Business Intelligence and Organizational Ambidexterity a Study on Telecommunications Sector in Egypt

Author Details:
Prof. Dr. Wageeh A. Nafei
University of Sadat City, Menoufia, Egypt

Abstract

The objective of the research is to examine the influence of Business Intelligence (BI) on Organizational Ambidexterity (OA). The research population consists of all employees at Telecommunications sector in Egypt. The researcher adopted a sampling method to collect data for the study. The appropriate statistical methods such as Alpha Correlation Coefficient (ACC), Confirmatory Factor Analysis (CFA), Multiple Regression Analysis (MRA), were used to analyze the data and test the hypotheses.

The research has reached a number of results, the most important of which are (1) organizations do not rely on BI applications and technologies as a repository of data and immediate analytical processing, (2) the organizations operate in a competitive framework, represented by other organizations operating in the Egyptian environment, which makes the organization's environment suitable for using BI and competitive intelligence applications, (3) the low level of the organizations 'infrastructure to deal with the field of software that supports BI . Perhaps this is due to the organizations' tendency to deal with technologies that work to accomplish the traditional activities of the organization, (4) the interest in BI was limited to certain aspects, the most important of which is the use of BI in reviewing and completing operations within the organization, while the lesser concerns were related to various aspects, the most important of which is cooperation with individuals inside and outside the organization, and the search for new knowledge, and allowing individuals to learn in multiple locations, (5) attention has been focused on the practice of BI in specific aspects, the most important of which is the focus on ensuring that workers in the organization understand the importance of BI for the success of the organization and considering this concept as part of the organization's culture.

The study referred to a number of recommendations, the most important of which are (1) the necessity of attracting workers with experience and skill in dealing with BI techniques, as well as the possibility of developing workers in the technical field by directing them to participate in training courses in this field, (2) the use of the data warehouse as the most prominent techniques that provide analytical information through which administrative decisions are made, in addition to the analytical and immediate processing of the data and presenting it in an appropriate manner, (3) the necessity of integrating BI techniques in a manner that achieves the highest level of efficiency in exploiting and analyzing data, in order to achieve the highest level of decisions in light of the use of cost-benefit analysis, (4) identify the applications of BI in organizations operating in the same field in order to benefit from them and achieve the highest levels of benefit in this field, (5) the need to pay attention to amending the services provided by banks to their customers, with the aim of making use of BI systems in developing the performance of employees, which leads to the survival, growth, and distinction of the banking sector while it is in the process of providing services to its customers, (6) the necessity to invest in all available resources in a manner that meets the needs and desires of customers on a daily basis, and to work on increasing and diversifying the services provided.

Keywords: Business Intelligence, Organizational Ambidexterity, Telecommunications Sector

1. Introduction

The term BI appeared in 1958 when Hans Peter adopted the idea of building an automated system for disseminating information at the level of the organization (Luhn, 1958). However, the real interest in BI began in the late 1980s, as it was the beginning of the shift from focusing on reporting and information to managers to focusing more on situational analysis about how the organization has performed in the past, current performance, and future performance (Ionescu & Podaru, 2014).

Howard Dresner, Chief Executive Officer at Hyperion, is consider the father of the term BI in 1989, which he described as the concepts and methods that are used in the process of improving decision-making at work through the use of supportive systems based on facts (Evans, 2010).

The term BI has been used instead of decision support systems, executive information systems, and management information systems, and in some literature the term BI and analytics (Abai et al., 2016). Reports indicate that investments in BI tools are expected to double at the service level (Tabbitt, 2013).

In the context of the decision support environment, BI systems have improved the effectiveness of decision-making at different levels in various areas, including the industrial sector in airlines, banking, insurance, finance, securities, manufacturing, and communications (Propovic et al., 2012, Ramakrishnan et al., 2012).

Although many organizations have successfully implemented BI systems in organizational decision-making, decision-making and performance, some organizations have not achieved this (Henshen, 2008).

Researchers have viewed BI from different perspectives, with some researchers studying BI as a tool from a technical perspective (Elbashir, et al., 2008), while others have viewed BI as an approach to support decision-making (Moss & Atre, 2007).

The effectiveness of BI lies in its ability to support the decision-making process within the organization and to provide decision-makers with appropriate and timely information (Massa & Testa, 2005).

Most organizations are striving to understand the increasing diversity, speed, and volume of data that is being produced from internal and external sources. The importance and role of BI in understanding the huge volume of data and helping organizations improve their performance appears (Isik et al., 2013).

A critical component of an organization's success is its ability to make use of all available information (Cody et al., 2002). The ability to collect and analyze data and turn it into information that can be used in a timely manner is not only a necessity for success, but also a necessity for survival (Pirttimaki et al., 2006).

Investing in BI has a high priority in all organizations worldwide (Gartner, 2016), and its global market is expected to reach 22.8 billion dollars in 2020 (Ghosh, 2018).

Organizational Ambidexterity (OA) has its roots in 1976. A number of studies have confirmed that successful organizations seek new opportunities, be able to invest their current resources and uncover new possibilities (Siadat & Chaharmahali, 2010).

OA is the ability to capitalize on existing competencies and explore new opportunities (Popadić et al., 2015).

OA is the ability of an organization to allocate resources for success in both exploration and exploitation. (Yigit, 2013)

OA means an organization's ability to design structures that contribute to the application of innovation phases. OA is linked to exploitation and exploration activity. There is a fundamental difference between them. Exploitation activity is linked to processes such as optimization, efficiency, and implementation. Exploration activity is associated with processes such as variation, and experimentation (Simsek, 2009).

The idea of OA is based on the fact that the requirements imposed by the environment may be incompatible, so that the most successful organizations can reconcile them and thus enhance competitiveness (Gibson & Birkinshaw, 2004).

2. Literature Review

2.1. Business Intelligence

2.1.1. Business Intelligence Concept

The concepts presented by researchers regarding the term BI have varied and varied, depending on the scientific background or the viewpoint through which this concept is viewed.

Intelligence is the mental energy that we apply to our prior knowledge in order to generate ideas, discover relationships between things, draw conclusions, and solve problems. Intelligence has transferred to organizations and their actions, and organizations have turned to BI or the use of information systems to collect and analyze information from internal and external sources in order to make efficient and effective decisions (Chen, 2016).

BI is the leveraging of software and services to transform data into actionable vision and support strategic and tactical business decisions of the organization (Pratt & Fruhlinger, 2019).

BI is a term that encompasses analytical applications and infrastructure, as well as best practices in creating benefit (Gartner, 2019).

BI is the technologies, applications, and practices for collecting, integrating, analyzing and presenting business information to support better and faster decision-making (Balachandran & Prasad, 2017)

BI is an umbrella term that includes a variety of information technology applications that are used in analyzing the organization's data and communicating it to users (Maheshwari, 2015).

BI is the use of analytical methods with the purpose of using them both now and in the past to predict the future (Alawin & Mayteh, 2014).

BI is a set of technological tools and processes that help convert data into information, information into knowledge, and knowledge transfer to help the organization's strategy for planning and facing competitors (Loshin, 2013).

BI is a set of technologies that help to discover the best data from the huge amount of data to improve the production process (Naraina, 2013).

BI is the process of transforming raw data into useful information in order to create strategic and operational vision on the one hand, and decision-making on the other hand, with the aim of achieving real business benefits (Duan & Xu, 2012).

BI is a set of tools and techniques that help convert a large amount of data from different sources into meaningful information to support decision-making and improve organizational performance (Ramakrishnan et al., 2012).

BI is the computer-based technologies used in identifying, extracting and analyzing business data and using it in making various decisions in an organization with the aim of improving its performance (Kumar, 2012).

BI is the use of technology in the process of retrieving, extracting and analyzing the organization's data in order to produce concise and meaningful information to support decision-making, and this type of intelligence is usually presented in the form of a written report, summary or presentation with diagrams (Barbieri, 2012).

BI is the core of the organization's system, which is based on a series of strategic and tactical steps implemented by technology in terms of providing data and producing analytical results to generate an efficient and effective decision-making process in the business sector, at a time when many organizations seek to explore the vast amount of data. (Karim, 2011).

BI is a term that includes tools, databases, data warehouses, and performance management, all of which are combined into a unified software package (Turban & Volonino, 2011).

BI is a set of processes, tools, and technologies that deal with data and turn it into information, and information into knowledge, and this accumulated experience, as well as the accumulated knowledge, are transformed into sections that are managed intelligently and used in decision-making, building appropriate strategies and tactics (Turban et al., 2011).

BI is a process that focuses on supporting a variety of business functions, and using advanced analytics to create real benefit (Glancy & Yadav, 2011).

BI is a group of programs that collect and analyze data in order to assist workers in the field of making decisions efficiently and effectively (Chaudhuri et al., 2011).

BI is the approach followed by the management of an organization that allows identifying useful information relevant to its decisions (Lioyd, 2011).

BI is a set of tools and practices that help managers and users control business activities, improve organization performance and maintain competitiveness (Matei, 2010).

BI is the use of technologies, applications, and processes to collect, store and analyze data with the purpose of helping its users reach appropriate decisions (Wixom & Watson, 2010)

The steps in analyzing BI systems are to process data with the aim of producing the necessary information for its users. These steps are data collection, data storage, information dissemination and use of information (Kaplan & Norton, 2010).

BI is a set of perceptions, methods, and processes to improve managerial decisions, use information from multiple sources, and apply experiences to develop a correct understanding of business dynamics (Tabatabaei, 2010).

BI is an integrated set of tools, technologies and software used to discover, simplify and analyze information from various sources (Yeoh & Koronios, 2009).

BI is a large group of application programs that are used in data collection, analysis, and storage with the purpose of assisting business practitioners in making better decisions (Watson, 2009).

BI is a set of data repositories related to customers, competitors, the competitive environment and internal processes of the organization, which gives the organization the ability to make decisions efficiently and effectively (Dayal et al., 2009).

BI is a technological method that is used in business management to manage data in order to make better decisions (Rubio et al., 2008).

BI is a description of the applications that are used to collect, analyze and provide data and information in the organization for the purpose of making business decisions in the best possible way (Wu et al., 2007).

BI is the process of properly collecting the right information in the right way and at the right time and delivering the right results to the right people for the purpose of making appropriate decisions (Xu & Kaycl, 2007).

BI is a package of new technologies such as data warehouse, real-time analytical processor, and data search that are used in structured data processing and analysis (Haag et al., 2007).

BI is the umbrella that brings together the architecture, tools, database, analytical tools, applications, and methodologies (Turban et al., 2007).

BI is a set of tools and methods that improve executive decision-making, business activities, and increase value in an organization (Zeng et al., 2006).

BI is all that is related to obtaining, accessing, understanding, analyzing and converting one of the basic and valuable assets of the organization, which is raw data into effective information for the improvement of business and decision-making process in the organization (Azvine et al., 2006).

BI is a management philosophy and an essential tool that helps organizations manage and improve information in order to make more effective decisions (Lonnqvist & Pirttimaki, 2006).

BI is a set of approaches and processes by which raw information is converted into final information that is used in support of strategic, tactical and operational plans in a manner that leads to improved decision-making (Kimball et al., 2005).

BI is a set of software used to rationalize decisions within an organization and increase its effectiveness. This is in addition to providing the latest information on the various commercial actors (Pirttimaki, 2004).

BI is a set of analytical tools used to understand the capabilities available to the organization, trends in the market, technology used in the environment and the work of competitors, with the aim of providing the necessary information to planners and decision-makers within the organization, with the aim of converting information into a competitive advantage for the organization (Negash, 2004).

BI is a group of processes that convert data into information, as well as convert information into knowledge (Golfarelli et al., 2004).

BI is an information system that allows users to look at data in databases easily and quickly (Turban, 2002).

BI is a purposeful analytical process to collect and accurately analyze information about competitors, markets, and customers to support business decisions or convert data, information and knowledge into actionable value (Kalakota & Robinson, 2000).

2.1.2. Business Intelligence Importance

BI analyzes help to discover important trends, identify the opportunities that can be exploited, as well as the threats that must be faced, and BI helps shape SI analyzes (Fleisher & Bensoussan, 2007).

The benefits of BI are tangible and intangible, and that is why companies invest in it in the hope of a quantum leap in the future (Negash, 2004).

The tangible benefits of BI are to reduce the overall infrastructure costs in the organization by eliminating the data extraction processes that are widespread in the organization that may contain duplicate data. Accessing data from multiple sources in a centralized, single format (Watson & Wixom, 2007).

BI plays an important role in improving organizational performance (Trieu, 2018). It also contributes to improving the operational efficiency of operations, raising the dynamic capabilities necessary to innovate

new products or services, enhancing organizational intelligence, and the dynamic organizational structure (Moreno et al., 2018).

BI also helps in making appropriate strategic and operational decisions since it eliminates the method of guessing, in addition to that BI provides more accurate data on various business aspects such as financial data, production, and customers, which helps management in making decisions that are based on reality. It is not just a guess (Moreno et al., 2018).

2.1.3. Business Intelligence Dimensions

There are three dimensions of BI. They are technology, people, and strategic alignment (Torres et al., 2018; Knabke & Olbrich, 2017; Yeoh & Popovič, 2015; Sangari & Razmi 2015; Cosic et al., 2012).

2.1.3.1. Technology

Technology refers to the technological components of a BI system, and includes extracting accurate data from various process systems to be integrated into the data ware house, and using interactive reporting technology to address structural problems.

In addition to that, the use of data mining technology to deal with non-structural problems, and display information according to the user's request for the system, in addition to the necessity of integrating the BI system with other information systems.

BI technology includes data quality from its sources, information query, report generation, data visualization functions, and knowledge discovery by extracting variable information from data in databases (Yeoh & Koronios, 2010). A set of basic elements of technology must be taken into account in the sense that it is one of the basic dimensions of BI and these elements are data quality, reporting and visualization technology, discovery baseness analytic technology, user access, integration with other systems, Systems Integration (Torres et al., 2018).

2.1.3.2. People

The management role is concerned with the necessary support, the skills of the BI team, and the skills of the system user. Individuals include everything related to those related to BI systems, such as senior management, its team, and its users in terms of their predominant technical, managerial and cultural capacity that governs their actions and decisions (Mungree et el., 2013).

There is a set of basic elements for individuals in the sense that it is one of the basic dimensions of BI. These elements are to support the upper management, the team and its skills, the system user and the skills of (Yeoh, & Koronios, 2010).

2.1.3.3. Strategic Alignment

Strategic alignment means undertaking the necessary restructuring to align applications and uses of BI with the objectives of strategic operations in order to support and enhance the operational processes (Watson & Wixom, 2007).

Strategic alignment is the foundation in the governance of information systems, which requires alignment of BI, and business strategy must be aligned with strategies and plans of information technology with strategic business objectives so that information technology provides the ability to provide business value and create a clear vision of BI (Wilkin & Chenhall, 2010).

Strategic alignment means that BI strategies and plans are aligned with the objectives of operations management (Luftman, 2000).

2.2. Organizational Ambidexterity

2.2.1. Organizational Ambidexterity Concept

OA can be viewed through three perspectives. They are (1) the interval between exploitation and exploration activities, where the organization exploits at one time and explores at another, (2) the structural separation between exploitation and exploration, where the organization exploits in certain sections, and explores in other sections, (3) specialization between companies, where one company exploits, and another explores (Prieto & Santan, 2012).

OA is the link between exploring and exploiting opportunities for all individuals and sub-units of the organization (Adler & Heckscher, 2011).

OA is the ability of the organization to link exploration and exploitation to opportunities (Bodwell, 2011).

OA is the organizational capacity to exploit available competencies, as well as to explore new opportunities (Danzinger & Dumbach, 2011).

OA is the ability to use skills, achieve innovations and strive to distinguish an organization from competing organizations. This is done through the exploitation of available resources and the pursuit of skills that achieve competitive excellence focused on new opportunities (Cao, et al. 2010).

OA is the ability of an organization to capitalize on existing knowledge and explore new knowledge (Shoo, 2010).

OA is the organization's ability to optimize opportunities and seek new opportunities (Walrave et al, 2010).

OA can be embodied at the level of team operations through the ability of organization staff to find creative solutions to problems in the light of a shared vision and mutual trust (Tempelaar, 2010).

OA is the ability of an organization to perform various actions such as stabilization, the search for new resources, efficiency, flexibility, exploration, exploitation, harmonization, adaptation and overall innovation, progressive innovation, growth strategy, and profit strategy. In other words, OA is the organization's pursuit of interdependence among all activities. It also seeks to achieve adaptation by restructuring its activities in a manner that achieves competitive excellence. In other words, all activities are interconnected, and adaptation means restructuring activities quickly to meet changes in the environment (Simsek, 2009).

OA is an integrated concept that points to a twin approach to exploration and exploitation (Cao & et al., 2010).

OA is the ability of the organization to achieve both exploitation and exploration, by excelling in existing opportunities to achieve gradual innovation that is concerned with modifying an existing product, and exploring new opportunities to foster innovation that is concerned with product change (Andriopoulos & Lewis, 2009).

OA is the ability of an organization to achieve competition in two directions: to exploit available resources, and to discover new resources or business that can achieve excellence from competing organizations (Taylor & Helfat, 2009).

OA can be seen by (1) separating exploitation and exploration activities, (2) structural separation between exploitation and exploration, and (3) specialization between organizations (Tran, 2008).

OA is the organization's pursuit of innovation and short-term operational objectives while maintaining long-term performance rates (Im & Rai, 2008).

OA is the ability of an organization to operate efficiently and effectively in managing its current business at the same time as it can adapt to changes in the internal and external environment of the organization (Raisch & Brikinshaw, 2008).

OA is the ability of an organization to balance the exploitation of existing possibilities and explore new opportunities (He & Wong, 2004).

OA is the extent to which an organization can achieve adaptation to all variables that occur in the environment and strive to improve long-term performance levels (Gibson & Birkinshaw, 2004).

2.2.2. Organizational Ambidexterity Dimensions

Researchers differed on the dimensions of OA according to the different philosophy of the providers and the objectives they seek to achieve. Two fundamental dimensions of OA have been the highest agreement among researchers. In other words, there are two dimensions of OA.

They are (1) exploitation of existing capabilities and satisfying the needs of existing customers and markets by improving existing products and processes, (2) exploration refers to the search for new possibilities and opportunities, new customers and new markets through a radical change based on the introduction of new products and processes in the organization. The present study relied on two main dimensions (He & Wong, 2004; Gibson & Birkinshaw, 2004; Jansen 2005; Lubatkin et al., 2006; Bierly & Daly, 2007; Jansen et al., 2008; Shoo, 2010):

1. *Optimization of Opportunities*: It refers to an organization's ability to improve activities to create value in the short term, to meet the needs of existing customers in the market, to seek to expand existing knowledge and skills, as well as to expand existing products or services, while increasing existing distribution channels.

2. *Search for new Opportunities*: It refers to the need for the organization to mobilize its efforts to obtain new opportunities, where the organization is working to determine the future demands of existing customers, as well as anticipating changes in the type of applications, and the need for the organization to seek new opportunities. The organization can seize opportunities by adopting new ways of delivering goods and services, undertaking competitive actions to confront other organizations and how to improve the competitive position and respond to market changes.

Exploration and exploitation are competing approaches for a number of reasons, the most important of which are: (1) exploration and exploitation strategies often compete for the limited resources of the organization; (2) exploitation strategies reduce the exploration of the organization, while exploration strategies reduce the exploitation of the organization's resources, (3) the organization faces a major problem of how to balance the exploration and exploitation activities, where exploitation activities ensure the present survival, and exploration activities ensure future survival (Kyriakopoulos & Moorman, 2004).

In light of the above, exploration is concerned with exploring new possibilities and opportunities, searching for new customers and entering new markets, increasing the company's ability to adapt quickly and appropriately to the fundamental changes that occur in the market, while exploiting the current possibilities and satisfy the needs of existing customers and current markets (Patel et al., 2013).

3. Research Model

Figure (1) Proposed Comprehensive Conceptual Model
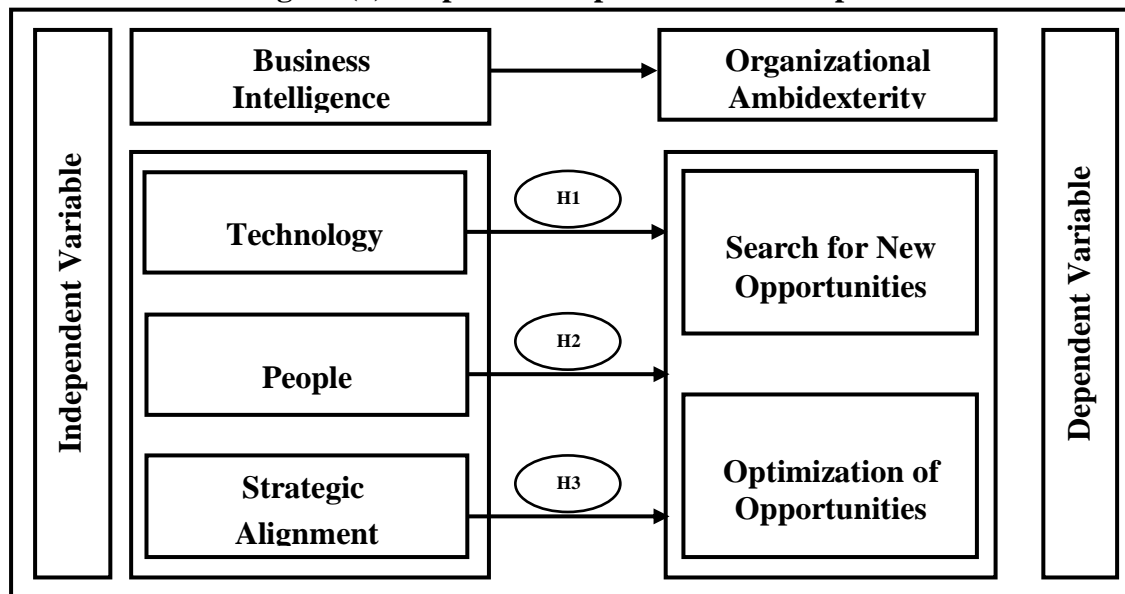
The diagram shows that there are two independent variable of BI. There is one dependent variable of OA. The framework suggests that BI have an impact on OA.

BI is measured in terms of technology, people, and strategic alignment (Torres et al., 2018; Knabke & Olbrich, 2017; Yeoh & Popovič, 2015; Sangari & Razmi 2015; Cosic et al., 2012).

OA is measured in terms of optimization of opportunities and search for new opportunities (Jansen 2005).

4. Research Questions

The first source of the research problem is to be found in previous studies. There is a lack in the number of literature review that dealt with BI and OA. This called for the researcher to test this relationship in the Egyptian environment.

In light of the review of previous studies related to BI, there is a study aimed at identifying the effect of BI on BI capabilities. The study found that there is a significant relationship between the experience of BI

employees and the capabilities of BI. The study also indicated that BI can be considered a strategic investment in improving the performance of the organization (Torres et al, 2018).

There is a study that aimed to implement the service oriented BI (SOBI) to integrate academic and financial data in the data warehouse, and to develop the data warehouse using the Galaxy system and implement it using the structural query language server. The study found that when implementing the BI-oriented service (SOBI), therefore, Dashboard applications that work to manage the data integration process must be performed, and data integration is usually done on the BI-oriented service with the help of the Web Service by building a provider. The service at the data source site and the service applicant on the Dashboard applications so that the service provider can be called by the dashboard application to perform the data retrieval process and transfer it to the data warehouse (Somya, 2018).

There is also another study aimed at identifying the effect of BI on artistic creativity. The study found a relationship between the BI dimensions represented in data storage, data mining, and immediate analytical processing on technical creativity in the organization (Irtaimeh et al, 2016).

There is a study aimed at identifying the impact of BI on managing organizational performance. The study concluded that BI is considered a basic necessity to assist decision makers in a way that leads to improving organizational performance. The study also indicated that designing a good BI system is useful to ensure that the organization's performance management is done effectively and dynamically (Yahaya et al, 2016).

There is a study aimed at identifying the way in which BI can help in knowledge management for employees. The study indicated that BI systems play an important role in achieving a competitive advantage for employees if they are able to employ and exploit BI tools such as data warehouse, data search, data analytical processing, and the process of reading, converting and writing data (Muhamnad et al., 2014).

There is another study aimed at developing a framework of critical success factors in BI. The study found all the factors that are strongly and successfully linked to the application of BI, with the exception of the technological framework, and they classified these factors from most to least important which are senior management support, the executive sponsor, the clear vision, Managing change, user engagement, aligning BI strategy with business goals, team skills, adequate resources, all of these factors lead to BI success (Mungree et al., 2013).

There is a study aimed at identifying the processes that underlie business administration and the relationship between it and BI. The study found that managing and improving work performance is a prerequisite not only for increasing commercial profitability but also for staying in a competitive and fast-moving business environment (Yan & Xiangjun, 2010).

As for OA, there have been many previous studies on the relationship between OA and some other variables, A study indicated that the characteristics of leadership and organizational structure contribute to the emergence of OA. The study confirmed the existence of a positive relationship between the characteristics of leadership and organizational structure and the balance between the dimensions of OA. The study found that OA plays the mediating role between organizational structure, leadership characteristics and organizational performance (Chang & Hughes, 2012).

Another study aimed to know the relationship between emergency rewards and social integration of the senior management team and OA. The study found a positive relationship between social integration of the senior management team and OA, while there was no relationship between emergency rewards and OA (Tempelaar, 2010).

While another study examined the impact of each executive manager and support of top management on OA. The study found a positive impact for the executive manager and senior management support on OA and the formation of an organizational structure that is skill-oriented (Cao et al., 2010).

Another study emphasized the relationship between OA and some variables such as cooperation, administrative communication, central decision-making, and the effectiveness of the team. The study pointed out that there is an inverse relationship between organizational excellence and central decision-making (Jansen et al., 2009).

Another study emphasized the relationship between OA and some variables such as cooperation, administrative communication, central decision-making, and the effectiveness of the team. The study concluded that there is a positive correlation between OA and cooperation, administrative communication,

team effectiveness and OA. The study pointed out that there is an inverse relationship between OA and central decision-making (Jansen et al., 2009).

The second source is the pilot study, which was conducted an interview with (30) employees at Telecommunications sector in Egypt. The researcher found several indicators notably the important role that could be played by BI in affecting OA at Telecommunications sector in Egypt. The research questions are as follows:

Q1: What is the relationship between BI (Technology) and OA at Telecommunications sector in Egypt?

Q2: What is the nature of the relationship between BI (People) and OA at Telecommunications sector in Egypt?

Q3: What is the extent of the relationship between BI (Strategic Alignment) and OA at Telecommunications sector in Egypt?

5. Research Hypotheses

In the light of a review of previous studies related to BI, there is a study aimed at identifying the effect of BI on the quality of decision-making. The study found that the existence of BI management has direct and indirect positive effects on data quality and information quality, and that all these factors affect the quality of managerial decision-making (Wieder & Ossimitz, 2015).

There is also another study aimed at identifying the effect of BI on the agile performance of the supply chain. The study concluded that there is a significant relationship between the different dimensions of BI in administrative efficiency, technical competence, cultural competence and the lean performance of the supply chain which is represented in customer satisfaction, productivity, Sales, delivery, cost, quality, and product development capability (Sangari & Razmi, 2015).

There is a study aimed at identifying the nature of the relationship between BI and knowledge management. The study concluded that BI systems play an important role as a tool for knowledge management for workers in the financial sector, and this is in addition to providing benefit to this sector, which is always characterized by the speed of change, as well as the huge size of Data used (Muhammed & et al., 2014).

There is also a study concerned with identifying the potential for BI to reduce the time allocated to decision-making in the organization. The study has found that the decision-making process necessarily leads to changes in the organizational behavior of all individuals working in the organization in a manner that leads to enhancing the quality of business decisions and their approach (Bara & Knezevic, 2013).

There is a study interested in learning about the role of BI in knowledge exchange. The study found that there is a significant impact of real-time analytical processing, data mining, and data warehouse on knowledge sharing. The results also indicated that BI tools had the greatest impact on sharing knowledge, and these tools are represented in the analytical processing of data, searching for it, and extracting it from all sources available to it (Barakat et al., 2013).

There is a study concerned with choosing the relationship between BI and information quality. The study found that the implementation of BI systems positively affects the quality of information. Also, the maturity of the BI system affects the quality of the information content and the quality of the methods used (Popovic et al., 2009).

As for OA, several previous studies have addressed OA as a mediating variable, not including PsyCap and SS either directly or indirectly. A study aimed to illustrate the role of OA as a mediating variable in the relationship between dynamic capabilities and competitive advantage. The study found that dynamic capabilities and OA are linked to competitive advantage, and OA plays a mediating role in the relationship between dynamic capabilities and competitive advantage (Jurksiene & Pundiziene, 2016).

There is a study found a positive relationship between OA and performance, especially in technology-oriented companies. The study also found that high levels of technology encourage OA from low levels (Han et al, 2001).

Another study examined the impact of exploration and exploitation on the performance of the organization by comparing organizations using pioneering and defensive strategies. The study found a positive correlation between exploitation and the performance of the organization, while there is a relationship between exploration and the performance of the organization (Wei et al., 2014).

Another study highlighted the role of OA as a mediating variable between organizational structure, leadership characteristics and the performance of organizations. The study confirmed that there is a positive relationship between the characteristics of leadership and organizational structure and the balance between the dimensions of OA. (Chang & Hughes, 2012). The following hypotheses were developed to decide if there is a significant correlation between BI and OA.

H1: There is no statistically significant relationship between BI (Technology) and OA at Telecommunications sector in Egypt.

H2: BI (People) has no statistically significant effect on OA at Telecommunications sector in Egypt.

H3: There is no relationship between BI (Strategic Alignment) and OA at Telecommunications sector in Egypt.

6. Research Population and Sample

The population of the study included all employees at Telecommunications sector in Egypt. The total population is 56800 employees. Determination of respondent sample size was calculated using the formula (Daniel, 1999) as follows:

$$n = \frac{N \times (Z)^2 \times P(1-P)}{d^2(N-1) + (Z)^2 \times P(1-P)}$$

A number of samples, obtained by 381 employees at Telecommunications sector   in Egypt, are shown in Table (1).

Table (1) Distribution of the Sample Size

Telecommunication Sector in Egypt	Numbers	Percentage	Sample Size
1. Telecom Egypt	33000	58%	381X 58% = 221
2. Vodafone	7800	14%	381X 14% = 54
3. Orange	8000	14%	381X 14% = 53
4. Télécommunications	8000	14%	381X 14% = 53
Total	**56800**	**100%**	**381X 100% = 381**

Source: Personnel Department at Telecommunication Sector in Egypt, 2020

Table (2) Characteristics of Items of the Sample

Demographic Variables		Frequency	Percentage
1. Gender	Male	220	73%
	Female	80	27%
	Total	**300**	**100%**
2. Marital Status	Single	110	37%
	Married	190	63%
	Total	**300**	**100%**
3. Age	From 30 to 45	200	67%
	Above 45	100	33%
	Total	**300**	**100%**
4. Educational Level	University	230	77%
	Post Graduate	70	23%
	Total	**300**	**100%**
5. Period of Experience	From 5 to 10	170	57%
	More than 10	130	43%
	Total	**300**	**100%**

7. Procedure

The goal of this study was to identify the role of BI in enhancing OA. A survey research method was used to collect data. The questionnaire included four questions, relating to BI, OA, and biographical information of employees at Telecommunications sector in Egypt. About 381 survey questionnaires were distributed. Multiple follow-ups yielded 300 statistically usable questionnaires. Survey responses were 78%.

8. Research Variables and Methods of Measuring

The 15-item scale BI section is based on Torres et al., 2018; Knabke & Olbrich, 2017; Yeoh & Popovič, 2015; Sangari & Razmi 2015; Cosic et al., 2012. There were five items measuring technology, five items measuring people, and five items measuring strategic alignment.

The 14-item scale OA section is based on Jansen, 2005. There were seven items measuring optimization of opportunities and seven items measuring Search for New opportunities.

Responses to all items scales were anchored on a five (5) point Likert scale for each statement which ranges from (5) "full agreement," (4) for "agree," (3) for "neutral," (2) for "disagree," and (1) for "full disagreement".

9. Data Analysis and Hypotheses Testing

9.1. Coding of Variables

Description and measuring of the research variables is presented in the following table:

**Table (3) Description and Measuring of the Research Variables**

Main Variables		Sub-Variables	Number of Statement	Methods of Measuring Variables
Independent Variable	Business Intelligence	Technology	5	Torres et al., 2018; Knabke & Olbrich, 2017; Yeoh & Popovič, 2015; Sangari & Razmi 2015; Cosic et al., 2012
		People	5	
		Strategic Alignment	5	
Total BI			15	
Dependent Variable	Organizational Ambidexterity	Optimization of Opportunities	7	Jansen, 2005
		Search for New Opportunities	7	
Total BD			**14**	

9.2. Construct Validity

9.2.1. Business Intelligence

The researcher used Confirmatory Factor Analysis (CFA) for BI. This can be illustrated in Figure (2).

Figure (2) CFA For BI
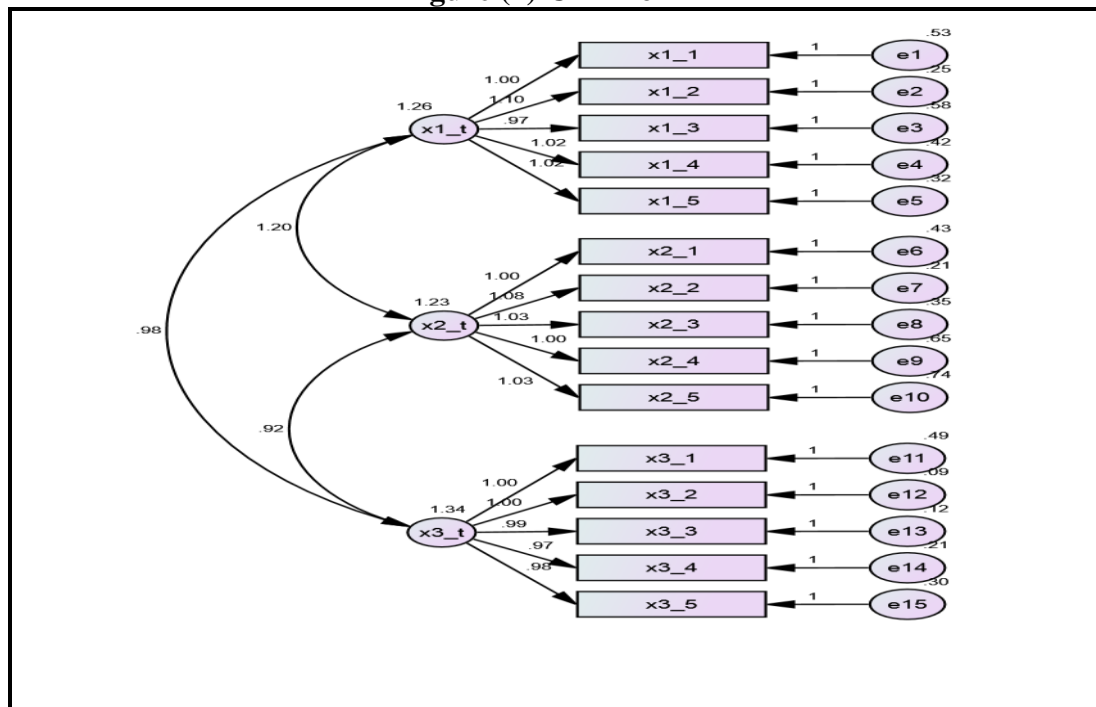
According to the previous figure, it is clear that all the statement of BI are greater than 0.50, which corresponds to GFI. This is a good indicator of all other statistical analysis. The quality indicators for BI at Telecommunications sector in Egypt can be illustrated in the following table:

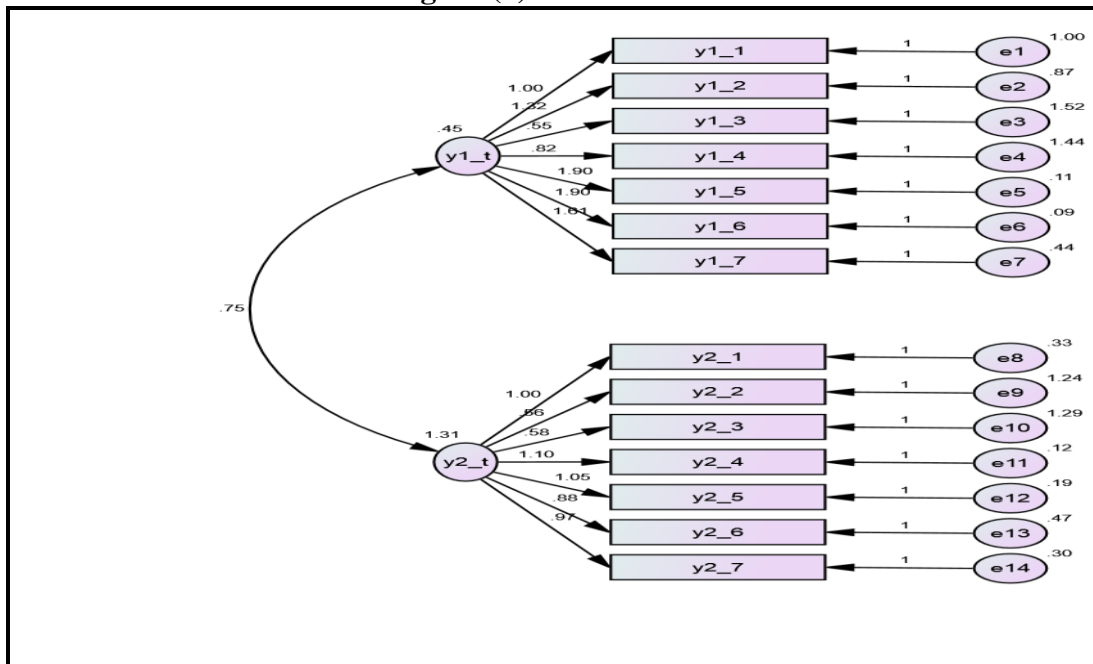### Table (4) Quality Indicators for BI Using AMOS Analysis

Test the Quality of the Model Acceptance Condition (Daire et al., 2008)	Test Value
X^2 / Degree of freedom >5	1423.912
P. value > 0.5	0.000
Goodness of fit Index (GFI) > 0.90	0.639
Tuker-Lewis Index (TLI) > 0.95	0.755
Comparative Fit Index (CFI) > 0.90	0.797
Normed Fit Index (NFI) > 0.90	0.787
Incremental Fit Index (IFI) > 0.95	0.797
Relative Fit Index (RFI) > 0.90	0.743
Root Mean Square Residual (RMR) < 0.5	0.107
Root Mean Square Error of Approximation (RMSEA) < 0.5	0.227

In light of the above-mentioned indicators, it is clear that the previous indicators are good for making all other statistical analysis.

9.2.2. Organizational Ambidexterity

The researcher used CFA for OA at Telecommunications sector in Egypt. This can be illustrated by the following figure:

Figure (3) CFA For OA

According to Figure (2), it is clear that all the statement of OA are greater than 0.50. This is a good indicator of all other statistical analysis. The quality indicators for OA can be illustrated in the following table:

Table (5) Quality Indicators for OA Using AMOS Analysis

Test the Quality of the Model Acceptance Condition (Daire et al., 2008)	Test Value
X^2 / Degree of freedom < 5	1358.165
P. value > 0.5	0.000
Goodness of fit Index (GFI) > 0.90	0.635
Tuker-Lewis Index (TLI) > 0.95	0.706
Comparative Fit Index (CFI) > 0.95	0.754
Normed Fit Index (NFI) > 0.90	0.744
Incremental Fit Index (IFI) > 0.95	0.755
Relative Fit Index (RFI) > 0.90	0.694

Root Mean Square Residual (RMR) < 0.5	0.205
Root Mean Square Error of Approximation (RMSEA) < 0.5	0.238

In light of the above-mentioned indicators, it is clear that the previous indicators are good for making all other statistical analysis.

9.3. Descriptive Analysis

Table (6) shows the mean and standard deviations of BI and OA

Variables	The Dimension	Mean	Standard Deviation
Biasness Intelligence	Technology	3.58	1.18
	People	3.51	1.19
	Strategic Alignment	3.75	1.16
	Total Measurement	**3.62**	**1.09**
Organizational Ambidexterity	Optimization of Opportunities	3.48	0.974
	Search for New Opportunities	3.42	1.04
	Total Measurement	**3.45**	**0.986**

According to Table (6), most of the respondents identified technology (M=3.58, SD=1.18), people (M=3.51, SD=1.19), strategic alignment (M=3.75, SD=1.16), and total BI (M=3.62, SD=1.09).

Regarding to OA, most of the respondents identified the optimization of opportunity (M=3.48, SD=0.974), search for new opportunities (M=3.42, SD=1.04), and total OA (M=3.45, SD=0.986).

9.4. Evaluating Reliability

Table (7) Reliability of BI and OA

Variables	Dimension	Number of Statement	ACC
Business Intelligence	Technology	5	0.940
	People	5	0.936
	Strategic Alignment	5	0.966
	Total Measurement	**15**	**0.970**
Organizational Ambidexterity	Optimization of Opportunities	7	0.875
	Search for New Opportunities	7	0.921
	Total Measurement	**14**	**0.947**

Table (7) presents the reliability of BI. The 15 items of BI are reliable because the ACC is 0.970. Technology, which consists of 5 items, is reliable because the ACC is 0.940. The 5 items related to people are reliable because the ACC is 0.936. The 5 items related to strategic alignment are reliable because the ACC is 0.966. Thus, the internal consistency of BI can be acceptable.

The 14 items of OA are reliable because the ACC is 0.947. Optimization of opportunity, which consists of 7 items, is reliable because the ACC is 0.875. The 7 items related to search for new opportunities are reliable because the ACC is 0.921. Thus, the internal consistency of OA can be acceptable.

9.5. The Means, St. Deviations and Correlation among Variables

Table (8) Means, Standard Deviations and Intercorrelations among Variables

Variables	Mean	Std. Deviation	BI	OA
Business Intelligence	3.62	1.09	1	
Organizational Ambidexterity	3.45	0.986	0.654**	1

Table (8) shows correlation coefficients between BI and OA. BI is (Mean=3.62; SD=1.09), while OA is (Mean=3.45; SD= 0.986). Also, the correlation between BI and OA is (R=0.654; P <0.01).

9.6. The Correlation between BI and OA

Table (9) Correlation Matrix between BI and OA

Research Variables	1	2	3	4
Technology	1			
People	0.898**	1		
Strategic Alignment	0.745**	0.691**	1	
Organizational Ambidexterity	0.540**	0.509**	0.765**	1

Based on Table (9), correlation between BI (Technology) and OE is 0.250 whereas BI (people) and OE shows correlation value of 0.168. Also, BI (strategic alignment) and OE is 0.315. The overall correlation between BI and OE is 0.317.

9.6.1. Business Intelligence (Technology) and OA

Table (10) MRA Results for Business Intelligence (Technology) and OA

Business Intelligence (Technology)	Beta	R	R^2
1. BI system uses accurate, error-free data.	0.278*	0.455	0.207
2. BI system provides reports for taking quick action to tackle everyday problems.	0.035	0.524	0.274
3. BI system analyzes historical data to identify trends and detect problems.	0.031	0.434	0.188
4. BI system has the ability to display information as requested by the system user.	0.239**	0.437	0.196
5. BI system has the ability to integrate with other information systems.	0.578**	0.578	0.334
▪ MCC	0.592		
▪ DC	0.351		
▪ Calculated F	31.745		
▪ Degree of Freedom	5, 294		
▪ Indexed F	3.01		
▪ Level of Significance	0.000		

As Table (10) proves, the MRA resulted in the R of 0.592 demonstrating that the 5 independent variables of BI (Technology) construe OA significantly. Furthermore, the value of R^2, 5 independent variables of BI (Technology) can explain 0.35% of the total factors in OA level. Hence, 65% are explained by the other factors. Therefore, there is enough empirical evidence to reject the null hypothesis that it said there is no relationship between BI (Technology) and OA.

9.6.2. Business Intelligence (People) and OA

Table (11) MRA Results for Business Intelligence (People) and OA

Business Intelligence (People)	Beta	R	R^2
1. The organization management encourages the use of BI system in various administrative levels.	0.223**	0.443	0.196
2. The management of the organization is interested in making operational improvements through the use of the BI system.	0.717**	0.572	0.327
3. The employees in the BI system have the appropriate technical skills.	0.059	0.475	0.225
4. The BI system workers have the ability to provide appropriate solutions.	0.381**	0.427	0.182
5. The organization provides appropriate training programs for BI system users in a timely manner.	0.395**	0.368	0.135
▪ MCC	0.598		
▪ DC	0.357		
▪ Calculated F	32.651		
▪ Degree of Freedom	5, 294		
▪ Indexed F	3.01		
▪ Level of Significance	0.000		

As Table (11) proves, the MRA resulted in the R of 0.598. This means that OA has been significantly explained by the 5 independent variables of BI (people). As a result of the value of R^2, the five independent variables of BI (people) justified 35% of the total factors in OA level. So, there is enough empirical evidence to reject the null hypothesis that it said there is no relationship between BI (people) and OA.

9.6.3. Business Intelligence (Strategic Alignment) and OA

Table (12) MRA Results for Business Intelligence (Strategic Alignment) and OA

Business Intelligence (Strategic Alignment)	Beta	R	R^2
1. The organization takes into account the restructuring of BI processes.	0.512**	0.746	0.556
2. The organization takes into account restructuring the operations of the operational divisions in order to cope with the available opportunities.	0.0.34	0.726	0.527
3. The organization takes into account that BI applications are compatible with the needs of operational management.	0.389**	0.735	0.540
4. The organization takes into account that BI applications are compatible with the objectives of the operational management.	0.222**	0.708	0.501

5. The organization is keen that BI is concerned with generating information from it.	0.260**	0.676	0.456
▪ MCC	0.790		
▪ DC	0.625		
▪ Calculated F	97.892		
▪ Degree of Freedom	5, 294		
▪ Indexed F	3.01		
▪ Level of Significance	0.000		

As Table (12) proves, the MRA resulted in the R of 0.790 demonstrating that the 5 independent variables of BI (strategic alignment) construe OA significantly. Furthermore, the value of R^2, 5 independent variables of BI (strategic alignment) can explain 0.62% of the total factors in OA level. Hence, 38% are explained by the other factors. Therefore, there is enough empirical evidence to reject the null hypothesis that it said there is no relationship between BI (strategic alignment) and OA.

10. Research Results

By reviewing the results of testing the research hypothesis, the study reached a set of results which will be reviewed and discussed as follows:

1. Telecommunications sector do not rely on BI applications and technologies as a repository of data and immediate analytical processing. Perhaps this is due to the low knowledge of workers about these applications as one of the directions that beneficiaries must deal with.
2. Telecommunications sector operate in a competitive framework, represented by other organizations operating in the Egyptian environment, which makes the organization's environment suitable for using BI and competitive intelligence applications.
3. The low level of the Telecommunications sector infrastructure to deal with the field of software that supports BI. Perhaps this is due to the organizations' tendency to deal with technologies that work to accomplish the traditional activities of the organization.
4. The interest in BI was limited to certain aspects, the most important of which is the use of BI in reviewing and completing operations within the organization, while the lesser concerns were related to various aspects, the most important of which is cooperation with individuals inside and outside the organization, and the search for new knowledge, and allowing individuals to learn in multiple locations. Perhaps this is due to the leaders 'lack of interest in adopting BI in the completion of activities and processes within the organization, in addition to the lack of technical personnel necessary to manage and operate BI systems in the organization.
5. Attention has been focused on the practice of BI in specific aspects, the most important of which is the focus on ensuring that workers in the organization understand the importance of BI for the success of the organization and considering this concept as part of the organization's culture. Therefore, the organization focused on the need to support the top management in achieving the role of BI in the success of the organization. As for the aspects that received a lesser level of attention, they were represented in the organization's management expecting a high level of participation in the development and exchange of experiences in the field of BI.
6. The interest of Telecommunications sector in the vital role played by BD technology and BI in transforming data into information, which is the first step in knowledge management, as well as the extent of organizations 'interest in all methods and procedures related to improving performance in the organization.
7. Telecommunications sector use data from a variety of sources, and that is why organizations are keen to use BD technology to link their various data sources, store them, and facilitate the speed of their analysis, with the aim of studying them and making use of them in all the different work in the organization.
8. Telecommunications sector adopt many data analyzes that help them in analyzing what happened in the past regarding customers in terms of their desires and needs, and predicting what will happen in the future.
9. The operational management in Telecommunications sector seeks to improve the quality of the services they provide as a major factor in achieving customer satisfaction, as well as the desire to increase the

size of their customers, which leads to a reduction in the cost of producing their services on the one hand, and the speed in delivering the service with the required specifications on the other hand.

10. There is a conviction from the operational management that BI plays an important role in improving and developing the operational performance in the organization, in addition to the interest of the operational management in the necessity and importance of effective use of BI in order to make the appropriate decision at the appropriate time.

11. Recommendations

In the light of the previous results, the researcher concluded with a set of recommendations summarized as follows:

1. The necessity of attracting workers with experience and skill in dealing with BI techniques, as well as the possibility of developing workers in the technical field by directing them to participate in training courses in this field.

2. The use of the data warehouse as the most prominent techniques that provide analytical information through which administrative decisions are made, in addition to the analytical and immediate processing of the data and presenting it in an appropriate manner.

3. The necessity of integrating BI techniques in a manner that achieves the highest level of efficiency in exploiting and analyzing data, in order to achieve the highest level of decisions in light of the use of cost-benefit analysis.

4. Identify the applications of BI in Telecommunications sector operating in the same field in order to benefit from them and achieve the highest levels of benefit in this field.

5. The need to pay attention to amending the services provided by banks to their customers, with the aim of making use of BI systems in developing the performance of employees, which leads to the survival, growth, and distinction of the banking sector while it is in the process of providing services to its customers.

6. The necessity to invest in all available resources in a manner that meets the needs and desires of customers on a daily basis, and to work on increasing and diversifying the services provided.

7. Interest in designing flexible organizational structures with which the organization's management can respond to the increasing changes in the market on the one hand, and strengthening its position in the application of BI systems on the other hand.

8. Work to form communication networks with academic institutions, whether universities, research centers or others, with the aim of getting acquainted with what is new in the field of BI systems and benefiting from them.

9. Conducting more studies and research in the field of BI and making use of it in developing, improving and diversifying the services provided by the organization.

10. The need for Telecommunications sector to pay attention to employing BI tools in building strategic information systems and activating their role in all different areas in the organization.

11. Benefiting from the experiences of developed Telecommunications sector and countries in building and employing BI tools and making use of available technologies, developing them and supporting them in a manner that leads to efficient and effective use of them.

12. The need for higher management in the Telecommunications sector to pay attention to the mechanism of obtaining information from the various parties, so that this information is stored in the organization's storage warehouses after verification, collection and transfer so that the organization can use it well in all its decisions.

13. Increasing the interest of senior management in generating knowledge from employees and converting it into tacit knowledge, through which it is possible to achieve competitive excellence and excellence for the organization.

14. The need to pay attention to the causes of the decline in interest in the BI system by strengthening the relationships between all existing information systems in the organization, and choosing modern technology in collecting information, in addition to working to exploit the implicit knowledge possessed by workers in the organization, which leads to building learning organization.

15. The necessity of investing the progress made between the BI system in enhancing knowledge transfer processes on the basis that it is the main gateway to achieving the learning organization, by identifying the necessary resources for the development of the organization, and the optimal investment for the BI system in knowledge acquisition and sharing among users in a manner that allows the organization to diversify Its informational resources.

16. Increasing attention to the need to build the technical capabilities of individuals working in the field of information technology, through specialized training courses that increase their capabilities and skills in the field of BI technology.

17. The necessity and importance of spreading a culture of reliance on data among the organization's personnel in a manner that leads to the exploitation of the capabilities provided by both BI and OA in improving the performance of all different operations of the organization.

18. The necessity of holding training courses and workshops at the level of the operational departments in the organization in order to identify the importance of data and BI and their role in improving the operational performance of the organization.

12. Future Studies

The present study attempts to reveal the dimensions of BD and its impact on the dimensions of the BI, but the scope of this study, the methods used and its findings indicate that there are areas for other future studies.

Among these research areas are (1) the impact of BD on BI in different sectors, (2) the effect of BI on SI, (3) the impact of BI on organizational excellence, (4) the impact of BI on strategic success, (5) the impact of BI on organizational prowess, (6) the role of BD and BI in improving operational performance, (7) the role of SI in facing crises, (8) The role of SI in human capital management, (9) the relationship between SI and some other concepts such as strategic thinking, strategic management, (4) the reality of SI in the banking sector (10) the impact of SI in achieving institutional excellence, (11) The role of strategic knowledge in enhancing SI.

References

i. *Abai, N. Hani, N. Yahaya, J. and Deraman, A. (2016). Business Intelligence and Analytics in Managing Organizational Performance: The Requirement Analysis Model. Journal of Advances in Information Technology, 7(3), PP. 208-213.*

ii. *Adler, P. and Heckscher, C. (2011). Collaborative Community is the Basis of Organizational Ambidexterity, available at: https://msbfile03.usc.edu/digitalmeasures/padler/intellcont/version %209.7.2011.single-1.pdf.*

iii. *Alawin, A. and Mayteh, M. (2014). Proposed Ranking for Point of Sales using data mining for telecom operators, International Journal of Database Management Systems (IJDMS), 6(3). PP.17-31.*

iv. *Andriopoulos, C., and Lewis, W. (2009). Exploitation- Exploration Tensions and Organizational Ambidexterity: Managing Paradoxes of Innovation. Organization Science, 20(4), PP.696-717.*

v. *Azvine, B. Cui, Z. Nauck, D. Majeed, B. (2006). Real Time Business Intelligence for the Adaptive Enterprise, IEEE Joint Conference: The 8th IEEE International Conference on E- Commerce Technology and the 3rd IEEE International conference on Enterprise computing, E- Commerce, and E-Services (CEC/EEE,06) IEEE, San Francisco, California.*

vi. *Balachandran, B and Prasad, S. (2017). Challenges and benefits of deploying big data analytics in the cloud for business intelligence. Procedia Computer. Science, 112(1), PP.112-1122.*

vii. *Bara D. and Knezevic, N. (2013). The Impact Of Right-Time Business Intelligence On Organizational Behavior," Interdisciplinary Management Research, Josip Juraj Strossmayer University of Osijek, Faculty of Economics, Croatia, vol. 9, pages 27-42.*

viii.   Barakat S. Al-Zu'bi H. Al-Zegaier H. (2013). *The role of business intelligence in knowledge sharing: a Case Study at Al-Hikma Pharmaceutical Manufacturing Company, European Journal of Business and Management, Vol.5, No.2, PP.237-243.*

ix.   Barbieri, D. (2012). *Business Intelligence and its Applications to the Public Administration, Journal of Business Management and Applied Economics, PP1-9.*

x.   Bierly, E., and Daly, P.(2007). *Alternative Knowledge Strategies, Competitive Environment, and Organizational Performance in Small Manufacturing Firms. Entrepreneurship theory and practice,31, PP.493-516.*

xi.   Bodwell, W. (2011). *A Theoretical Model of Organizational Ambidexterity in Hospitals, Doctorate Dissertation, Colorado State University, Colorado.*

xii.   Cao, Q. Simsek, Z. and Zhang, H. (2010). *Modeling the Joint Impact of the CEO and the TMT on Organizational Ambidexterity", Journal of Management Studies ,Vol.(47), No.7, PP.1272- 1296.*

xiii.   Chang, Y and Hughes, M, (2012). *Drivers of innovation ambidexterity in small- to medium-sized firms", European Management Journal ,Vol.(30),No.1, PP.1-17.*

xiv.   Chaudhuri, S., Dayal U., and Narasayya, V. (2011). *An overview of business intelligence technology. Communications of the ACM, 54(8), PP.88-89.*

xv.   Chen, C. (2016). *Use cases and challenges in telecom big data analytics, APSIPA Transactions on Signal and Information Processing, 5(1), PP.1-7.*

xvi.   Cody, W., Kreulen, J., Krishna, V., and Spangler, W. (2002), *The integration of business intelligence and knowledge management, IBM Systems Journal, 41(4), 697-713*

xvii.   Cosic, R., Shanks, G., and Maynard, S. (2012). *Towards a business analytics capability maturity model. Proceeding of 23rd, Australasian Conference on Information Systems, Geelon, Australia.*

xviii.   Danzinger, F. and Dumbach, M. (2011). *Communities for Innovation as Enablers of Cyclical Ambidexterity in SMEs, www.user.tu-berlin.de/komm/CD/paper/060233.pdf*

xix.   Dayal, U., Castellanos, M., Simitsis, A. and Wilkinson, K. (2009). *Data integration flows for Business Intelligence. Proceedings of the 12th International Conference on Extending Database Technology: Advances in Database Technology (EDBT '09), Martin Kersten, Boris Novikov, Jens Teubner, Vladimir Polutin, and Stefan Manegold (Eds.). New York, USA, PP. 1-11.*

xx.   Duan, L., and Xu L.D. (2012). *Business intelligence for enterprise systems: a survey, Industrial Informatics, IEEE Transactions on Industrial Informatics, 8(3), PP. 679- 687.*

xxi.   Elbashir Z., Collier A., and Davern J. (2008). *Measuring the Effects of Business Intelligent Systems: The Relationship between Business Process and Organizational Performance". International Journal of Accounting Information Systems, (9), PP. 135-153.*

xxii.   Evans, P. (2010). *Business Intelligence is a Growing Field. Data Base Journal. Retrieved January 12, 2019 from, Available at: www.databasejournal.com/features/article.php/3878566/Business-Intelligence- is-a-Growing-Field.htm.*

xxiii.   Fleisher, C. and Bensoussan, B. (2007) *Business and Competitive Analysis: effective application of new and classic methods. Upper Saddle River: FT Press.*

xxiv.   Gartner (2016). *Gartner Says Worldwide Business Intelligence and Analytics Market to Reach $16.9 Billion in 2016. Retrieved January 7, 2019 from: https://www.gartner.com/en/newsroom/press-releases/2016-02-03-gartner-says- worldwide-business-intelligence-and-analytics-market-to-reach-17-billion-in- 2016*

xxv.   Gartner (2019). *Business Intelligence (BI). Retrieved January 6, 2019 from: https://www.gartner.com/it-glossary/business-intelligence-bi/*

xxvi.   Ghosh, P. (2018). *Business Intelligence and Analytics Trends in 2018. Retrieved February 12, Available at: http://www.dataversity.net/business-intelligence- analytics-trends-2018/.*

xxvii.   Gibson, C. and Birkinshaw, J. (2004). The Antecedents, Consequences, and Mediating Role of Organizational Ambidexterity, Academy of Management Journal 2004, 47 (2), PP. 209–226.

xxviii.   Glancy, F. and Yadav, S. (2011). Business Intelligence Conceptual Model, International Journal of Business Intelligence Research, 2(2), PP. 48-66

xxix.   Golfarelli, M, Rizzi, S and Cella, I., (2004). Beyond data warehousing: what's next in business intelligence? Washington, DC, USA, 7th ACM international workshop on Data warehousing and OLAP.

xxx.   Haag, S. Cummings, M. and Phillips, A. (2007). Management Information Systems, 6th ed, Irwin McGraw-Hill, New York, U.S.A

xxxi.   Henshen, D. (2008). Special Report: Business Intelligence Gets Smart. Information Week.

xxxii.   Ionescu, B., and Podaru, S. (2014). Business Intelligence. A Presentation of the Current Lead Solutions and a Comparative Analysis of the Main Providers. Database Systems Journal, 5 (2), PP.60-69.

xxxiii.   Isik O., Jones C., and Siorova A. (2013). Business Intelligence Success: The Roles of BI Capabilities and Decision Environments. Information & Management, (50), PP. 13-23.

xxxiv.   Kalakota, R., and Robinson, M. (2000). E-business: Roadmap for success. Addison-Wesley.

xxxv.   Kaplan R. and Norton D. (2010). Le tableau de bordprospectif, ed. Eyrolles, Paris, France.

xxxvi.   Karim, A. (2011). The value of Competitive Business Intelligence System (CBIS) to Stimulate Competitiveness in Global Market, International Journal of Business and Social Science, Vol. 2, No. 19, PP. 196-203.

xxxvii.   Kimball, R. Reeves, L. Ross, M. and Thornthwaite, W. (2005), The data warehouse: Guide de conduit de project, ed. Eyrolles, Paris, France.

xxxviii.   Knabke, T., and Olbrich, S. (2017). Building novel capabilities to enable business intelligence agility: results from a quantitative study. Information Systems and e-Business Management. 16(3), PP.493–546.

xxxix.   Kumar, P. (2012). Impact of Business intelligence in India, Telecom Industry, Business Intelligence Journal, July, Vol.5 No.2. poonamkumar123@gmail.com

xl.   Lioyd, J. (2011). Identifying Key Components of Business Intelligence Systems and Their Role in Managerial Decision making, Master of Applied Information Management Program, University of Oregon.

xli.   Lonnqvist, A., and Pirttimaki, V. (2006). The measurement of business intelligence. Business Intelligence, 23 (1), PP.32-40.

xlii.   Loshin, D. (2013). Business Intelligence The Savvy Managers Guide, Elsevier Morgan Kaufmann Publisher, USA.

xliii.   Luftman, J. (2000). Assessing Business-IT Alignment Maturity. Communications of the Association for Information Systems, 4, https://doi.org/10.17705/1CAIS.00414

xliv.   Luhn, H. (1958). A Business Intelligence System. IBM Journal of Research and Development, 2(1), PP.314-319.

xlv.   Maheshwari. (2015). A. Business Intelligence and Data Mining. - New York: Business Expert Press, LLC.

xlvi.   Massa, S., and Testa S. (2005). Data Warehouse-In-Practice: Exploring the Function of Expectations in Organizational Outcomes". Information Management, (42), PP. 709-718.

xlvii.   Matei, G., (2010), a collaborative approach of business intelligence systems, Journal of Applied Collaborative Systems, Vol. 2, No 2, PP.91-101.

xlviii.   Moreno, V. Carvalho, W., and Cavazotte, F. (2018). Does Business Intelligence and Analytics Leverage Dynamic and Operational Capabilities? An Empirical Study in a Brazilian Telecommunications Company. Twenty-fourth Americas Conference on Information Systems, New Orleans, 6(1), PP.1-10

xlix.   Moss, T., and Atre S. (2007). Business Intelligence Roadmap. Boston: Pearson Education Inc.

l.   Muhammad, G., Ibrahim, J., Bhatti, Z., and Waqas, A. (2014). Business Intelligence as a Knowledge Management Tool in Providing Financial Consultancy Services American, Journal of Information Systems, 2(2), PP.26-32.

li.   Mungree, D. Rudra, A. and Morien, D. (2013). *A Framework for Understanding the Critical Success Factors of Enterprise Business Intelligence Implementation, Proceedings of the Nineteenth Americas Conference on Information Systems; Chicago, Illinois, AMCIS, PP. 1–9.*

lii.   Naraina A. (2013). *Business Intelligence, UniSa, Stu Docu, Available https://www.studocu.com/row/user/264074 8*

liii.   Negash, S. (2004). *Business Intelligence. Communications of the Association for Information Systems, 13, PP. 199-195, https://doi.org/10.17705/1CAIS.01315*

liv.   Pirttimäki, V. (2004). *The Roles of Internal and External Information in Business Intelligence, Frontiers of E-Business Research, PP. 385-396.*

lv.   Pirttimäki, V., Lönnqvist, A., and Karjaluoto, A. (2006). *Measurement of Business Intelligence in a Finnish Telecommunications Company. The Electronic Journal of Knowledge Management, 4(1), PP. 83-90.*

lvi.   Popovic A., Hackney R., Coelho S. and Jaklic J. (2012). *Towards Business Intelligence Systems Success: Effects of Maturity and Culture on Analytical Decision Making". Decision Support Systems, (54), PP. 729-739.*

lvii.   Popovič, A. Coelho, P. and Jaklič, J. (2009). *The Impact of Business Intelligence System Maturity on Information Quality (December 21, 2009). Information Research, Vol. 14, No. 4, Available at SSRN: https://ssrn.com/abstract=1625573.*

lviii. Pratt M and Fruhlinger. J. (2019). *What is business intelligence? Transforming data into business insights. - cio.com, Available at: https://www.cio.com/middle-east/*

lix.   Ramakrishnan T., Jones C. and Sidorova A. (2012). *Factors Influencing Business Intelligence (BI) Data Collection Strategies: An Empirical Investigation. Decision Support Systems, 52, PP. 486-496.*

lx.   Rubio, J. and Crawford, B. (2008), *An approach towards the integration of Adaptive Business Intelligent and Constraint Programming, Hyderabad, India, International Symposiums on Information.*

lxi.   Sangari, M. and Razmi, J. (2015). *Business intelligence competence, agile capabilities, and agile performance in supply chain: An empirical study, The International Journal of Logistics Management, 26 (2), PP. 356-380. https://doi.org/10.1108/IJLM-01-2013-0012.*

lxii.   Somya R. Manongga, D. Pakereng M. (2018). *Service-Oriented Business Intelligence (SoBI) for Academic and Financial Data Integration in University, International Seminar on Application for Technology of Information and Communication, PP.1-5.*

lxiii. Tabbitt, S. (2013). *BI Services Market Predicted to Double by 2016, Information Week, (2013).*

lxiv.   Tabtabaei, S. (2010). *Evaluation of Business intelligence Maturity Level in Iranian Banking industry, MASTER THESIS, Tarbiat Modares University Faculty of Engineering Department Industrial Engineering Lulea University of Technology, Iran.*

lxv.   Torres, R., Sidorova, A., and Jones, M. (2018). *Enabling firm performance through business intelligence and analytics: A dynamic capabilities perspective. Information & Management. doi:10.1016/j.im.2018.03.010*

lxvi.   Trieu, V. Cockcroft, S. and Perdana, A. (2018). *Decision-Making Performance in Big Data Era: The Role of Actual Business Intelligence Systems Use and Affecting External Constraints. Research-in-Progress Papers. 38. https://aisel.aisnet.org/ecis2018_rip/38.*

lxvii. Turban, E. Liang, J. Sharda, R. (2007). *Decision Support and Business Intelligence Systems, Eighth Edition, Prentice Hall, New Jersey.*

lxviii. Turban, E., and Volonino, L. (2011). *Information Technology for Management: Improving Strategic and Operational Performance, 8th Ed., Wiley, Hoboken, New Jersey.*

lxix.   Turban, E., Sharda, R., Aronson, J, and King, D. (2011). *Business Intelligence: A Managerial Approach, Prentice Hall.*

lxx.   Watson H. and Wixom, B. (2007). *The Current State of Business Intelligence, IEEE Computer, Vol. 40, No. 9, PP. 96-99. doi:10.1109/MC.2007.331*

lxxi.   Watson, H. (2009). *What is new and important in Business Intelligences, ITI'09, 31st International Conference on Information Technology Interfaces.*

lxxii. Wilkin, C. and Chenhall, R. (2010). *A Review of IT Governance: A Taxonomy to Inform Accounting Information Systems. Journal of Information Systems: Fall Vol. 24, No. 2, PP. 07-146.*

lxxiii.   *Wixom, B. and Watson, H. (2010). The BI-based organization. International Journal of Business Intelligence Research, 1(1), PP.13-28.*

lxxiv.   *Wu, L. Barash, G. Bartolini, C. (2007). Service-oriented Architecture for Business Intelligence, Berlin: Springer.*

lxxv.   *Xu, M. and Kaye, R. (2007). The Nature of Strategic Intelligence, Current Practice and Solutions, In Xu, M. (Ed). Managing strategic intelligence. PP. 36-53. Hershey, PA: Information Science Reference.*

lxxvi.   *Yan S. and Xiangjun L. (2010). The Role of Business Intelligence in Business Performance Management, 3rd International Conference on Information Management, Innovation Management and Industrial Engineering.*

lxxvii.   *Yeoh, W. and Koronios, A. (2010). Critical success factors for business intelligence systems, Journal of computer information systems, 50 (3), PP.23-32, URL: https://pdfs.semanticscholar.org/7a66/7cdb124e404be1f0152260eade99b1f8d217.pdf.*

lxxviii.   *Yeoh, W., and Popovič, A. (2015). Extending the understanding of critical success factors for implementing business intelligence systems. Journal of the Association for Information Science and Technology, 67(1), 134-147.*

lxxix.   *Zeng, L. Xu, Lida, S. Shi, Z. Wang, M. and Wu, W. (2006). Techniques, Process, and Enterprise Solutions of Business Intelligence, SMC '06. IEEE International Conference on, Systems, Man and Cybernetics, PP. 4722-4726.*