



MIMBAR PENDIDIKAN:

Jurnal Indonesia untuk Kajian Pendidikan

Journal homepage: <https://ejournal.upi.edu/index.php/mimbardik>



Understanding Big Data and Digital Business

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ABSTRACT

In today's digital era, the integration of big data into digital business has become a must for companies that want to thrive in a competitive market landscape. This article aims to investigate the role of big data in the context of digital business and explore the different types of big data analyses used in various sectors. The research method used is a qualitative approach through a literature study which explores the various dimensions of big data and its applications in various business domains. Data was collected from various sources such as scientific journals, books, and reliable online sources. This article discusses the basic concept of big data that includes its characteristics such as volume, velocity, variety, veracity, and value proposition. In addition, the critical success factors and challenges associated with big data implementation are also identified, underscoring the importance of aligning business strategies, fostering a data-driven culture, and investing in a robust data infrastructure. The results show that the role of big data provides valuable insights into consumer behaviour, enables sales predictions, and improves operational efficiency in digital businesses. In addition, different types of Big Data analyses have been widely applied in sectors such as healthcare, transportation, and manufacturing. In conclusion, Big Data can have a positive influence on Digital Business. Big Data helps to improve efficiency, effectiveness, and decision-making.

ARTICLE INFO

Article History:

Submitted/Received 10 Jan 2022

First Revised 17 Jan 2022

Accepted 24 Jan 2022

First Available online 01 Mar 2022

Publication Date 01 Mar 2022

Keyword:

Big Data, Digital Business,
Decision Making, Efficiency,
Effectiveness.

1. INTRODUCTION

In today's digital age, information has become one of the most valuable assets for companies in various industries. Advances in information and communication technology have made it possible to collect large data from various sources (Agung et al., 2018). Technological advances have spread widely and influenced various aspects of life. Technology is now an inseparable part of people's daily lives. This phenomenon can be observed from the many innovations that have emerged throughout the world, from simple innovations to those that attract global attention. In the past, the internet was considered something extraordinary, but now it has become commonplace for many people. Almost every individual interacts actively with other people virtually through various social media platforms.

Technological advances in globalisation allow us to quickly obtain information about events around the world today (Rohman et al., 2024). In addition, the use of digital technology has expanded the scope of business to an increasingly complex global market. Companies can now easily reach international markets through e-commerce platforms and collaborate with business partners from various countries. Customer data and information collected through digital technology provides valuable insights into consumer behaviour and their preferences. This allows businesses to design more targeted and personalised marketing strategies.

Data has become a key asset in the world of digital marketing. Data is a guide to company strategy because it helps marketers understand target audiences to create more tailored campaigns. Although the process of collecting and analysing data is not new, the role of big data has become increasingly important in the last decade as the world shifts towards a more digital environment. Big data and data analysis have become valuable resources for companies, playing an important role in decision making, business strategy, and increasing competitiveness in an increasingly competitive market (Mayasari & Agussalim, 2023).

As a marketer in the modern era, understanding big data and efforts to utilise it can help optimise and increase ROI. Big data refers to the large amounts of information, both structured and unstructured, that flows into companies every day. The importance of big data is not only limited to the amount of information companies receive, but also how companies use this data to understand customer behaviour, needs, desires and transaction patterns in their purchasing decision making journey (Sudarsono, 2022).

By understanding the relationship between Big Data and digital business, companies can take proactive action to optimise the use of data to achieve their business goals. These steps include investing in Big Data technologies, improving data analysis skills, and integrating Big Data into overall digital business strategies. Through this approach, companies can become leaders in the ever-evolving digital era, gain competitive advantage, and meet increasingly complex market needs.

2. METHODS

A research method is a procedure that is prepared systematically with the aim of collecting data objectively, which can then be analysed, developed and proven correct. This aims to make a significant contribution in solving existing problems in a particular field of knowledge or practice (Mulyani, 2021). This research uses a qualitative approach. Qualitative research is a research method carried out in a real life environment with the aim of investigating and

understanding phenomena that occur, why these phenomena occur, and how these phenomena occur. In other words, qualitative research is based on an exploratory concept that involves in-depth and case-oriented study or a number of cases, including single cases (Muhammad Rijal Fadli, 2021). Literature study is the method used in this research to investigate the relationship between Big Data and Digital Business. According to (Danial and Warsiah in Muhamad Zainal Abidin, 2021), literature study is a research method carried out by researchers by collecting various books, magazines and related scientific articles with specific issues and research objectives.

The aim of this method is to present a number of theories related to research issues as a basis for discussing research results. This method was chosen because it allows us to gain a comprehensive understanding of the topic by analysing and integrating findings from various relevant literature sources. The scope of this research includes an understanding of the concepts of Big Data and Digital Business and their impact on various aspects of business. The information sources used in this research include academic journals, books, and online sources such as official websites and news platforms that are leading in discussing the topic of Big Data and Digital Business.

3. RESULTS AND DISCUSSION

3.1. Big Data Concept

Big Data is a group of data that has a large volume or scale, consisting of data that has structure, semi-structure and no structure, which may increase over time (Mantik & Awaludin, n.d.). Meanwhile, according to (Fajriyah et al., 2022), Big Data refers to large and complex amounts of data that cannot be processed using database management software or traditional data processing applications.

According to Sharda (2018), Big Data has three characteristics known as the "Three V's":

1. Volume

Big Data refers to large amounts of data, where data size plays a key role. Identifying whether data can be categorised as Big Data depends on its volume. Therefore, volume is an important factor that must be considered in handling Big Data.

2. Velocity

Refers to data velocity, namely how quickly data is generated, processed, and analysed to meet certain needs. Apart from speed in data collection, data transfer is also important, especially in data transmission situations. With sufficient speed, Big Data can be received or used directly in real time.

3. Variety

Shows the various types of data owned by Big Data. Although traditional data tends to be more structured, the evolution of Big Data has brought a lot of new data in unstructured or semi-structured formats, such as text, audio, and video. These data require additional processing to reveal their meaning.

These three characteristics are conditions that must be met by Big Data. If one of these characteristics is not met, then the data set cannot be classified as Big Data. Apart from the Three V's, (Sharda, 2018) also explains several additional characteristics:

1. Veracity

Refers to the level of accuracy in data collection and how precise the data is. With a high level of accuracy, the decisions taken will be better and optimal. The level of accuracy of this data is very important in the context of its implementation in the business world.

2. Value Proposition

Data is considered to have value if the results of processing the data can help in making better decisions. These value characteristics are very useful in a business context.

3. Variability

In addition to increasing data speed and variety, data flows can become highly inconsistent at certain periods. Are there any significant trends on social media? Maybe a big event occurs that attracts attention. Variability in daily, seasonal and event-driven data loads can vary widely and is therefore challenging to manage, especially with social media engagement.

Sharda also lists five critical success factors in the Big Data concept, namely:

1. A Clear business need (alignment with the vision and the strategy)

Investment in Big Data Analytics must aim to improve business performance, not just advance technology alone. Therefore, the main impetus for implementing Big Data Analytics must come from business needs, both strategic, tactical and operational.

2. Strong committed sponsorship (executive champion).

The importance of having a strong and committed executive sponsor is obvious. Without this, success in implementing Big Data Analytics will be difficult (perhaps even impossible) to achieve. If the focus is only on one or a few analytical applications, sponsorship may come from the department level. However, if the goal is complete organisational transformation, as is often the case in Big Data initiatives, then sponsorship must come from the very top and permeate the entire organisation.

3. Alignment between the business and IT strategy

It is important to ensure that Big Data Analytics work always supports business strategy, not the other way around. Analytics must act as an effective tool in realising business strategies successfully.

4. A fact-based decision making culture

In this culture, decisions are based on factual data, not on intuition or assumptions alone. There is also a culture of experimentation to test the success of an action. To create a culture like this, senior management needs to realise that not everyone will or is able to adapt, be a vocal advocate, reinforce the importance of retiring outdated methods, understand the analytical methods used, and link incentives and compensation to desired behaviour.

5. A strong data infrastructure

Data Warehouse has become the basic infrastructure for data analysis. However, with the advent of the Big Data era, a data infrastructure that is stronger and can accommodate new technologies is needed. Success in this case requires good integration between old and new infrastructure to create a system that functions holistically.

3.2 Types of Big Data Analysis

1. Descriptive Analysis

This type provides a summary of previous data in an easy-to-read form. This data helps create reports and visualise information that can detail a company's profits and sales. Descriptive Analysis contains an explanation of what has happened over a certain period of time, for example reports of profits, sales, income, etc.

2. Diagnostic Analysis

This type focuses on analysing why something happens. Diagnostic Analytics takes more diverse input data to discover facts and create hypotheses. Here data recovery, data mining and tracing are carried out.

3. Predictive Analytics

Predictive Analysis is a type of data processing to predict what will happen in the near future, with machine learning intelligence (AI), and data mining, users can analyse data to predict customer trends and market trends.

4. Prescriptive Analytics

Prescriptive analytics combines information obtained from previous analyzes to provide suggestions or determine the next action to be taken. The process utilises machine learning and artificial intelligence technology.

3.3 Benefits of Big Data

The benefits of big data itself have many benefits and make it increasingly necessary for companies or individuals to find important information from this data. The company will make various efforts as best as possible to process the data obtained so that it can be useful in the future. The benefits of big data are as follows (Iqbal et al., 2020):

1. Field of Data Analysis

In the field of data analysis, big data has benefits in carrying out analysis carried out by a company or individual, especially for companies that provide platform services such as websites or applications. With a large collection of data, it can help companies find the causes of problems resulting from the failure of websites or applications that are built and launched.

2. Business Field

In the business sector, large-scale data can provide enormous benefits for companies, such as helping companies improve business operations, develop appropriate and appropriate CRM (Customer Relationship Management), and also improve the user experience of published applications with all its improvements.

3. Information Field

In the information field, big data has benefits in managing and providing the best social media, and can help many companies to find or obtain the appropriate data collection needed by the company.

Meanwhile, according to research by Kusumasari and Rafizan (2017), the government can utilise big data technology to speed up the implementation of policy making. Through the data available in the big data system, the government is actually empowering citizens to increase transparency and participation of all stakeholders. In order to make a decision, the government must take appropriate and effective steps, namely by managing the data into useful information for consideration in making decisions. Therefore, utilising media (big data) is the most effective and efficient way to filter the information that the government currently needs.

3.4 Big Data Challenges

In implementing Big Data technology in an organisation, there are 4 elements important challenges, namely (Aryasa, 2015):

1. Data
2. Technology
3. Process
4. Human Resources (HR)

Meanwhile, Connolly in Sirait (2016) identified seven drivers of big data in business:

1. The opportunity to discover new, innovative business models
2. The potential to gain new insight that drives excellence competitively.
3. The data stored and collected will grow exponentially
4. Data can be found anywhere in various formats
5. Traditional solutions are unable to keep up with new needs
6. System costs for data, as a percentage of IT spending will continue to grow
7. Cost advantages of common hardware and open source software

The current challenge faced, especially in the business world, is unstructured data analysis. Many companies explicitly focus on unstructured data analysis, namely the real-time type by streaming directly into analytical systems (Sensmeier, 2013). The company's focus on real-time data analysis is because companies or industries need data that is more relevant and reliable. As a result of the V characteristics of Big Data, it is very possible that there is data that is irrelevant or does not provide useful information, but contains more useful information. The data analysis process is the task of an analyst to process data in order to produce information that is easy to understand and more useful (Economics et al. 2020).

3.5 Application of Big Data in Various Sectors

Currently, big data implementation is being used in various business layers. Big data does not only focus on the size of the data, the data that will be carried out in the analysis stage must have criteria to help make decisions and also tactics in carrying out business processes (Mikalef et al., 2019). As time goes by, the implementation of big data does not only focus on the business sector but also spreads to other areas, as in the following example:

1. Tax

The application of big data in the tax sector is in terms of increasing state tax revenues. Public awareness of taxpayers is still low, which means the Director General of Taxes cannot meet the expected targets. By implementing and applying big data, the Director General of Taxes can make decisions from family tree data and then find out what items they own that have tax value.

2. Health Sector

In the health sector, big data is implemented based on existing problems, where every health centre clinic or even hospital has a system or uses different health applications, this causes the process of inputting data to the Health Service to be different depending on the type of application or website used. By implementing big data, all health information can be used as one door and centred on one database, making it easier to input data, process data and also carry out analysis about public health in Indonesia.

3. Agricultural Sector

Indonesia is a country with quite extensive agricultural land on the Asian continent, this makes Indonesia an agricultural country. In the agricultural sector, the application of big data that can be carried out is to carry out analysis of agriculture, where the results of this analysis are expected to improve the standard of living of farmers. In the agricultural sector, research can be carried out on existing data based on agricultural land by taking pictures that are

related to weather, soil quality and plant growth and so on. The results of this analysis can be used to help farmers increase agricultural productivity.

4. Transportation Sector

Big data can be applied to the transportation sector. Road traffic jams have become an inseparable thing in big cities in Indonesia today. With GPS data owned by public vehicles, it can be converted into speed, acceleration and also the duration of stops on the road. Apart from that, other conversions were also carried out. From this conversion data, it can be used to provide recommendations on when is the right time to travel and when to travel through busy roads.

5. Communication and Media Sector

In the communications and media sector, big data can play a role in creating detailed consumer profiles. This can be used to create content according to customer requests with different target audiences, recommend content according to demand and can measure content performance. One of the existing services is a video streaming service which obtains hundreds of millions of data from users and carries out analysis of that data. to provide good film recommendations for each individual.

6. Field of education

In the education sector, big data can be used in managing and scheduling classes in higher education. When students access the system, the system can collect progress data. Apart from that, it can also be measured according to the number of students, courses, student demographics, student aspirations and other variables.

7. Manufacturing and Natural Resources Sector

In the natural resources industry, big data will help in making predictions for modelling decision making based on data integration. This data can be in the form of geospatial data, graphics, text and temporal data. Big data can also be used to solve manufacturing problems, one example of which is product supply chain capabilities.

8. Business Fields with Location Intelligence

In the business sector, one application is to collect information about consumers with the aim of finding the best way to interact with customers. This can be called digital customer intelligence. The data collection will be analysed from consumer data to help and understand consumer needs and determine the right tactics to apply in business. Location intelligence is a platform that can be used to connect big data with machine learning which is able to provide information.

9. Banking and Finance Sector

In the banking and finance sector, big data can be used to monitor financial market conditions or activities. The use of network analytics can identify illegal trading activities in financial markets. The financial industry also relies on big data to carry out business risk analysis. This

can include money laundering, enterprise risk management, customer recognition and prosecuting financial fraud.

3.6 Application of Big Data in Business

1. Customer analysis

- a. Companies collect data from customer transactions, product choices, and customer online behaviour, then analyse the data using algorithms and special analysis techniques to find certain patterns and trends. The results of the analysis can then be used to improve the shopping experience and suggest products that customers might want to buy. By applying big data for analysis, companies can find out customer preferences and adjust marketing and sales strategies to suit customer needs. Apart from that, companies can also improve customer service by providing chatbot services or question and answer services that suit customer needs.
- b. Targeted Marketing, in targeted marketing practices, companies can collect data from social media, online advertisements, and websites, then analyse the data. The results of the analysis of this data can be used to determine the right target market and increase the effectiveness of advertising or marketing efforts carried out. By applying big data to carry out targeted marketing, companies can know the exact demographics, interests and behaviour of their target market, so they can create more relevant and effective advertising. Apart from that, companies can also increase the effectiveness of ads by choosing the right time to play ads or choosing the right platform to show ads.
- c. Production Optimization, by applying big data for production optimization, companies can identify weaknesses in the production process and take necessary corrective action. For example, companies can optimise production schedules by taking into account machine setup times, identifying damaged or overloaded machines before damage occurs, or looking for ways to reduce production time by using more efficient materials. Apart from that, companies can also use big data to optimise the use of raw materials and reduce waste by predicting raw material needs and adjusting production according to demand. In this way, companies can increase production efficiency, reduce production costs, and obtain greater profits

2. Sales Prediction

Data collected from previous sales, prices, promotions, and external factors such as weather and holidays can be used to predict future sales. By predicting future sales, companies can manage inventory and production more effectively. Apart from that, companies can also optimise promotions and marketing by choosing the right time and targeting the right market according to sales predictions. So, companies can increase revenue and reduce costs by utilising available data.

3. Risk Analysis

Risk analysis is the process of assessing business risks by utilising available data, such as financial, operational, and industry. Through big data, companies can find out risks that may occur in the future, assess these risks, and take necessary preventive actions.

In addition, companies can also use big data to assess investment risk by predicting the likelihood of investment success or failure based on historical data and external factors that influence investments. Thus, companies can make wise decisions and minimise business risks by utilising available data

4. Performance Monitoring

Through big data, companies can find out business performance in detail and take necessary corrective actions. For example, a company may identify financial problems such as low profit levels or high debt levels, identify operational problems such as low levels of productivity or customer satisfaction, or identify human resource problems such as high turnover rates.

5. Quality Improvement

Companies can collect and analyse data from customers' shopping experiences, products or services, and manufacturing processes to improve product and service quality. In addition, companies can also use big data to increase innovation by finding new ideas that suit customer needs or finding new ways to solve existing problems.

4. CONCLUSION

Big Data refers to large and complex data sets that cannot be easily processed using traditional data processing applications. It is characterised by the Three V's: Volume, Velocity, and Variety. Additionally, Big Data must also possess characteristics like Veracity, Value Proposition, and Variability to be considered as such.

Implementing Big Data comes with challenges such as managing the volume, variety, and velocity of data, as well as ensuring the veracity of the data collected. However, it offers various benefits, including improved data analysis, better decision-making, and the ability to discover new business models and insights.

Big Data is applied across various sectors, including taxation, healthcare, agriculture, transportation, education, manufacturing, banking, and finance. In business, Big Data is used for customer analysis, targeted marketing, production optimization, sales prediction, risk analysis, performance monitoring, and quality improvement.

5. ACKNOWLEDGMENT

The author is very grateful to all resources, both primary and secondary, which have provided insight and inspiration in writing this article. The author also wishes to state that the views and opinions expressed herein are entirely the responsibility of the author himself and do not represent the views of any organisation or institution.

The author would also like to thank the readers for their interest and time spent reading this article. Hopefully this article can be a valuable contribution in broadening horizons and triggering critical thinking regarding Big Data and Digital Business.

6. AUTHORS' NOTE

This article was prepared by the author with the aim of explaining the role played by Big Data in the rapidly developing digital business era. This article reviews the concept of Big Data and its impact on business strategy, decision making, and company competitiveness in the current digital era. The author hopes that this article can provide a deeper understanding of how effective data management can improve company performance and success in facing increasingly complex market challenges.

7. REFERENCES

- Abidin, M. Z. (2021). STUDI LITERATUR PENERAPAN MODEL PEMBELAJARAN KOOPERATIF UNTUK MENINGKATKAN KERJASAMA DALAM PERMAINAN HOKI. Universitas Pendidikan Indonesia.
- Andini, M. (2023). Filsafat Stoicisme dan Hubungan Manusia dengan Alam: Memahami Pandangan Stoic tentang Kehidupan dan Alam Semesta.
- Duha, T., Fajriyah, N., Setiawan, W., & Dewi, E. (2022). Implementasi Teknologi Big Data di Era Digital. *Jurnal Informatika*, 1(1), 1-7.
- Fadli, M. R. (2021). Memahami desain metode penelitian kualitatif. *Humanika, Kajian Ilmiah Mata Kuliah Umum*, 21(1), 33-54.
- Manshur, A. (2021). Satu data, big data dan analitika data: Urgensi pelembagaan, pembiasaan dan pembudayaan. *Bappenas Working Papers*, 4(1), 30-46.
- Mantik, H., & Awaludin, M. (n.d.). REVOLUSI INDUSTRI 4.0: BIG DATA, IMPLEMENTASI PADA BERBAGAI SEKTOR INDUSTRI (BAGIAN 2).
- Mayasari, E., & Agussalim, A. (2023). Literature Review: Big Data dan Data Analys pada Perusahaan. *Jurnal Ilmiah Sistem Informasi Dan Ilmu Komputer*, 3(3), 171-187.
- Mulyani, S. R. (2021). Metodologi Penelitian. *Widina Bhakti Persada*: Bandung.
- Pujianto, A., Mulyati, A., & Novaria, R. (2018). Pemanfaatan Big Data Dan Perlindungan Privasi Konsumen Di Era Ekonomi Digital. *Majalah Ilmiah BIJAK*, 15(2), 127-137.
- Rezaldi, A. P., Amarullah, R., & Aguspriyani, Y. (2024). ANALISIS JEJAK DIGITAL: MEMAHAMI PERAN BUKTI AUDIT DALAM ERA BIG DATA. *Musyteri: Neraca Manajemen, Akuntansi, dan Ekonomi*, 3(3), 91-100.
- Rohman, A., Asbari, M., & Rezza, D. (2024). Literasi digital: Revitalisasi inovasi teknologi. *Journal of Information Systems and Management (JISMA)*, 3(1), 6-9.
- Solihin, O. (2021). Implementasi big data pada sosial media sebagai strategi komunikasi krisis pemerintah. *Jurnal Common*, 5(1), 56-66.
- Sudarsono, S. (2022). SYSTEMATIC LITERATURE REVIEW: BIG DATA DAN ARTIFICIAL NEURAL NETWORKS DALAM KERANGKA STRATEGI DIGITAL MARKETING. *RADIAL: Jurnal Peradaban Sains, Rekayasa dan Teknologi*, 10(2), 275-291.
- Sharda, Ramesh. Delen, Dursun. Dan Turban, Efraim. 2018. *Business Intelligence, Analytics, And Data Science*. Global Edition. Pearson. United Kingdom
- Wali, Muhammad., et.all. (2023). *Pembangunan Berkelanjutan Era Industri 4.0 dan Society 5.0*. PT. Sonpedia Publishing Indonesia