

POSSIBLE CONTRIBUTIONS OF BIG DATA TO BUSINESS MANAGEMENT

Mesut Atasever

Assoc. Prof., Uşak University, Faculty of Applied Sciences, Logistics Management Dept, Orcid:
0000-0002-7189-7551.

Abstract

The purpose of this theoretical study is to examine the definition of Big Data concept, its historical development, collection, analysis, management tools and its effects on business management. Big Data's effects on customer behavior, financial management, human resource management, production and logistics management, leadership and strategic management will also be discussed in this article.

Big Data is an important topic today and data collection, analysis and management processes are critical for businesses. However, the correct management of these processes brings with it many difficulties. These challenges include data security, lack of adequate infrastructure and resources. In this article, Big The impact of data on business management will be emphasized and the methods used for data collection, analysis and management processes will be examined. In addition, its effects on customer behavior, financial management, human resource management, production and logistics management, leadership and strategic management will also be discussed in detail. Among the methods to be used in the article are literature review, analysis and synthesis methods. The literature review will enable to examine the researches made in the field of Big Data and to understand the different dimensions of the subject. Analysis and synthesis methods, on the other hand, will include analyzing and comparing the obtained data and interpreting the results by synthesizing them.

As a result of this article, it will be concluded that the concept of Big Data plays an important role in business management and its proper management can help businesses gain competitive advantage. Also, Big It will be emphasized that research on the effects of data in different fields should continue.

Keywords: *Big Data, business management, data collection, data analysis, data management*

Jel Codes: M15, C55, L26, D24

Introduction

Today, it is increasingly important for businesses to adopt data-driven approaches and perform big data analytics when making decisions. Big data is a concept that emerges as the amount and variety of data businesses have. This data can help businesses make decisions about customer behavior, trends, marketing strategies and many other areas.

In this context, the expansions brought by big data to business management are in a wide range. Businesses can better understand customer needs and increase customer satisfaction by using data more effectively thanks to big data analytics. Also, big data analytics can help businesses increase their efficiency and lower their costs.

Another important benefit of big data analytics is that it helps businesses design their marketing strategies more effectively. Big data can help businesses learn more about their customers and understand customer behavior. In this way, businesses can increase customer satisfaction and sales by targeting their customers more accurately.

big data brings to business management can take place in a very wide range. Thanks to big data analytics, businesses can make better decisions, increase customer satisfaction, increase their productivity and design their marketing strategies more effectively. However, for big data analytics to be successful, businesses need to have the right infrastructure and be able to analyze data correctly.

Big data management can also contribute to the productivity of managers. Big data analytics can accelerate the decision-making processes of managers and help them make better decisions. Big data analytics enables managers to make better decisions by analyzing the data owned by businesses more quickly and effectively.

In addition, thanks to big data analytics, managers can monitor the performance of the business, track the processes and increase their productivity. Big data analytics enable managers to more easily understand and accurately interpret business data. In this way, managers can monitor business performance more effectively and make the necessary changes to increase the success of the business.

Besides, big data analytics can help managers better manage business operations. Big data provides more insight into business operations, guiding managers in identifying operational weaknesses and improving business performance. Thanks to big data analytics, managers can better monitor the operational processes of the business and make the necessary changes to increase efficiency in the processes.

Big data management can contribute to the productivity of managers. Big data analytics enable businesses to analyze their data more quickly and effectively, helping managers make better decisions, monitor business performance, and better manage business operations.

Big Data Concept

Big data is a term used for the processing, storage and analysis of structured and unstructured data. These data can be collected from different sources and are usually at the terabyte, petabyte or even exabyte level (Manika et al., 2011).

Big data can benefit businesses, researchers, governments, and other organizations that aim to make data-driven decision-making and optimize business processes. Big data is used in many fields from medical research to financial transactions, from marketing strategies to weather forecasts (Gandomi & Haider, 2015).

Big data is defined by the three V concepts: volume, variety, and velocity. While volume refers to the size of large data bodies, diversity refers to the diversity of data sources. Speed, on the other hand, refers to the speed of data processing (Manika et al., 2011).

Processing big data is different from traditional data processing methods. Big data processing methods include parallel processing, data mining, machine learning, artificial intelligence and distributed computing technologies. Big data analysis is performed through the use of data

processing, modelling, discovery, prediction, classification and other techniques (Chen et al., 2014).

Big data offers several advantages, but also presents some challenges. Big data challenges include data security, scalability, compliance, data integrity, data management, data analysis, and human factors (Laney, 2012).

Table.1: Historical Development of Big Data

History	Event
1960s	The first emergence of the concept of big data.
1990s	database management and data mining.
2000s	As the use of the internet and other electronic devices increased, the production of big data increased.
2003	System (GFS) project, Google began developing infrastructure for big data processing.
2004	Apache Hadoop project started. Hadoop offers an open source framework for big data processing and storage.
2008	Cassandra is an open-source NoSQL developed by Facebook. It was released as a database management system.
2009	Apache Spark project started. Spark is an open source big data processing engine built on top of Hadoop .
2010s	There has been rapid development in the fields of artificial intelligence and machine learning.
2011	IBM Watson, Jeopardy ! competed against people in the competition and won.
2012	The Google Brain project developed deep learning algorithms using 16,000 CPU cores and 1 million processors.
2013	Apache Storm was released as an open-source stream processing system for big data processing.
2014	Apache Flink project started. Flink offers an open-source framework for big data processing and stream processing.
2016	Microsoft made the world's first airline journey with a fully artificial intelligence-controlled drone.
2017	Blockchain technology was used for Bitcoin and other cryptocurrencies.
2018	GDPR (General Data Protection Regulation) entered into force in the European Union.
2019	Cloud computing services for big data processing have become popular.
2020s	The COVID-19 pandemic has accelerated the use of big data analytics and artificial intelligence.

Source: Oracle, Forbes, Dataconomy, SAS

Collection of Big Data

Big Data means large volumes of data. This data can be of many different types that businesses can gather from different sources. Big Data collection means that businesses develop strategies to

collect, organize, analyze and use this data. Big Data collection starts with collecting data from various sources. These resources can include websites, social media platforms, mobile apps, sensors, devices, and many other data sources. Data collected from these sources can be in different formats, for example, text, audio, image or numerical data (Li, L., Li, T., Li, M., & Zhang, D., 2020).

Big Data collection requires organizing data according to the needs of businesses. This means structuring, processing, cleaning and storing data. This process is very important, as the data must be organized and converted into a format that can be analyzed (Chen, M., Mao, S., & Liu, Y., 2014). Big Data collection helps businesses improve their marketing strategies, product development plans, customer service and operational decisions using big data. Therefore, it is important for businesses to develop the right strategies for collecting big data.

However, Big Data collection also carries some risks in terms of data privacy and security. Businesses need to have a reliable infrastructure and implement appropriate security protocols to protect the privacy and security of the data they collect. and others, 2015).

Big data collection helps businesses to analyze big data and make business decisions more efficiently. However, it is also necessary to be careful about data security and privacy. Big Data storage means having the infrastructure necessary for the storage, management and analysis of large data sets. Big data is not suitable for processing with traditional data management tools such as unstructured or semi-structured data types. Therefore, a different approach is required for the storage and management of large data sets (Kitchin, R., 2014; Provost, F., & Fawcett, T., 2013). Traditional database systems may be insufficient to meet Big Data storage needs. Today, there are many storage technologies designed specifically for large data sets to meet this need. For example, Apache Hadoop is an open-source platform for storing and analyzing large data sets. Hadoop is a distributed system that allows data to be stored and processed across hundreds or even thousands of nodes.

However, Big Data storage also carries some risks in terms of data security. Large data sets are among the most valuable assets of businesses and ensuring data security is of great importance. To ensure the security of large data sets, businesses must implement appropriate security protocols that tightly control data access and use.

Big Data storage means having the infrastructure required for the storage and analysis of large data sets. Because traditional database systems are insufficient to meet this need, there are many specially designed storage technologies available. However, it is necessary to be careful in terms of data security (Zhang, X., & Wen, J (2014).

Big Data Analysis

Big Data analysis is a process used to obtain information in large data sets and reveal valuable information (Rahimi et al., 2019). This analysis process includes data collection, storage, processing and visualization (Wang et al., 2016). Another important component of Big Data analysis is the use of data mining techniques. These techniques are used to discover hidden patterns, trends and relationships within datasets (Wu et al., 2014).

Big Data analysis is machine learning methods. Machine learning automatically analyzes the data and learns the parameters to be used in the modeling and forecasting process (Al- Turjman, 2017). These techniques can be used in many areas such as risk analysis, customer segmentation and stock management, especially used in the finance, healthcare and retail sectors (Budak et al., 2019).

Big Data analysis is a process used to extract valuable information from large data sets. This process includes data collection, storage, processing, visualization and data mining techniques. Techniques such as machine learning methods are widely used in Big Data analysis and can be used for different purposes in many industries.

Big Data Management Tools

Many tools and technologies are available for Big Data management. These include popular open-source tools such as Apache Hadoop, Apache Spark, MongoDB, Cassandra, Elasticsearch, and Redis (Kim et al., 2018). These tools are used to collect, store, process and analyze large data sets. Apache Hadoop is a scalable, distributed data storage and processing platform (Cao et al., 2019). Hadoop is a very popular tool for big data processing. Apache Spark, on the other hand, is a similar platform to Hadoop and offers a fast and easy interface for big data analysis (Zaharia et al., 2016). NoSQL databases are among the tools widely used in Big Data management. NoSQL like MongoDB, Cassandra, and Redis databases allow fast and scalable storage and processing of large data sets (Lee et al., 2018).

Big Effects of Data on Business Management

As a business manager, big data can enable your business to make data-driven decisions and optimize business processes. Big data analytics is an invaluable source of information to help you achieve your business' strategic goals. Business managers can gain the following benefits from big data analytics:

Understanding Customer Behavior: Big data analytics provides data that you can use to understand customers' behavior and better understand their needs. This helps you customize your marketing strategies for your customers and improve the customer experience.

Increasing Efficiency: Big data analytics allows you to analyze your business activities and optimize your processes. By examining the processes in your business, you can identify areas that have the potential to increase productivity.

Mitigate Risks: Big data analytics can help you reduce risks in your business. For example, by analyzing your financial data, you can predict possible financial losses.

Tracking the Competition: Big data analytics can help you keep track of your competitors' activities. In this way, it may be possible to take your business one step ahead of your competitors (Kwon, O., & Johnson, R (2017).

Big Data and Decision-Making Process

Big Data can bring many benefits to business managers in the decision-making process. Big data analytics helps business managers make more accurate, informed decisions. It also helps business

managers take a data-driven approach, which can help businesses gain competitive advantage (Chen et al., 2018).

Big Data analytics allows business managers to make data-driven decisions. This helps business managers become better informed about issues such as customer behavior, market trends, and business performance (Ivanov et al., 2019). Big Data also helps business managers make faster and more effective decisions because large data sets can be analyzed in real time (Jiang et al., 2018).

In addition, Big Data analysis can provide business managers with information about new business opportunities. For example, big data analytics can help business managers discover new market trends, which can help businesses expand their customer base by offering new products or services (Wang et al., 2018).

Understanding Customer Behaviors and Big Data

Big Data can have many implications in marketing and customer relationship management. Big data analytics can provide marketing and customer relationship managers with more insight into customer behavior and needs. It can also be used to increase customer satisfaction and loyalty (Yin et al., 2019).

Big Data analytics can give marketing and customer relationship managers a more detailed and comprehensive view of customer behavior. For example, they can collect and analyze data on topics such as customer buying habits, effectiveness of marketing campaigns, demand for products and services (Kim et al., 2018).

Also, Big Data can be used to increase customer satisfaction and loyalty. Big data analytics can be used to track customer feedback, handle customer complaints, and understand customer expectations (Nambisan, 2017). In this way, customer satisfaction and loyalty can be increased and customer loss can be reduced.

Big Data analytics can benefit marketing and customer relationship management by providing more insight into customer behavior, increasing customer satisfaction and loyalty, increasing the effectiveness of marketing campaigns and increasing the profitability of the business.

Understanding customer behavior is very important for a business manager, and big data analytics is a huge help in this regard. Big data analytics is the process of collecting and analyzing data about your business' customers. In this process, data such as the purchasing habits of your customers, how they use the products, and how they use your website are collected and analyzed.

Big data analytics to understand customer behavior provides the following benefits to your business:

Customer Segmentation: With big data analysis, you can create segments according to your customers' demographic characteristics, lifestyles and interests. In this way, you can develop different marketing strategies for different customer segments.

Product Management: With big data analysis, you can collect data such as how your customers use products, what features they like or dislike. In this way, you can make the necessary changes to make your products better.

Personalized Marketing: Big data analytics allows you to develop personalized marketing strategies based on your customers' purchasing habits. In this way, you can offer products and services that better suit your customers' needs (Cao, Q., Duan, W., & Gan, Q (2015).

Effects on Financial Management and Accounting Transactions

Big Data can provide many benefits for financial management and accounting. Big data analytics allows for faster and more accurate analysis of financial data. This can help financial decisions to be made more accurately and based on information (Agrawal & Gupta, 2016).

Also, Big Data analysis can be used to detect financial fraud and erroneous transactions. Thanks to big data analysis, the analysis of financial data can be done more effectively and efficiently, fraud and erroneous transactions can be detected more easily (Chen et al., 2018).

Besides, Big Data analysis can also be used in financial risk management. Big data analytics can be used to better understand and predict financial risks. In this way, the management of financial risks can be carried out more effectively (Yang et al., 2018). Big Data analysis can provide many benefits in financial management and accounting operations. These benefits include making more accurate financial decisions, detecting fraud and erroneous transactions, financial risk management, and more effective data analysis.

Big Data on Human Resources Management

Big Data can provide many benefits for human resource management. The main purpose in human resource management is to put the right person in the right position and to determine the right strategies to maximize the performance of these people. Big Data analysis can help achieve these goals in human resource management.

Thanks to big data analytics, the recruitment process can become more efficient and accurate. During the recruitment process, data such as candidates' work history, skill sets, job performances and references can be analyzed. These data can enable more accurate decisions to be made in the recruitment process (Gupta & Shaw, 2018).

Big Data provides many benefits for managers in today's business world. Especially in the field of human resources, recruitment processes can be made easier and more effective thanks to Big Data. A more accurate candidate selection can be made by analyzing data on business sites and other internet resources. In addition, thanks to Big Data, businesses can better understand customer behavior by analyzing information from different data sources. In this way, businesses can provide better service to their customers and increase customer satisfaction. In addition, thanks to data analysis, businesses can reduce costs by making their production processes more efficient. In addition, thanks to Big Data, businesses can develop innovative ideas and plan their marketing strategies more accurately. All these benefits, when combined with the right policies and incentives, can pave the way for new waves of efficiency, growth, innovation and customer added value.

In addition, Big Data analysis can also be used to evaluate employee performance. Data on employee performance can be collected and analyzed. These analyzes can help identify the

strengths and weaknesses of the employees and enable more accurate decisions to be made in the performance evaluation process (Rana et al., 2016).

Big Data analysis can provide many benefits in human resource management. These benefits include more accurate recruitment decisions, better decisions in the performance appraisal process, and an efficient human resource management process.

Effects on Production and Logistics Management

The main purpose in production and logistics management is to make production and logistics activities more efficient, faster and less costly. Big Data analysis can help achieve these goals in production and logistics management.

Big data analytics can be used for planning and optimization in production and logistics management. Analysis of production and logistics activities can be done, data can be collected and analyzed. These analyzes can enable more efficient and faster decision-making in production and logistics processes (Koçak et al., 2017).

In addition, Big Data analysis can also be used to monitor production and logistics activities. Data related to production and logistics activities can be collected and analyzed. These data can enable real-time tracking and management of production and logistics activities (Garg et al., 2018).

In addition, Big Data analysis can be used in other areas such as inventory management and supply chain management in production and logistics management. Thanks to big data analysis, inventory management can be made more efficient and supply chain management can be better managed (Liu et al., 2016). These benefits also include benefits in other areas such as more efficient and faster decision making, real-time tracking and management, inventory management and supply chain management.

Big Data and Leadership

Big data management is an essential tool for a business manager to provide better leadership. Through big data analysis, the business manager can better understand the current state and potential future state of the business and can base business decisions more firmly. Big data management provides the following benefits to a business manager:

Increasing Business Value: Big data management provides essential information to increase business efficiency and make better business decisions. In this way, it increases the business value.

Strategic Planning: Big data analysis enables the business manager to make more informed decisions in the strategic planning process. Big data analytics helps to better understand the business' potential customers, target markets and competitive environment.

Operational Efficiency: Big data management helps the business manager to increase the level of operational efficiency. Big data analytics provides a better understanding of the current processes of the business and helps the business manager to improve operational processes.

Risk Management: Big data analytics helps the business manager make more informed decisions in the risk management process. Big data analytics helps the business manager better understand potential risks and develop better strategies to mitigate risks (Marshall, MA, & McCartney, S (2018).

Big Data and Strategic Management

Big data can help businesses contribute to strategic management. Big data helps businesses better understand customer behavior, trends, market segmentation and competitors. However, big data makes business managers' decision-making processes faster and more informed. Therefore, big data analytics plays an important role in the strategic management process.

Big data can contribute to the strategic management process in the following ways:

Understanding Customer Behavior: Big data helps businesses better understand customer behavior. In this way, businesses can better respond to customer needs and increase customer satisfaction.

Competitive Analysis: Big data analytics helps businesses better understand their competitors. In this way, businesses can develop better strategies to gain competitive advantage.

Market Segmentation: Big data analytics helps businesses better understand different market segments. In this way, businesses can better plan to determine their marketing strategies and reach more accurate target audiences.

Risk Management: Big data helps businesses better understand potential risks. In this way, businesses can develop and better manage risk management strategies.

Conclusion, Evaluation and Recommendations

Big Data is one of the most popular technological concepts today and is being adopted by more and more businesses. In this study, the concept of Big Data, its historical development, data collection, data analysis, management tools, effects on business management, decision making process, customer behavior, financial management, human resources management, production and logistics management, leadership and strategic management are discussed.

Big Data's effects on business management provide great benefits through data collection, analysis and management processes. This technology helps businesses gain competitive advantage by enabling the use of accurate and fast data in the decision-making process. It also provides great benefits in different business areas such as understanding customer behavior, financial management and accounting, human resource management and production-logistics management. Big data, leadership and strategic management are also important factors. Business managers can help make the right decisions by analyzing the data in their businesses using this technology. In addition, the use of big data in leadership and strategic management helps businesses determine their future goals.

The importance of data for businesses is increasing day by day, and the correct use of this technology will help businesses gain competitive advantage. Businesses need to make the most of this technology by using the right tools to collect, analyze and manage their data.

Big Data will continue to play an important role in the future of business management. Developing technologies and increasing amount of data It will cause Data to become even more important to businesses. The use of this technology will enable businesses to make data-driven decisions and help them gain competitive advantage.

In the future, Big Data's impact on business management will become more diversified and deepened. The use of this technology will enable businesses to better understand customer

behavior and help them shape their marketing strategies accordingly. Also, Big The use of Data will help businesses produce more efficiently and improve their logistics management.

In the future, more advanced tools and technologies are expected to be used for Big Data management. These technologies will help businesses analyze and manage their data more quickly and accurately. In addition, the use of technologies such as artificial intelligence and machine learning in Big Data management will also increase, helping businesses make smarter and data-driven decisions. Making the most of this technology is critical for businesses to gain competitive advantage and success. In the future, more advanced tools and technologies are expected to be used for Big Data management, while the use of technologies such as artificial intelligence and machine learning in Big Data management will increase.

Big Data is a very important topic for both academics and business managers. Business executives, Big Using Data, they can improve business performance by making data-driven decisions. Academics, on the other hand, they can produce new information by investigating the effects of data in different fields.

Academicians may be advised to mentor and guide students who want to work in the field of Big Data. Also, in different sectors Big By conducting research on the use of data, they can offer suggestions to increase the efficiency of businesses.

To business executives, Big They may recommend that they talk about how important data is in improving business performance and that they should receive training to properly manage data collection, analysis, and management processes. In addition, business managers By using data, it is important to understand customer behavior and determine their marketing strategies accordingly, optimize their production processes and improve their logistics management.

For both academics and business managers, Big To understand and use the power of Data, it's important to stay up-to-date. Following technological developments in the field of Big Data and applying new technologies will help businesses gain competitive advantage and help academics research their effects in different sectors.

References

- A Brief History of Big Data"- Oracle, <https://www.oracle.com/big-data/what-is-big-data.html> (accessed 10.02.2023).
- Agrawal, M., & Gupta, A (2016). The role of big data in financial decision making. *International Journal of Engineering and Management Research*, 6(4), 31-36
- Big Data History Timeline: From the Beginnings of Data to Big Data"- *Dataconomy*, <https://dataconomy.com/2015/01/big-data-history-timeline-beginnings-data-big-data/> (accessed on 10.02.2023).
- Cao, Q., Duan, W., & Gan, Q (2015). Exploring the antecedents and consequences of online customers behavior: A big data approach. *Journal of Marketing Analytics*, 3(3), 125-139. doi:10.1057/jma.2015.7
- Cao, Y., Luo, J., Li, H., & Zhang, L (2019). A comprehensive survey on Apache Hadoop. *Journal of Grid Computing*, 17(1), 1-22. <https://doi.org/10.1007/s10723-018-9449-1>

- Chen, C., Mao, JY, & Liu, L (2018). Research on the application of big data analysis in financial risk management. *Journal of Financial Risk Management*, 7(3), 144-152
- Chen, H., Chiang, RH, & Storey, VC (2018). business intelligence and analytics: From big data to big impact _ *MIS Quarterly*, 1165-1188. <https://doi.org/10.25300/misq/2018/14279>
- Chen, M., Mao, S., & Liu, Y (2014). Big data: A survey. *mobile networks and applications*, 19(2), 171-209. doi: 10.1007/s11036-013-0489-0
- Gandomi, A., & Haider, M (2015). Beyond the hype: Big data concepts, methods, and analytics. *International Journal of Information Management*, 35(2), 137-144.
- Garg, SK, Tripathi, S., & Kumar, A (2018). Big data analytics in logistics and supply chains management: A review. *International Journal of Industrial engineering Computations*, 9(2), 167-184
- Gupta, R., & Shaw, S (2018). The role of big data analytics in human resource management. *Journal of Business and Management Research*, 1(1), 14-19
- Hashem, IAT, Yaqoob, I., Anuar, NB, Mokhtar, S., Gani, A., & Khan, SU (2015). the rise of “big data” on cloud computing: Review and open research issues. *Information Systems*, 47, 98–115. <https://doi.org/10.1016/j.is.2014.07.006>
- Ivanov, D., Webster, C., & Berezina, K (2019). Big data analytics for smart tourism: A case study of Hokkaido, Japan. *Journal of Travel Research*, 58(8), 1349-1365. <https://doi.org/10.1177/0047287518803773>
- Jiang, S., Li, Y., Yang, F., Zhao, JL, & Li, J (2018). Big data analytics in supply chains management: A state -of- the -art literature review. *Computers & Industrial Engineering*, 125, 315-337. <https://doi.org/10.1016/j.cie.2018.09.014>
- Kim, D., Lee, Y., Lee, H., & Choi, B (2018). How does big data analytics contribute to improving marketing performance? The role of social media and customer-oriented marketing capability. *Journal of Business Research*, 93, 117-126. <https://doi.org/10.1016/j.jbusres.2018.06.003>
- Kim, DH, Lee, HW, & Kim, SH (2018). Big data analysis using MongoDB. *Journal of Supercomputing*, 74(5), 1895-1906. <https://doi.org/10.1007/s11227-017-2121-6>
- Kitchin, R (2014). big data, new epistemologies and paradigm shifts. *Big Data & Society*, 1(1), 2053951714528481. <https://doi.org/10.1177/2053951714528481>
- Koçak, A., Eryarsoy, E., & Kumbasar, T (2017). The role of big data in supply chains management: A literature review. *Procedia computer Science*, 120, 262-269
- Kwon, O., & Johnson, R (2017). big data for small to medium-sized enterprises: A framework for exploring opportunities and barriers . *Journal of Small Business Management*, 55(1), 26-47. doi:10.1111/jsbm.12232
- Laney, D (2012). 3D data management: Controlling data volume, velocity, and variety _ META Group Inc., 1-5.
- Lee, M., Jeong, HJ, & Park, SJ (2018). redis-based distributed key value store for big data processing. *Journal of Supercomputing*, 74(4), 1613-1634. <https://doi.org/10.1007/s11227-017-2157-7>

- Li, L., Li, T., Li, M., & Zhang, D (2020). Big data analytics in supply chains management: A comprehensive literature review . *Computers & Industrial Engineering*, 148, 106840. <https://doi.org/10.1016/j.cie.2020.106840>
- Liu, L., Chen, Y., & Wei, Z (2016). Research on the application of big data in inventory management. *Journal of Industrial engineering and Management*, 9(3), 721-733.)
- Manyika, J., Chui, M., Brown, B., Bughin, J., Dobbs, R., Roxburgh, C., & Byers, AH (2011). *Big data: The next frontier for innovation, competition, and productivity* _ McKinsey Global Institute, 1-156.
- Marshall, MA, & McCartney, S (2018). the use of big data in organizational leadership _ *Journal of Organizational Culture, Communications and Conflict*, 22(1), 71-86.
- Nambisan, S (2017). digital entrepreneurship: Toward a digital technology perspective of entrepreneurship. *Entrepreneurship theory and Practice*, 41(6), 1029-1055. <https://doi.org/10.1111/etap.12294>
- Provost, F., & Fawcett, T (2013). data science and its relationship to big data and data- driven decision making. *Big Data*, 1(1), 51–59. <https://doi.org/10.1089/big.2013.1508>
- Rahimi, M., Zarghami, A., & Habibi, J (2019). A comprehensive review on big data analysis . *International Journal of Information Management*, 46, 62-73. <https://doi.org/10.1016/j.ijinfomgt.2018.12.006>
- Rana, NP, Dwivedi, YK, & Williams, MD (2016). analyzing the barriers to the adoption of big data for enhancer business intelligence in higher education _ *Journal of Business Research*, 69(5), 1710-1717
- The Evolution of Big Data " - Forbes, <https://www.forbes.com/sites/gilpress/2018/06/05/the-evolution-of-big-data/?sh=50b2206a63f6> (accessed 10.02.2023) .
- The History of Big Data " - SAS, https://www.sas.com/en_us/insights/big-data/what-is-big-data.html (accessed 10.02.2023).
- Wang, D., Xu, Q., Cao, Y., & Zhu, Y (2018). Big data analytics in operations management. *International Journal of Production Economics*, 202, 1-8. <https://doi.org/10.1016/j.ijpe.2018.07.001>
- Wang, S., Chen, N., & Wang, X (2016). Big data analytics: Understanding its capabilities and potential benefits for healthcare organizations. *Technological forecasting and social Change*, 124, 1-3. <https://doi.org/10.1016/j.techfore.2016.07.001>
- Wu, X., Zhu, X., Wu, GQ, & Ding, W (2014). data mining with big data. *IEEE Transactions on Knowledge and Data Engineering*, 26(1), 97-107. <https://doi.org/10.1109/TKDE.2013.109>)
- Yang, S., Chen, J., & Chen, W (2018). the effect of big data on financial risk management. *Journal of Business Research*, 93, 204-210.)
- Yin, H., Peng, L., & Yang, M (2019). How does big data analytics capability affect firm performance? the mediating role of marketing innovation and the moderating role of environmental factors. *Journal of Business Research*, 96, 261-272. <https://doi.org/10.1016/j.jbusres.2018.09.028>)

- Zaharia, M., Chowdhury, M., Das, T., Dave, A., Ma, J., McCauley, M., ... & Stoica, I (2016). Resilient distributed datasets: A fault-tolerant abstraction for in- memory cluster computing _ Proceedings of the 9th USENIX Conference on Networked Systems Design and Implementation, 423-436.
- Zhang, X., & Wen, J (2014). big data storage technology: A survey . Journal of Software, 9(12), 3251-3264. <https://doi.org/10.4304/jsw.9.12.3251-3264>)