Data Excellence: Building Organizational Dexterity through Big Data and Data Quality

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Abstract
Study design/ Methodology: In today's rapidly evolving digital landscape, the convergence of organizational dexterity and data quality has become paramount for organizations seeking to thrive amid the data revolution and navigate the complex web of opportunities and problems generated by data. This paper explores the essential intersection of data excellence, showing how organizational dexterity and well-informed decision-making are based on the synergy of big data and data quality. This paper has been divided into three fundamental elements, starting with the vast field of big data and its capacity to reveal revolutionary discoveries. Next, we move on to the idea of organizational dexterity, or the capacity of an organization to quickly adjust to changing conditions, data quality, which is the keystone that guarantees the accuracy and dependability of insights obtained from big data analytics, and obstacles that organizations encounter in preserving data of superior quality, then integrating contemporary research through the practical advantages of combining organizational dexterity, data quality, and Big Data analytics are highlighted via case studies and real-world examples. All these points were obtained through a review of the literature and articles from global databases. Findings: This paper emphasizes the necessity of data excellence as a critical strategic initiative by coordinating big data endeavors with organizational dexterity and dedication to data integrity. In conclusion, organizations should prioritize data quality through governance, cleansing, and validation and foster a data-driven culture with training and leadership to enhance decision-making. Since developing agility within organizations is crucial for adapting to market changes, companies can not only prosper in the digital environment, but also foster an environment of perpetual innovation and achievements.
Keywords: Organizational Dexterity, Big Data, Data Quality

Introduction
An organization's data is one of the most significant assets in the digital era, and the management of this data is crucial to the organization's expansion (Martin et al., 2020). Data are now ubiquitous in commercial, political, academic and everywhere due to the advent of the digital age, over the past 40 years, computing has seen a dramatic transformation. In the

1980s, centralized data centers were focused on business and collected data by 2000, however, data centers had expanded their capabilities to include data management and individual users were increasingly able to access private computers and the World Wide Web, the amount of data that is gathered and made available has significantly increased since 2000 as a result of data centers' expansion into cloud computing and the internet's continued growth (Reinsel et al., 2017).

Data within organizations grows enormously, which required researchers to develop new and innovative techniques to find information and develop solutions to organizational problems. This has led to new progress in storing and analyzing data, which is called big data, which the McKinsey Global Institute defines as a collection of data, its size exceeds the ability of traditional database tools to capture, store, manage and analyze it and this data is generated through the increasing use of digital devices, tools and platforms supported by the internet. All of these digital activities in their aggregate constitute the largest part of big data, which represents a new digital breakthrough in the field of data analysis data and decision support.

The tremendous expansion of data in practically every industry and business area in recent years can be attributed to the quick development of the Internet, Internet of Things and Cloud Computing, Big data is becoming a trendy topic that is being actively pursued by governments, businesses and academic institutions worldwide (Jin et al., 2015).

Big data is an emerging field that contains many challenges related to information technology, such as collecting, storing, searching, quality, structuring and visualizing data, the real challenge faced by various institutions is to find ways to benefit from it and provide better services to their customers (Garoufallou, 2020).

As a result of the rapid and successive changes and the intensity of competition, organizations in all their forms and with their various activities seek to achieve excellence by balancing exploratory and exploitative activities to achieve organizational dexterity, this can be achieved through organizations adopting the concept of big data, especially in light of technological developments and the rise of the information revolution via mobile phones, cloud computing and the Internet of Things in order to adapt to the changes occurring in the business environment.

A company's ability to discover and capitalize on the distinctive talents, skills and abilities of its workforce in a way that improves its competitiveness in both new and modern markets is referred to as organizational dexterity (Tushman et al., 2013). Data quality directly affects a company's decision making, operational efficiency and customer satisfaction, which in turn affects the achievement of organizational dexterity (O'Cass et al., 2014). Today 's businesses generate valuable data that can be mined and processed to enhance the effectiveness and quality of business processes, process mining and analysis of high-quality data can assist businesses in making decisions that will maximize their business, but in order to do so, the quality of the data must adhere to certain standards (Dogan & Gurcan, 2018). This means that quality improvement techniques must be used to address data quality issues to ensure the reliability of the information obtained from the data analysis (Van der Aalst et al., 2011).

The synergy between big data, data quality and organizational dexterity forms the foundation for sustainable competitive advantage in today's fast-paced business environment by harnessing the power of data while maintaining a focus on quality and agility, organizations can position themselves for long-term success and resilience in an increasingly data-driven world.

Understanding Big Data

Big data has become an important and necessary resource for competition, as it is classified among the most important business items in many organizations, due to the spread of data and information very rapidly and its availability in different forms and patterns, which has made it have a major role in making many decisions and drawing up plans and policies (Al-Salmi , 2018).

It is not just about the massive number of data; it is also about diversity, speed, and complexity, this demonstrates the necessity of information technology and superior methods for handling, processing and managing it. Big data is defined as "information assets" of such high volume, speed and diversity that they need high-quality technologies to process them in order to enhance vision and decision-making" according to (Bin Al-Tayeb & Al-Riaei, 2019).
The four key components of big data are volume, velocity, diversity and veracity (Schroeck et al., 2012). Volume describes how much data there is, but velocity describes how much data is moving and more precisely, how quickly it is created, processed and sent. Managing the complexity and heterogeneity of various data sources, such as structured, semi-structured and unstructured data, is referred to as variety. Lastly, the term "veracity" describes the degree of uncertainty in the data as well as the dependability and quality of particular data kinds (De Mauro et al., 2016).

Big data comes from both older, established transaction systems and more recent ones, including emails, phone conversations, online activities, social media, news media, sensor records and videos, to name a few (Zhang, Yang, & Appelbaum, 2015; Vasarhelyi et al., 2015). Large amounts of structured and unstructured data are constantly being gathered by organizations from a variety of sources, including social media, the Internet of Things, sensors, clickstreams and transactions (Ghavami, 2020).

Numerous techniques for examining enormous amounts of knowledge, data, and information both structured and unstructured are referred to as "big data techniques" which used for big data analytics, these techniques are applied to confidentiality, data transfer, storage, analysis and search (Xu, Xu, & Li, 2018). The emergence of big data analytics has made it possible to manage big data efficiently and effectively and it has become an essential source for decision-making, as it can be said that the success or failure of a decision depends on the good organization and investment of data (Fattouh, 2017).

Big data analytics makes it easier to comprehend customer behavior, preferences and demands in the context of marketing, this knowledge is essential for developing tailored marketing efforts that appeal to certain customers, for example, big data analysis has been crucial in the energy sector in modernizing and changing marketing techniques, allowing power companies to provide value-added services by providing individualized and unique offerings (Wang et al., 2022).

Big data is being used in business sectors to improve decision-making, speed up decision-making, comprehend customer needs, create policies for introducing new goods and services, find new markets, increase staff productivity and efficiency, improve inventory turnover, lower customer complaints and discover new markets (Ram, Zhang & Koronios, 2016; Appelbaum, Kogan, Vasarhelyi, 2017).

Also Big data is being used in business in a variety of sectors, including social media, so businesses all over the world are processing heterogeneous data types from social media using big data analytics in an effort to boost revenue and performance and this trend highlights how big data can lead to a revolutionary shift in business marketing, research, and invention (Alsghaier et al., 2017).

Businesses face many obstacles when using big data, including worries about data privacy, the requirement for sophisticated analytical skills, and the possibility of inaccurate data. However, despite these difficulties, big data has the unquestionable potential to revolutionize marketing practices, for example, as long as companies continue to use big data effectively, they will be able to achieve unprecedented levels of efficiency, customer engagement, and market competitiveness (Okorie et al., 2024).

Businesses can use big data analytics to find patterns, trends, and correlations in these enormous datasets, which helps them make better decisions, this analytical capacity is especially important in the business world, where data-driven choices can have a big impact on competitiveness and market positioning (Neves & Bernardino, 2021).

An inadequate management of the data can raise the likelihood of making poor decisions, which could lead to financial losses. Event logs provide information gathered from various information technology platforms used by these businesses during process executions, the actions, events, case ID at the start and conclusion of each event are all contained in the event log (Martin et al., 2020).

In summary, Big data refers to vast volumes of structured and unstructured data that organizations collect from various sources. Its importance lies in the potential to extract valuable insights and patterns that traditional data processing methods cannot handle, but by analyzing big data, businesses can make data-driven decisions, improve operational efficiency, enhance customer experiences and innovate product offerings. The benefits include gaining competitive advantages, predicting market trends, and fostering growth through informed strategies and targeted actions.

Figure (1) illustrate the evolution and growing importance of big data over time provides valuable insights into the historical trajectory of big data, illustrating how its relevance and utilization have expanded over time.
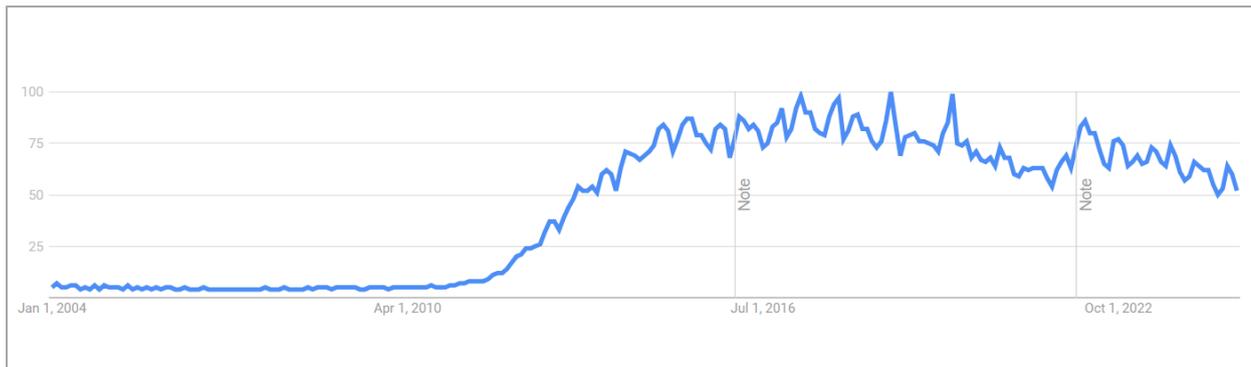
Figure 1: Using Big Data from 2004 – present (2024)
Source: Google Trends
https://trends.google.com/trends/explore?date=all&q=big%20data&hl=en

Organizational Dexterity

One of the most significant topics that has piqued the interest of researchers studying organizations is organizational dexterity, because of the complexity and rapid pace of change that many businesses encounter in developing goods and services demands organizational skill (Tempelaar et al., 2009). Dexterity refers to the integration of both radical, novelty-oriented innovation techniques like exploitation and exploration with incremental, more efficiency-oriented innovation practices, for both short-term success and long-term survival (Jurksiene & Pundziene, 2016).

Organizational Dexterity defined as the organization's exploitation of its available resources and the discovery of external opportunities in a way that enables it to achieve creativity and distinguish itself from competing organizations (Mardi et al. , 2018), or the ability of an organization to simultaneously explore and exploit its internal and external resources to meet current business needs and be flexible enough to adjust to changes in the market in the future is known as organizational dexterity (Raisch & Birkinshaw 2008; O'Reilly & Tushman 2013; Turner, Swart, & Maylor 2013).

O'Reilly and Tushman (2013) defined organizational dexterity as an organization's capacity to both explore and exploit in order to compete in both established markets and technologies that value efficiency, control and incremental improvement as well as emerging ones that require flexibility, autonomy and experimentation. Because it consistently strikes a balance between exploitative and exploratory activities, organizational dexterity is extremely important in enabling a company attain greatness and success over time which organizational performance indicators are typically connected to organizational dexterity (Husain & Al-Ane, 2018).

In order to succeed in the long run, organizations must be able to explore new opportunities outside of their present boundaries while still making effective use of their current resources and capabilities and this is where organizational dexterity comes in (Silva et al. ,2021). Efficiency and the capacity to direct the production process are measured through it and as technological competition increases, it seeks constant development (Tushman et al., 2013). Opinions regarding the dimensions of organizational dexterity have differed in how much emphasis they place on certain dimensions over others, according to Rodriguez (2014), there are several dimensions of organizational dexterity that successful organizations rely on to

accomplish their tasks and set themselves apart from other organizations, such as exploration and exploitation.

Exploitation
Companies aiming at exploitation seek to achieve the best possible dexterity by focusing on production and processes and cutting costs, exploitation is defined as the use of activities that achieve dexterity, this behavior focuses on operations and reduces cost and quality to improve performance (Miles & Darroch, 2006).

Exploitation is defined as the process of continuously improving current goods and services through incremental innovation. Businesses engage in exploitation activities to adapt their routines, goods and technology to meet market demands with small changes (Kohtamäki et al., 2010). Instead of developing a large body of knowledge across a variety of subjects, exploration and exploitation concentrate on producing substantial understanding in a small number of domains. Organizations use their acute and continuously honed market expertise through centralization and progressively standardized, codified procedures and duties, which organizational features of exploitation include low risk and high staff commitment to achieving short-term goals (Ireland & Webb, 2009).

Exploration
Businesses use exploration tactics to find untapped market prospects, pinpoint client demands, or generate new demand by projecting future wants (O'Cass et al., 2014), exploration is focused on innovation techniques, goods and technology, encompasses untapped talents and the hunt for new information because it enables businesses to generate and gain knowledge and information from any angle of the organization's surroundings (Jurksiene & Pundziene, 2016). According to Wolf et al. (2010), exploration is the process of concentrating on product innovation and growth in order to ensure future effectiveness and the organizations that pursue this goal seek to create flexibility by providing an open door to experiential learning and direct instruction (Gibson, 2004).

In summary, organizational dexterity is the agile capability of a company to swiftly adapt to changes in its environment, industry trends and customer needs. It allows organizations to proactively respond to challenges, seize opportunities and stay ahead of competitors, this adaptability fosters innovation, enhances operational efficiency and improves overall performance. By cultivating organizational dexterity, businesses can navigate uncertainties with ease, maintain relevance in dynamic markets and foster a culture of continuous improvement. Ultimately, this flexibility enables companies to sustain long-term growth and achieve strategic objectives effectively.

Data Quality as the Foundation
One of an organization's most significant assets nowadays is data (Zhang, 2020), because data is thought to benefit the organization in the future, it is referred to be "a new oil" (Irawan, 2021). Fundamentally, data quality is defined as the extent to which the relevant data meets the specifications, is error-free and is appropriate for the intended use, data quality is typically assessed using a number of criteria, which may vary in the relative weights assigned based on factors such as the target audience, stakeholders, or the specific data being used (Hassenstein & Vanella, 2022).

High-quality data is that which can help users achieve their objectives and meet their expectations, all organizations and businesses but particularly those that are digitally transforming and innovating need high-quality data (Indriany, 2021). The satisfaction level of data users, which reflects all kinds of objects that data users expect, can be expressed as the fulfillment of data quality, businesses with high-quality data will gain a positive reputation among clients and even rivals because data is so widely used, research on data quality will always be interesting (Mulyadi, 2023).

It is vital to measure data quality in the systems used by the organizations and pay attention to data quality, which at the very least includes accuracy, completeness, consistency, reasonability, timeliness, uniqueness and validity, data is a critical asset in an organization and policies require data quality improvement (Menteri & Keuangan, 2021).These qualities of high-quality data increase corporate value and lower risks, practices that guarantee data complies with quality standards at every stage of its lifecycle from creation, acquisition and storage to processing, dissemination and archiving are referred to as data quality management. It establishes criteria for data quality through monitoring, measurement, problem-solving and improvement projects (Wende & Otto, 2007). The level of data quality directly impacts the reliability, validity of decision-making, operational efficiency and customer satisfaction (Vuckovic et al., 2023).

Several data problems may arise along the data life cycle which effect to quality of the data, for example: A few real-world instances of data quality problems from an open source dataset are multiple instances of the same person, differences in date formatting, variations in a condition's spelling, or missing numbers (Sadiq & Indulska, 2017), Then, improperly prepared data for reuse could make data linkage and processing more difficult. This is particularly true for quickly and widely available data from the world wide webpages, which could result in inadequate data quality control involving incorrect data, missing data, compatibility problems, or poor data structure (Sadiq & Indulska, 2017).

If sound governance and prudent management are lacking, poor quality data might mask true insights and lead to business strategy errors. Poor data quality costs organizations an astounding $15 million or more a year on average, in addition, the poor quality of this data results in poor business decisions and significant regulatory concerns that have resulted in millions of dollars in fines (Wang et al., 2022). Low-quality data can lead to deadly errors for businesses or organizations (Pradhan,2023), This results in poor decision-making, a detrimental effect on service performance and losses for the company as a result of resource waste (Buelvas et al., 2021).

Organizations may face several data quality problems, including:
1. Inaccurate Data: Data that is incorrect, outdated, or contains errors can lead to flawed analysis and decision-making.
2. Incomplete Data: Missing or partial information creates gaps, hindering comprehensive insights.
3. Inconsistent Data: Variations across sources or formats lead to discrepancies and complicate integration.
4. Duplicate Data: Redundant entries skew results and waste processing resources.

5. Data Bias: Influences like biased sampling or collection methods yield misleading or discriminatory outcomes.
6. Poor Data Governance: Lack of proper data governance practices, including data management policies, standards and controls can result in data quality issues.

In summary, data quality is crucial for ensuring accuracy, reliability, and usefulness of information within organizations. High-quality data enables informed decision-making, enhances operational efficiency and supports strategic initiatives by maintaining clean and reliable data, businesses can minimize errors, improve productivity and gain deeper insights into customer behavior and market trends, ultimately driving competitive advantage and sustainable growth.

Figure (2) illustrate signify changes in data quality and gradual increase, with a few significant spikes and troughs, indicating rising interest and improved data quality over time.
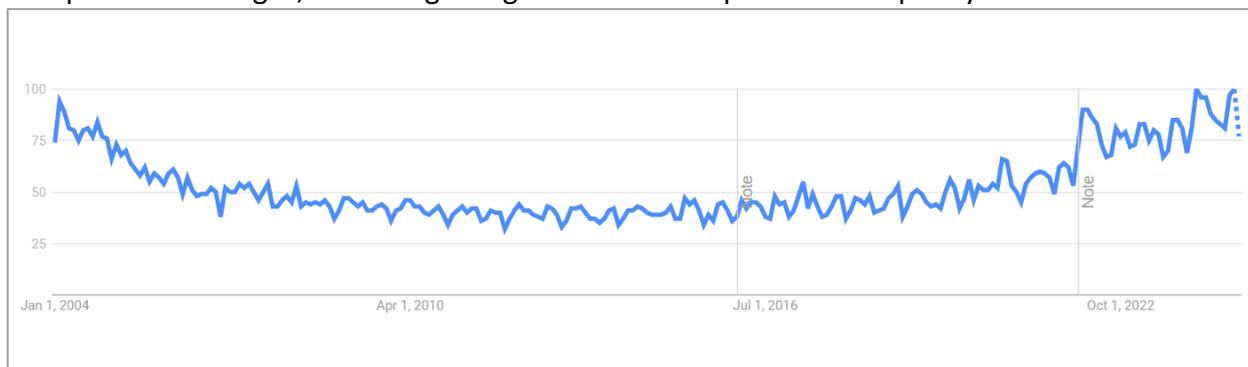

Figure 2: Using Data Quality from 2004 – present (2024)
Source: Google Trends.
https://trends.google.com/trends/explore?date=all&q=Data%20Quality&hl=en

Integrating Contemporary Research in Organizational Dexterity, Big Data and Data Quality
The banking sector is one of the most important and most invested sectors in the field of big data and its analytics, due to its importance in improving internal operations, obtaining a better understanding of many aspects related to customers, meeting their needs effectively and marketing the changing services that have resulted from successive technological developments in the business environment (Liu et al., 2020).

In a study for Morshadul et al. (2021) , he says that big data has significant impacts on different dimensions of banking operations and data mining technology has broad market prospects in decision support, and can be used for business management applications such as banking database marketing, retail customers, customer background analysis, customer credit history, and customer discovery. Market fraud through analysis activities, in addition to the fact that the banking sector faces increasing challenges in management due to the application of data technology related to changes in banking operations, which has made it more competitive and dangerous in the decision-making process, the lack of professional data analysts, and the high costs that play an important role in controlling Banks weaknesses, especially when dealing with external cyber-attacks Which affects its role in achieving organizational dexterity. Big data plays a more significant part in digital marketing than just gathering data, it uses and strategic analysis of this data to inform long-term business plans and marketing choices, it gives businesses the insights they need to serve bigger markets and gain a competitive edge,

but the difficulty is in sorting through the massive amounts of data to find relevant information that can guide strategic choices (Rathi & Betala, 2019).

In study for Wang and Liu (2024), they showed that Big data technologies can assist tourism destinations in forecasting changes and trends in the market, tourist locations can forecast future passenger flow, shifts in visitor consumption choices, and market demand dynamics forward-loopingly by analyzing historical and market data. This allows them to plan ahead and develop coping mechanisms achieving organizational dexterity.

Buelvas et al. (2021) showed in their study that the rise of the Internet of Things and the influx of data from numerous interconnected devices have made data quality essential for deriving reliable insights and making informed decisions; high-quality data is crucial for user engagement and the successful deployment of Internet of Thin services. They focused on a smart city initiative for environmental monitoring, identifying key Data Quality indicators relevant to this context, by evaluating a dataset from SIATA's air quality monitoring network in Buelvas Colombia, demonstrating the importance of assessing and being aware of data quality as a means to effectively respond to real-world challenges and emphasizing that data quality is vital for achieving the goals of IoT applications and ensuring their successful impact.

Methodology
The methodology employed in this study draws upon an extensive review of the literature and research studies published in global journals, by synthesizing insights from past studies and leveraging evidence-based research, the methodology adopted herein ensures a rigorous analysis and synthesis of key findings and perspectives in the field, facilitating a nuanced exploration of the topic at hand.

Conclusion
This paper provides an extensive examination of academic research focusing on big data, data quality, and organizational dexterity are interconnected elements that mutually reinforce each other, and the interplay between them are critical importance of leveraging data effectively to drive organizational dexterity and excellence. Big data offers immense potential for organizations to gain valuable insights, but its value is contingent upon the quality of the data being analyzed.
This paper recommends for the following:

1. Prioritize Data Quality Initiatives: Organizations should invest in data quality practices to ensure that the data analyzed is reliable and accurate. This includes implementing robust data governance frameworks, regular data cleansing and validation processes to enhance the overall quality of data utilized in decision-making.
2. Foster a Data-Driven Culture: To maximize the potential of big data, organizations should cultivate a culture that values data-driven decision-making. This can be achieved through training programs, workshops, and leadership initiatives that encourage employees to leverage data insights in their daily operations.
3. Enhance Organizational Dexterity: Companies must develop agility within their organizational structures to effectively respond to changing market dynamics. This involves adopting flexible processes, encouraging cross-functional collaboration and

being open to innovation, which can help organizations capitalize on emerging opportunities presented by big data.

4. Integrate Data Quality with Business Strategy: It's crucial for organizations to integrate data quality principles into their overall business strategy. This alignment will ensure that data-driven insights directly inform strategic initiatives, leading to better-informed decisions and improved organizational performance in a competitive landscape.

Theoretical and Contextual Contribution of this Paper

This paper provides a robust theoretical contribution by conceptualizing the interdependence of big data, organizational dexterity, and data quality as critical drivers for sustainable competitive advantage in a data-driven era. It advances understanding by framing organizational dexterity as a key mechanism for leveraging big data insights and aligning them with strategic objectives. Additionally, it underscores data quality's foundational role in ensuring the accuracy and reliability of decisions derived from big data analytics.

Contextually, the study highlights the practical integration of these elements in dynamic business environments, employing case studies and examples from sectors such as banking and smart cities. It offers actionable recommendations, such as fostering a data-driven culture and enhancing governance, to adapt to rapidly changing markets. This dual focus on theory and application bridges gaps between abstract models and real-world practices, providing a comprehensive framework for organizations aiming to thrive in the digital economy.

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