

# Chapter 44

## The Full Knowledge of Big Data in the Integration of Inter- Organizational Information: An Approach Focused on Decision Making

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### ABSTRACT

*Big Data is a radical shift or an incremental change for the existing digital infrastructures, that include the toolset used to aid the decision making process such as information systems, data repositories, formal modeling, and analysis of decisions. This work aims to provide a theoretical approach about the elements necessary to apply the big data concept in the decision making process. It identifies key components of the big data to define an integrated model of decision making using data mining, business intelligence, decision support systems, and organizational learning all working together to provide decision support with a reliable visualization of the decision-related opportunities. The concepts of data integration and semantic also was explored in order to demonstrate that, once mined, data must be integrated, ensuring conceptual connections and bequeathing meaning to use them appropriately for problem solving in decision.*

### 1. INTRODUCTION

From the grating volume of applications deployed over cloud operating on big data, we consider a collection of datasets so large and complex that it becomes difficult to gather, store, analyze, and visualize through traditional methods (Assunção, Calheiros, Bianchi, Netto, & Buyya, 2015; Bechini, Marcelloni, & Segatori, 2016).

In this context, organizations need to use a structured view of information to improve their decision making process (Power, 2014). To achieve this structured view, they have to collect and store data, per-

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form analysis, and transform the results into useful and valuable information (Renu, Mocko, & Koneru, 2013). To perform these analytical and transformational processes, it is necessary to make use of an appropriate environment composed of a large and generalist repository, a processor core with the appropriate intelligence, and a user-friendly interface (Jacobs, 2009).

The organizational repositories must be filled with data originating from many different kinds of external and internal data sources. These repositories are the data warehouses (generalists) and data marts (when considering a specific company activity or sector) (March & Hevner, 2007). Most recently, the Big Data paradigm has received considerable attention since it gives a great opportunity to mine knowledge from massive amounts of data to feed these organizational repositories (Esposito, Ficco, Palmieri, & Castiglione, 2014; Manyika et al., 2011). The thematic of Big Data is also promising and challenging for social research and the application of its results to help solving social problems (Tinati, Halford, Carr, & Pope, 2014).

According to Mcneely & Hahm (2014) big data technology is drastically revolutionizing commerce and society, some examples of the potential big data sources in this way are: the Open Science Data Cloud (Abaker et al., 2015); the social media which has become one of the most representative and relevant data sources for big data (Narayanan & Kumar, 2016); its usage in data-driven economy that is received by experts in the field with great enthusiasm (Ramine Tinati et al., 2014); and finally, we can mention its usage to provide powerful competitive advantages for governments and companies that are struggling to establish effective governance and privacy in connection with data-driven and analytical initiatives (Janssen & Hoven, 2015).

From a technical point of view, the big data concept and its applications have emerged from the increasing volumes of external and internal data from organizations that are differentiated from other databases in four aspects: volume, velocity, variety, and value. Volume considers the data amount, velocity refers to the speed with which data may be analyzed and processed, variety describes the different kinds and sources of data that may be structured, and value refers to valuable discoveries hidden in great datasets (Chen, Mao, & Liu, 2014). Very few empirical studies to assess the real potential of big data have been conducted with a focus on decision making.

Make closer the organizational and technical approaches is a great challenge to be faced by those who wish to develop the idea of the application of Big Data in supporting organizational processes. Thus, the main proposal of the present study is to develop an investigation that describes the roles of big data, and BI in the decision making process, and to provide researchers and practitioners with a clear vision of the challenges and opportunities of applying data storage technologies so that new knowledge can be discovered. In this paper, we worked with main contexts: First, identify the limitations of the Big Data approaches in context decision organizational. Second, we proposed strategic vision that big data can be used as support generating alternatives and create opportunity decision. Furthermore, it is important to note that decisions are implements considering the preferences of the decision-maker.

The sequence of this work is as follows. Section 2 explains the methodology followed to achieve the objectives of the research. Section 3 provides a background for big data analysis and some of its applications. Section 4 deals with data integration and semantics in big data information and knowledge generation. Section 5 conceptualizes the importance of visual analysis in decision making. Section 6 presents knowledge management in the context of big data. Section 7 presents a scheme for integration between big data, BI, and decision making. Section 8 contains a discussion about the limitations and challenges in using big data. Finally, the conclusion presents the limitations of this study and highlights the insights this work has gained.

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