

# Global Studies On Management Information Systems

Editors

Elif KARTAL, Emre AKADAL, Gökhan ÖVENÇ, Saeed TABAR





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# GLOBAL STUDIES ON MANAGEMENT INFORMATION SYSTEMS

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## PREFACE

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Each of the past three centuries is known for a distinguishing technology. The 19<sup>th</sup> century was the era of steam engines, which led to the mechanization of factories and the urbanization of the population. In the 20<sup>th</sup> century, Information and Communication Technology (ICT), which resulted from the development of integrated circuits and processing chips, was the most transformative technology. The invention of personal computers as well as the Internet, as the biggest network interconnecting users across the world, changed all aspects of life. Users are now able to communicate with each other and receive education without having to make a trip . Companies do business with their partners and communicate with their customers through electronic platforms. The advancement of computing devices relying upon digital technologies, along with the development of modern organizations, has made fast data collection possible. The 21<sup>st</sup> century is known as the information age, when huge amounts of information are produced within a second through advanced digital devices such as sensors and surveillance cameras. The information age has created its own challenges and opportunities for society. Therefore, the mainstream research in the area of information systems is on reducing the challenges of adopting it in organizations for better decision making and designing improved processes. On the plus side, many online businesses came into existence, which changed the norm of brick-and-mortar businesses. Well-known companies such as Amazon and eBay that dominate the global business were born in the information age. However, on the negative side, companies should be able to process the data produced by various electronic devices. Organizations deal with huge amounts of raw data, including structured or unstructured data, that is collected on different subjects. If organizations are not able to process the collected data efficiently and effectively, they can end up drowning in masses of data, which can lead to losses to competitors. In addition, evidence-based decision making is a necessity today given the magnitude and complexity of information produced, as well as the fast pace of technological change. According to the digital Darwinism theory, those companies that cannot adjust to the technological changes in the market are doomed to extinction. Therefore, it is of great importance to collect and analyze data and then use the obtained results from data analysis for organizational strategy setting. Over the past decade, there have been several examples of companies that went bankrupt due to failure to set their strategies based on evidence or to adjust to technological changes.

In order to automate and integrate various departments in an organization, Management Information Systems (MIS) is used. MIS encompasses a broad area, from running organizations and setting strategy, to process automation and improvement and many other tasks. It aims at facilitating the internal and external processes of organizations to offer better products and services to end users. Along with the evolution of computer technology, MIS has also experienced several eras. It started with the development of mainframes, which worked on a time-sharing basis. With the advancement of hardware technology in microchips and the development of minicomputers, more organizations could afford computing devices for their needs. In the the 1980s, the introduction of personal computers created a breakthrough in computing. That is when personal computers made their way into business with the development sheets such as VisiCalc for Apple and, later on, Microsoft Excel. The abundance of personal computers as well as the need to interact across organizations led to the intranet, which enabled distributed computing in organizations. This is also referred to as the third era of MIS, which is known as the client/server computing era. The next leap was the enterprise-wide use of high-processing-power computers with high-speed network computers for decision-making at operational, managerial,

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and executive levels. The most recent progress was the transition of computing systems from onsite to cloud computing. With cloud computing and Internet access, users can access hardware, software, and operating platforms irrespective of their location. Therefore, MIS has come a long way and has experienced various improvements since the introduction of mainframes. All these improvements in MIS are meant to facilitate departmental processes and their data to meet organizational vision and missions.

As such, timely and accurate processing of data plays a significant role in the success of organizations. That is where business analytics comes into play. Business analytics refers to a set of tools, techniques, and methods that convert data into insight for better decision-making. Business analytics takes advantage of the sophisticated mathematical and statistical methods that are implemented as machine learning algorithms in high-level programming languages. Its main function is to solve business problems using insight obtained from the collected data. Analytics started in the 1930s and 40s, during World War II, when companies were required to produce effective outputs with limited resources. Due to the complexity and multifaceted nature of the data produced today, analytics is gaining popularity quite rapidly. Its main objective is to facilitate decision-making by reporting current trends, predicting the future given the current and historical data, and optimizing business processes. Thus, descriptive, predictive, and prescriptive analytics categories were introduced in business literature. Descriptive analytics answers the question, “what has happened?” However, predictive analytics is related to the question, “What will happen?” and prescriptive analytics answers the question, “What should we do if in case of various scenarios?” Most organizations start with descriptive analytics, then move into predictive analytics, and end with prescriptive analytics. As analytics moves from descriptive to predictive to prescriptive, the sophistication of tools and techniques increases. This sophistication can create challenges with respect to the implementation of analytical methods and most importantly, the reliability of the obtained results. Therefore, the current trend of research in MIS and Business Analytics is moving toward developing faster, more accurate, and more adaptable algorithms for solving complicated business problems.

This book provides a wealth of knowledge on the use of analytical as well as ICT solutions to address real-world problems. The practical problems that are addressed range from process mining, use of ICT in smart cities, cryptocurrency, text mining, machine learning, and digital payment, to optimization with Julia. In addition, the theoretical evolution of research in MIS and Business Analytics is described. On the theoretical side, the foundation of MIS in top business journals is also outlined.