

Big data and its effective role in supporting the different business sectors in multiple environments: an analytical study

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Abstract

Big data is of great importance for companies and organizations of all kinds. In fact, it helps them survive and achieve a competitive advantage, which contributes to attracting new beneficiaries to increase the percentage of their profits and services. At this level, big data provides a deeper understanding in discovering some unclear patterns and practices that constitute an important factor not only in understanding customer requirements but also in making effective decisions. The current study aims at identifying and shedding light on big data technology, and then learning how to apply it in different business sectors. The study used the descriptive analytical method using a SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis to accomplish these goals, which is concerned with identifying the strengths and weaknesses of big data technology in the various business branches and diagnosing the opportunities and threats of that technology. Accordingly, big data technology's significant contribution to the growth of the numerous operations and activities of various business sectors is one of the study's most notable conclusions. Indeed, it helps them improve visibility, make better and more accurate decisions in a timely manner, analyze market sectors, identify new business opportunities, improve and simplify operations, and provide predictive analytics capabilities to discover customer trends. The current study also resulted in a list of recommendations, the most notable of which was that professionals in the field of business and information technology around the world should cooperate to develop big data, make it more effective, and pay more attention to the legal and security aspects of big data technology. Cloud computing, social media, mobile and digital computing technologies along with a growing number of transactions are fueling data growth. Big data technologies enable quick data capture, identification, and/or analysis in order to get economic value from massive amounts of various and diversified data. These technologies are applied in all sectors. Big data has several applications, including risk analysis, customer feedback analysis, process analysis, transaction analysis, IT security, and more. Many instances of big data use cases include analytics and discovery (such as data mining, multi-dimensional analytics, and "interactive" visual data), information management (such as access to information through search and access across multiple content and data sources), and infrastructure (such as a social networking platform via Internet, gaming, retail, and transaction processing). All these features and characteristics have increased the importance of their use and application in all work environments in multiple sectors.

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1 Introduction

We are currently experiencing a massive data explosion. The analysis and processing of this data improves comprehension of client needs, boosting productivity and decreasing losses for businesses. The biggest difficulty facing many businesses of all sizes and across all industries is data management and analysis. Businesses have long tried to come up with a viable strategy for gathering data about their clients, goods, and services [1]. With fewer customers and fewer services available in the past, the procedure may not have been very difficult or challenging, but with time, as more businesses grew, things became more challenging. Various enterprises and sectors are investing in big data technologies to be able to obtain commercial value from these huge data sets, by integrating analytics techniques (risk, customer and network analytics), developing IT security, and accelerating the development of business operations [2].

The importance of the current study is due to the topic I dealt with. Big data is of high importance for companies and organizations of all kinds, as it helps them persevere, survive, and achieve a competitive advantage that contributes to attracting new beneficiaries to increase their profits and services, because big data provides a deeper understanding in discovering some patterns and practices of others. The current study aims at reviewing and analyzing the studies and research conducted in this field using the analytical and descriptive method. Mainly, this paper targets determining the most notable strengths and weaknesses of big data technology, to know the opportunities and the most prominent challenges that it faces when applied in the various business sectors, and to collect them in one study from an analytical perspective to highlight the significance of big data technology and the vital role it plays in improving the business environment in different sectors. As well, this paper seeks to highlight the most prominent shortcomings of this technology, which were indicated by most studies and research, in order to encourage the process of improving and developing this technology to overcome the gaps it suffers from.

Big data is characterized as a collection of data that is so vast and intricate that it becomes challenging to process it with just one database management tool or with conventional data processing software. Challenges, time, storage, search, sharing, transfer, analysis, and visualization are all included [3].

Big data is any amount of data that is larger than what conventional database systems can gather, store, manage, and analyze, according to the Mckinsey Institute [4].

[5] pointed out that big data has been given this name because it is characterized by a large size and a large degree of diversity, and it is generated very quickly and also requires great speed during its processing. In addition, it is characterized by a large degree of inaccuracy and complexity, which exceeds the ability of traditional information systems (in terms of storage and operation) to deal with.

Accordingly, we can define big data as the data generated through our increasing use of multiple electronic devices, as well as tools and applications of the Internet and mobile phones to perform many operations related to daily life practices such as making calls, sending messages, tweets, files of various types, or to complete purchases, and many other practices and activities. All these uses constitute speedily growing digital data through which big data was formed, which is difficult to manage and analyze in database management systems, so it depends on multiple algorithms of artificial intelligence that have enormous capabilities to reach new and innovative information that would help in making decisions or solving problems.

Some factors and reasons have now emerged that have helped to explode data or information

and increase its volume and diverse elements, such as [6]:

- Several fields, such as meteorology (weather science), genetics (genomics), intricate physical simulations, and biological and environmental studies, have data sets that are too large for analysis.
- The development of social networks, which constantly transmit massive amounts of data worldwide.
- Low cost of storing this data. (Storage space)
- These databases must be maintained by law in order to track out criminals, saboteurs, and invaders.
- The rise of the Internet of Things (IOT), which enables all devices to interact with the Internet, communicate with one another, and create new data, which resulted in the fact that all of the gadgets we use on a daily basis are now connected to the Internet.
- It is used to infer expectations in ambiguous areas where it is difficult to know the facts, like using big data to analyze data for both past and present crimes to anticipate crime.

Among the most prominent benefits of using big data and its applications in some areas, are:

1. Maximizing the user's or customer's electronic experience, starting with their exposure to advertising, through placing an electronic purchase order, until the arrival of the commodity. This is done by analyzing the reactions of customers to advertising campaigns, such as their comments, how long they stay on the page or clicking on certain links, then their purchase method, and finally, their choice of shipping method and postal addresses. Then, customer comments in social media on the product are analyzed. Data scientists link past data and try to find correlations or links that allow predicting whether customer X will buy good Y. [7].
2. Predicting upcoming events by analyzing historical data and linking it with current readings. For example, the electricity and energy companies analyze previous outages and whether there is a common factor causing these outages [8].
3. Contrasting the official statistics with the actual data of users in the technical domain to support the strategic decision using big data [9].
4. One of the practical advantages of big data is what happened in China when fifty "ghost towns," or entirely abandoned cities and structures, were discovered. These settlements were constructed without proper planning, making their remote and inappropriate location. Then, they computed the urban density as the number of people living in an area of one hundred square meters using additional data from well-known residential neighborhoods to get to the places of residence. The government will be helped by this information to make wiser judgments [10].

Big data, which is the next generation of computers, build value by collecting and analyzing data. The amount of data generated by consumers is increasing quickly over time for a variety of reasons, including purchasing information from supermarkets, commercial markets, freight invoices,

banks, healthcare, and social media. This has led to the difficulty to access and reach, analyze, and organize it effectively, So, the need for big data technology to handle and analyze the vast amounts of data to make wise judgments and find creative solutions to the issues faced by businesses and organizations of all kinds became apparent, thus helping them achieve a competitive advantage and maintain their survival in the global market.

Several firms now use big data analytics as a standard procedure to gather useful information. Nevertheless, little is known about how businesses and organizations may convert the promise that big data offers into actual social and economic value [11]. These analyses refer to a variety of data that is collected by technologies from different heterogeneous sources. They standardize, examine, and exploit this data to improve business performance and make improved managerial decisions, thus enabling businesses to gain an advantage over their competitors [12]. Big data analytics are now of utmost relevance in this regard since they play a critical role in capturing and exchanging explicit information by encouraging its spread. to make decisions within organizations, and therefore acquire new insights that support effective action and decisions [13].

From the previous premises, this research reveals the application of big data technology in practice in the various business sectors, in order to know the most notable possibilities and difficulties it faces, as well as its most notable strengths and limitations.

The following question captures the issue with the current study: **What is the actual state of big data technology usage across various business sectors?** In this current study, we will deal with the scientific method on which the study relied. Then, we will conduct a review of the most notable uses of big data technology across several business sectors, in addition to reviewing and discussing the results through the analytical and descriptive study of studies and research conducted in this field, to identify the most prominent strengths and weaknesses of data technology. The study aims at identifying the huge opportunities, and the most prominent challenges that they face when applying them in the different business sectors, and finally identify the most prominent conclusions and recommendations that were reached.

2 Research methodology

Because it suited the nature of the current study, the descriptive-analytical technique was used. In fact, this approach depends on the study of the phenomenon, the way it is in the real world. It aims to undertake reliable qualitative and quantitative descriptions of the studies addressing the reality of the use of big data technologies in many business sectors. The SWOT analysis, which is concerned with determining the strengths, weaknesses, opportunities, and threats in the subject of the current study, is also used to investigate, analyze, describe, and observe the current situation. Data and information were collected through a set of studies and research that dealt with the subject of Arab and foreign intellectual production.

The SWOT analysis method is the actual outcome of a group of studies that were conducted at Stanford Institute between 1960 and 1970, which aimed at determining the reasons for the failure of planning, predicting the economic problems and crises that may result from it, and also developing plans to avoid mismanagement and planning. The SWOT analysis approach is used in the early stages of projects, to assess the internal and external conditions of the project, which helps to make the decision on a logical and thoughtful basis, instead of using intuition and prediction.

3 Big data and its various applications

Big data technologies are a new generation of engineering and technology that enable quick data capture, identification, and/or analysis in order to get economic value from massive amounts of various and diversified data. Big data provides important capabilities for enterprises of all sizes and in various sectors. Among the most prominent sectors that have used big data technology in their work environment are the following:

3.1 Governmental sector

Many governments have used big data to achieve many goals. For example, [14] highlighted some of these uses as follows:

- The Big Data Research and Development Initiative, which looked at how to use big data to address significant issues facing the government, was introduced by the Obama administration in 2012. The project included 84 distinct big data programs spread across six divisions. Notably, big data analysis was crucial to Barack Obama's 2012 campaign for reelection.
- Six of the top ten "super powerful computers," or supercomputers in the world are owned by the federal government of the United States.
- The "Utah Data Center" data center, which will be able to handle information with an estimated volume of Yuta bytes that the National Security Agency collects via the Internet, is currently being built by the US National Security Agency.
- The Massachusetts Big Data Initiative, which receives financing from both the state government and private businesses for a range of research institutes, was introduced by the US state of Massachusetts in May 2012. The MIT Laboratory for Computer Science and Artificial Intelligence, the Massachusetts Institute of Technology (MIT) is home to the Intel Science and Technology Center for Big Data.
- The sixth program of the European Commission to include businesses, universities, and other stakeholders in debating big data concerns is supporting a two-year forum for the public and private sectors working on big data. In order to successfully implement the big data economy, the project intends to define a research and innovation strategy to direct European Commission assistance actions. Their subsequent initiative, Horizon 2020, will be informed by the findings of this one.

3.2 The private sector

Big data has been utilized by numerous businesses and organizations in the private sector extensively to achieve many profits and revenues. For example, [15] mentioned some of these uses as follows:

- Every day, Amazon.com performs millions of back-end tasks as well as requests from more than 500,000 third-party vendors. To operate in the midst of this enormous amount of data, Amazon mostly uses Linux technology. With capacities of 7.8, 18.5, and 24.7 terabytes, Amazon held the top three largest Linux databases in the world in 2005.
- Conversely, Walmart conducts more than a million merchant transactions every hour, which are imported into databases that are thought to contain more than 2.5 petabytes (2,560 terabytes) of data — or 167 times as much information as all the volumes in the US Congress Library combined.

- In relation to Facebook, its user base contributes 50 billion images. Worldwide protection for 2.1 billion active accounts is provided by the FICO Falcon Credit Card Fraud Detection System.
- The amount of business data worldwide, across all firms, doubles in size every one to two years, according to the most recent statistics.
- In order to assist potential homebuyers in deciding when to drive to and from work at various times of the day, Windermere Real Estate collects anonymized GPS signals from close to 100 million drivers.

3.3 The sector of international development

It has been proposed that big data can significantly benefit global development after decades of work in the appropriate use of information and communication technologies for development (or ICT4D). On the one hand, big data's growth presents opportunities for improving decision-making at a reasonable cost in key development sectors like resource management, crime and security, natural disasters, employment, and production economics. However, due to long-term development issues like a lack of economic and technological infrastructure as well as a shortage of human resources, concerns about big data such as privacy, interoperability issues, and the unlimited power of flawed algorithms are constantly growing in developing countries. "This has created a new type of technical gap: a data-finding gap to make informed decisions (Hayek, 2015).

3.4 Health sector

Health information about people and medications is collected, breathing rates, pulse and vital signs are recorded on devices all the time, patterns of disease progression are learned and then this data is analyzed, enabling authorities to predict complications and the spread of diseases long before they actually occur. The healthcare market in the GCC is anticipated to reach \$71.3 billion in 2020, according to Alpen Capital, creating an unprecedented amount of data that will present a significant opportunity for businesses to expand the market. For instance, bedside history charts will soon be obsolete because doctors, nurses, and even laboratory technicians will have access to the most recent information regarding patients' medical histories, prescriptions, and test results, as well as the ability to share digital files with specialists, other professionals, or referral hospitals. Additionally, this brings together numerous parties that are involved, including insurance companies, pharmaceutical firms, and others from the same inner circle, facilitating improved information sharing, quicker input on trends and even epidemics, and increased transparency for all [16].

3.5 E-commerce areas

Giant electronic stores such as eBay and Amazon are interested in analyzing all sales, wish lists, comments and visits made by users, in order to understand the consumers' tastes and choose the right product for them. These companies also use social media analytics in order to gauge the uptake of brands. Moreover, supermarkets can easily track customers' data through their purchases and credit card data and provide them with appropriate offers when they notice a change in the purchasing and consumption pattern. This is also used to know the level of customer satisfaction with the service s/he receives and to avoid the risks of his/her switching to a competing company [17].

3.6 Labor market sector

Big data and its analyzes have been extensively utilized in the labor market sector, and among the most prominent of these uses, as indicated by [18] are:

- For this massive program, "Big Data" has increased the demand for information management specialists, and several multinational corporations, including Oracle Corporation, IBM, Microsoft, SAP, EMC, and HP, have invested more than \$15 billion in software firms that are solely dedicated to the field of data management and analytics. This market alone was valued at more than \$100 billion in 2010 and is expanding at a rate of around 10% annually, which is twice as fast as the software industry as a whole.
- Data-intensive technologies are being used in affluent economies. In the world, there are 4.6 billion mobile phone subscriptions, and between 1 and 2 billion people have Internet access. More than a billion people worldwide moved into the middle class between 1990 and 2005, which implies that more and more individuals with incomes increase their educational attainment, which in turn fuels the growth of knowledge. The effective capacity of the world's wired and wireless networks to exchange data ranged from 281 petabytes in 1986 to 471 petabytes in 1993 to 2.2 exabytes in 2000 to 65 exabytes in 2007. By 2013, it's anticipated that the Internet will transmit 667 Exabytes of data each year.

3.7 Banking sector

The financial industry is experiencing a big data revolution as it continues to spread preparing to take advantage of a large amount of available data such as spending habits, methods of saving, and the application of software and algorithms to evaluate them and come to the proper conclusions to provide their clients with smart solutions and services According to a recent assessment from the Alacer household group, US banks have more over an Exabyte of client data saved in their systems. The correct use of this data has not yet been made. It is expected that financial institutions will soon benefit from data to develop a number of sectors in banks. In fact, banks can use big data in several areas, including:

- **Risk management:** One of the biggest difficulties facing the financial industry is risk management, which is expected to be developed by benefiting from the field of big data analysis. For example, banks today are faced with the problem of borrowers' failure to pay loans. Big data analysis can keep track of important borrower events, including as payment history, borrower behavior, and other information that can help with the analysis of probable borrower behavior.

Big data is essential for determining dangers as well in financial markets, especially as markets are more interconnected than ever. Big data analysis is expected to provide key solutions for handling or monitoring the fluctuations of financial markets around the world [19].

- **Security and frauds:** Understanding each customer's spending habits makes it possible to know if any unusual transaction has occurred. Banks are currently deactivating credit cards when they are used in a strange area or for improbable purchases. To better understand the customer's behavior, banks can use big data analysis to avoid fraud in more sophisticated ways by comparing the customer's spending patterns to those of other customers who have the same income and similar spending patterns (Al-Otaibi, 2020). Also, it is now crucial to

analyze client data and comprehend their behavior due to the growth of e-commerce and the prevalence of online buying through smart devices.

- **Individual offers:** With the advent of big data technologies, banks will no longer use public offers to draw in new clients. It is anticipated that after consumer data analysis, the individual will be offered with individualized offers catered to their needs. Banks can use the information to target customers who like to connect with customized offers that are suited to their needs, just like online retailers do today. These offers will be based on an analysis of client information, spending patterns, and social media data that enables banks to understand their preferences and target offers appropriately.
- **Client service:** To gather information, big data technology relies on meticulous data analysis and linking of the data in a way that summarizes the relationship. Banks will be able to pinpoint and promptly address each client's difficulties in terms of customer care. The current method relies on the bank's interaction with each customer in particular and asking a number of questions in order to ensure that the problem has been correctly identified. Yet with the right application of big data, the bank can identify an issue in real-time and communicate with the customer as soon as they notice any error and solve it in a quickly time. In addition, having this data will enable banks to analyze the needs of each individual customer in a deeper and wider way, which will improve the quality and customer experience.

3.8 Oil and gas sector

Facilities in the oil and gas sector will invest in solutions that help them make the best use of their assets. This journey from basic field data acquisition and data management to intelligent warnings, event management and advanced forecasting, and the full optimization of assets will be accelerated by investing in big data. In the field of drilling rigs and pipelines, investments in big data will help facilities extract value from increasing the amount of seismic data generated through multidimensional seismic acquisition and development of digital software from the oil field. This data is produced on an ongoing basis, incorporating inputs from the fields of geology, physical geology, reservoir engineering, and production and operations engineering. This makes oil and gas facilities ideal candidates to benefit from big data technologies. The biggest challenge faced by facilities operating in the oil and gas sector is the security of critical information, and this does not depend on the fact that these facilities produce more data, but rather that this data has become more important to their activities [20]. Protecting critical data is a top priority, and as such, industry leaders have pioneered big data projects in a number of departments and are now gradually moving data into production. As these organizations realize the value that can be obtained from these investments, they will move many of their major operations to big data technologies.

3.9 Telecom sector

The telecommunications sector is a pioneer in adopting big data technologies, as major telecommunications companies have already implemented big data solutions, and since this sector is based on customer service, it is not surprising that investments in big data solutions are mainly focused on customer management solutions that can enhance customers' satisfaction. In addition, telecom companies have invested in big data tools to be able to manage and activate traffic in their networks, thus reducing the cost of their operations. Moreover, as telecommunications companies realize the value of big data solutions, they will expand their investments in these solutions to cover

services to customers based on their location, additional customer analytics (including new campaign management), and deep integration with its internal call centers enabling it to solve problems quickly.

3.10 Retail sector

The retail sector may be one of the biggest candidates to benefit from the possibilities that big data software offers. In fact, the sector has succeeded in presenting commercial offers according to the categories of visitors to outlets in crowded streets or commercial centers. There, digital screens display different groups of products on the basis of the categories most likely to visit the shops at different times. Besides, by following the demographic shift of site visits, retail stores can easily change their offerings to suit, for example, a late-morning housewife visit, a group of college students in the early evening, or families on the weekend.

3.11 Travel and tourism sector

The global tourism digital footprint may be the most effective source of actionable data for the entire travel and tourism industry, including hotels, resorts, airlines, and other transportation service providers, as well as experiential service providers like theme parks and cruises and even supporting industries like car rental and travel insurance companies. We can actually predict the day when your travel advisor will transform into a smart digital travel assistant capable of finding the best travel experience and package on the go based on your previous trips, given that typical holiday seasons vary around the world based on weather, school calendars, religious festivals, other factors, your online reviews, and reactions, or even based on the number of social media posts you made during or after your vacation.

Ruichiro proposed an analysis model for IBM's big data, as illustrated in Figure 1, which shows the type of data beginning and its sources. By migrating the data to the operating system region and using the results of the data process to be analyzed and displayed to form a predictive and model analysis for the end user [21].

4 Results and discussion

According to studies and research in this area, the first step in examining the use of big data technology in various business sectors is to study and analyze the current status of experiences with using this technology in these sectors, specifically in terms of analyzing the internal environment (strengths and weaknesses) and the external environment (opportunities and threats), as follows:

First / The internal environment analysis:

The process of analyzing the internal environment deals with examining and analyzing the current big data technology use in various business sectors in order to determine the elements of strength, which are represented by big data technology efficiency and ability To attain the greatest successes in those fields, and the internal weaknesses, which are usually represented in the weak application of big data technology by business sectors. These strengths and weaknesses are presented as follows:

Strengths:

Big data is used to determine the fateful decisions of large companies or to define business plans for the operation itself. It is expected that the size of companies that use artificial intelligence to analyze big data in order to make decisions will be 5 times faster. IBM declared that they produce 2.5 quintillion bytes of data every day from various sources. Statistics show that big data is growing



FIGURE 1. IBM's Ruichiro Big Data Analytics Model

rapidly and remarkably at an annual rate of 40%, as the percentage of data production doubled to 44% in 2020 compared to 2009. A study prepared by the American company Better buys, which is specialized in developing smart solutions for companies, indicated that the data-analytics-related artificial intelligence market would grow by \$20 billion in 2019. 85% of corporate executives think big data will fundamentally alter how we work. More than 50% of data analysts in organizations and companies use self-development tools in 2017, while 42% of companies plan to deploy AI for phones, and 90% of large organizations become data executives in 2019, [21] as shown in Figure 2.

Through studying and analyzing the reality of the application of big data technology in the different business sectors, some strengths became clear as follows:

1. Boost visibility and make quicker, more precise decisions.
2. Examining different market segments, finding, capturing, and taking advantage of new business possibilities by spotting patterns and trends in data, as well as forecasting prospective actions and results.
3. Process streamlining and improvement by real-time monitoring of important parameters, spotting deviations from the desired outcome, and comprehending the causes of the discrepancy.
4. Improving customer experience by analyzing interactive data of applications by customers to provide extraordinary user experiences that increase loyalty and satisfaction.
5. Providing predictive analytics capabilities to discover customer trends and anomalies in customer behavior.



FIGURE 2. A model of statistics showing the rapid growth of huge data over several years

6. Shortening the time and effort in accomplishing multiple operations and functions and issuing various reports.
7. Helping to increase the company's profits and revenues by gaining new customers, thus achieving a competitive advantage.

Weaknesses:

There are some weaknesses related to the reality of the application of big data technology in the different business sectors, which became clear through analysis and study, and they are as follows:

1. Some employees do not accept this technology, and they do not have the necessary skills to use it correctly.
2. The lack of laws and policies regulating the management and application of big data technology to preserve data privacy and security.
3. The weak infrastructure for some sectors, affects the effectiveness of the use of big data technology in data analysis.

Second/external environment analysis:

The process of analyzing the external environment helps to understand the risks associated with using big data technology across many business sectors and to know the opportunities available in order to work on exploiting and implementing them. The opportunities and threats are presented as follows:

Opportunities:

Big data technologies can greatly play a role in the development of different processes and functionalities of different business sectors, and provide many opportunities that must be exploited, supported, and activated. The following are some examples of these opportunities:

1. Improving dialogue with clients: through the following methods:

- Activating social media and other unstructured data, through which information about customers can be obtained. This would help address them more effectively.
- By combining unstructured data with structured data, an organization can obtain a comprehensive view of its customers.

2. Assist in product redevelopment:

- Big data can help to understand how others perceive the company's products so that the company can adjust these products to suit different needs.
- Through the analysis of social media content (unstructured data), customer opinions can be identified and categorized by geographical locations or by demographic groups.
- Big data enables rapid testing of thousands of computer-aided designs, helping to test small changes in a single factor affecting the final output. For example, a slight change in materials may affect the cost, time to market, and performance. The process efficiency of the product can then be enhanced according to those tests.

3. Implementation of Risk Analysis:

- Predictive analytics powered by big data enables surveying and analyzing health reports or attitudes from social media so that they keep abreast of the latest developments in business products and services and in the surrounding environment.
- Accurate and detailed tests of service suppliers and customers, will enable actions to be taken in case there is a risk of delay or failure.

4. Data Security:

- Develop a map of the entire data environment in the business sector, utilizing big data tools, which enables the analysis of internal threats.
- Monitor information that may be important and not properly protected and ensure that it is stored as per regulatory requirements.

5. the real-time content, look, and nature of the business portal or website to be customized to suit each user or customer accessing the website is made possible by Big data analytics, depending for example on gender, nationality, age or geographical location.

6. Proactive and predictive monitoring is designed to identify network devices or equipment and anticipate when they will need to be changed, thus enhancing utilization and preventing unnecessary changes.

Threats:

The use of big data technology comes with significant hazards and difficulties in the different business sectors, which must be taken care of and addressed. These challenges are represented as follows:

Legal threats: There are no laws and legislations currently regulating big data, but at the same time, companies that seek to provide a big data analysis service must ensure that their proposed activities are consistent and compatible with the existing laws that regulate electronic data, as

big data is electronic data by nature. Current provisions and laws such as privacy law and data protection laws are applicable to it. The biggest challenge is to develop these laws that were issued several years ago in an innovative way that does not hinder progress. The following section is a review of some of the legal challenges that are believed to constitute a challenge in the process of regulating the provision of this service:

1. **Privacy:** Ensuring the privacy of personal data has become more and more difficult as the volume of data doubles and its rapid sharing speed is becoming wider and wider. Big data analysis results do not always involve personal data. However, when this happens, such information must abide by the guidelines and standards for data preservation. For example, we find that although the United States does not have comprehensive data protection laws as in Europe, under Article 702, this law states: The telecommunications company itself must protect the confidentiality of proprietary and customer-related information, and the use, disclosure, and access to specific customer data are subject to legal limitations. Yet, it is acceptable to use the customer data that has been gathered.
2. **Responsibility:** at this level, responsibility points to the responsibility of the service provider (internal control) in dealing with the data. In fact, internal control requires the creation of internal controls, such as standard operating procedures, internal rules, and audit reports, that give proof and ensure compliance with regulatory authorities. Accountability is not a one-time exercise, but the service provider's continuity of compliance with the law is an essential component of responsibility. Although this factor depends on the actions taken by the supplier and the service provider to guarantee service quality. However, this does not preclude the necessity of obligating the service provider and supplier to submit the results of the internal audit to the competent authority.

Security threats: The challenge of securing big data has increased with the increase in the speed of data transmission and the diversity of its patterns, its size, and the diversity of its sources, as well as the nature of the continuous transmission of data acquisition. Thus, traditional security mechanisms, which are designed to secure static data in a small, limited scale, may be insufficient to secure big data. Analyzing this large data outside the borders of the country that owns the data poses another challenge in securing any data.

For example, the European Union's privacy law states that data collected must remain safe and secure from potential abuse, theft, or loss. It also obligated Member States to require the controller to choose a processor that provides adequate safeguards with regard to technical security measures and regulatory measures governing the processing of such data and to ensure compliance with those measures. The conduct of processing by a particular processor must be governed by an obligating legal contract binding the processor by the controller (European Commission, 2015).

- **Social threats (related to organizational culture):** They center around employees' lack of acceptance of new technology and lack of effective training on it, as well as low trust in data or refusal to share information within the company.
- **Ethical threats:** represented in some employees' inappropriate use of big data technology, and the infringement of customer data without ethical restrictions.
- **Technical threats:** Some employees do not have the skills to use big data technology, besides the big data architecture poor design, and insufficient big data tools.

5 Conclusion, recommendations and future actions:

The multiple uses of big data technology in the environment of multiple business sectors have been reviewed, through a four-way analysis of the topic by identifying strengths, weaknesses, opportunities, and threats, and the current study reached the following results:

- Big data technology has helped improve the work environment in various sectors and increase their production efficiency.
- Improving visibility and making better and more accurate decisions in a timely manner.
- Processes can be made better and simpler, and business performance can be raised by tracking important metrics in real-time, spotting deviations from the desired outcome, and comprehending the causes of those deviations.
- Provide predictive analytics capabilities to discover customer trends and anomalies in customer behavior.
- Shortening the time and effort in accomplishing multiple operations and functions and issuing various reports.
- One of the most serious threats facing big data technology is legal and security threats.

In light of the previous results, some future proposals that may contribute to the growth of the application of big data technologies in the various business sectors could be stated as follows:

- Business and IT professionals must work together around the world in developing big data and making it more effective.
- Attention to professional qualification to produce trained and specialized human cadres capable of applying and managing big data technology.
- Spreading the organizational culture, by training and educating employees about the importance and how to use big data technology, and preparing them to accept the new technology.
- Work with different business units and jobs to identify the most important business opportunities and challenges that can be addressed with better and timely information.
- By enforcing rules and policies by international organizations and bodies to control the process of handling big data with regard to information privacy and security, attention is being paid to the legal and security aspects of big data technology.
- Stressing the interest in developing big data technologies and tools in line with recent developments and innovations, especially now that the Internet of Things has emerged, which leads to a huge increase in data.
- Develop comprehensive strategies for all aspects of big data technology.
- The real investment of big data technology in all sectors that suffer from data huge increase, to take advantage of their capabilities in processing and analyzing this data to obtain effective decisions and innovative solutions to problems.
- Continuing to evaluate advanced big data tools with the rapid development of technology, and working to balance the current infrastructure with the latest technologies.
- Completing additional research to cover areas and industries that this study does not cover.

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