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# A framework for Business Process Data Management based on Big Data Approach

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**Abstract**

A business process (BP) refers to a set of activities carried out by humans to achieve one or more business goals. BPs are ubiquitous and occur in several sectors: marketing, healthcare, financial management and of course business. BPs generate a significant amount of data known as big data.
In recent years, the management of business process models and data is very challenging. On one hand, business process must be powerful in terms of modeling. On another hand, big data analytics support to find suitable knowledge to enact business process models.
In this paper, we will introduce an overview of our big data process-based approach that places big data and process in the same framework.


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*Keywords:* BPM; Business Process; big data; big data analytics

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## 1. Introduction

A business process is a collection of related, structured activities that produce a specific service or a particular goal for a particular person(s). It can often be viewed as a sequence of activities with decision points based on data in the process. Business processes are inseparable from execution data, artifacts and data generated or exchanged during the execution of the process. Aalst and Ter Hofstede[1] has determined four perspectives to be considered for business process modeling (control flow, data flow, resource and operational perspective). The data flow perspective defines the data manipulated by activities, their structures, their sources, their destinations, and their transformation rules if they are exported to information systems or invoked applications[1]. In this context, business process models are integrated with external information systems to ensure their execution by involving actors in the realization of their tasks. Furthermore, business processes become part of a complex area where they store and integrate data. This becomes an essential step for future analytics and decision applications.

On another hand, big data is playing a more and more important role nowadays. While many new technologies have been developed to support big data, it is equally important to explore software engineering technologies with big data. Moreover, Business Process Management (BPM) has gained great importance in the last decade and is increasingly used in several contexts (marketing, E-Commerce, E-Heath, E-Learning, E-Government ...).

The usage of big data analytics in order to manage business process has gained more and more importance in recent years. First, BPM provides approaches for management of business processes to achieve business goals. Specifically, BPM includes techniques and tools for design, execution, analysis, and improvement of BP models. Secondly, BPM will have to face a big challenge if we need to design business processes which generate very big data. How to process big data is a key factor for a BPM project.

A key contribution of this paper is to propose a framework to facilitate business process improvement based on big data analytics. This framework describes the monitoring of business processes since the modeling phase, the deployment until the analysis of the relevant process-related data by means of big data analytics tools.

This paper is organized as follows. The first section is dedicated to present BPM. The second section is devoted to introduce the big data phenomenon. Big data analytics is presented in the third section. In the fourth section big data analytics and Business process are exposed. Our framework architecture is presented and detailed in the fifth section. Finally, the sixth section draws conclusions and suggests further research.

## 2. Business process Management

Business Process management (BPM) includes methods, techniques, and software to design, enact, control and analyze operational processes[2]. This approach has received considerable attention in recent years due to its potential for significantly increasing productivity and reducing costs. BPM can be seen as successive steps that form the lifecycle of such an approach. BPM lifecycle model systemizes the steps and activities that should be followed for conducting a BPM project. According to Gillot[3], the BPM lifecycle can be decomposed into four steps as follows (fig.1):

- Design: The processes are generally modeled using an understandable and executable graphical tool
- Execution: Once the processes have been designed, documented and simulated, they will be integrated into the information system
- Management and supervision: The processes are deployed in an execution environment and must be managed and monitored.
- Analysis and optimization: After a certain period of operation of the processes, the collected data can be used to analyze their functioning. The analysis will be able to identify the areas of the process that are poor or not performing.