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The role of compatibility in predicting business intelligence and analytics use intentions

Jurij Jaklič[a], Tanja Grublješič[a], Aleš Popovič[a,b,*]

[a] Faculty of Economics, University of Ljubljana, Slovenia
[b] NOVA Information Management School (NOVA IMS), Universidade Nova de Lisboa, Campus de Campolide, 1070-312 Lisboa, Portugal

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ABSTRACT

Research shows that data-driven decision-making using Business Intelligence and Analytics (BI&A) can create competitive advantages for organizations. However, this can only happen if users successfully accept BI&A and use it effectively. Analytical decision processes are often characterized by non-routine and ill-structured tasks and decisions, making individuals' work styles more pronounced. Aligning on one hand what a BI&A solution can offer and, on the other, the changing needs and expectations of users, the way they like to work – their work style, can thus be difficult. This illustrates the importance of compatibility evaluations in the BI&A context, including perceptions of the technology fit with the user's work needs and style, along with the fit with the organizational decision processes and organizational values when deciding to use BI&A. These issues have not yet been thoroughly researched in the existing BI&A literature. In response, we conduct a quantitative survey-based study to examine the interrelated role of compatibility in predicting BI&A use intentions. The model is empirically tested with the partial least squares (PLS) approach through to structural equation modeling (SEM). Our results show that compatibility perceptions have a direct positive impact on use intentions, mediate the impact of performance perceptions on use intentions, while the socio-organizational considerations of result demonstrability and social influence have interaction effects by positively strengthening the perceived relevance of compatibility in impacting use intentions.

1. Introduction

The era of digitalization and digital transformation is fundamentally changing the existing value chains of businesses and organizations (Loebbecke & Picot, 2015), leading to the growing importance of IT/IS in these new ways of doing business. Organizations are accordingly ever more reliant on flexible IT and big data analytical capabilities to ensure they can quickly adapt to changes and stay competitive (Chen & Siau, 2011). Decision-making based on Business Intelligence and Analytics (BI&A) use is thus regularly emphasized as a foundation for innovation and agility (Chen & Siau, 2011; Davenport, Barth, & Bean, 2012; Mao & Quan, 2015). BI&A equips users with "technological capabilities to support decision processes with reliable information and analytical insights" (Kowalczyk & Buxmann, 2015).

In the modern business environment, employees have to make hundreds of decisions every day, frequently choosing to base them on facts (data-driven) using BI&A or just based on their intuition or "gut feeling" (Kowalczyk & Buxmann, 2015). Research shows that BI&A use provides value to these organizations by increasing their organizational performance (Audzeyeva & Hudson, 2016; Olszak, 2016; Sharma, Mithas, & Kankanhalli, 2014). More specifically, research shows that data-driven decision-making exhibits higher decision quality than decision-making based on intuition (Kowalczyk & Buxmann, 2015). Hence, it is in organizations' interest to understand the relevant drivers impacting employees' intentions to use BI&A. Knowing these influential individuals' beliefs thus provides great value to organizations for better managing the organizational work environment to foster positive perceptions of BI&A use intentions (Agarwal & Prasad, 1997). Yoon, Ghosh, and Jeong (2014) reveal that, while the adoption of BI&A on the organizational level has attracted considerable research, individual-level drivers of BI&A use intentions have yet to be given adequate attention.

User acceptance and continued use of IT/IS have been extensively researched over the past decades (Palvia, Kakhki, Ghoshal, Uppala, & Wang, 2015; Venkatesh & Bala, 2008; Venkatesh & Davis, 2000). This stream of research provides insights and implications concerning how organizations can better manage and utilize their IT/IS resources (Mao & Palvia, 2006). Scholars increasingly point to the immense value of

* Corresponding author.
E-mail addresses: jurij.jaklic@ef.uni-lj.si (J. Jaklič), tanja.grubljesic@ef.uni-lj.si (T. Grublješič), ales.popovic@ef.uni-lj.si (A. Popovič).

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studying context-specific determinants of acceptance and use (Hong, Chan, Thong, Chasalow, & Dhillon, 2013; Venkatesh & Bala, 2008), showing that traditional models require modifications in the context of new and emerging trends and technologies (Shin, 2016). Integrating context into theory development brings many benefits as it helps better convey the applicability of the findings, enhancing the relevance of research for practice (Hong et al., 2013; Johns, 2006). Our study setting is a context-specific contemporary BI&A use environment.

Existing studies have explored how the use of BI&A within firms improves individual business activities, such as marketing (Xu, Wang, Li, & Haghighi, 2017) and customer relationship management (Nam, Lee, & Lee, 2018), as well as organizational performance (Bronzo et al., 2013; Vukšić, Bach, & Popovič, 2013). Although BI&A systems can provide firms with insights into their business operations, scholars agree they are painstakingly challenging to implement (Seah, Hsieh, & Weng, 2010). While domain-specific frameworks to guide BI&A implementation (Foshay & Kuziemsky, 2014) and frameworks for developing and assessing BI&A maturity (Brooks, El-Gayar, & Sarnikar, 2015) have been proposed, a better understanding of BI&A use is still limited. While extant findings suggest employees' use of enterprise systems is a paramount concern for firms striving to reap benefits from IT investments (Peng, Sun, & Guo, 2018), the present literature has only partially explored BI&A use; (Hou, 2012) has examined the effect of user satisfaction on BI&A system usage while Peters, Işık, Tona, and Popovič (2016) have explored how system quality influences mobile BI&A use. Our work extends the existing literature by providing novel insights into how users perceive a BI&A solution fits in with their work style.

Following the Hong et al. (2013) guidelines, the specificity of BI&A technology characteristics, users' characteristics and the usage context should all be considered to more profoundly understand and capture the influential drivers of users' intentions to use BI&A. Users' familiarity and competencies with IT/IS are already high in modern business environments, especially among decision workers (Chen, Chiang, & Storey, 2012). Employees who use BI&A in their work typically also have a higher level of education (Luo, 2016). The interfaces of BI&A solutions are, in addition, increasingly user-friendly (Chang, Hsu, & Wu, 2015). In this setting, motivations to use BI&A can no longer be based on pure assessments of individuals' effort perceptions of IT/IS use, such as faster and easier access to information. Moreover, the effects of BI&A use are much more difficult to discern and identified usually in the long run (Grublješič & Jaklič, 2015). Performance improvements are thus less evident to these individuals and their performance perceptions may consequently be less influential drivers of use intentions. The nature of organizational decision processes is often characterized by non-routine and ill-structured tasks and decisions (Grublješič & Jaklič, 2015). Consequently, data and analytics requirements can change frequently, calling for a high degree of adaptability and flexibility in these procedures (Kowalczyk & Buxmann, 2015). Hence, there can be a high probability of discrepancies between user requirements or needs and the BI&A solution capabilities, i.e. the task-technology fit. Users' compatibility evaluations thus come to the fore. Similarly, another related compatibility aspect, i.e. one's evaluations of how a BI&A solution fits in with their work style – the way they like to work – is especially important.

Previous studies in the BI&A context recognize the dominance of socio-organizational drivers of BI&A acceptance (Grublješič & Jaklič, 2015). Further, empirical research reveals that individual considerations of effort and performance perceptions have no significant direct effect on an individual's BI&A use intentions, with these instead being driven by socio-organizational considerations like social influence and result demonstrability (Grublješič, Coelho, & Jaklič, 2014). While the shift to the socio-organizational drivers of BI&A use intentions is already evident, a deeper understanding of the mechanism by which how these socio-organizational motivations interrelate and interact to thereby influence use intentions is still missing. We argue that compatibility evaluations, including perceptions of a technology's fit with the user's work needs and style, organizational values as well as the fit with the organizational decision processes, should be very important. These aspects have not yet been adequately addressed in the BI&A use intentions context and, based on the issues presented above, need a more thorough investigation.

Theories and empirical research already demonstrate the importance of compatibility in predicting the individual's technology acceptance (Moore & Benbasat, 1991). The concept includes both normative (e.g. socio-organizational) as well as operational compatibility (e.g. task-technology fit) considerations (Karahanna, Straub, & Chervany, 1999). However, solely the operational part was usually considered and examined in the existing research (Agarwal & Prasad, 1997; Karahanna et al., 1999; Yoon et al., 2014). Resulting from the above discussion, accounting for the issues of the high frequency of change in non-routine decision processes, the changing data and analytics requirements, the importance of the user's work style, organizational values, and decision process, and the BI&A fit, positive perceptions of compatibility should increase the BI&A use intentions.

Thus, this paper's main goal is to investigate the role and importance of compatibility in impacting BI&A use intentions, while considering the established predictors of BI&A use intentions and framing them all under the umbrella of general theories in the field. We consider two facets of compatibility perceptions, namely operational and normative, founded on theoretical reasoning and particularities of the context-specific BI&A use environment. In our research model, compatibility is conceptualized as directly predicting BI&A use intentions and mediating the impact of performance perceptions on BI&A use intentions. Further, result demonstrability and social influence, as influential drivers in the BI&A context (Grublješič et al., 2014), are conceptualized as moderators strengthening the impact of compatibility on BI&A use intentions. Our findings enrich understanding of the influential drivers of BI&A use intentions by demonstrating how they interrelate and interact through the mechanism of compatibility perceptions and further underscoring the predominant influence of socio-organizational considerations.

Theoretical foundations provide a basis for our model development and identify the interrelationships and interactions between the explored constructs. The model is empirically tested with the partial least squares (PLS) approach through to structural equation modeling (SEM). Statistical analysis is performed on data collected from experienced BI&A users in medium and large-sized organizations.

The structure of the paper is as follows. In the next section, the theoretical foundations regarding the role of compatibility in creating beliefs and perceptions about IT/IS use intentions are elaborated by pinpointing the specifics of the BI&A use environment. The research model is then conceptualized and hypotheses are developed. Further on, the research design, methodology, and results of the estimations are outlined. This is followed by a discussion of the results, including implications for research and practice with suggestions for future research.

2. Theoretical foundations

2.1. Information technology acceptance theories and compatibility

Significant theories on the theoretical foundations of technology acceptance research include the technology acceptance model (TAM) (Davis, 1989), innovation diffusion theory (IDT) (Kapoor, Dwivedi, & Williams, 2014a; Rogers, 1983), and the unified theory of acceptance and use of technology (UTAUT) (Venkatesh, Morris, Davis, & Davis, 2003). The TAM proposes that two distinctive behavioral and control beliefs – perceived usefulness and perceived ease of use – account for the individual's behavioral intention to use a technology (Davis, 1989). Moore and Benbasat's (1991) refined set of determinants of IDT for studying the individual's technology acceptance includes relative advantage, ease of use, image, visibility, compatibility, result