

# A Framework for Managing Big Data in Enterprise Organizations

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## ABSTRACT

Big Data management is trending research that seeks to find a framework that will give support to decision makers in governments and enterprises organizations. For the rapid growth of data, dealing with Big Data with respect to management and finding new values has drawn attention recently. Strategies should be established together with the goals, vision, and objectives of an organization to manage Big Data. Big data management frameworks are the main components for the implementation of Big Data service. Many organizations that deals with Big Data have three critical problems, how to manage Big Data, how can Big Data create new values reference to its strategies and business needs, and how it can take the correct decision in the correct time. In this article, the authors propose a Big Data management framework that will handle all Big Data operation beginning with collecting data until making analysis and how new value can be created. The proposed framework also takes care of other factors such as organization strategies, governance, and security.

## KEYWORDS

Big Data, Big Data Management, Decision Making, Framework, Governance, New Value Creation, Survey on Data Management Framework

## 1. INTRODUCTION

Over the last few years, the volume of data worldwide has blown up with the growing use of various digital devices that continuously generate massive amounts of structured or unstructured data, resulting to “big data” (Amatriain, 2013). Big data refers to rapidly increasing amounts of data for which traditional structured database mechanisms become inefficient in terms of storage, processing, analysis and value creation (Power, 2011). Using the word “big data” has spread to be the most common spoken over the last years. While populist in many cases, these words are rooted in the real world and practice of being able to extract, measure, analyze, create new values and information from larger data amount (Hussein et al., 2019).

The most popular definition for big data is the 3Vs, which refer to volume, velocity, and variety, this definition was proposed by Doug Laney in the year 2001, in a Meta Group report. In this report, Laney (Laney, 2001) identifies the 3Vs as the most and common challenges in huge data management and is nowadays widely used to define Big Data (Gandomi et al., 2015).

Organizations need to make the data analysis process to create new values and new knowledge from the huge gathered data. New knowledge creation will be the most important feature that decision-makers need to know, according to marketing challenges and organization strategy (Tseng et al., 2018). Managing big data with different data formats and data volumes are the main basis for competition

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between different companies (Sumbaly et al., 2013). When data defined by a numerical representation of some measurement, which now is easy by using available technology that extracts data, analyze, and convert it into information and finally into new values or knowledge (Muliawaty et al., 2019).

Although many enterprises organizations are trying to discover different ways of manipulation and utilize big data to have the ability to create new values of its own big data, many organizations are fighting with how to create new knowledge from the important amount of data they already have and taking in the consideration its volume, velocity and variety (Goes, 2014). Indeed, simply data possessing a valuable resource does not guarantee the development of value creation in the required time to take a fast and correct decision. Another research by (Sirmon et al., 2007) define new values as the prorated amount of value that is subjectively needed by a target user, and this objective must at least translate and introduced to the user in the simple and suitable format to be readable and useful in taking the correct decision.

Decision making is the most important process in any organization. The organization can make or separate on the type of decisions taken. In an organization, decisions are taken on a different level starting from the operational level until the strategical level (Sivathanu et al., 2019). On any day in an organization, many decisions are made. There are many methodological, processes and approaches to logical decision making. In an organizational context, most of the critical decisions are not taken in a mental manner. Behavioral decision making depends on how responsible person makes a choice and what are the factors which impact him in this choice (Sony et al., 2019).

The main challenges that face the enterprises are managing data security, data accountability, costs reduction of overall data operation in the enterprise, data quality improvements, new value creation, taking a correct decision in a timely manner, and matching between business needs and data provided (Kumar et al., 2008).

When applying a framework for managing big data in enterprises, there will be some sectors affected indirectly due to the actions of stakeholders, such as market and public needs, which demand that organizations focus on environmental change and adaptation (Akter et al., 2016). This means that organizations must make some internal changes to face these challenges as well as try to take advantage of the opportunities and business needs (Cai et al., 2018). However, it is very important to note that organizations should keep track different response strategies depending on applying the new environment to climate risks, their sector, their individual capabilities, and their leadership (El-Kassar et al., 2019).

There are some frameworks proposed to manage big data, but none of them has a complete framework that can handle all the factors needed by organizations to manage big data. Some of them focused on data governance but didn't handle organization strategies, support decision makers, and the technology used. Other frameworks focused on decision making but forgot the governance and organization strategies. Many of them didn't mention the technology applied and how new values and analysis process will be done.

The proposed framework handles all factors that affect big data application. It helps the organizations to facilitate big data operation, achieve organization objectives and go ahead with business and market needs. The proposed framework gives support for decision makers to take the correct decision at the correct time. The proposed framework consists of eight layers, the first four layers deal with data collection, processing, analysis, new value creation, presentation, and the decision support layer. The other four layers are organization strategy, governance, security, and monitor and control. Each one of them interacts with the first data layer.

The structure of the paper is as follows: section 2 describes the most familiar big data management frameworks. Then a comparison between different data management frameworks is presented in section 3. The proposed big data management framework with detailed description for each layer is presented in section 4. The paper is concluded in section 5.

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