Chapter 8
Leveraging Data Analytics for Informed Decision-Making in Process Management

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ABSTRACT

This survey chapter aims at discussing the application of data analytics in process management in order to improve operational performance, decision making and innovation. This chapter also describes the analytical techniques including descriptive, predictive, and prescriptive analytics and illustrates their use in manufacturing, healthcare, finance, and logistics industries. The chapter also discusses new trends, which are in the development of process management, including artificial intelligence, edge analytics, and digital twins. However, there are some barriers to the implementation of the framework such as data quality, skill, privacy, and

DOI: 10.4018/979-8-3373-3336-6.ch008

organizational readiness. The chapter concludes by emphasizing the importance of leveraging data analytics strategically and responsibly to ensure long-term success in a data-driven business environment.

1. INTRODUCTION

1.1 Background and Motivation

In an era defined by rapid technological advancement and ever-increasing competition, organizations are under immense pressure to optimize their operations, reduce inefficiencies, and deliver high-quality products and services. Process management is the systematic approach of designing, implementing, controlling and improving an organization's activities that culminate in the achievement of its performance goals. In the past, theories of process management are fixed of prominent structures of management including Lean, Six Sigma as well as Total Quality Management. These methodologies have been useful to businesses in enhancing on operational effectiveness and quality. However, in an open world of rapidly changing circumstances and increased availability and use of data, these do not easily provide fast and effective solutions to a complicated situation. The changing business environment and the advancement of technology have propelled the generation of large volumes of data from various sources such as sensors, enterprise systems, customers, and supply chain partners. This has led to data being not just a result of activities or a side product of an organization but rather an asset that if well managed, provides value to an organization by enabling informed decision making. Business data analytics has described as an essential tool to analyze raw information to understand the behaviors of the processes and patterns and provide recommendations regarding their future performance. The application of data analytics within process management helps organizations to shift from the reactive approach to problem-solving to the proactive one. Using historical data and real-time data, decision-makers can determine the source of the problems, model possible operation strategies, and enhance the use of resources. This transformation in process management is not a mere product of technology, it is a change in organizational culture towards process orientation and improvement. In addition, the influx of new technologies like artificial intelligence and machine learning, Internet of things (IOT), cloud computing possibilities of data analytics has also boosted tremendously. These technologies enable real-time data collection, operations and analysis on a large and intricate scale, enabling the identification of an abnormality or the making of mundane decisions without the need for man intervention and even enable predictions of future trends with a lot of efficiency. Thus, the integration of data analytics and process management can