

## **BIG DATA: AN INDISPENSABLE RESOURCE FOR BUSINESS MANAGEMENT IN NIGERIA**

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### **Abstract**

*Big Data opens up new business opportunities, and businesses can use it to gain a competitive advantage. New technologies are expected to be used in business management, particularly in data exchange, document recognition, communication and text recognition, receipt and payment transactions, and excel replacement. Big Data has evolved to account for the rapidly increasing quantities of digital information systems generated, the effort required to create information that can be analyzed, and the actual use of that data as capital to increase efficiency and improve business management decision-making. Against this backdrop, this research investigates the importance of Big Data in business management in Nigeria. In order to gather data for this study, relevant information was extracted from books, conference papers, public records, journals, and other sources. This study comes to the conclusion that efficient data use is becoming the foundation of competition; Big Data fundamentally alters how companies compete and function. Businesses in Nigeria that make the necessary investments and successfully extract value from their data will have a clear advantage over their rivals. Almost every aspect of business, from research and development to sales, marketing, and supply-chain management, including new growth opportunities, has the potential to be transformed by Big Data. The study among others recommends strategies to optimize the benefits of Big Data for business value in Nigeria. This study is significant because it investigates a problem in a largely unexplored area of research in Nigeria. As a result, this research adds to the body of knowledge on the role of Big Data in business management in Nigeria.*

**Keywords:** Big Data, business management, value chain, business digitalization

## Introduction

Big Data has impetuously penetrated almost every domain of human interest/action over the last two decades, and it has (more or less consciously) become a ubiquitous presence of day-to-day life. Individuals' general life values are supplemented by values that they exhibit in business and reflect on business processes within the organization. Individuals' work behaviors, attitudes, and perceptions are influenced by these values (Cuzzocrea, Song & Davis, 2011; Akbarzada, 2022). Big Data supports business activity by providing real-time alerts from smart meters, database events and log data, inconsistencies between consumption and billing, changes in consumption patterns compared to historical levels, and processes associated with investigating the level of security and questionable services (Erevelles, Fukawa & Swayne, 2016). Big Data is quickly becoming an indispensable resource for many organizations and has the potential to be a highly valuable resource for professional business management. In comparison to traditional analytical tools, the Big Data concept introduces changes in four dimensions: (1) data types, (2) data accumulation speed, (3) data volume, and (4) data quality. Since the introduction of the Web 2.0 environment, much of the valuable data for businesses has been generated outside of the organization, by consumers and general Web users (Iaragan, Zorzoliu & Gurgu, 2022).

Big Data sets' solution helps businesses better manage their high volume, high variety, and high speed data flows and transform this data into information that generates profits. The ability of cooperation, public-private partnerships, and coordination in the public sphere are crucial for a society to function well given the complexity of economic and social life in

market-economy states and the confluence of global effects like the pandemic and war (Ogrea, 2018). How we live, work, and think will change as a result of the Big Data revolution. But beyond Big Data, and what makes it more than just a buzzword, fueling its transformative power, are "Big Data analytics" - an application of advanced analytic techniques to Big Data sets (Russom, 2011), able to pave the way from insights to values in general, and business intelligence capable of shifting from Big Data to big impact (Chen, Chiang, & Storey, 2012), and by turning Big Data into big money (Ohlhorst, 2012). Big Data is considered to be a game-changer that has the potential to completely alter how businesses conduct themselves across a wide range of industries as a frontier for innovation, productivity, and competition (Lee, 2017).

In order to rewire your value creation processes, optimize your key business initiatives, and find new monetization opportunities, Schmarzo (2013) claims that Big Data is about leveraging the distinctive and actionable insights gained about your customers, products, and operations. In order to outperform their competitors, leading companies are increasingly turning to the use of Big Data. As a result, digital services and solutions are rapidly expanding in many facets of human society. The majority of scientific disciplines examine the potential of digital applications. These data are used by scientists to conduct research in fields such as biology, environmental protection, meteorology, and complex physical simulations (Leonard, 2014). Big Data provides us with fresh perspectives and tools for understanding the planet and tackling the monumental task of sustainable development with renewed vigor as a result of the digitalization process (Dumitru, 2022).

Big Data's potential for value creation is still in its infancy, but it already represents a paradigm shift that every company should take into account. The ever-growing popularity of social media in China makes it clear that it is important to comprehend how the vast amounts of data collected there can be used to boost business productivity and enhance customer service. Big Data has the potential to draw the attention of the academic and professional communities more in developed countries than in developing ones, with Nigeria being no exception. Big Data is an interdisciplinary topic. Furthermore, the practical implications of utilizing Big Data analytics to improve business intelligence are still comparatively understudied. The existing research on the use of Big Data for effective business management has primarily focused on the advantages and challenges of Big Data. This study examines the value of Big Data in business management to close this knowledge gap. In light of this, the following are the main issues that this study aims to resolve:

- i. What is the impact of Big Data on business management?
- ii. How can businesses in Nigeria through their management leverage on the potential of Big Data to their benefit?

## Research Methods

The research method is the process of looking for a thorough, clear, and comprehensive explanation of issues in light of the available data in order to advance current understanding. It might be necessary to employ more than one of the common types of investigation methods in a given research. The secondary method of data collection was employed in this study, and it involved extracting pertinent information from books, conference papers, public records, journals, and other sources. On the

other hand, the study adopted an exploratory research approach. This is due to the fact that it piques the researchers' interest and drives them to fully comprehend the subject. This makes it possible for the researchers to gather background data on the research.

## Review of Related Literature

In order to collect, host, and analyze the vast amounts of data gathered in order to derive real-time business insights relating to consumers, risk, profit, performance, productivity management, and enhanced shareholder value, we refer to this as "Big Data." Big Data refers to the dynamic, large and disparate volumes of data being created by people, tools, and machines (Wang & Alexander, 2015). Data generated from social media, data from internet-connected devices (such as smartphones and tablets), machine data, video and audio recordings, and the ongoing preservation and logging of structured and unstructured data are all examples of Big Data (Marshall, Mueck & Shockley, 2015). It is typically characterized by the five 'V's':

**Volume:** When compared to traditional data sources, the amount of data being created is enormous. Volume, or the initial size and quantity of data that is collected, can be thought of as the foundation of Big Data. Big Data can be used to describe a set of data that is sufficiently large. However, the definition of Big Data is subjective and subject to change depending on the market's supply of computing power (Gandomi & Haider, 2015). The following are some instances of the kinds of data that big businesses typically store:

1. Retailers: via loyalty cards being swiped at checkouts (details of all purchases made, when, where, how the customer paid, use of coupons) or via websites (every product the customer had looked at, every page

had visited, every product that had ever bought etc).

2. Social media (e.g. Facebook, Twitter): friends and contacts, postings made, location when postings were made, photographs, etc.
3. Mobile phone companies: numbers ranged, texts send (which can be automatically scanned for key words), every location the phone has ever been whilst switched on, browsing habits or voice mails.
4. Internet providers and browser providers: every site and every page visited, information about all downloads and all emails search terms which were entered.
5. Banking systems: every receipt, payment, credit card information (amount, date, retailer, location), location of ATM machines used (Kowalczyk & Buxmann, 2014).

**Variety:** Data is produced by both humans and machines and comes from a variety of sources. An organization may obtain data from a variety of sources, the value of which may vary. Data can originate both inside and outside of an organization. The standardization and distribution of all the data being gathered pose a challenge in terms of variety. Both unstructured and structured data can be collected. Structured data is information that is kept in a file of related records with defined fields (numerical, text, date, etc.) and frequently with defined lengths. In order to store, process, and access structured data, a model of the types and formats of business data that will be recorded is necessary. The term for this is a data model. The model's design establishes and places restrictions on the data that can be gathered, stored, and processed (Jiwat, Changyu & Andy, 2016).

Banking systems are an example of structured data because they keep track of current account receipts and payments, including the date, amount, and brief justifications like payee or source of funds. Well-known database structured query languages make access to structured data simple. Unstructured data is information without a pre-established data model. It comes in all different sizes and shapes, and because of this variety and irregularity, it is challenging to store it in a way that will enable analysis, searching, or other uses. 80% of business data, which can be found in unstructured formats such as word processor documents, spreadsheets, PowerPoint presentations, audio, video, social media interactions, and map data, is a frequently cited statistics (Jiwat et al., 2016).

**Velocity:** Rapid data generation occurs all the time, even while people are sleeping. It describes the rate at which data is created and transferred. For businesses that need their data to move quickly so that it is available when needed to make the best business decisions, this is a crucial factor. A Big Data-using organization will have a significant and ongoing flow of data being produced and sent to its final destination. Data may come from devices, networks, mobile devices, or social media. This information must be quickly processed and analyzed, sometimes in close to real time. As an illustration, there are numerous medical devices created today to monitor patients and gather data in the healthcare industry. The collected data must be quickly sent to its destination and analyzed, whether it comes from wearable technology or medical equipment used in hospitals (Jiwat et al., 2016).

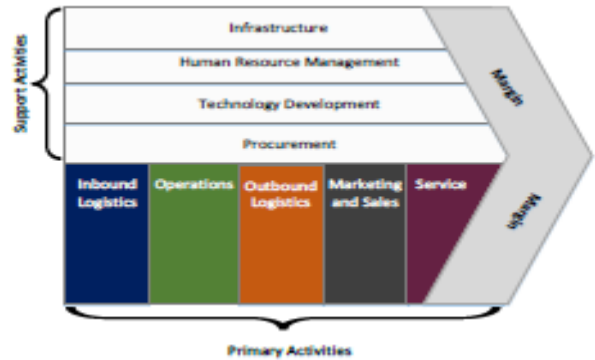
**Veracity:** Because Big Data comes from so many different sources, its quality and veracity must be verified. The gathered

information might be incomplete, inaccurate, or unable to offer any useful, insightful information. Veracity, in general, refers to the degree of confidence in the data that has been gathered. Data can occasionally become disorganized and challenging to use. If the data is incomplete, a large amount of data may produce more confusion than insights. For instance, in the medical field, if information regarding the medications a patient is taking is insufficient, the patient's life may be in danger (Jiwat et al., 2016).

**Value:** Value is the fifth and final V in the Big Data acronym. This is a reference to the benefits that Big Data can offer, and it has a direct bearing on what businesses can do with the information they gather. It is necessary to be able to extract value from Big Data because the value of Big Data greatly depends on the insights that can be obtained from them. While businesses can use the same Big Data tools to collect and analyze data, how they use that data should be specific to their organization (Jiwat et al., 2016).

### The Big Data Value Chain

The value chain concept was first introduced by Porter (1985) as a general framework for strategically considering the activities in any business and evaluating their relative costs and roles in differentiation. The value chain is built around a number of key processes that deal with the conversion of raw materials into finished goods or services, as well as with marketing, sales, and customer service. Firm infrastructure, human resource management, technology development, and procurement are examples of support activities. A visualization of the value chain is shown in Fig. 1.



**Fig. 1:** Porter's value chain model  
**Source:** Porter, 1985

By creating a unique value chain for data, Miller and Mork (2013) applied Porter's value chain to Big Data. Data discovery, data integration, and data exploitation were listed as the three main activities in their framework, which was focused on the fundamental tasks. The following tasks are part of the data discovery phase:

1. **Collect and annotate:** Create an inventory of data sources and the meta data that describe them.
2. **Prepare:** Enable access to sources and set up access-control rules.
3. **Organize:** Identify syntax, structure and semantics for each data source. The data integration phase has one activity:
4. **Integrate:** Establish a common data representation of the data, Maintain data provenance. The data exploitation phase has three activities:
5. **Analyze:** Analyze integrated data.
6. **Visualize:** Present analytic results to decision makers as an interactive application that supports exploration and refinement.
7. **Make decisions:** Determine what actions (if any) to take based on the interpreted results.

### **Big Data Business Opportunities**

The value chain mentioned above is closely related to revenue opportunities. The value chain can be broken down into individual units that can be carried out either internally or by external partners. An open data value chain model, according to Lee (2017), distinguishes between five actors:

1. Suppliers - Organizations that publish their data via an open interface, letting others use and reuse them.
2. Aggregators - Organizations that collect aggregated open data and sometimes other proprietary data, typically on a particular theme, and find correlations, identify efficiencies, or visualize complex relationships.
3. Developers - Organizations and software entrepreneurs that design, build, and sell web-based, tablet, or Smartphone applications for individual consumption.
4. Enrichers – Organizations - typically larger, established businesses - that use open data to enhance their existing products and services through better insights.
5. Enablers - Organizations that facilitate the supply or use of open data, such as the AppsForX competition initiatives.

Without a doubt, the Big Data revolution has greatly benefited both businesses and consumers, but there are also risks associated with using Big Data. Whether data sets are large or small, the need to secure sensitive information, safeguard private information, and manage data quality still exists. Big Data's unique characteristics, such as its volume, variety, velocity, veracity, and value, however, create new kinds of risks that call for a thorough strategy in order to allow a business to use

Big Data while avoiding the pitfalls. Prioritizing this will help businesses begin to reap the rewards of Big Data while also managing the risks (Rusu, Hurloiu, Hurloiu & Geamănu, 2022). Big Data efficiently overcomes historical limitations and creates new opportunities for data ingest, storage, and processing from sources like market data, communications, and customer engagement through digital channels. More than 80% of the data in organizations, according to some estimates, is unstructured and unsuitable for conventional processing. Big Data will make it possible to process this unstructured data, leading to increased system intelligence and improved system performance that can be used to boost sales performance, better understand customer needs, strengthen the internal risk management function, support marketing initiatives, and improve fraud monitoring (Mayer-Schönberger & Cukier, 2013).

According to Rusu et al. (2022), Big Data capability enables businesses to quickly and easily combine numerous data sources with little effort. When coupled with lower storage per gigabyte costs, this makes it possible for businesses to run consolidated analytics and reporting on customer data that has been moved from various separate business departments into a single infrastructure, for example, to create a holistic view of their customers. Big Data technologies free businesses from the traditional accuracy vs. cost dilemma by allowing them to store data at the most basic level of detail while maintaining all previous data at a reasonable cost and with the least amount of work. Big Data does, however, present a number of risk issues. The storage and retention of large amounts of data, data ownership and quality, information security, reputational risks, and various regulatory requirements, including privacy concerns, are all common sources of

risk. The following are the main dangers of using Big Data:

1. **Cost:** It is expensive to establish the hardware and analytical software needed, though these costs are continually falling.
2. **Regulation:** Some countries and cultures worry about the amount of information that is being collected and have passed laws governing its collection, storage and use. Breaking a law can have serious reputational and punitive consequences.
3. **Loss and theft of data:** Apart from the consequences arising from regulatory breaches as mentioned above, companies might find

themselves open to civil legal action if data were stolen and individuals suffered as a consequence.

4. **Incorrect data (veracity):** If the data held is incorrect or out of date incorrect conclusions are likely. Even if the data is correct, some correlations might be spurious leading to false positive results.

Effectively managing these risks will require companies to revisit governance structures and frameworks in order to allow for the effective and timely identification and assessment of risks in order to make informed risk/reward decisions.

**Table 1: Typology of the Big Data Business Model**

Type	Examples of functions	Dependencies
Data users	Using data to inform strategic decisions; data development in products	Depends on providers for raw data and facilitators for infrastructure and skills
Data providers	Collection of primary data; aggregation and packaging of data for sale	It depends on facilitators for infrastructure and skills and on users both as clients and as data sources
Data facilitators	Providing infrastructure; consultancy; outsourced analysis	It depends on the users and suppliers as customers

**Source:** Iaragan et al., 2022

By integrating Big Data in a way that enables in-the-moment analysis and comparison, businesses in Nigeria will give their staff the resources they need to spot fraud more quickly, safeguarding infrastructure and revenue. The fear that people might lose their jobs as a result of the

increased use of technology is common. To meet the challenges of the 21st century, Nigeria must alter its current development paradigm. This is because we are currently experiencing a period of globalization, rising inequality, and escalating environmental issues.

**Table 2: Advantages and Disadvantages of using BIG DATA in Business**

ADVANTAGES	DISADVANTAGES
cloud-based solution related to data storage and transmission	increased education in technology and analytical methods
large data solution focused on control and monitoring	mandating the provision of the data standard
solution for supply chain and risk management systems	changes in the timing and frequency of checks
smart grid and power system solution	
re-examination of concepts such as materiality and independence	

**Source:** Iaragan et al., 2022

Big Data has drawn a lot of attention recently due to its potential to generate business value. Enterprises can use advanced analytics to analyze Big Data to learn about both the current state of the business and constantly changing processes like consumer behavior (Russom, 2011). Big Data analytics is anticipated to address a variety of issues that businesses are currently facing. However, according to Schmarzo (2013), some specific Big Data value chain activities may present business opportunities.

- a. **Raw Data Production:** Different types of sensors can generate raw data. A sensor is a device that generates data in this context. In addition to measuring physical properties like blood pressure, temperature, weight, and humidity, sensors can also be cameras or sound recorders. Platforms for sensors can be created and sold. The sensor data itself can either be made available as open data or sold.
- b. **Building Collaborative Networks of Businesses:** As never before, networks are combining their

business knowledge, exchanging experiences, and learning from one another. This is a chance for co-creating business value and 2.0., collaboration among other things.

- c. **Technological Development:** Big Data management software can be created internally or purchased from third parties. A potential niche is software development. Software developers now have the opportunity to create software for a variety of applications, including data acquisition, data transformation, data analysis, and visualization.
- d. **Mining Data:** Raw data can also be mined from the Internet. One helpful source of such information is social media, where users post information relevant to their own situations. Crawling websites and using the APIs of social media platforms are two methods for gathering data (Application Programming Interfaces).
- e. **Infrastructure:** Businesses that provide network infrastructure and



cloud computing can benefit from Big Data (both processing and storage).

- f. **Human Resource and Knowledge Management:** Specialists in this field can find work because smaller businesses frequently lack specialized expertise in human relations management. The individual organizational members' knowledge that is relevant to the development of a value chain may be included in the organizational knowledge base.
- g. **Procurement:** Businesses with specialized expertise in contract law and intellectual property rights can benefit from procurement.
- h. **Analyze Data:** The application of data analytics can result in business value. Based on past and present data, analytics can be used for diagnosis, forecasting, and trend discovery.
- i. **Store Data:** The raw data must be saved before being transformed. The company may use its own storage or rent it from service providers to store data in the cloud.
- j. **Sell Results:** Results may be sold to clients directly or via brokers or portals. Using CRM (Customer Relationship Management) 2.0 and gaining benefits from web 2.0 channels, social media strategies, and social media marketing to listen to, analyze, publish, and engage potential customers across networks can be an effective strategy.

### **The Role of Big Data in Enhancing Business Value via Business Intelligence**

If used properly, Big Data analytics can help businesses better utilize Big Data for managing supply chain risk, increasing customer satisfaction, generating competitive intelligence, offering business real-time insights to help make crucial decisions, and optimizing pricing (Davenport, 2014; Narayanan, 2014; Erevelles et al., 2015; Wang & Alexander, 2015). An investigation found that a retailer with the right Big Data skills could increase operating margins by 60% by outpacing competitors and utilizing the detailed consumer data (Tankard, 2012). Big Data analytics generally has five main advantages. By facilitating easier access to relevant data, it first increases visibility. By gathering precise performance data, it facilitates performance enhancement and variability exposure. Thirdly, by segmenting the population, it helps to better meet the actual needs of customers. Fourth, it adds worthwhile insights to the automated algorithms' decision-making. Fifth, it produces fresh business ideas, concepts, goods, and services (Marshall, Mueck & Shockley, 2015). The development of new management principles, the economy built on these principles, and knowledge creation are some of the most significant applications of Big Data analytics, according to Ahmad and Quadri (2015) and Wang and Alexander (2015).

Big Data analytics can enhance the management of the supply chain in a number of ways, including supply chain effectiveness, planning, risk management, inventory control, market intelligence, and real-time personalized service (Wang & Alexander, 2015). Big Data can also help the supply chain to understand how various sub-firms can work together to optimize the operation process in a way that is both

efficient and innovative for the development of new products and services. The decision-making processes may benefit from the use of Big Data analytics (Kocielniaka & Puto, 2015). An improved understanding of the various decision contexts and necessary information processing mechanisms is the foundation for the efficient use of Big Data. Companies that want to use Big Data analytics for decision-making should place a high value on lowering ambiguity and data variety.

The effective use of Big Data in decision making can be improved by collaboration between decision makers and data analysts, but the decision processes should be carefully managed to minimize any potential understanding gaps (Kowalczyk & Buxmann, 2014). It's critical to create appropriate and effective analytical techniques in order to take advantage of the enormous amount of heterogeneous data present in unstructured text, audio, and video formats (which make up 95% of Big Data). Utilizing new tools to perform predictive analytics on structured Big Data is also important in the meantime (Gandomi & Haider, 2015).

### **Conclusion and Recommendations**

For businesses, Big Data presents both opportunities and difficulties. Big Data must be processed and analyzed quickly in order to be valuable, and the outcomes must be made accessible in a way that can lead to positive change or have an impact on business decisions. An organization's effectiveness also depends on having the ideal blend of personnel, procedures, and technology. By transforming information into intelligence, Big Data empowers organizations to meet stakeholder reporting requirements, manage massive data volumes, gain competitive advantages, manage risk, enhance controls, and

ultimately improve organizational performance. In conclusion, efficient data use is becoming the cornerstone of competition. Big Data fundamentally alters how companies compete and function. Businesses in Nigeria that make the necessary investments and successfully extract value from their data will have a clear advantage over their rivals.

Almost every aspect of business, from R&D to sales, marketing, and supply-chain management, including new growth opportunities, has the potential to be transformed by Big Data. One of the main applications of Big Data analytics is to improve decision-making capabilities, understanding of customer needs, faster decision-making, developing strategies for launching new products and services, improving inventory turnovers, exploring new markets, enhancing staff productivity and efficiency, and reducing customer complaints. Big Data offers a variety of opportunities to increase business value and productivity.

For businesses, Big Data presents both opportunities and difficulties. Big Data must be processed and analyzed quickly in order to be valuable, and the outcomes must be made accessible in a way that can lead to positive change or have an impact on business decisions. An organization's effectiveness also depends on having the ideal blend of personnel, procedures, and technology. Organizations will gradually become much more data-driven in their decision-making, product and service development, and interactions with stakeholders at all levels. The ability to innovate in ways that are challenging to replicate is often granted to organizations that act quickly to take advantage of the potential of Big Data. The study makes the following recommendations going forward:

1. Organizations in Nigeria should step up their efforts to embrace the Big Data value chain in order to achieve modest success and move their cutting-edge customers into large-scale production.
2. Small and medium-sized businesses in Nigeria should integrate Big Data platforms into their operations to increase their source of competitive advantage.
3. Nigerian supply-chain industries and sales agents should strive to use Big Data to improve their efficiency and business management decision-making.

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