

Chapter 33

Multifaceted Applications of Data Mining, Business Intelligence, and Knowledge Management

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ABSTRACT

This article reviews the literature in the search for the multifaceted applications of data mining (DM), business intelligence (BI), and knowledge management (KM). The literature review highlights the overviews of DM, BI, and KM; the practical applications of DM, BI, and KM; and the prospects of DM, BI, and KM in terms of marketing, business, human resources, and manufacturing. DM plays a key role in organizing huge amount of data and condensing it into valuable information. BI involves the delivery and integration of relevant and useful business information in an organization. KM allows companies to manage a system of core competencies in order to maximize business opportunities and minimize the risk of losing business opportunities. The findings present valuable insights and further understanding of the way in which DM, BI, and KM efforts should be focused.

INTRODUCTION

Data mining (DM) is a powerful tool that can be used to analyze the large quantities of data and discover the potentially helpful patterns (Chen & Tsai, 2016). DM involves the discovery of patterns in the large data sets through the application of specific algorithms (Kantardzic, 2011). DM is utilized to process information from sensor networks (Papadimitriou, Brockwell, & Faloutsos, 2003), in scientific data collection (Ball & Brunner, 2010) or computer science (Ektefa, Memar, Sidi, & Affendey, 2010). DM is also used in the commercial applications to find the marketing trends (Linoff & Berry, 2011). The difficulty in the extraction of knowledge from large databases has been perceived by many sectors of the economy, and much of the research has identified DM as an efficient way to extract knowledge from these sources (Aggarwal, 2015).

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Business intelligence (BI) system is an array of techniques and tools, aimed at providing businesses with the essential support for decision making (Mikroyannidis & Theodoulidis, 2010). The information system (IS) literature has long emphasized the positive impact of information provided by BI systems on decision making, particularly when organizations operate in the highly competitive environments (Popovič, Hackney, Coelho, & Jaklič, 2012). BI is the combination of business processes with the use of information technology (IT) systems, such as data warehouse system, data marts, extract, transform and load (ETL), query and reporting software, online analytical processing (OLAP), and visualization (Pareek, 2006) to support the effective decision making in modern organizations.

Knowledge management (KM) is a set of behaviors, processes, and technologies that are designed for managing information more efficiently to improve learning, decision-making, innovation, and other keys to business success (Kasemsap, 2016). Organizational knowledge creation integrates context, knowledge assets, and knowledge creation processes throughout the organization (von Krogh, Nonaka, & Rechsteiner, 2012). The use of knowledge exchange systems to facilitate transfer and reuse of knowledge has become commonplace in modern organizations (Gressgård, 2015). Effective knowledge sharing depends on knowledge leaders to develop a share vision, and promote a trustworthy in modern business (Zhang & Cheng, 2015).

This article aims to bridge the gap in the literature on the thorough literature consolidation of DM, BI, and KM. The extant literature of DM, BI, and KM provides a contribution to practitioners and researchers by describing the multifaceted applications of DM, BI, and KM in order to maximize the business impact of DM, BI, and KM in modern business.

THEORETICAL AND PRACTICAL REVIEW OF THE LITERATURE

The literature review describes the overviews of DM, BI, and KM; the practical applications of DM, BI, and KM; and the prospects of DM, BI, and KM in terms of marketing, business, human resources, and manufacturing.

Overview of Data Mining

Data mining (DM) is the analysis of historical business enterprises, stored in data warehouse databases, to reveal unknown patterns and DM orientations. DM software utilizes the advanced pattern recognition algorithms to examine through the large amounts of data to support in discovering the previously unknown strategic business information. Examples of utilizing DM in the fields of marketing and business management are about demonstrating new product bundles, finding the root cause of manufacturing problems, acquiring new customers, and outlining customers with more certainty (O'Brien & Marakas, 2011).

DM is the computational procedure of pioneering schemes in the large data sets regarding methods at the integration of artificial intelligence, machine learning, statistics, and database systems (Kasemsap, 2015a). DM involves several techniques, such as decision tree, association rule mining, and neural networks (Yang & Chen, 2015). DM has been an established field (Chen & Liu, 2005) as knowledge discovery in databases (Premalatha & Baskar, 2012). Knowledge discovery in databases is the larger process extending from the collection of the relevant data saved into the database to the interpretation of the knowledge contained in it (Maimon & Last, 2001). The extraction of unknown information from

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