



Management theory and big data literature: From a review to a research agenda



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ABSTRACT

The purpose of this study is to enrich the existing state-of-the-art literature on the impact of big data on business growth by examining how dozens of organizational theories can be applied to enhance the understanding of the effects of big data on organizational performance. While the majority of management disciplines have had research dedicated to the conceptual discussion of how to link a variety of organizational theories to empirically quantified research topics, the body of research into big data so far lacks an academic work capable of systematising the organizational theories supporting big data domain. The three main contributions of this work are: (a) it addresses the application of dozens of organizational theories to big data research; (b) it offers a research agenda on how to link organizational theories to empirical research in big data; and (c) it foresees promising linkages between organizational theories and the effects of big data on organizational performance, with the aim of contributing to further research in this field. This work concludes by presenting implications for researchers and managers, and by highlighting intrinsic limitations of the research.

1. Introduction

Over the past years, the volume, variety, velocity and value of the massive amounts of data that firms deal with has increased exponentially (Fosso Wamba, Akter, Edwards, Chopin, & Gnanzou, 2015). In this context, the concept of “big data” has emerged, defined as the organizational use of such vast data to support more accurate decision-making processes (Davenport, 2014; Goes, 2014). Consequently, by using big data, firms can increase organizational performance (Raguseo, 2018; Yaqoob et al., 2016), which can signify increased competitive advantages (Kubina, Varmus, & Kubinova, 2015). Big data can be applied to all business functions, such as marketing (Shirdastian, Laroche, & Richard, 2017).

While technologies supporting big data have been developing rapidly (McAfee & Brynjolfsson, 2012; Rodríguez-Mazahua et al., 2016), academic research on the effects of this phenomenon on firms' performance is still in its infancy (Raguseo, 2018; Sena, Demirbag, Bhaumik, & Sengupta, 2017). On the other hand, companies are speeding up the adoption of big data technologies (Santos et al., 2017). In this context, it is possible to highlight the fact that the understanding of how

organizational theories are being applied to big data research is still lacking.

According to Glaser and Strauss (2009), the theories are important lenses through which to analyze various issues, and they can enable deeper arguments. The organizational theories have several implications in various disciplines, including information systems, as already shown in classic works (De Loff, 1995). In addition, certain theories can help to support findings and discussions about the implications of big data in organizational contexts, like the implications for organizational performance. Thus, considering the importance of the theories to understand better the implications of big data in organizational contexts and the lack of studies on the subject, the research question that guides this work is: which organizational theories have been applied to understand the effects of big data on organizational performance?

Therefore, the main goal of this study is to enrich the existing state-of-the-art literature on the impact of big data on business growth by examining the application of organizational theories to understand how big data affects organizational performance. While other emerging topics (Sarkis, Zhu, & Lai, 2011) and other management disciplines (Jackson, Schuler, & Jiang, 2014) have had studies dedicated to

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understanding organizational theories supporting their development, the body of research into big data lacks an academic work capable of systematising the organizational theories supporting big data scholarship. To achieve the proposed goal, a structured literature review was adopted, similar to those research methods employed by Seuring and Müller (2008); Lage Junior and Godinho Filho (2010); Seuring and Gold (2012); Jabbour (2013); Mariano, Sobreiro, and Rebelatto, (2015), and Gaur and Kumar (2018). This work also is inspired by previous systematized reviews which have implications for information systems, such as Kapoor et al. (2014a), Kapoor et al. (2014b), Dwivedi et al. (2017a).

The unique contributions of this work to better understanding the link between big data and organizational performance can be summarised thus:

- This work addresses the application of dozens of organizational theories to big data research.
- This work offers research avenues on how to link dozens of organizational theories to empirical research in big data.
- This work identifies promising linkages between organizational theories and the effects of big data on organizational performance, with the aim of contributing to further research in this field.

This paper is organized as follows: following this introduction (Section 1), the research method is presented (Section 2). Next, a theoretical background of the main concepts is provided (Section 3). Section 4 presents the core of this paper, the organizational theories linked to big data studies. Lastly, the conclusion (Section 5) explains the implications of this study for theory and practice.

2. Research method

Inspired by Sarkis et al. (2011), this work revises literature on big data, and highlights how management theory can be used to enhance big data research. The research method adopted was an integrative – or structured – literature review (Huisinigh, 2012). This method was initially applied by Lage Junior and Godinho Filho (2010) and later employed by other studies, for instance, Jabbour (2013); Mariano et al. (2015); Seuring and Gold (2012), and examined in detail by Gaur and Kumar (2018).

A literature review approach is suitable for emerging topics, such as big data, because, this approach classifies the literature of a research domain, helps understanding a topic in comprehensive perspective, and sheds light on research gaps aiming moving a theme forward (Fosso Wamba et al., 2015; Gunasekaran, Ngai, & McGaughey, 2006; Ngai & Gunasekaran, 2007). The steps of the integrative literature review are presented in Fig. 1.

In the sequence, the details of the integrative literature review will be presented: the search for articles; the selection of articles; and the data extraction from articles.

2.1. Search for articles

The first step was the definition of the research question, as presented in Section 1. Based on the research question, the general and specific objectives were defined too (the second step, see Fig. 1). The third step was the definition of the combinations of keywords to use in the searches.

The combinations of keywords used in the searches are in the Table 1. The first combination was determined to capture articles about Big Data that used theories in general (without specification of theory). Instead, the second combination was applied to capture articles about Big Data that used specific organizational theories. All the two searches were carried out on the Scopus database – the Scopus' advanced search tool was utilized. The utilization of the Scopus database is advantageous since it indexes about 70% more sources than the Web of Science

(Brzezinski, 2015) and provides more comprehensive coverage of the latest literature (Harzing & Alakangas, 2016).

Using the first combination of keywords in the search, 541 articles were identified. In the second search 150 articles were identified. After the exclusion of repeated articles (articles that appeared in both searches), the total number identified was 588. However, all these articles were refined by document type: article, article in press and review. Finally, the number of selected articles were 285. All the searches were conducted in October 2017.

2.2. Selection of articles

The following steps applied were the definition of the Inclusion Criteria (IC) and Search Filters (SF1 and SF2). The IC was defined as: articles about big data that applied some organizational theory to study an organizational context, for example, an organization and/or its processes.

All the 285 articles were submitted to search filter 1 (SF1), which consisted of reading the title, abstract, and keywords of the studies. Articles passed through SF1 only if they demonstrated potential for meeting the inclusion criteria (IC). Among the 285 articles, only 95 passed through SF1. These 95 articles were then submitted to search filter 2 (SF2): a full reading of the articles. As with SF1, only those that met the IC went through SF2. Of the 95, 41 passed through SF2 for fully meeting the IC. Finally, 41 studies in the literature were identified as capable of responding to the defined research question (Table 2).

2.3. Data extraction from articles

The final steps of the integrative literature review were the in-depth reading and analysis of the papers to identify the contributions and the gaps for future research. All 41 articles were analyzed in detail according to how they have applied management theories to underpin the research.

3. Theoretical foundation

3.1. Big data

Big data has been seen as a revolution in business and management (Dwivedi, et al., 2017a, 2017b; Erevelles, Fukawa, & Swayne, 2016; Frizzo-Barker, Chow-White, Mozafari, & Ha, 2016; McAfee & Brynjolfsson, 2012), with implications for a variety of contemporary management topics (Acharya, Singh, Pereira, & Singh, 2018; Gupta, Kar, Baabdullah, & Al-Khowaiter, 2018; Hashem et al., 2016; Ragini, Anand, & Bhaskar, 2018). It has attracted enormous attention worldwide because of its huge potential to transform ways of doing business, management and research (Aker, Fosso Wamba, Gunasekaran, Dubey, & Childe, 2016; Berner, Graupner, & Maedche, 2014; Chen & Zhang, 2014; Popovič, Hackney, Tassabehji, & Castelli, 2016). Big data deserves being studied further as this also can signify risks for companies if not properly implemented (Raguseo, 2018). As any kind of IT, big data has its adoption challenges (Dwivedi et al., 2015).

The concept of big data can be defined as the use of massive amounts of data to support different types of decision-making (Davenport, 2014; Goes, 2014). It is often characterized among scholars and practitioners by the notion of several “Vs”. The big data “Vs” have evolved from the classical three – volume, variety, and velocity – to the two more recent additional Vs – veracity and value (Fosso Wamba et al., 2015). Whereas volume and variety refer to the large amount and the several sources and types of data, velocity refers to the rapid rate at which data is generated (Dubey et al., 2017). Veracity, in turn, represents the unreliability inherent in some sources of data, which requires analysis in order to gain reliable predictions (Gandomi & Haider, 2015). Finally, value refers to the extent to which big data generates worthwhile insights and benefits through data analysis (Fosso Wamba

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