venkatesh & Davis, 2000; Venkatesh, Morris, Davis & Davis, 2003; Venkatesh & Bala, 2008). But, in contrast, post-adoptive use behavior is still under-researched, and often conceptualized as increasing intensity or greater frequency of use (Jasperson, Carter & Zmud, 2005). Some efforts have already been made and show that post-adoptive use behavior may also diminish over time with gained experience (Bhattacharjee, 2001), or on the other hand become habitualized and routinized in individuals’ work routines (Jasperson et al., 2005). Undoubtedly, research on technology acceptance and initial use can enrich our understanding of post-adoptive use behaviors (Hernandez, Jimenez & Martin, 2008), but distinctions between pre- and post-adoptive beliefs and behaviors have already...
been observed (Agarwal & Karahanna, 2000). Understanding the three different dimensions of effective use in a specific BIS utilization context is central to this work. Deng and Chi (2013) argue that the Business Intelligence (BI) application context offers an ideal opportunity to examine a variety of post-adoptive system uses.

In the IS literature, the positive impact of the information provided by Business Intelligence Systems (BIS) on decision-making has been emphasized, particularly when organizations operate in highly competitive environments (Popović, Hackney, Coelho, & Jaklič, 2012; Harison, 2012). These technological innovations are one of the main sources of competitive advantage for the long-term survival of organizations (Jourdan, Rainer & Marshal, 2008), although their benefits can only be fully realized in situations where these promising innovations are completely accepted and effectively used. User acceptance is also crucial to BIS success, but in this context, in contrast with operational information systems (IS), there is a particularly pronounced difference between using or accepting the system and long-term routinization (Bhattacherjee, 2001) of the use of information provided by the system as part of management of the organization and business processes (Popović et al., 2012).

There are two motivations for this study. First, previous research in the field of IT acceptance has mainly focused on general IS and thereby only considered the narrower aspect of use, merely the frequency of use and not how IS is used (Davis, Bagozzi & Warshaw, 1989; Venkatesh & Davis, 2000; Venkatesh & Bala, 2008), treating system use simply and solely as a measure of the relevant behavior consequent to technology acceptance. This work represents a step in the direction advocated by Jasperson et al. (2005) who call for richer conceptualizations of system use by also treating system use as a theoretical construct. Second, it also responds to the call by Burton-Jones and Straub (2006) to develop the conceptualization of usage and select usage constructs and measures for specific contexts. The specific features of BIS use as compared to operational IS motivate the three conceptualizations of BIS use. For BIS it is important if BIS are deeply embedded within the business (Shanks et al., 2012). Therefore, BIS use behavior should be measured by several dimensions to yield a rich understanding of its utilization. In addition to quantitative measures of how much a BIS is used (frequency or duration) (Davis et al., 1989), we are also interested in a qualitative measure of how a BIS is used in the organization. The aims of this study are therefore to:

- Conceptualize and develop relevant measures for the three constructs of BIS use behavior, namely intensity, extent, and embeddedness; and
- Empirically test and evaluate the construct reliability and validity of these three conceptualizations of BIS use.

The structure of the paper is as follows. In the next section, the specifics of BIS and the three conceptualizations of its use are elaborated. Further on the research design, methodology, and results of the estimations are given. This is followed by a discussion of the results, including the implications for research and practice, and a conclusion.

**SPECIFICS OF BIS USE**

There are many definitions of BIS, but all of them state that BIS provide the ability to analyze business information in order to support and improve management decision-making across a broad range of business activities (Elbashir, Collier & Davern, 2008; Yeoh, Koronios & Gao, 2008). Their growing strategic importance is seen from the rising volume of investments in BIS (Gartner Research, 2013) which emphasizes the need to give them greater attention in research studies.

To study the use of BIS, one must understand the specific characteristics of BIS as compared to operational or transactional IS, particularly in the post-technology adoption phase. BIS are different from operational IS
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