Chapter 10
The Role of Big Data and Business Analytics in Decision Making

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ABSTRACT

The amount of data in our world has been exploding, and big data represents a fundamental shift in business decision-making. Analyzing such so-called big data is today a keystone of competition and the success of organizations depends on fast and well-founded decisions taken by relevant people in their specific area of responsibility. Business analytics (BA) represents a merger between data strategy and a collection of decision support technologies and mechanisms for enterprises aimed at enabling knowledge workers such as executives, managers, and analysts to make better and faster decisions. The authors review the concept of BA as an open innovation strategy and address the importance of BA in revolutionizing knowledge towards economics and business sustainability. Using big data with open source business analytics systems generates the greatest opportunities to increase competitiveness and differentiation in organizations. In this chapter, the authors describe and analyze business intelligence and analytics (BI&A) and four popular open source systems – BIRT, Jaspersoft, Pentaho, and SpagoBI.

INTRODUCTION

New advances of Information and Communication Technologies (ICT) continue to rapidly transform how business is done and change the role of information systems in business and our daily life. The amount of data in our world has been overwhelmingly exploding. Enterprises are flooded with ever-growing data of all types, easily amassing terabytes and even petabytes, of data. Analyzing such so-huge amounts of

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data is a keystone of competition, synonym for productivity growth, and innovation. With the emergence of new data collection technologies and analytical tools, Big Data offers a way to make businesses more agile, and to answer questions that were previously considered beyond reach. Increasing competition, demand for profits, contracting economy, and savvy customers all require companies and organizations to make the best possible decisions. With the fast advancement of both business techniques and technologies in recent years, knowledge has become an important and strategic asset that determines the success or failure of an organization (Wit & Meyer, 2010). Studies show that a competitive advantage in the business environment depends on the accessibility to adequate and reliable information in shortest time possible – sometimes even in real-time – and the high selectivity in the creation and use of information. An effective instrument to create, aggregate and share knowledge in an organization has therefore become a key target for management.

The need to implement decision support systems in organizations is not only an unavoidable reality but also a prerequisite for todays' companies (Arsham, 2015). Currently, the majority of organizations have platform services, designed to record and store massive amounts of data resulting from the operational activity (Wang et al., 2019). This dataset is then transformed in information and all that information will lead to knowledge useful for the organizations.

The terms Business Intelligence (BI) and Business Analytics (BA) have been widely used in various contexts, but there seems to be no commonly accepted definition of what, at least BA is. Hindle et al., (2019) define BA in the same way that Davenport and Harris (2007) defines BI, which is "the extensive use of data, statistical and quantitative analysis, explanatory and predictive models, and fact-based management to drive decisions and actions".

On this study, we follow a terminology defended by a few researchers, who call this area BI&A which stands for Business Intelligence and Analytics and represents a merge of Business Intelligence techniques and systems with a Business Analytics strategy (Torres et al., 2018).

In addition, in a competitive environment, traditional decision-making approaches no longer meet the requirements of organizations for decision-making; organizations must make good use of information system tools such as BI&A systems to quickly acquire desirable information from huge volume of data to reduce the time and increase the efficiency of decision-making procedure. Different researchers have different definitions for business intelligence and analytics systems, for example Sharda et al., (2014) defined these as "an umbrella term that encompasses tools, architectures, databases, data warehouses, performance management, methodologies, and so forth, all of which are integrated into a unified software suite".

Business Intelligence and Analytics is one of the few forms of sustainable competitive advantage left (Burstein & Holsapple, 2008). For example, any two well-funded competitors in a market have near real access to capital, technology, market research, customer data, and distribution. People and the quality of the decisions that they make are the primary competitive differentiators in the Information Age (Lin et al., 2009). The implementation of an effective BI&A strategy is the key to sustaining long-term competitive advantage as so, is normally driven by the top management as a whole instead of just the information technology department as usual.

Several studies have shown how BI&A investments impact enterprise performance (Albright & Winston, 2016; Evans, 2019). In the earlier steps of BI&A implementation, the selection of the most convenient strategy is very important: organizations implementing a BI&A strategy and solutions need to consider several factors such as data management and quality policies, data retention, data frequency and metadata stored required. Afterwards, an architecture to cope with the data strategy agreed needs to