The impact of Big Data Analytics in Developing Strategic Performance using Balanced Scorecard: A Field Study in Egypt

Dr. Sawsan Fawzy Mohamed Assaf *

---

*Sawsan Assaf is a lecturer in Accounting, Faculty of Commerce, Tanta University.
She got her PhD in Accounting from Tanta University, Egypt.
Email: sawsan.asaf@commerce.tanta.edu.eg

The impact of Big Data Analytics in Developing Strategic Performance using Balanced Scorecard: A Field Study in Egypt

Dr. Sawsan Fawzy Mohamed Assaf

Abstract:

This study aims to clarify and investigate the effect of Big Data Analytics (BDA) in developing the Strategic Measurement using the Balanced Scorecard (BSC). Big data is one of the most rising technology trends that has the potential to change the way businesses use behavior analysis and turn it into valuable insights. Research on the effects of using big data analytics on measures of financial and nonfinancial performance is still limited, especially in Egypt. To accomplish the research aim, the theoretical discussion was developed through the determination of Big Data, Big Data Analytics, and its most important characteristics, addressing the financial and nonfinancial measures for each of the Balanced Scorecard perspectives. The study's hypotheses were tested through the survey list that was distributed to 110 executives and data analysts in ICT companies in Egypt. The results of the study proved the significance of these hypotheses. The results of the field study indicated that measuring the financial and nonfinancial performance of the balanced scorecard based on BDA increases the ability of organizations to analyze structured data, reduce the cost of analyzing unstructured data, increase the ability to deal with the problems of stakeholders, customers, and employees in the organization quickly, and reduce the time spent to analyze the data of both financial and nonfinancial performance.

Keywords: Big Data Analytics (BDA), Balanced Scorecard (BSC), ICT companies.

أثر استخدام تحليلات البيانات الضخمة في تطوير الأداء الاستراتيجي لبطاقة الأداء المتوازن: دراسة ميدانية في مصر

مستخلص:

تهدف هذه الدراسة إلى توضيح والتحقق من تأثير استخدام تحليلات البيانات الضخمة (BDA) في تطوير القياس الاستراتيجي لبطاقة الأداء المتوازن (BSC). حيث تعد البيانات الضخمة واحدة من أكثر الاتجاهات التكنولوجية الحديثة والتي لديها القدرة على تغيير الطريقة التي تستخدمها الشركات لتحليل السلوك وتحويله إلى رؤى للعمل ذات قيمة.

ولتحقيق هدف البحث، تم تطوير المناقشة النظرية من خلال تحديد مفهوم البيانات الضخمة، وتحليلات البيانات الضخمة وأهم خصائصها، وتتناول المقاييس المالية وغير المالية لكل منظور من بطاقة الأداء المتوازن. تم اختبار فروض الدراسة من خلال قائمة الاستقصاء التي تم توزيعها على ١١٠ مدير تنفيذي ومحللي بيانات في شركات تكنولوجيا الاتصالات والمعلومات، وقد أثبتت نتائج الدراسة أهمية هذه الفروض.

وتشير نتائج الدراسة الميدانية إلى أن قياس الأداء المالي وغير المالي لبطاقة الأداء المتوازن على أساس BDA يزيد من قدرة المنظمات على تحليل البيانات المهيكلة، ويقلل من تكلفة تحليل البيانات غير المهيكلة، ويزيد من القدرة على التعامل مع مشاكل أصحاب المصلحة والعملاء والموظفين في المؤسسة بسرعة، وتقليل الوقت المستغرق في تحليل بيانات الأداء المالي وغير المالي.

الكلمات المفتاحية: تحليلات البيانات الضخمة (BDA)، بطاقة الأداء المتوازن (BSC)، شركات تكنولوجيا المعلومات والاتصالات.

The impact of Big Data Analytics in Developing Strategic Performance using Balanced Scorecard: A Field Study in Egypt

Dr. Sawsan Fawzy Mohamed Assaf

1. Introduction

With the explosive growth of information and technology, Human Civilization is undergoing rapid changes from the "Age of Information Technology" to the "Age of Data" (Su and China, 2021). McAfee and Brynjolfsson (2012) predict that the incorporation of Big Data tools and philosophies create a "management revolution" and that better visibility of business activities and performance measurement will convert decision making. According to Brown et al. (2011) Big Data may become a new kind of a corporate asset like brands and that it will become a basis for competition.

Huge amounts of data have become easily accessible to end users. Thus, Data analytics is crucial for the success of any enterprise (Khan, 2019). McAfee and Brynjolfsson (2012) showed that exploiting huge new flows of information can radically improve companies' performance. In addition, the continuous increase of data, has led to the complexity of performance measurement systems. These data require innovative techniques (to store, process and analyze) to provide meaningful information to support the decision-making process (Elkmash et al., 2021).

Jeble et al., (2018) states that information technology techniques (such as smart phones, digital devices, scanning devices, cloud computing, Internet of Things) help in improving productivity, innovation, and competition, these variety of large data sets will help in building analytics capabilities for the firms.

The researcher believes that organizations need a business strategy that includes big data and big data analytics. So, the main question of this paper is: What is the role of big data analytics in improving the performance of the balanced scorecard from the perspective of customer value, internal processes, learning & growth, and financial performance?

Thus, the current study is aimed to investigate the use of Big Data Analytics in developing strategic performance using balanced scorecard in information and communications technology companies. It also seeks to examine the effect of the use of Big Data Analytics on (a) financial performance measures and (b) nonfinancial performance measures in each

12

BSC perspectives (i.e., customer, internal business process, and learning and growth). The model of this study is shown in Figure 1. The results of this study will provide the practical evidence on the extent to which big data analytics are used to improve both financial and nonfinancial performance. This study will also provide an explanation on increasing the organization's ability to collect and analyze unstructured data, which will contribute to the improvement of the performance measurement process.

The remainder of the paper is organized as follows: Section 2 presents a Literature review, section 3 discusses a theoretical framework and development of hypotheses, section 4 describes research method and sample selection. The discussion and conclusion are presented in section 5 of this paper. Limitations and further research directions are also provided.
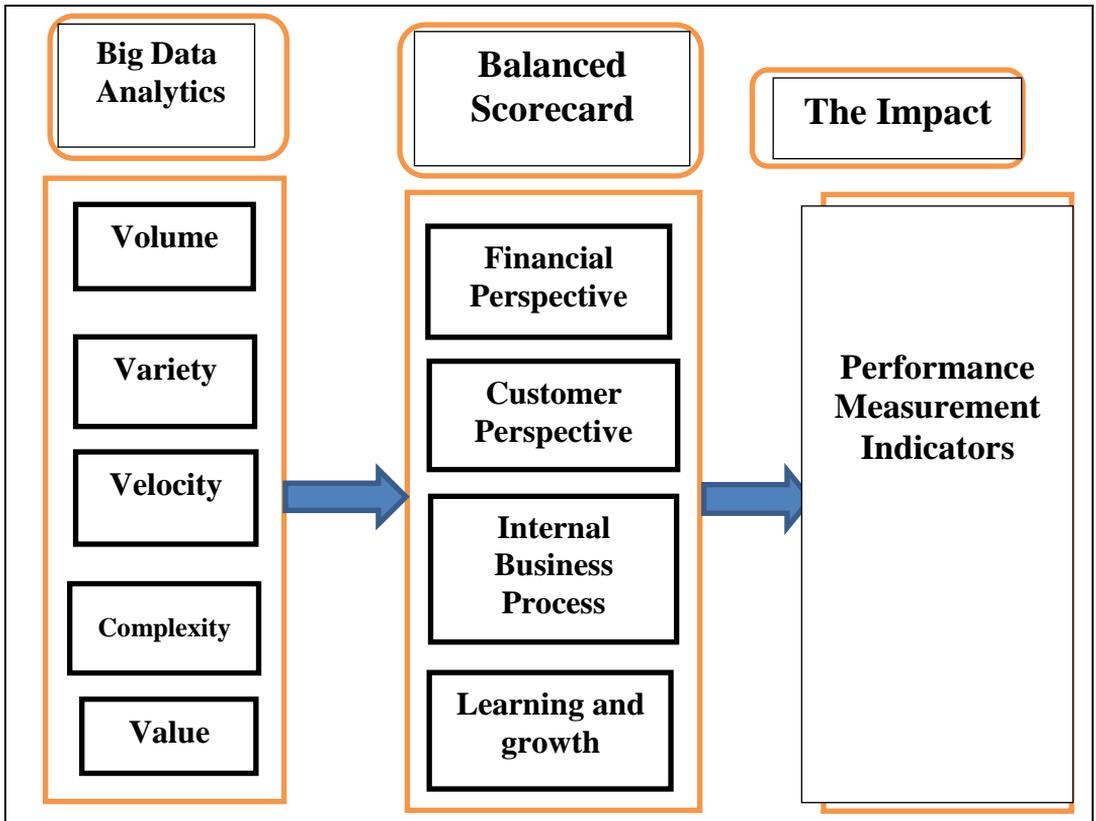
The impact of Big Data Analytics in Developing Strategic Performance using Balanced Scorecard: A Field Study in Egypt

Dr. Sawsan Fawzy Mohamed Assaf

Figure 1: Theoretical Framework
(Source: The Researcher)

2. Literature Review

According to the latest literature review studies, the number of publications on BDA has increased dramatically for the last years (Sivarajah et al., 2017).

Brown et al., (2011) found that companies are using data and business analytics to guide decision making are more productive and experience higher returns on equity than competitors. Also, organizations can gain an edge by opening information internally and by engaging customers and suppliers strategically through Web-based exchanges of information.

14

The study conducted by (McAfee and Brynjolfsson, 2012) showed that the use of big data had the potential to transform traditional businesses. It provided them with greater opportunities to gain a competitive advantage. The study showed that with big data technology companies can manage more accurately than ever before, they can make better predictions and smarter decisions. More effective interventions can be targeted, and this can be done in the areas they have dominated.

Another study was done by Chong and Shi (2015) presented an overview of big data analytics' content, scope and findings, with discussed its future development. The big data analytics literature was categorized into five categories, the big data acquisition and storage category, the data programming model category, the data analysis category, the data system benchmark category, finally, the category of big data analytics applications.

Particularly relevant study by (Elgendy and Elragal, 2016) tested the relationship of integration between Big Data Analytics and decision-making process. By applying advanced analytic techniques on Big Data, valuable information can be extracted to enhance decision making and support informed decisions.

Some of the prior published works include Khade (2016) who has developed a model of customer behavior analysis that is based on big data. Where Big data is one of the most emerging technology trends that has the potential to dramatically change the way business organizations use customer behavior to analyze and turn it into valuable insights.

Memon et al., (2017) explained the big data ideas that applications follow and the difficulties they face. Cloud services have been used to prepare and deconstruct massive amounts of data and have shifted to the new big data model of on-demand departmental care. The author illustrates that big data analytics has the potential to modify the way healthcare providers use advanced innovations.

Moreover, Adrian et al., (2018) identified and analyzed the factors influencing the implementation of a BDA and proposed a conceptual model for effective decision-making through BDA implementation assessment. The model was developed based on three dimensions such as data strategy

15

implementation, collaborative knowledge factor, and data analytics implementation (technology).

Fernando et al., (2018) investigated the effects of Big Data analytics, data security and service supply chain innovation capabilities on services supply chain performance. The results found that the Big Data analytics has a positive and significant relationship with a firm's ability to manage data security and a positive impact on service supply chain innovation capabilities and service supply chain performance.

In another conceptually based Big Data paper, Osman (2019) reviewed 30 papers addressing big data analytics in smart cities from two perspectives, big data analytics value chain and functional requirements. The author illustrates the characteristics of big data analytics frameworks applied in smart cities, and the basic design principles that should guide the design of big data analytics frameworks have to serve the purposes of smart cities.

Özemre and Kabadurmus (2020) developed a methodology for strategic decision making using Big Data Analytics and machine learning methods. The results showed that companies can make better strategic decisions according to future market trends and seize business opportunities. Similarly, Jeble et al. (2020) investigated the role of Big Data on the performance of supply chains. Further, it argued that social capital combined with BDA capability can result in a better supply chains performance.

In addition, Su et al. (2021) examined the direct effects of Big Data Analytics Capabilities (BDAC) on organizational performance, as well as the mediating role of dual innovations on the relationship between (BDAC) and organizational performance. This study conducts empirical analysis based on questionnaire-base survey data collected from 309 respondents working in Chinese manufacturing firms. The results support the proposed hypotheses regarding the direct and indirect effect that BDACs have on organizational performance.

Also, Lin et al., (2021) examined the impact of big data's ability to improve product and to explore supply chain dynamics including

16

relationship building and knowledge sharing as an important contribution to the power of big data. This study shows a positive relationship between supply chain relationship building, knowledge sharing and developing big data capability. Findings from this study encourage companies to take advantage of their supply chain resources to develop a big data capability that positively contributes to company performance.

3. The Theoretical Framework and development of hypotheses

3.1 The Determinates of BDA and its characteristics

While the interest in Big Data is increasing, there is no uniform definition of Big Data and Big Data Analytics. The idea of Big Data (BD) has been formulated because of massive data flows from a wide range of operational areas, such as the Internet, sensor networks, management systems, finance systems, and user-generated data. Then the concept of BD was expanded to include Big Data Analytics (BDA) which aims to discover valuable knowledge from large data sets that dictate intelligent decision making (Silva et al., 2018).

3.1.1 The definition of Big Data Analytics

Big Data Analytics (BDA) defined as collection of data, analytical tools, computer algorithms and techniques to derive meaningful insights, patterns from the collected large data sets. Therefore, big data analytics has become a key factor for companies to reveal hidden information and achieve competitive advantages in the market. (Chong and Shi, 2015; Jeble et al., 2018).

Moreover, Silva et al., (2019) & Elkmash et al., (2021) define Big Data Analytics (BDA) as the use of advanced analytic techniques against very large diverse data sets that include structured, semi-structured and unstructured data from different sources and in different sizes. These amounts of data cannot be processed or analyzed using conventional data processing techniques. BDA could support performance measurement systems for organizations through the analysis of a huge volume of structured and unstructured data.

17

The impact of Big Data Analytics in Developing Strategic Performance using Balanced Scorecard: A Field Study in Egypt

Dr. Sawsan Fawzy Mohamed Assaf

Many previous studies reported that big data has many characteristics, for example, a study made by Campos et al., (2016) found that Big Data has two important characteristics: high dimensionality and large sample size. High dimensionality of the data helps in accurately predicting the future. On the other hand, a large sample size helps the analysis in two ways; firstly, exploring the hidden structures of each sub-population of the data, secondly, extracting important common features across many sub-populations even when there are large individual variations.

In this context, Chong and Shi (2015) suggested that volume, variety, and velocity are the three dimensions of big data. The 3Vs have been used as a common framework to describe big data. IBM added veracity as a fourth dimension, SAS added two additional dimensions to big data: variability and complexity. Oracle introduced value as an additional dimension of big data (Lee, 2017).

The characteristics of big data can be summarized as follows (Kaisler et al., 2013; Lee, 2017; Sivarajah, 2017):

Volume: refers to the amount of data an organization or an individual collects and/or generates. As data volume increases, the value of different data records will decrease in proportion to age, type, and quantity among other factors.

Velocity: refers to the speed of data creation, streaming, and aggregation at which data are generated and processed. The velocity of data increases over time. As the speed of data generation and processing increased, real-time processing has become a standard for computing applications.

Variety: refers to the number of data types- text, images video, audio, etc. Technological advances allow organizations to generate various types of structured, semi-structured, and unstructured data.

Veracity: refers to the quality of the data which represents the unreliability and uncertainty latent in data sources.

Value: refers to the context and usefulness of data for decision making. It has been noted that "the purpose of computing is insight, not numbers".

Complexity: Complexity refers to the degree of interconnectedness and interdependence in big data structures such that a small change (or combination of small changes) in one or a few elements can yield very large

18

changes or a small change that ripple across or cascade through the system and substantially affect its behavior, or no change at all.

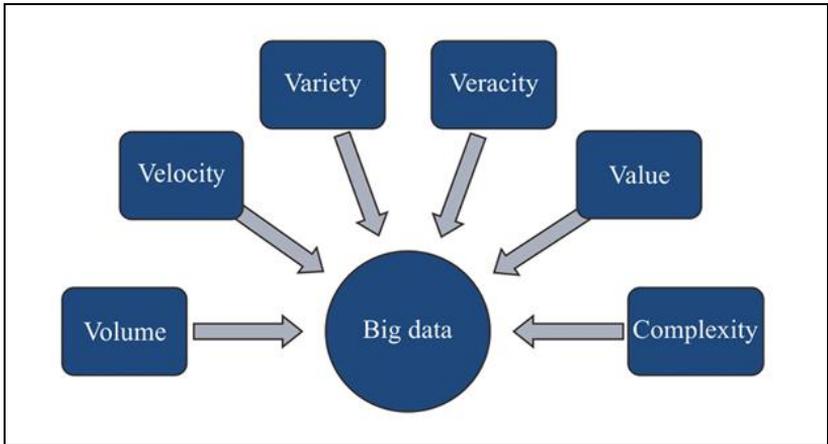Fig. 2 summarizes the above mentioned characteristics of Big Data characteristics.

Figure 2: Big Data characteristics
(Source: Mohammadpoor &Torabi, 2020)

High volumes of data are being generated from social media, various digital devices, and every business transaction. It is generally large when compared to traditional format. When data sets originating from several sources (such as social media, transactional data, search queries, call center logs) are combined and analyzed, useful patterns can be found that enable firms to estimate future outcomes (Jeble et al., 2020).

BDA is considered as a major differentiator between high- performing and low-performing organizations, as it allows firms become proactive and forward-looking, decreases customer acquisition costs by about 47% and enhances firm revenue by about 8% (Wamba et al., 2017).

Big data analytics implementation includes processes of managing the big data analytics capabilities and resources (such as technologies, people, and analytics processes), and transforming big data into valuable and understandable information to gain insights for effective decision-making and enhance the organizational performance (Adrian et al., 2018).

3.1.2 Big data analytics capability

Big data challenges the ability of technical facilities to manage it and puts new, advanced, and unique demands on "data storage, management, analysis, and visualization technologies." So, the main challenge is to develop the capabilities to understand and interpret big data to take advantage of the opportunities it offers (Ask et al., 2016).

The concept of big data analytics capability (BDAC) is broadly defined as the competence to deliver business insights using data management, infrastructure (technology) and talent ability (people) to transform the business into a competitive force (Akter et al., 2016). Similarly, Su et al., (2021) defines the concept of big data analytics capability as a dynamic ability to efficiently orchestrating and deploying the data, data management, data technology and talent for the generation of new insights to make decisions in real time, promoting the gaining of competitive advantages and organizational performance. With the rapid development of the Internet, the researcher believes that the capabilities of big data analysis have a vital role in improving the success rate of businesses and the performance of facilities. So, the survival and development of companies increasingly depends on big data analytics capabilities.

In a study conducted by Wamba et al., (2017) and Jeble et al., (2018), the effects of big data analytics capability on performance, found that there are three dimensions to big data analytics capabilities, represented in the following dimensions:

- Big Data Analysis Management capability: refers to the BDA unit's ability to handle routines in a structured manner to manage IT resources in accordance with business needs and priorities.

- Big Data Analysis Technological Capability: refers to the ability of the BDA infrastructure (e.g., applications, hardware, data, and networks) to enable the BDA staff to quickly develop, deploy, and support necessary system components for a firm. (Which is essential to explore and manage variety of data). So many companies have developed infrastructure to collect, analyze and use large sets of data to either make operational decisions or predictions.

20

- Big Data Analysis Personal Capability: refers to the BDA staff's professional ability (e.g., skills or knowledge) to undertake assigned tasks. (Which is important to understand, develop and apply analytics models).

Gupta and George (2016) were developed the big data analytic capability model equally relies on tangibles resources such as data, technology, basic resources, and intangibles resources such as data- driven culture and intensity of organizational learning. Furthermore, intangible resources also include perceived benefits of external and internal data usage (Adrian et al., 2018).

According to Yasmin et al., (2020), the previous studies were highlighted sets of core BDA capabilities such as data integration, analytics, predictive ability, analytic person, data interpretation and complementary organizational resources such as data governance, evidence-based decision making, and dynamic and planned capabilities.

3.2 The Balanced Scorecard perspectives

The Balanced Scorecard (BSC) is a performance management framework that can be used by organizations to track the execution of key activities and the consequences arising from those activities. The Balance Scorecard is a framework that links the performance of an organization to its strategy and emphasizes the connections between strategy, actions, and results (Kaplan and Norton, 2001).

According to Kaplan and Norton (1992), BSC approach allows managers to answer four fundamental questions: (1) How do we look to our shareholders (financial perspective)? (2) What must we excel at (internal business perspective)? (3) How do our customers see us (the customer perspective)? (4) How can we continue to improve and create value (innovation and learning perspective) (Neely et al., 2000). The performance measures are critical because they enhance communication – they enable the organization to address the following critical question – "Given our mission, how is our performance going to be defined?" (Bourne et al., 2018).

Proponents of strategic performance measurement argue that to develop strategic performance management systems, it is necessary to measure and use a variety of financial and non-financial measures (Ittner et al., 2003).

21

The Balanced Scorecard (BSC) emphasizes that financial and nonfinancial measures are all part of a system that gives information to every part of the organization (Brewer and Speh, 2000).

The financial perspective is focused on measuring the economic and financial situation of the organization (Oliveira et al., 2021).

3.2.1 Financial performance measures

Traditionally, firms have measured managerial performance using financial measures such as earnings, return on investment, or return on sales. Current profit and other financial measures only partially reflect the effects of past and current activities (Banker et al., 2000). Financial measures are used to indicate whether the company's strategy implementation and execution are contributing to improvements in the bottom Line.

Chavan (2009) showed that the exclusive reliance on financial measures was causing organizations to do wrong things. Whereas financial measures are lag indicators; they report on outcomes, the consequences of past actions.

Financial measures may only tell a fraction of a company's behavior. As a result, the financial measurement systems must be expanded to incorporate the company's intangible and intellectual assets that satisfy customers and employees (Ghanbarloo, 2020).

3.2.2 Nonfinancial performance measures

The reason for using nonfinancial measures to evaluate performance is that nonfinancial measures are leading indicators of financial performance (Kaplan and Norton 1992; Ittner and Larcker 1998). Olve et al. emphasized on the need to include nonfinancial measures in the performance measurement system. Also, recent literature suggests that organizations should place more emphasis on nonfinancial measures in their performance measurement systems (Campos et al., 2016). By also focusing on nonfinancial dimensions, the organization can assess its performance in building the key capabilities, required in terms of its strategy to survive in the future. This is especially important for companies that seek higher

returns in the long run, enter new strategies or seek competitive advantage, where the lack of these organizational capabilities threatens the long-term sustainability of the organization (Hagood and Friedman, 2002).

(A) Customer perspective

Understanding the customer's perceived value, the ability to forecast future value perceptions, and the capability to address unique customer requirements are central elements in developing and sustaining a competitive advantage (Nicola et al., 2014).

The perspective of customers is linked to initiatives about customer relationship and satisfaction (Frederico et al., 2021). Moreover, a set of studies have examined the links between customer satisfaction and financial performance, the results indicate that higher customer satisfaction means lower marketing costs, lower price flexibility, and higher customer loyalty, which in turn leads to better financial performance (Banker and Mashruwala, 2007). This perspective enables the managers to translate their general mission statement into specific measures that reflect the factors that are important to customers.

(B) Internal business process perspective

Organizational effectiveness depends on the social structure of the organization, which can be measured by employee satisfaction and worker productivity. Some theorists suggest that satisfied workers are productive workers because satisfied employees work harder and better than discouraged employees, resulting in greater organizational effectiveness (Banker and Mashruwala, 2007).

The internal perspective focuses on the analysis of the operational processes that are intended to create value in the short and long terms. This perspective is related to the organizations' productivity and efficiency (Kaplan & Norton, 1996; Oliveira et al., 2021).

(C) Learning and growth perspective

Davis and Albright (2004) stated that the foundation of the organization's BSC is a training program designed to educate and empower

employees to achieve the objectives of the other three perspectives. By enhancing employee ability to interact and learn about customer needs, improving cross-selling, and customer service, the objective can be achieved from this perspective. Measures include employee skills, computerization, the number of training hours received per month, and results in internal testing of product offerings.

Learning and growth measures focus on factors that facilitate continuous improvement (Banker et al., 2004).

3.3 Using BDA in improving strategic performance

Performance management system is a holistic system of measuring the performance of an organization. Therefore, the data produced in the company is very important for improved decision making. Performance measurement is a well-recognized and important area in the manufacturing strategy literature (Campos et al., 2016).

Reliance on nonfinancial performance measures along with financial performance measures and the availability of many internal and external data in the manufacturing environment, leads to an increase in the effectiveness of performance measurement systems. This huge amount of data is part of the big data that is being analyzed.

Structured and unstructured performance measurement process should be a useful managerial way to obtain major value from data. Therefore, the researcher believes that adopting the concept of big data and its analysis within the balanced scorecard reveals new opportunities for using and improving performance measurement and management.

3.3.1 Using BDA in improving financial performance measures

According to Su et al., (2021), An enterprise is organized with the main purpose of earning profits and therefore the ultimate objective of any related business resources, capabilities and activities is to obtain organizational performance. As private organizational sources, big data analysis capabilities are created with the aim of obtaining and improving company performance.

24

Big data analytics brings more transparency to firms and makes it easier for firms to continuously collect and analyze operational and financial data. Chong and Shi (2015) reported that valuable information from big data analytics allows managers to make more accurate business decisions.

In addition, the previous studies have focused on the relationship between big data analytics capability and financial performance (McAfee and Brynjolfsson, 2012, Akter et al., 2016, Wamba et al., 2017, Su et al., 2021). These previous studies highlight the usefulness of that relationship for price optimization and profit maximization; sales, profitability, and market share; and return on investment (ROA).

Moreover, Yasmin et al., (2020) showed that performance measures correlate with BDA capabilities, BDA capabilities are more associated with return on sales (21.52%), product development (18.41%), and number of new products and service projects (17.74%). In contrast, the growth of sales (14.77%) and market share (11.08%). While these findings cast some light on the potential link between BDA capabilities and firm performance measures, BDA capabilities tend to be more closely related to financial and operational performance measures.

Ask et al., (2016) states that 34% use Big Data for analysis and that the top five desired benefits of using it are: better targeted marketing, accurate business insights, customer segmentation, recognition of sales and marketing opportunities and automated decisions.

Therefore, the first hypothesis was developed as follows:

(*H1*): There is a significant positive impact for using big data analytics and improving financial Performance measures.

3.3.2 Using BDA in improving nonfinancial performance measures

(A) BDA and customer perspective

As customer needs and expectations shift toward real-time payments, ease of use, predictability, and e-payments, technologies associated with big data capabilities can assist in meeting such changing customer requirements

25

by providing businesses with key insights derived from customer behavior and trends (Segarra et al., 2016).

Moreover, Big data analytics can enhance customer perspective through rich data sources and advanced computational capabilities that provide additional insights across a value network along with real time identification and tracking of key factors in determining customer value perceptions.

Once online shopping moved, customer understanding increased dramatically. Online retailers can keep track of not only what customers have bought, but also what they have been looking at; how they navigated through the site; how far they have been affected by promotions, reviews, and page layouts; The similarities between individuals and groups. Before long, they developed algorithms to predict which books individual customers would want to read next algorithms that work best every time a customer responds or ignores a recommendation. Simply, traditional retailers cannot access this type of information, let alone act on it in a timely manner (McAfee and Brynjolfsson, 2012).

Following the above discussion, the second hypothesis is thus proposed below.

(*H2*): There is a significant positive impact for using big data analytics on the customer's perspective of Balanced Scorecard.

(B) BDA and internal business process perspective

Looking at big data analytics in a process perspective has major benefits since improving process drives a better outcome; satisfied customers, evidence-based practices, and better investment strategy (Ali et al., 2018).

According to Lee (2017), Big data reduces operational costs for many firms. Where firms that use data analytics in their operations have faster and more effective reaction time to supply chain issues than those that use data analytics on an ad-hoc basis. Moreover, Big data analytics leads to better demand forecasts, more efficient routing with real-time tracking during shipments, and highly optimized distribution network management.

Therefore, the third hypothesis was developed as follows:

26

(*H3*): There is a significant positive impact for using big data analytics on the process 's perspective of Balanced Scorecard.

(C) BDA and learning & growth perspective

The learning and growth perspective refers to the ability to develop continuous improvement, innovation and learning to deal successfully on the medium and long term. This perspective relates to the investments aimed at increasing the capacity of systems, processes, and human resources (Basso et al., 2018).

In the context of a company's big data function, intelligence derived from data will be of little use to the organization if managers fail to anticipate the potential of newly extracted insights. Thus, it is essential for managers to have an accurate understanding of how and where to apply the ideas extracted from their technical teams. To do this, big data managers must have the ability to understand the current needs and forecast the future needs of other business units, customers, and other partners (Gupta & George, 2016). Moreover, mutual trust and a good working relationship between big data managers and other functional managers will likely lead to the development of superior human big data skills.

According to Oliveira et al., (2021), the use of the digital technologies may support organizational learning and growth goals. The organizational communications can enhance internal business processes as well as the delivery of service quality to the businesses' customers.

Therefore, the fourth hypothesis was developed as follows:

(*H4*): There is a significant positive impact for using big data analytics on the learning & growth 's perspective of Balanced Scorecard.

4. Research Method and Sample Selection

4.1 The sample

Data collected from Information Technology executives and data analysts in various Communications Companies in Egypt. In view of the continuous development in big data, the Egyptian Ministry of Communications and Information Technology achieved during the year

2021 steady steps in implementing Egypt's digital strategy, which aims through it to adopt the latest global technology.

This study is based on a questionnaire that was conducted on the study sample. A number of 140 survey forms were distributed to the companies under study. The electronic means were used to send and receive responses. A number of (125) survey lists were received, and the number of valid survey lists reached (103). Thus, the response rate reached 74%, which is valid for statistical analysis.

4.2 Data collection

To obtain the primary data necessary for the study and testing hypotheses, this study based on a questionnaire as a primary means of collecting the necessary data and information from the respondents (research community), and it was divided into three parts:

• The first section: It consists of general data represented in the name (optional), job location, educational level, and the number of years of Experience.

• The second section: It consists of survey questions using open-ended and closed-ended questioners according to the 5-point Likert Scale, and contains five weights (5) strongly agree, (4) agreements, (3) neutrals, (2) disagreements, and (1) disagree, in order to give the greatest amount of freedom to the respondents when answering and in order for the results to be more accurate. The researcher depended on the Likert scale with the first choice to transform the descriptive statement into a quantitative statement that can be dealt with statistically.

• The third section: The survey questions included the following topics:

(A) questions related to the capabilities of big data analytics, by (12) questions.

(B) questions related to the impact of big data analytics on the four perspectives of the balanced scorecard (financial perspective, customer perspective, Internal business process perspective, and learning & growth perspective), by (26) questions.

28

4.3 Measures of variables

The study variables are the independent variable (X) which is represented in the technique of big data analytics, and the dependent variable (Y) included four axes, and the following table No. 1 summarizes the research variables.

Table (1) Research variables

variable symbol	Variable Items
X	**Information related to the capabilities of Big Data Analysis (independent variable)**
X1	The company is constantly studying innovative opportunities for the strategic using of business analytics
X2	The company conducts business analytics planning processes in a systematic manner.
X3	The company is adjusting its business analytics plans to better adapt to changing conditions.
X4	When the company makes decisions related to big data analytics, it estimates its impact on employees' work productivity.
X5	When the company makes decisions related to big data analytics, it anticipates to what extent these choices will help end users make faster decisions.
X6	When the company makes decisions about big data analytics, it estimates the cost of training that end users will need.
X7	When the company makes decisions about big data analytics, it estimates the time managers will need to oversee change.
X8	The company invites, business analysts and line managers to meet regularly to discuss important issues.
X9	Big data analysts and line managers harmoniously coordinate their efforts.
X10	Business analysts and line employees from various departments attend cross-functional meetings regularly.
X11	Big data analysts and line managers harmoniously coordinate

29

variable symbol	Variable Items
	their efforts.
X12	Information is widely exchanged between business analysts and line workers so that decision makers can access to all available knowledge.
Y	**Information related to the balanced scorecard (dependent variable)**
Y1	**BDA and financial perspective**
y11	Stakeholder decisions depend on big data analytics as a source of future information.
y12	Big data analytics helps companies to increase their rate of return on investment.
y13	Big data analytics helps companies to improve prices and maximize profits.
y14	Big data analytics helps companies to increase their market share.
y15	Big data analytics helps companies to increase sales and profitability.
y16	Big data analytics capabilities help companies to increase return on sales, product development and number of new products and service projects.
Y2	**BDA and Customer perspective**
y21	Big data helps companies to analyze customer data for include the required specifications within the product design.
y22	Big data analytics helps companies to monitor the quality of delivery services and products on time.
y23	Big data analytics helps companies improving lead times to meet ever-evolving customer requirements and specifications.
y24	Big data analytics helps companies to reduce the cost of the organization for measuring the level of customer satisfaction.
y25	Big data analytics helps companies to produce products and services without waste.
y26	Big data analytics helps companies to attract new customers,

30

variable symbol	Variable Items
	while retaining existing ones.
y27	Big data analytics helps reducing data storage costs and external support costs for data management.
y28	The ability of big data to contribute for innovation of modern methods and means to help customers understanding the nature of the services provided to them.
Y3	**BDA and Internal business process perspective**
y31	Big data helps the company sense opportunity in the business environment.
y32	Big data helps the company to reduce their operational costs.
y33	Big data analytics leads to better demand forecasts.
y34	Big data analytics leads to more efficient routing with real-time tracking during shipments.
y35	Big data analytics leads to highly optimized distribution network management.
y36	Big data helps the company to reduce the time it takes to perform operations.
Y4	**BDA and learning and growth perspective**
Y41	Big data helps the company to increase the skills of employees through continuous training programs.
Y42	The company uses digital technologies that support organizational learning and growth goals.
Y43	Big data helps the company to increase the ratio of investment in training programs to total sales.
Y44	Big data helps the company to increase employee innovation.
Y45	Mutual trust and a good working relationship between big data managers and other functional managers leads to the development of human skills.
Y46	Big data helps the company to monitor employee behavior.

(Source: The Researcher)

4.4 Hypothesis Testing

The basics data were collected and analyzed by using Statistical Package for Social Sciences (SPSS) version 23 and presented systematically using descriptive statistics, Based on the results of integrity and reliability of the importance of Big data analytics, BDA and financial perspective, BDA and Customer perspective, BDA and Internal business process perspective, BDA and learning & growth perspective have Cronbach's Alpha value greater than 0.6 , it can be stated all the variables in the research is reliable. Table 2 presents the results obtained for Reliability Analysis of all variables.

Table 2: Reliability Statistics

	Cronbach's Alpha	N of Items
Big Data Analytics	.972	12
BDA and financial perspective	.963	6
BDA and customer perspective	.961	8
BDA and internal business process perspective	.956	6
BDA and learning & growth perspective	.958	6
All	.989	38

Table 2 shows the results of the Reliability Analysis, as it becomes clear that there is a high degree of homogeneity and consistency reflected by the value of Alpha among the set of variables used, where the value for the set of all variables used in the study is .989, while this value was (1) for a set of big data analytics (the independent variable) is .972, (2) for a set of variables representing the impact of big data analytics on the financial perspective is .963, (3) for a set of variables representing the impact of big data analytics on the customer dimension is .961, (4) for a set of variables representing the impact of big data analytics on internal business process perspective is .956, (5) and for a set of variables representing the impact of

32

big data analytics on learning & growth perspective is .958 (dependent variables). Therefore, there is a high degree of homogeneity and consistency between the set of variables used.

The descriptive statistics for all variables are presented in Table 3.

Table 3: Descriptive statistics

Variable	variable symbol	Mean	S. D.
Big Data Analytics.	X	3.3196	1.20886
BDA and financial perspective.	Y1	3.2573	1.26516
BDA and customer perspective.	Y2	3.2816	1.13850
BDA and internal business process perspective.	Y3	3.2382	1.22460
BDA and learning & growth perspective.	Y4	3.2016	1.25900

The descriptive statistic for the independent variable represented in the big data analytics reflects the importance of the study variables, as the Mean of the opinions of the respondents as a whole was (3.3196) with a Standard Deviation of (1.20886). The descriptive statistics of the dependent variables also show the impact of big data analytics on the dependent variables [financial perspective with Mean (3.2573) and S. D. (1.26516), customer perspective with Mean (3.2816) and S. D. (1.13850), internal business process perspective with Mean (3.2382) and S. D. (1.22460) and learning & growth perspective with Mean (3.2016) and S. D. (1.25900)].

Correlation coefficients between the variables appear in Table 4.

The impact of Big Data Analytics in Developing Strategic Performance using Balanced Scorecard: A Field Study in Egypt

Dr. Sawsan Fawzy Mohamed Assaf

Table 4 : Correlation coefficients
Correlation

Variable	X	Y1	Y2	Y3	Y4
Big Data Analytics.	1.00				
BDA and financial perspective.	.837**	1.00			
BDA and customer perspective.	.826**	.931**	1.00		
BDA and internal business process perspective.	.830**	.917**	.925**	1.00	
BDA and learning & growth perspective.	.818**	.836**	.865**	.878**	1.00

**. Correlation is significant at the 0.01 level

Table 4 shows the results of correlation coefficients between the variables, and (a) there is a very strong direct correlation between the impact of big data analytics and the financial perspective of BSC with an average of (.837) at the $p < .001$ level, (b) there is a very strong direct correlation between the impact of big data analytics and the Customer perspective of BSC with an average of (.826) at the $p < .001$ level, (c) there is a very strong direct correlation between the impact of big data analytics and the Internal business process perspective of BSC with an average of (.830) at the $p < .001$ level, (d) there is a very strong direct correlation between the impact of big data analytics and the learning & growth perspective of BSC with an average of (.818) at the $p < .001$ level.

Regression analysis was performed to test the hypotheses as shown in Table No 5.

Table 5: Results of Regression

Panel A: BDA and financial perspective

Sig.	F	Adjusted R Square	R Square	Sig.	t	B
				.085	1.740	.350
.000(a)	235.819	.697	.700	.000	15.356	.876

Dependent variable: Financial perspective (Y1). R^2=70.0%; Adjusted R^2 = 69.7%, $p < .001$; n = 103.

Panel B: BDA and customer perspective

Sig.	F	Adjusted R Square	R Square	Sig.	t	B
				.000	3.748	.699
.000(b)	217.088	.679	.682	.000	14.734	.778

Dependent variable: customer perspective (Y2). R^2=68.2%; Adjusted R^2 = 67.9%, $p < .001$; n = 103.

Panel C: BDA and internal business process perspective

Sig.	F	Adjusted R Square	R Square	Sig.	t	B
				.026	2.253	.447
.000(c)	223.446	.686	.689	.000	14.948	.841

Dependent variable: internal business process perspective (Y3). R^2=68.9%; Adjusted R^2 = 68.6%, $p < .001$; n = 103.

Panel D: BDA and Learning & growth perspective

Sig.	F	Adjusted R Square	R Square	Sig.	t	B
				.078	1.778	.374
.000(d)	203.924	.665	.669	.000	14.280	.852

Dependent variable: Learning & growth perspective (Y4). R^2=66.9%; Adjusted R^2 = 66.5%, $p < .001$; n = 103.

The impact of Big Data Analytics in Developing Strategic Performance using Balanced Scorecard: A Field Study in Egypt

Dr. Sawsan Fawzy Mohamed Assaf

The results presented in Table 5 (Panel A, B, C, and D) indicated that the impact of Big Data Analytics is significantly and positively related to the financial performance measures, and the impact of Big Data analytics is significantly and positively related to the nonfinancial performance measures in all three perspectives of BSC. Therefore, hypothesis H1, hypothesis H2, hypothesis H3, and hypothesis H4 were supported.

The results, presented in Table 5 (Panel A), indicated that the relationship between the impact of Big Data Analytics and financial perspective of BSC was significant, where the coefficient of determination for the independent variable (big data analytics) and the dependent variable (financial measures) is Adjusted R^2 = 69.7% and it was a value of (F) = 217.088, Sig .000, which means that with a confidence level (99%), there is a statistically significant effect between Big Data analytics and financial perspective.

The results, showed in Table 5 (Panel B), indicated that the relationship between the impact of Big Data Analytics and the use of customer perspective was positive and significant, as the coefficient of the independent variable (big data analytics) and the dependent variable (customer perspective) is Adjusted R^2 = 67.9% and it was a value of (F) = 235.819, Sig .000, which means that with a confidence level (99%), there is a statistically significant effect between Big Data analytics and customer perspective.

The results, showed in Table 5 (Panel C), indicated positive and significant relationships between (a) the impact of Big Data Analytics and the use of internal business process perspective where the coefficient of determination for the independent variable (big data analytics) and the dependent variable (internal business process perspective) is Adjusted R^2 = 68.6% and it was a value of (F) = 223.446, Sig .000, which means that with a confidence level (99%), there is a significant effect between Big Data analytics and internal business process perspective.

The results, presented in Table 5 (Panel D), indicated positive and significant relationships between the impact of Big Data Analytics and the use of the learning & growth perspective where the coefficient of determination for the independent variable (big data analytics) and the

dependent variable (learning and growth perspective) is Adjusted $R^2 =$ 66.9%, and it was a value of (F) = 203.924, Sig .000, which means that with a confidence level (99%), there is a significant effect between Big Data analytics and learning & growth perspective.

5. Conclusion, limitations and future research

Big Data Analytics has emerged as a new technology with the opportunities created by digital and information revolution. The present study focuses on examining the impact of Big Data Analytics in improving both financial and nonfinancial performance measures in ICT companies in Egypt. The results revealed that the use of Big Data Analytics was positively related with the performance measurement systems. In addition, the use of BDA helps managers to analyze both structured and unstructured data using the Balanced Scorecard in each perspective: (a) financial perspective; (b) customer perspective; (c) internal business process perspective; and (d) learning and growth perspective. Additionally, the study notes that once the scope of big data analytics is defined; understand its characteristics; Correctly addressing the challenges, its application will increase by promoting the extensive use of insights.

This research is based on a questionnaire conducted on a group of executives and financial analysts to test five key aspects, Big Data Analysis, BDA and financial perspective of BSC, BDA and financial perspective of BSC, BDA and Customer perspective of BSC, BDA and Internal business process perspective of BSC, BDA and learning and growth perspective of BSC.

The empirical results indicate that measuring financial and non-financial performance based on BDA increases the ability of organizations to analyze unstructured data, increases the ability to deal with the problems of stakeholders, customers and employees in the organization quickly, reduces the cost of internal operations, and an increase in the level of growth and learning of employees and reduces the time spent on analyzing financial and nonfinancial data.

One of the limitations of this research is the sample size and response rate. Although they are sufficient for statistical analysis; However, the

sample focused on information technology companies only, and therefore does not include companies representing all sectors. For this reason, further research on the impact of big data analytics capabilities on performance is encouraged to validate relationships with larger samples in many industries. Another limitation is the generalization ability of the research findings of this study because of using a questionnaire that may be subjective.

For future research, the researcher proposes a set of topics, including:
- Comprises the managerial implications of Big Data application in supply chain.
- Integration between Big Data Technology and Blockchain Technology to improve the competitive advantage of industrial companies.
- The impact of Big Data Analytics in developing and improving performance in the service sector.
- The impact of big data on measuring and evaluating the financial and operational performance of companies listed on the Egyptian Stock Exchange.
- The impact of big data on the auditor's responsibility in reducing material misstatements in the financial statements: an applied study.

References

- Adrian, C., Abdullah, R., Atan, R., & Jusoh, Y. Y. (2018). Conceptual model development of big data analytics implementation assessment effect on decision-making. *IJIMAI*, Vol (5), No (1), pp:101-106.
- Akter, S., Wamba, S.F., Gunasekaran, A., Dubey, R. and Childe, S.J. (2016), "How to improve firm performance using big data analytics capability and business strategy alignment?", *International Journal of Production Economics*, Vol. 182, pp: 113-131.
- Ali, I. M., Jusoh, Y. Y., Abdullah, R., & Nor, R. N. H. (2018). A review on the performance measurement of big data analytics process. *Journal of Fundamental and Applied Sciences*, Vol (10), No (2S), pp:103-115.
- Ask, U., Magnusson, J., & Bredmar, K. (2016). Big data use in performance measurement and management: A call for action. *Journal of Business and Economics*, Vol (7). No (3), pp: 402-417.
- Banker, R. D., Potter, G., & Srinivasan, D. (2000). An empirical investigation of an incentive plan that includes nonfinancial performance measures. *The Accounting Review*, Vol (75), No (1), pp: 65-92.
- Banker, R. D., Chang, H., & Pizzini, M. J. (2004). The balanced scorecard: Judgmental effects of performance measures linked to strategy. *The Accounting Review*, Vol (79), No (1), pp: 1-23.
- Banker, R. D., & Mashruwala, R. (2007). The moderating role of competition in the relationship between nonfinancial measures and future financial performance. *Contemporary Accounting Research*, Vol 24, No (3), pp: 763-793.
- Basso, A., Casarin, F., & Funari, S. (2018). How well is the museum performing? A joint use of DEA and BSC to measure the performance of museums. *Omega*, Vol (81), pp: 67-84.
- Bourne, M., Melnyk, S., & Bititci, U. S. (2018). Performance measurement and management: theory and practice. *International journal of operations & production management*. Vol (38), No (11), pp: 2010-2021.
- Brewer, P. C. & Speh, Thomas W (2000). Using the balanced scorecard to measure supply chain performance Brewer, Peter CSpeh, Thomas W. *Journal of Business logistics*, Vol (21), No (1), pp: 75-93.

**The impact of Big Data Analytics in
Developing Strategic Performance using
Balanced Scorecard: A Field Study in Egypt**

Dr. Sawsan Fawzy Mohamed Assaf

- Brown B., Chui M. and Manyika J. (2011). Are you ready for the era of 'big data'? *McKinsey Quarterly*, October, pp: 1-12.
- Campos, J., Sharma, P., Jantunen, E., Baglee, D., & Fumagalli, L. (2016). Business performance measurements in asset management with the support of big data approach. *In Maintenance Performance Measurement and Management Conference*, Luleå University of Technology, pp: 89-95.
- Chavan, M. (2009). The balanced scorecard: a new challenge. *Journal of management development*, Vol (28), No (5), pp; 393-406.
- Chong, D., & Shi, H. (2015). Big data analytics: a literature review. *Journal of Management Analytics*, Vol (2), No (3), pp: 175-201.
- Davis, S., & Albright, T. (2004). An investigation of the effect of balanced scorecard implementation on financial performance. *Management accounting research*, Vol (15), No (2), pp:135-153.
- Elkmash, M. R. M., Abdel-Kader, M. G., & El Din, B. B. (2021). An experimental investigation of the impact of using big data analytics on customers' performance measurement. *Accounting Research Journal*. https://www.emerald.com/insight/1030-9616.htm.
- Elgendy, N., & Elragal, A. (2016). Big data analytics in support of the decision making process. *Procedia Computer Science*, 100, pp: 1071-1084.
- Fernando, Y., Chidambaram, R. R., & Wahyuni-TD, I. S. (2018). The impact of Big Data analytics and data security practices on service supply chain performance, *Benchmarking: An International Journal*, Vol (25), No (9), pp: 4009-4034.
- Frederico, G. F., Garza-Reyes, J. A., Kumar, A., & Kumar, V. (2021). Performance measurement for supply chains in the industry 4.0 era: a balanced scorecard approach. *International Journal of Productivity and Performance Management*. Vol (70), No (4), pp: 789-807.
- Ghanbarloo, N. V., (2020). A dynamic performance measurement system for supply chain management. *International Journal of Productivity and Performance Management*. available on Emerald Insight at: https://www.emerald.com/insight/1741-0401.htm.

40

- Gupta, M., & George, J. F. (2016). Toward the development of a big data analytics capability. *Information & Management*, Vol (53), No (8), pp:1049-1064.
- Hagood, W. O., & Friedman, L. (2002). Using the balanced scorecard to measure the performance of your HR information system. *Public Personnel Management*, Vol (31), No (4), pp: 543-557.
- Ittner, C. D., & Larcker, D. F. (1998). Are nonfinancial measures leading indicators of financial performance? An analysis of customer satisfaction. *Journal of accounting research*, Vol (36), pp:1-35.
- Ittner, C. D., Larcker, D. F., & Randall, T. (2003). Performance implications of strategic performance measurement in financial services firms. *Accounting, organizations and society*, Vol (28), No (7-8), pp:715-741.
- Jeble, S., Dubey, R., Childe, S. J., Papadopoulos, T., Roubaud, D., & Prakash, A. (2018). Impact of big data and predictive analytics capability on supply chain sustainability. *The International Journal of Logistics Management*, Vol. 29, No. 2, pp: 513-538.
- Jeble, S., Kumari, S., Venkatesh, V. G., & Singh, M. (2020). Influence of big data and predictive analytics and social capital on performance of humanitarian supply chain: developing framework and future research directions. *Benchmarking: An International Journal*, Vol. 27, No. 2, pp: 606-633.
- Kaisler, S., Armour, F., Espinosa, J. A., & Money, W. (2013, January). Big data: Issues and challenges moving forward. *In 2013 46th Hawaii international conference on system sciences,* pp: 995-1004, IEEE.
- Kaplan, R. S., and Norton, D. P. (1992). The balanced scorecard: Measures that drive performance. *Harvard Business Review*. Vol (70). No (1). pp: 9–71.
- Kaplan, R. S., and Norton, D. P. (2001). Transforming the balanced scorecard from performance measurement to strategic management: Part 1. *Accounting horizons*, Vol (15), No (1), pp: 87-104.
- Khade, A. A. (2016). Performing customer behavior analysis using big data analytics. *Procedia computer science*, Vol (79), pp: 986-992.
- Khan, M. (2019). Challenges with big data analytics in service supply chains in the UAE. *Management Decision*.

- Lee, I. (2017). Big data: Dimensions, evolution, impacts, and challenges. *Business horizons*, Vol (60), No (3), pp: 293-303.
- McAfee A. and Brynjolfsson E. (2012). Big data: the management revolution. *Harvard business review*, Vol (90), No (10), pp: 60-68.
- Memon, M. A., Soomro, S., Jumani, A. K., & Kartio, M. A. (2017). Big data analytics and its applications. *Annals of Emerging Technologies in Computing (AETiC),* Vol. 1, No. 1, pp: 45-54.
- Mohammadpoor, M., & Torabi, F. (2020). Big Data analytics in oil and gas industry: An emerging trend. *Petroleum*, Vol.6, No(4), pp:321-328.
- Neely, A., Mills, J., Platts, K., Richards, H., Gregory, M., Bourne, M., & Kennerley, M. (2000). Performance measurement system design: developing and testing a process- based approach. *International journal of operations & production management*. Vol. (20) No. (10), pp: 1119-1145.
- Nicola, S., Ferreira, E. P., & Ferreira, J. J. P. (2014). A quantitative model for decomposing & assessing the value for the customer. *Journal of Innovation Management*, Vol (2), No (1), pp: 104-138.
- Oliveira, C., Martins, A., Camilleri, M. A., & Jayantilal, S. (2021). Using the Balanced Scorecard for strategic communication and performance management. In *Strategic corporate communication in the digital age*. Emerald Publishing Limited.
- Osman, A. M. S. (2019). A novel big data analytics framework for smart cities. *Future Generation Computer Systems*, Vol (91), pp: 620-633.
- Özemre, M., & Kabadurmus, O. (2020). A Big Data Analytics based methodology for strategic decision making. *Journal of Enterprise Information Management*. Vol. 33, No. 6, pp: 1467-1490.
- Sardi, A., Sorano, E., Cantino, V., & Garengo, P. (2020). Big data and performance measurement research: Trends, evolution and future opportunities. *Measuring Business Excellence*.
- Segarra, L. L., Almalki, H., Elabd, J., Gonzalez, J., Marczewski, M., Alrasheed, M., & Rabelo, L. (2016). A framework for boosting

42

revenue incorporating big data. *Journal of Innovation Management*, Vol (4), No (1), pp: 39-68.

- Silva, B. N., Khan, M., Jung, C., Seo, J., Muhammad, D., Han, J., ... & Han, K. (2018). Urban planning and smart city decision management empowered by real-time data processing using big data analytics. *Sensors*, Vol (18), No (9), 2994.
- Silva, B. N., Diyan, M., & Han, K. (2019). Big data analytics. In *Deep Learning: Convergence to Big Data Analytics*, Springer, Singapore, pp: 13-30
- Sivarajah, U., Kamal, M. M., Irani, Z., & Weerakkody, V. (2017). Critical analysis of Big Data challenges and analytical methods. *Journal of Business Research*, Vol (70), pp: 263-286.
- Su, X., Zeng, W., Zheng, M., Jiang, X., Lin, W., & Xu, A. (2021), "Big data analytics capabilities and organizational performance: the mediating effect of dual innovations", European Journal of Innovation Management, https://www.emerald.com/insight/1460-1060.htm.
- Wamba, S. F., Gunasekaran, A., Akter, S., Ren, S. J. F., Dubey, R., & Childe, S. J. (2017). Big data analytics and firm performance: Effects of dynamic capabilities. *Journal of Business Research*, Vol (70), pp: 356-365.
- Yasmin, M., Tatoglu, E., Kilic, H. S., Zaim, S., & Delen, D. (2020). Big data analytics capabilities and firm performance: An integrated MCDM approach. *Journal of Business Research*, Vol (114), pp:1-15.