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EDITORIAL

Dear Readers,

It is with great pleasure and enthusiasm that we present to you the first issue of the third volume of the International Journal of Business Analytics and Security (IJBAS). As the world becomes increasingly interconnected and data-driven, the importance of business analytics and security has never been more crucial. This issue, like those before it, aims to explore the latest advancements, trends, and challenges in these dynamic fields.

With the rapid growth of digital technologies and the ever-expanding volume of data being generated, organizations across industries are realizing the immense potential of business analytics to drive informed decision-making, improve operational efficiency, and gain a competitive edge. In this volume, we bring you a collection of articles that cover a broad spectrum of topics related to business analytics, including predictive modeling, data mining, machine learning, data visualization, and artificial intelligence. These articles not only offer theoretical insights but also provide practical applications and case studies from various industries, showcasing the real-world impact of business analytics.

In addition to the vital field of business analytics, this issue also emphasizes the critical aspect of security in today's digital landscape. As organizations increasingly rely on data-driven technologies, the need for robust security measures to safeguard sensitive information has never been more important. The articles in this volume explore various facets of cybersecurity, including threat detection and prevention, risk management, privacy protection, and secure data transmission. By delving into these topics, we aim to promote a comprehensive understanding of the challenges posed by cyber threats and to provide insights into effective security strategies.

We would like to express our deepest gratitude to the authors who have contributed their valuable research to this issue. Their dedication, expertise, and commitment to advancing the fields of business analytics and security have made this volume possible. We also extend our heartfelt appreciation to the reviewers for their meticulous evaluation and constructive feedback, ensuring the high quality and rigor of the published articles.

Editor-in-Chief
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Critical Evaluation on Business Excellence Models (BEM) – A Case Study

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A B S T R A C T

When looking at companies that have adopted TQM as part of their corporate strategic planning, DEWA stands out as one of the most successful. Examining the specifics of DEWA's strategy and the rules it follows to be an innovative corporation is essential to understand how the company got successful. This research analyzes quality management and discusses various topics relevant to Excellence and TQM. Subsequently, how DEWA practices and implements overall quality management, with an emphasis on multiple divisions, where several patent applications have been filled. The results indicate that DEWA systematically assesses its quality management concepts highlighting TQM and the BEM they use (EFQM) to ensure they are in line with the strategy of the business and the global innovation index. Due to organization's high level of implementation and focus on quality, no major gaps were observed. However, there is always a need to maintain forward momentum, in which it requires the company's concepts to be in sync with all these principles (TQM & BEM) along with ISO, and risk management.

1. INTRODUCTION

Due to the industrial revolution and increased development in global trade, all organizations around the world were forced to meet international standards in terms of quality management (QM) by seeking excellence and innovation through the application of quality concepts in management and the adoption of standard specification models, referred as Business Excellence Models (BEMs) (Youssef et al., 2017). This has led to the emergence of a competitive number of approaches such as; TQM, ISO9000, Kaizen, Lean Six Sigma, etc. As well as the BEMs such as; DGEM, EFQM, MBNQA, ABEF, etc (Abusa and Gibson, 2013).

TQM is considered a way of thinking that leads to applying quality principles in all organizational activities to achieve world-class performance (Singh and Singh, 2014). It is achieved by considering activities that would attain customer satisfaction and ensure continuous improvement throughout all organization's processes (Martínez-Lorente et al., 2004). While BEMs are identified as overarching frameworks used by organizations to assess their quality practices and improve performance (Al-Juboori and Al-Azemi, 2016). However, the organization's culture of implementing excellence is considered also a key driver to succeed in applying such philosophy (Koval et al., 2019).

As stated by Prajogo et al. (2006), a rebirth in organization management has been represented by QM, focusing on excellence as a result of global

competition and economic liberalization (Prajogo and Brown, 2006). Since the emergence of modern quality practices in the mid-1980s until today, quality management has attracted more attention from organizational management, leading most countries worldwide to focus on BEMs, highlighting it as a significant factor of success and a critical mechanism for achieving improved performance and national competitiveness (Ellitan and Dihardjo, 2021).

One primary industry that focuses on quality is the Public Sectors of Water & Electricity. Upon (Setiawan and Purba, 2021) research on the best quality management approach applied for this sector, TQM has marked the highest ratio of success among other proposed philosophies and traditional methods (Al-Juboori and Al-Azemi, 2016; Almasaeid et al., 2022; H. M. Alzoubi et al., 2022c). The study has approved that applying TQM for the mentioned sector noticeably influences the organization's success positively by contributing to reducing costs and expenses (Alzoubi et al., 2021; Kassem and Martinez, 2022), improving customer satisfaction and supplier performance, and improving profit directly after applying TQM (H. M. Alzoubi et al., 2022e).

This research aims to explore the TQM and BEM applied in the local-based public water & electricity sector, DEWA, focusing on the organization's benefits upon applying such philosophy, current quality culture, TQM compatibility, quality management systems, quality processes development, and the critical challenges encountered. The research also intends to identify gaps and shortcomings within the organization's applied models and philosophy and propose recommandations for further improvement.

2. LITERATURE REVIEW

2.1 Quality Management in relation to Business Performance

Quality is of utmost importance in the modern, highly competitive economy (R. S. Al-Maroof et al., 2021b; T M Ghazal et al., 2023a). As stated by Singh & Singh, loss in quality is directly results in loss of customers (Abudaqa et al., 2021; AlDhaheri et al., 2023; Muhammad Turki Alshurideh et al., 2022b; Farrukh et al., 2023). Overall competition in the global market has led companies to make sustained efforts in improving quality to achieve better products, services (Alzoubi et al., 2021, 2019; Amiri et al., 2020; E. Khatib et al., 2022), processes, and eventually better performance (Al-Kassem et al., 2022; Alshurideh et al., 2023b, 2023c; H. M. Alzoubi et al., 2022b, 2022g; Varma et al., 2023). Many different models can be used to execute quality management, including those from the European Foundation for Quality Management (Aziz et al., 2023; El Khatib et al., 2020a; Sakkthivel et al., 2022), the International Organization for Standardization (ISO), and the Malcolm Baldrige National Quality Program (Taher M. Ghazal et al., 2023)(Ghazal et al., 2021)(Aziz et al., 2023; M. El Khatib et al., 2021). The objective of the quality movement is to improve the overall level of work performed at an organization on all levels (Alshawabkeh et al., 2021; Louzi et al., 2022b). It guarantees that the activities will be carried out well and that internal and external customers' needs will be met (Arshad et al., 2023)(El Khatib et al., 2019)(T M Ghazal et al., 2023c; Hani Al-Kassem, 2021). One must first focus on raising the bar for quality to reach the pinnacle of performance (T M Ghazal et al., 2023b). Excellence is the state of being exceptional (Al-Kassem, 2017; Alshurideh et al., 2022; Anaam et al., 2023). To achieve business excellence, one must go above and beyond what internal and external customers expect (I. Akour et al., 2022; El Khatib and Ahmed, 2019). Profitability and customer satisfaction go hand in hand, which is why an excellent business can achieve both (Al-Kassem et al., 2013; El Khatib and Ahmed, 2018; Louzi et al., 2022a). To excel means to win in a competitive market by acquiring and delivering superior goods and services to consumers in the least amount of time possible while maintaining the highest level of efficiency (Alshurideh et al., 2022; H. M. Alzoubi et al., 2022d). Business, Engineering and Technology, and Organization can alternatively serve as its axis labels (Al-Kassem, 2014; H. M. Alzoubi et al., 2020; El Khatib, 2015). However, quality can only be maintained via persistent overtime efforts (Alshraideh et al., 2017; M T Alshurideh et al., 2022; H. M. Alzoubi et al., 2022d, 2022f; Khatib et al., 2022). A business with sustainable excellence stays at a high level of success and profit for a long time and responds well and quickly to the needs of the social and economic environment (Alzoubi et al., 2022; Alzoubi and Ahmed, 2019; Mat Som and Kassem, 2013). Quality management is stated to be a

significant factor to address while processing elimination of waste (Akour et al., 2023; Al-Dmour et al., 2023; El Khatib and Opulencia, 2015), product and service protection from faults, and consequently loss of jobs or organization value (Al-Kassem et al., 2012; Bawaneh et al., 2023; El Khatib et al., 2020b).

2.2 Quality in Literature

Quality experts have varied definitions of what quality is (I. A. Akour et al., 2022; H. Alzoubi et al., 2020). According to Juran, quality means that a thing can be put to good use. The ability to deliver value to customers or users as advertised is what we mean when talking about quality . The product needs to work as expected (Al-Maroof et al., 2022a; Alzoubi et al., 2022). However, risk refers to a scenario where the outcome is either unsure or undesirable. (El Khatib and Ahmed, 2020) argues that combining the two definitions opens the door to the possibility that any plausible cause can result in poor product quality (A I Aljumah et al., 2022a; M T Nuseir et al., 2022a; Mohammed T. Nuseir et al., 2022).

2.3 Integration of TQM & ISO for Organizational Effectiveness.

Many studies advocate the integration of TQM and ISO to boost organizational effectiveness (A I Aljumah et al., 2022b; Nuseira and Aljumahb, 2020). (Alzoubi et al., 2022) claim that combining TQM with ISO is a novel approach that could benefit a business (Aljumah et al., 2021a; Muhammad Turki Alshurideh et al., 2022a; Nuseir et al., 2021). The research focused on manufacturing firms and the steps they may take to become more on par with the best in the world (H. M. Alzoubi et al., 2022a). There were 2,961 participants in the study from developing and developed countries (Aljumah et al., 2020; Blooshi et al., 2023; Gaytan et al., 2023; E. Khatib et al., 2021). The product is what happens when combining two different approaches to quality management, namely, ISO 9000's quality management system and Total Quality Management (Abudaqa et al., 2022; M. El Khatib et al., 2022a). The investigation discovered that ISO and TQM are complementary to one another (Al-Maroof et al., 2022b; M. El Khatib et al., 2022b; Nuseir, 2020). Combining Total Quality Management (TQM) with the International Organization for Standardization (ISO) in companies leads to enhancements in quality, operational management, inventory, time-based performance (Aljumah et al., 2021a, 2021b; Yasir et al., 2022), and competitiveness (Nuseir and Elrefae, 2022; Nuseir et al., 2020; Nuseir and Aljumah, 2022). Univariate and multivariate analyses were used to analyze the data. Ultimately (Ahmed and Nabeel Al Amiri, 2022; Hanaysha and Alzoubi, 2022; Emad Tariq et al., 2022), it was determined that ISO and TQM had the potential to improve business results both immediately and over the long term (A. Al-Maroof et al., 2021; Alshurideh et al., 2023a; Nadzri et al., 2023; E Tariq et al., 2022).

2.4 Global cases on TQM's influence on Organizational Performance

Researchers Abusa and Gibson (2013) investigated the link between organizational effectiveness and increased prospects. The study was conducted in a Libyan setting (Khan et al., 2022; Lee et al., 2023). The authors of this study analyzed the effects of TQM on a Libyan manufacturing firm's productivity (El Khatib et al., 2021; Nuseir and Aljumah, 2020). Both with and without ISO, the performance was measured (Ahmed et al., 2022). Companies that combined ISO and TQM saw considerable increases in exports, as measured by these statistics (Aityassine et al., 2022; Al-Awamleh et al., 2022).

According to a study conducted in Albaha province in KSA public sector entities to investigate the correlation between TQM and organizational performance along with the organizational culture (Nuseir, 2021); TQM is stated to be highly influential on organization's performance (Akour et al., 2021; R. S. Al-Maroof et al., 2021a; Mubeen et al., 2022). Organizational culture's effect on implementing such philosophy is also noticed in the correlation results (Aljumah et al., 2023; Ahmad Ibrahim Aljumah et al., 2022a; M T Nuseir et al., 2022b).

2.5 Research Gap and Problem Statement

Looking into factors influencing organizational performance and effectiveness, the adoption of TQM, ISO, and other business models appeared to be highly influential. However, each type of entity requires different collection of strategies and techniques to improve it's performance. Public sector entities are considered a critical category in

which its nature of huge operations and projects running makes it highly challenging to be continuously running in an excellent performance. This paper studies Dubai's Water & Electricity Authority adoption of TQM and the practices it undergoes to sustain its excellence position (Ahmad Ibrahim Aljumah et al., 2022b; Khatib et al., 2016).

2.6 Methodology and Research Design

Research methodology depends qualitative data gathered from both resources; online journals and books for secondary data, and two structured interviews for primary data (Gulseven and Ahmed, 2022). The three interviewees were from three different divisions in DEWA. However, interviewees' names are kept as anonymous for ethical considerations. The research organization (DEWA) obtained multiple ISO certifications such as ISO 18404, and ISO 9001:2015, which guarantees the high quality of the organization's services, processes, and procedures. The number of people working for DEWA was quite large. Collecting information from each worker was impossible. This meant that the sample size had to be carefully chosen. Both time and points of contact reach were constraints for the study. For this reason, the study focused on two divisions and a single firm.

3. DATA ANALYSIS

3.1 Interview Analysis

Quality as a whole, which in technical terms can refer to a product or service that meets specified requirements or a defect-free product or service, assumes a high degree of importance as a critical element for gaining a competitive advantage. To construe, a company can develop quality as its core competence and a differentiation marker in a highly competitive and over-saturated market. Given the importance of quality, it is no surprise that quality management is necessary for most service-providing companies, such as Dubai Electricity and Water Authority (DEWA). Implementation of quality management can take the form of various standards and models, such as the International Organization for Standardization standards, the Malcolm Baldrige model, the European Foundation for Quality Management model, Deming Application Prize model, among others.

According to the interviewees, DEWA uses the Quality, Health, Safety, and Environment (QHSE) management system to enhance the quality of their operations and products, while also ensuring worker safety, managing the environmental effects of their processes, and increasing the sustainability of their operations. DEWA's QHSE management system aims to improve quality and reduce the possibility of occupational risk. DEWA emphasizes increasing internal communications at higher and lower levels, significantly increasing contacts at all levels of the organization. It also aims to ensure everyone is on the same page regarding quality standards.

Alongside the QHSE management system, DEWA, as informed by the interviewees, follows the TQM business model for total quality management. The model focuses on improving customer experience and satisfaction from top to bottom. Developing an organizational culture at DEWA with a solid customer-focused orientation and process centrism has been necessary to successfully implement the QHSE management system and the TQM business model. To ensure complete compatibility of the corporate culture with the principles of TQM, DEWA utilizes an integrated system that brings together all the different parts of the organization and focuses the efforts towards a shared mission, vision, and values.

Excellence is closely related to quality. Business excellence can be defined as developing and enhancing an organization's management procedures and operations to improve performance and create value for stakeholders. As a result, improving quality is the first step toward achieving excellence. DEWA is recognized for business excellence by several international organizations, including The European Foundation for Quality Management, which recently awarded the Sustainable Excellence certificate for Quality Management. According to the information gathered from the interviews, DEWA follows the European Foundation for Quality Management (EFQM) Excellence Model for assessing quality excellence. The EFQM Excellence model is a self-assessment framework for evaluating an organization's competencies and underperforming areas across its activities.

One central element that has reportedly come up through the interviews is the importance of enhanced and smooth communications to make

quality management a resounding success and achieve business excellence. Communication between the top management and the lower levels in the organization is crucially essential for achieving business excellence, as has been duly recognized at DEWA.

3.2 Findings

The following conclusions were also reached as a result of this research.

1. Subjects admitted that they were observable to a lesser extent than their criticality would indicate for all of the considerations discovered to be critical in TQM implementation.
2. Although their significance makes a difference, the critical motivational variables can be classified as devotion, execution, and evaluation, with each criterion playing an essential role in the TQM implementation segments.
3. Every framework has a summary of its connections with each managerial methodology and technique to prove how operations and maintenance assimilation is achieved. In brief, employees dedicate their time to exercises assigned to personal toolkits assimilated into TQM adoption.
4. To achieve effective TQM rollout, the first step in the process, dedication, requires support from top executives to specify the intent of the Performance measurement, such that a well-resourced brilliance advisory board communicates a clear view of the prototype across the organization to develop a sense of urgency that perhaps the transformation is necessary for the organization. This same management ensures that the versatility attributes and assimilation activities are resolved during project implementation to maintain the modification procedure throughout the TQM rollout.

4. DISCUSSION ON THE RESULTS

The results and findings of the present study will be helpful for DEWA and other organizations as well, as they can study the positive outcomes of TQM and decide to shift to TQM. Furthermore, since no such data was previously reported for the electrical company working in Dubai, the study can be further extended by other researchers who want to study the subject in different in-depth dimensions. Hence, the present study will be a foundation for the other relevant companies and researchers interested in exploring the implementation and effectiveness of TQM in the working environment of UAE.

Integrating Total Quality Management with risk management is one crucial area that needs change. TQM and risk management are highly complementary and will significantly benefit from integration. This can be achieved by identifying all probable risks in the product at hand and designing the quality of the product in such a way that it should incorporate all the possible risks.

Integrating TQM with ISO could greatly benefit quality management and help DEWA achieve business excellence, with such integration also having the potential to improve organizational performance. Integrating TQM processes with standardization processes improves quality, inventory management, and competitiveness, all of which lead to improved organizational performance.

By combining TQM with risk management and ISO, DEWA could improve organizational performance by improving product quality, better inventory management, reducing redundancies and making production more time and cost-effective.

5. CONCLUSION

The project aimed to study the effectiveness of TQM and BEM, which is applied by the local-based public Dubai Electricity and Water Authority, DEWA. Since very few organizations working in UAE have been shifted to TQM, it is essential to explore what changes have been observed in the organizations that have adopted this along with the excellence model. The study provided a detailed insight into the TQM implemented by DEWA and other factors associated for boosting business excellence through the analysis of data collected from the concerned professionals of the company. The study would be helpful for DEWA as it will highlight the current strengths and weaknesses of the system implemented there. The company can improve its performance in various operations domains by working on weaknesses and strengthening the vital areas further. As well as for any other similar entities that would like to improve performance and sustain excellence.

6. RECOMMENDATIONS

In this section, we detail the steps the company should take to implement TQM and the Excellence

Business Model throughout the company. TQM is a process focused on the notion of creating a quality-focused organization. The quality-focused organization is hence involved in long term development and success. Firstly, it is essential to raise employees' level of understanding and provide them with the tools they need to keep management costs in check, businesses in the United Arab Emirates (UAE) should provide them with quality. Secondly, The necessity of quality management should be emphasized through frequent formal and informal training provided by the organization. Learning how to combine the Excellence Model and Total Quality Management effectively will be facilitated by this training and development. Thirdly, Businesses in the United Arab Emirates (UAE) would do well to implement strategies to solicit input and suggestions from their workers as part of their quality management processes. Employees should be rewarded for making valuable suggestions. Finally, with the rise of innovation and globalization, it is crucial for DEWA to constantly update their innovations. It would be essential for DEWA to stay up to date with their knowledge, research, and technological areas to excel in every part of their quality management. By focusing on innovation, in research areas and technologies, DEWA will have a first hand in staying ahead in compared to other organizations.

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How Big Data Analytics Supports Project Manager in Project Risk Management – Cases from UAE Health Sector

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A B S T R A C T

Big data analysis allows analysts, researchers, and business users to make better and faster decisions using data that was previously inaccessible or used. Companies can use advanced analytics techniques such as text analysis, machine learning, predictive analytics, data mining, statistics, and natural language processing to gain new insights and insights from previously untapped data sources independently or with existing enterprise data. Significant challenges are still in how to deal with this data and maximize their use, so large data have become the clock that has become the most national, regional, and international institutions, and a broad range of database management, methodologies and measures that can be adopted for the exploitation of large data in all areas of life.

This paper investigates the effects of big data analytics on project risk management with examples from Healthcare sector in UAE. Inclusive research has been done by searching approximately more than 20 references resulted in a literature review studied the effect of implementing data analytics in business, technology, industry, and society businesses aspects. A research methodology has been done by interviewing professionals from healthcare field investigating further the role of Data analytics in analyzing and managing data in healthcare, its benefits in predicting risks and improving healthcare outcomes and future insights.

This research's result reveals that collecting data and applying data analytics even in businesses or healthcare represent an important kind of digital transformation. An obvious finding from this research is that business intelligence and data analytics has been implemented widely in UAE healthcare sector by both government and privet sectors resulting in opportunities that develop and emphasize positive changes to this sector.

1. INTRODUCTION

The data collected by devices connected to the Internet is often used to identify their users. This is because the users' devices can capture and store data (Lee and Peing, 2019). The data collected by smart objects is used to analyze their users' activities and interests. Aside from the devices themselves, the data collected by these gadgets comes from various sources such as climate data, scientific data, and energy consumption data (Lee and Peing, 2019). These data can be used to identify their users and provide useful information about them. Due to the increasing number of

mobile phone and Internet users, the volume of data collected by these gadgets is growing (Mohandu and Kubendiran, 2021). This data can be used to extract useful information from the various systems and equipment that are used (Mikalef et al., 2020). The Society of Information aims to provide useful information that can be used in various political and economic activities (Riahi and Riahi, 2018).

Big Data refers to the rapid emergence and evolution of technologies that enable the collection, analysis, and dissemination of information from a vast amount of data (Kaisler et al., 2013). The challenge of managing this massive amount of data is not only to deal with its increasing complexity, but also to make sense of it all (Kabanda, 2020). The concept of a complex polymorphic object, such as the Big Data, is very different depending on the community that it belongs to (Begoli and Horey, 2012). For instance, the term big data is very different from the concept of big in terms of the volume of data that it collects (Hong et al., 2019). Although Big Data is not a set of technologies, it is a broad category that encompasses various techniques and technologies. As the field continues to evolve, the definition of Big Data is changing (Al-Kassem et al., 2022; Mohd Selamat et al., 2018).

1.1. Characteristics of Big Data

Volume: The rise in data volume is largely attributed to the increasing number of transactions and the amount of unstructured data that are collected and stored in various forms (Aityassine et al., 2022; Bawaneh et al., 2023; El Khatib et al., 2020a; Kassem and Martinez, 2022). This is also caused by the increasing number of sensors and machine-to-machine data (I. Akour et al., 2022)(Al-Awamleh et al., 2022; H. M. Alzoubi et al., 2022e, 2022d). Aside from reducing storage costs, other factors such as the use of analytics to derive value from the data are also becoming more critical (I. A. Akour et al., 2022).

Velocity: The explosion of data is forcing organizations to deal with it in a timely manner (El Khatib and Ahmed, 2018; Khatib et al., 2016). With the rise of smart meters and RFID tags, the need to deal with massive amounts of data is becoming more critical (Al-Kassem et al., 2013; A. Al-Maroof et al., 2021; Alhamad et al., 2021).

Variety: Today, data is in various forms, such as structured and non-structured data (Akour et al., 2021; Emad Tariq et al., 2022). It can be created from various sources such as line-of-business applications and financial transactions. Despite the variety of formats, managing and governing data still remains a challenge (Al-Dmour et al., 2023; Aljumah et al., 2023; Ahmad Ibrahim Aljumah et al., 2022a; Arshad et al., 2023; Hani Al-Kassem, 2021).

Variability: Due to the variety of data types and velocities, managing the data flows can be challenging (A I Aljumah et al., 2022a). Also, with the increasing volume of data, peak data loads can occur frequently (Nuseir and Aljumah, 2020).

Complexity: Today, data comes from multiple sources (Nuseira and Aljumahb, 2020). It is still an ongoing process to link, cleanse, and transform it (A I Aljumah et al., 2022b). However, it is also important to manage the relationships and data linkages to prevent them from getting out of control (Al-Kassem, 2017; Aljumah et al., 2021a).

Value: The article also explores how these data can be used to enhance the living style and business performance (M T Nuseir et al., 2022a; Nuseir et al., 2021). Although there are various types of data that can be generated by various social and business applications, identifying the appropriate values still remains a challenge.

1.2. Big Data Analytics

Big Data Analytics is a process that involves collecting, organizing, and analyzing large data sets (Nuseir et al., 2020; Nuseir and Aljumah, 2022). This type of data is often referred to as a massive amount of data that can be accessed and analyzed in different ways. It requires new techniques and technologies to analyze and interpret the data (El Khatib et al., 2019; El Khatib and Ahmed, 2020).

Big data analytic is a process that helps organizations make better decisions by analyzing large amounts of data. For instance, if a company has a website that sells products online, then it uses data from various social media platforms to analyze the customer behavior (Al-Kassem, 2017; Gulseven and Ahmed, 2022). Big data analytic allows users to make faster and better decisions by analyzing previously unusable data (Gaytan et al., 2023; Khatib et al., 2022). Using advanced analytics techniques, such as machine learning, statistical, and text analytics, businesses can gain new insights from their data. Big data analytics can help businesses identify hidden patterns, improve their customer service, and generate new revenue

opportunities (Abudaqa et al., 2021; Ahmed and Nabeel Al Amiri, 2022). It can also be used to analyze and interpret market trends.

There are various types of big data analytics that are commonly used (H. M. Alzoubi et al., 2022a). These include prescriptive analytics, which help users make informed decisions. For instance, this type of analytics can help determine the best course of action for a patient. Predictive analytics is a type of data analysis that helps predict the future (H. Alzoubi et al., 2022, 2020; Farrukh et al., 2023; Mat Som and Kassem, 2013). For instance, if a company decides to launch a new marketing campaign, then it uses this type of analytics to identify the most effective strategy (AlDhaheri et al., 2023).

Other types of big data analytics include market analysis, customer behavioral analysis, and weather prediction (Al-Kassem et al., 2012; Nadzri et al., 2023). These tools can help organizations improve their operations and sales by analyzing and predicting the future (Alfaisal et al., 2022; Alhamad et al., 2021; Amiri et al., 2020).

Due to the increasing complexity of the health care system, the need for more data has become a major issue in developing countries and middle-income regions (Blooshi et al., 2023; Louzi et al., 2022b). There are four main types of data that can be collected and used in the field of health care: medical/clinical Big Data, public health Big Data, medical experiments, and medical literature (El Khatib et al., 2021a; Louzi et al., 2022a).

Due to the increasing amount of data collected and processed in the healthcare industry, Big Data is expected to grow significantly in the coming years.

2. LITERATURE REVIEW

The below literature review will demonstrate articles and reports done regarding the effect of implementing data analytics in projects and risk management in healthcare industry.

2.1. Business Analytics in project Risk Management

In the business context, digital transformation in project management have played a significant role in developing and lots of Businesses are aware enough to invest in technology as they aim to enable their organizations to keep on compliant, cyber safe, current, agile. According to (Muhammad Turki Alshurideh et al., 2022c; Varma et al., 2023), 97% percent of companies in with revenues of more than 100$ million were found to apply some form of business analytics in their businesses. the opportunities that are generating with the usage of data and analysis in different organizations have build a significant interest in Business intelligence and Analytics (Arshad et al., 2023; E. Khatib et al., 2022; Lee et al., 2023). This is because that such field concerned on the techniques, technologies, systems, practices, methodologies, and applications the work on business data analyses to provide the managements with better understand its business and market and make timely business decisions (Abudaqa et al., 2022; Alzoubi et al., 2019; H. M. Alzoubi et al., 2022c).

One of the most important aspects of business analytics usage in business it the Business Performance Management (BPM), were it using scorecards and dashboards to assist analyze and visualize lots of performance metrics, as well as, generating well established business reporting (Alfaisal et al., 2022). These tools will be discussed later as a kind of Data Analytics approaches that work on providing lots of benefits in business applications (H. M. Alzoubi et al., 2022f; Aziz et al., 2023).

In healthcare, healthcare industry worldwide is going towards digitalizing every document that related to provide services for the clients and using data analytics systems for various reasons (T M Ghazal et al., 2023b; Yasir et al., 2022). This is what called today smart health and wellbeing (T M Ghazal et al., 2023a). One of the most important reasons is that this industry generating large volume of data that should be collected, analyzed effectively for improving the quality of healthcare, improving long-term care, patient empowerment, minimizing cost, and predicting future trends (R. S. Al-Maroof et al., 2021b; M. Alshurideh et al., 2023; M. T. Alshurideh et al., 2023d).

Framework to identify key initiatives.

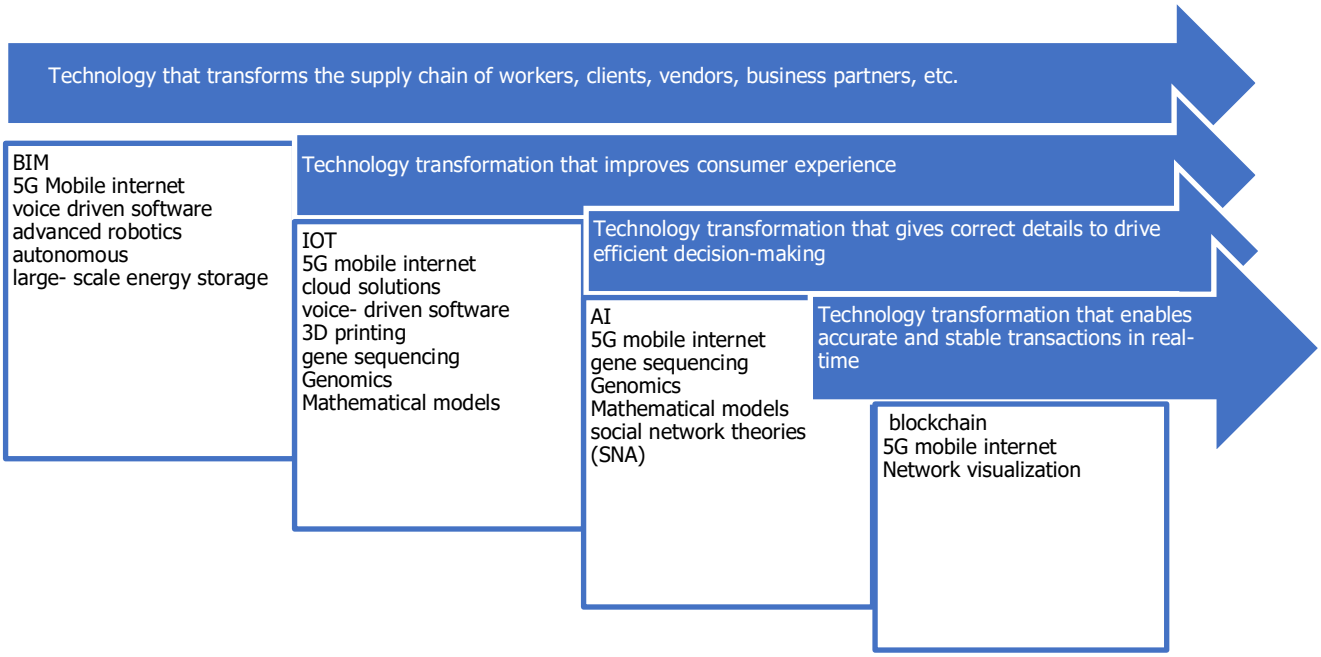

Figure 1 : Technology Transformation

2.2. Technology Analytics Initiatives in Project Risk Management

In the technology context, today's advances in information technologies have provided the organizations and enterprises with an unlimited access to an extraordinary amount and variety of data (Ahmed et al., 2022; H. M. Alzoubi et al., 2022e, 2020; Sakkthivel et al., 2022). In addition, data management and warehousing are found to be the fundamental factors of business intelligence and analysis (M. T. Alshurideh et al., 2023a). Such concepts have various data marts and tools used to extract data, transform them, converting and integrating them to enterprise specific data (M. T. Alshurideh et al., 2023b; El Khatib et al., 2020b). The most important approaches that could be used by organizations to implement data analytics in managing projects and business application are Business Visualization Tools, OLAP (Online Analytical Processing), Interactive visualization, Predictive Project Analytics (PPA), Data warehousing, Data mining, Association analysis etc (Muhammad Turki Alshurideh et al., 2022d; T M Ghazal et al., 2023c; Mubeen et al., 2022). However, these approaches usually differ based on the business's industry and the goals from performing the analysis. For example, in healthcare, there are several tools that could be used in analysis process based on the outcome expected (Muhammad Turki Alshurideh et al., 2022a, 2022b; El Khatib and Ahmed, 2019). Bibliometric analysis, citation network, coauthorship network, social network theories, network metrics and topology, mathematical network models and network visualization are examples to analytics tools used in healthcare (Kurdi et al., 2022).

Table 1: List of top three digital initiatives by healthcare competitors:

#	Competitors	Key Digital Transformation Initiatives
1	Electronic Healthcare Predictive Analytics (e-HPA) in US hospitals	Microsoft Heath Vault, an e-health safe, acting as EMR
2		Electronic Health Records (EHRs)
3		Collection large amount of data to understand people's habits, detect and predict outcomes
4	Mayo Clinic in Rochester, London	International appointment offices
5		Healthy Living Programs

6		Clinic Voice Apps
7	The Johns Hopkins Hospital	300 programs and initiatives carried out or supported by administrative, clinical, and operational departments
8		Paying the medical bills by payment plans and to pay your bill online or by phone
9		MyChart App
10	Cleveland Clinic, Abu Dhabi	Virtual Visits
11		Robotic Surgery
12		Muashir Assessment

In UAE, business intelligence and data analytics has been implemented widely by a range of health authorities both government and privet sectors (El Khatib, 2015). Riayati Initiative to National Unified Medical Record (NUMR), is one of the leading initiatives that the Ministry of Health and Prevention is aiming to connect more that 2500 healthcare facilities among the country (Almasaeid et al., 2022; M. T. Alshurideh et al., 2023c). It is a digital healthcare platform launched to transform the current UAE healthcare environment through the centralization of medical records and the delivery of an innovative, fully integrated, digitized clinical information system serving the UAE population and raising the quality of their life (Alshawabkeh et al., 2021; Ghazal et al., 2021). The system will create an efficient and sustainable healthcare system by reducing overall costs following in deceasing readmissions, hospital visits and creating overall savings in prescription costs (Aljumah et al., 2021b; H. M. Alzoubi et al., 2022b; E. Khatib et al., 2021).

Another Example of implementing digital transformation in UAE Healthcare is Malaffi health information exchange (HIE) platform. It has been launched through Public Private Partnership between the Department of Health - Abu Dhabi (DoH) and Injazat Data Systems for connecting the Emirate healthcare facilities and facilitating appropriate and reliable sharing of patient health information between points of care for better care coordination and informed decision-making. From the analytical aspect, health authorities using the platform (Malaffi Analytical Portal) in performing population health analytics and monitoring care quality trends among Abu Dhabi residents. for example, and by analyzing inputs, the system generates reports regarding trends in obesity, diabetes and chronic diseases (E Tariq et al., 2022). in contributing to these reports, the government can obtain real-time and accurate data to examine the population health needs so as to provide public health programmes needed in prevention and management of chronic diseases. Malaffi is the first HIE outside of the US have been awarded EHNAC accreditation where it has been assessing for the privacy policies, security measures, technical performance, business practices and organizational resources. In addition, it reflects the governance structure and the HIE ability to manage, ensure and enhance trust among healthcare community and patients (Informa Markets Healthcare, Jun 02, 2021).

Usually, governments initiate such technology for genomics and sequence analysis and visualization, EHR association mining and clustering, Health social media monitoring and analysis, Health text analytics, Health ontologies, Patient network analysis, Adverse drug side-effect analysis, Privacy-preserving data mining.

2.3. Industry Analytics Initiatives In Project Risk Management

In the industry context, operational risk management (ORM) is one of the most important approaches that has been applied to the operations management problems as it utilizes a number of analytical techniques to enhance making real-time decisions (Akour et al., 2023; M. Alshurideh et al., 2022).

Another method for applying data analytics in project management industry is the Project Predictive Analytics (PPA). This defined as a project risk assessment methodology assess foresight to predict potential risks at any stage of the project (Khan et al., 2022). In addition, it

identifies whether the project has enough level of oversight and governance in its all-execution stages. Such identifications of these risks allow organizations to apply adjustments recommended to improve the project performance and probability of success (Al-Kassem, 2014; Ahmad Ibrahim Aljumah et al., 2022b). PPA simply using a proprietary database that contains information of thousands of successfully completed projects and then provide insights to the specific level improvements required throughout the project stages to achieve the project objectives (M T Alshurideh et al., 2022; El Khatib et al., 2021b). This means that your project can benchmarked against many different scenarios and best practice. various advantages can be gained through implements PPA method where it identifies the complexity level of the project, mitigate project risk, reducing the probability of project failure and comparing the current performance levels against the predicted expected (Taher M. Ghazal et al., 2023; Nuseir, 2020).

Top three digital disruptions across all the five key areas of disruption that are most relevant in healthcare sectors

Table 2: Digital Disruptions

AI	AI-assisted surgery
	Make prompt, intelligent decisions before, during and after procedures to ensure the best outcomes
CRM Analytics	Database of potential and current customers
	It focuses on the role of the schedulers, nurses, and contact centers
Omnia Health	The latest developments and insights from the healthcare industry:
	Being better connected for our patients, health information exchange and system includes five of America's Best Hospitals

2.4. Society Analytics Initiatives in Project Risk Management

In the society context, this huge amount of data that is generated and stored has become a major strength for any knowledge-based society (M. El Khatib et al., 2022b, 2022a). This big data, if managed well, can contribute to the acceleration of economic and social development, as big data helps people to make the right decisions (Nuseir and Elrefae, 2022; Nuseir, 2021).

Because big data affects organizations that then affect the economy and that impact society that impacts big data technology (I. Akour et al., 2022; Al-Maroof et al., 2022a). It likes an endless cycle. The use of big data in manufacturing and healthcare has increased the level of industrial automation, privacy, and security. The impact of big data It could be good or bad on society and only time will tell if same will affects positively or negatively in the future (El Khatib and Opulencia, 2015).

Top three initiatives across all five areas of digital disruption in the table below:

Table 3: Digital Initiatives

#	key areas of disruption	Digital initiatives
1	Marketing and distribution	Blog posts
2		Videos in social media
3		SEO - search engine optimization
4	Product and service	Access Clinical Information Application

5		CRM Analytics
6		Access Transactional Data Application
7	Processes	Smart Staffing
8		Application On Patients' Care
9		Personnel Management
10	Ecosystems	AI - Artificial Intelligence
11		IoMT
12		Blockchain
13	Supply chains	Oracle
14		Omnia Health
15		McKinsey

Big data is a revolutionary concept that is bound to affect the companies' culture that can be compared to our Stone Age ancestors who underwent massive cultural changes over time. In case that organization want to move towards big data analytics, they must be prepared to make fundamental changes to their business strategies includes different approaches such as marketing culture, trade, finance etc (Al-Maroof et al., 2022b; M. El Khatib et al., 2021).

As to return to Riayati Initiative and Malaffi – the analytical portal by DoH Abu Dhabi, it is expected to reward a massive advantage to the UAE society (Aljumah et al., 2020). Today, UAE is facing the problem of aging population – high life expectancy rates, and rising prevalence of chronic diseases(M T Nuseir et al., 2022b). Therefore, technologies such as business intelligence, AI and big data analytics continue to play a massive role in sorting patient information that will provide the essential data to move toward a preventive and predictive healthcare system (Mohammed T. Nuseir et al., 2022). For example, using the analytics part for the clinical data will assess building models that predict the likelihood of being readmitted, developing chronic diseases or even genetic diseases in future (R. S. Al-Maroof et al., 2021a; H. Alzoubi et al., 2022). As a result, providers will have a greater insight into preventive medicine, support community to better health, directing needed population health activities and stimulate behavior change (Informa Markets Healthcare, Feb 02, 2020).

3. RESEARCH METHODOLOGY

Our research methodology will mainly be relying on the literature review that we have conducted regarding data analytics in business, especially in healthcare. Using various sources from articles and studies in google scholar and HBMSU Library used as a foundation to further investigate the importance of data analytics in businesses and healthcare. Interviews conducted with professionals in healthcare sector to find out the role of data analytics in enhancing health care sector in UAE, its extent to improve healthcare outcomes and its benefits in predicting risks and giving insights for future development. Such further investigation provides us with case studies from the field.

3.1 Data gathering and Data analysis

To go further with the investigation concerning the effect of implementing big data analytics on project risk management and having case studies from healthcare in UAE, and in addition to the literature review, interviews were conducted with 1 health informatics expert, 1 health informatics specialist and 1 coder from Emirates Health Services (EHS) - Clinical Services Sector.

The first question discussed how data analytics and

big data played an important role in enhancing healthcare sector in UAE. All interviewees agreed that data analytics is a driving key in management decision making process regarding the quality of services, adopting new technologies and global benchmark to improve healthcare system. Furthermore, two of interviewees mentioned that data analytics important for developing UAE healthcare sector through benchmarking with other global health sectors.

The second question discussed the interviewee's opinion about the extent that data analytics had improved their organization healthcare outcomes. All interviewees had similar opinions regarding the improvement in outcomes after implementing health information systems that collecting, gathering, analyzing, and interpreting data extracted from the available systems in EHS. Such improvements in outcomes could be seen in the process of finding gaps, taking actions, and then applying corrective plans. Moreover, it improves the health outcomes in regards of patient clinical management, patient journey, patient follow up and patient satisfaction. PACE is an example of implementing such systems at EHS (Appendix 1).

The third question discussed the ability of implementing data analytics in predicting risks and giving insight for future development for EHS management. interviewees stated that predicting trends by using data analytics is the powerful part of data analysis at today's technology transformation. All agreed that having statistics from analyzing data assist their organization and all healthcare sector to predict chronic disease probability in patients, obesity, or even genetic diseases, as well as benchmarking KPIs with other organizations providing same services.

4. DISCUSSION & RESULTS

Based on our literature review and interviews conducted with experts and specialists from EHS investigating the effect of big data analytics on project risk management, it is obvious that implementing the concept of digital transformation on businesses can play a substantial role in its development. Data Analytics for project risk management and its initiatives can enhance organizations' performance and increase the probability of success in the field.

In the literature review, data analytics and big data technology allowed an extraordinary of accesses to data by the organizations and companies. Such data are already existed, however, by applying analytics techniques such as data marts and tools used to extract data, then transform and integrated them to specific information systems to generate reports, monitoring performance, and predict risks and milestones.

Data analytics application can play a massive role in the development of the countries and communities. It can affect positively the businesses and technology values and directions by focusing on finding new models and approaches through conducting research and collecting data to serve clients and provide services through facilitating easy access and better technical user experience. Such changes can enhance the economic field, improve industries standards and processes, and definitely will serve the society through increasing knowledge, changing habits and emphasizing culture of sharing knowledge, communication and accepting the new digital transformation.

UAE Health sector recently works to maximize the benefits from adopting business intelligence and data analytics as an innovative- driven approach in its care systems. As most of the healthcare facilities have the required infrastructure of informatics, patient health records and information systems. The government represented by Ministry of Health and Prevision MOHAP, launched Riayati initiative to link all these facilities' systems to a unify patients' health records through all health care providers in the country. This linkage facilitates the health authorities in collecting information regarding patients' health and services provided. A huge number of data could be generated for better clinical decision making, catching trends, applying corrective actions, predicting future health problems, and lunching community health awareness programs.

4. RECOMMENDATION & CONCLUSION

Based on previous research papers and interviews that were conducted with specialists in the health care sector regarding the collection and analysis of big data, we conclude the importance of modern technology in the development of this sector because of its role in improving the quality of health care and providing much larger and more accurate information about patients, which helps in predicting It is also noted that the degree of risks in this area is very low. In view of the many

advantages of using big data analysis in the field of health care and the few disadvantages of it, we recommend several points that will develop the health care system in the United Arab Emirates.
The recommendation of this study are:

- Establishing one joint center that collects and analyzes all data related to the health care sector at the level of the United Arab Emirates, which will serve as a reference for all health care departments in the country, which will constitute a unified reference that provides all the necessary data in the fastest time using advanced technology.
- Urging all components of the health care sector in the United Arab Emirates to use and develop their data collection and analysis systems, which have an effective role in developing the process of collecting and analyzing data at the level of the state.
- Using the expertise available in developed countries in the field of health care and information technology to develop our system in the United Arab Emirates by organizing workshops and advanced courses for workers in the health care sector and to demonstrate the importance of data collection and analysis for this sector.

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Appendix

Interview 1

Q1) : How data analytics and big data played an important role in enhancing healthcare sector in UAE? (exp: patient experience, managing data

Q2: To what extent data analytics improve healthcare outcomes in your organization (exp: patient experience, managing data easily, EMRs, research,…etc)

EHS adopt a program called PACE (Performance and Clinical Excellence) the main scope of PaCE was to have a program, which can deliver accurate, timely, clinical, administrative, and operational data, helps in monitoring and evaluating the delivery of health care at MoHaP Hospitals in an efficient manner

As the project revolved around KPIs, we have encountered several areas of improvement which include:

- Patient waiting time in Outpatient clinics across all MOHAP hospitals,
- Reduction of waiting time in Emergency department
- Improvement in Bed occupancy and bed utilization, as Hospital management have access to monthly and real time information to make changes for improvement.
- Reduction in LAMA (left without being seen) patients, for this data was studied for category eventually improving the patient satisfaction in MoHaP facilities.
- Improvement in transferring patients across hospitals as all hospitals has access to live bed information for whole MOHAP.

- Did not Attend rate in Outpatient clinics went, by using data from each specialty clinic and moving resources across different clinics.

Q3: How data analytics can be used to predict risks and give insights for future development?
PACE helps stakeholder to predict the rhythm and trends of disease over the years. This prediction helps EHS is preparing plans and be ready for any crises.

Interview 2
Q1) : How data analytics and big data played an important role in enhancing healthcare sector in UAE? (exp: patient experience, managing data easily, EMRs, research…etc)
It helps in proving clues on healthcare status that is needed for decision making, also to find the gaps so that we improve it and work on it leading to a better patient journey and service, it also helps to find our situation in comparison to the global benchmark.

Q2: To what extent data analytics improve healthcare outcomes in your organization (exp: patient experience, managing data easily, EMRs, research,…etc)
It helps in improving the healthcare in regard the patients journey and their clinical management , which made the UAE to jump so fast to be among the first countries in this sector.

Q3: How data analytics can be used to predict risks and give insights for future development?
Data analysis gives a clue about the current status of the healthcare and compare it with the last status or with the surrounding countries and so predict the risk in the future if not tackled properly.

Interview 3
Q1) : How data analytics and big data played an important role in enhancing healthcare sector in UAE? (exp: patient experience, managing data easily, EMRs, research…etc)
from my point of view, healthcare sector is in UAE is witnessing a huge improvement towards implementing the technology in its health services. Data analytics is so important for the management to make decisions for every single service provided. This will lead to better patient experience, increase patient satisfaction, and increase the competitiveness of the country among the global community.
Q2: To what extent data analytics improve healthcare outcomes in your organization (exp: patient experience, managing data easily, EMRs, research,…etc)
Analytics reports or even day to day data extraction from the available systems in EHS help generally in improving the process of finding gaps, taking actions, and then applying corrective plans. Such analytics improve the health outcomes in regards of patient clinical management, patient journey from A to Z, patient follow up and patient satisfaction. Also, analytics used in EHS for research with cooperation with national organizations and entities. Also, it shows the areas or specialities that the hospitals are in need to be improved either by providing personnel, clinical training, bed management ..etc.

Q3: How data analytics can be used to predict risks and give insights for future development?
the systems implemented by EHS can give us an idea regarding the risks that could happen when the services or treatment is not correctly delivered to the patient. we usually work to correct such unusual trends to avoid any risks in the future. Also, by having statistics from analysing data, we can predict chronic disease probability for the patient, obesity or even genetic. This help management to go step forward with the prevention process to limit or avoid risk.

Platforms
Telemedicine, mobile and wireless platforms have been proven as an effective way to overcome some of the barriers to delivery of care, especially for communities located in rural and remote areas. Additionally, telemedicine can bridge gaps in providing critical care to those who are underserved, mainly due to a shortage of subspecialty providers.

Customer Network
The Customer Relationship Management (CRM) model offers a fresh look both from the patient and from the healthcare provider. Some of the features offered are the robustness of the

systems, the versatility/openness in sharing information, and the closeness of the patient-patient healthcare relationship with others. The model-based system generates value in every activity for the customer to provide better service. It also enables customers to access information.

Big Data

Big data is used to predict diseases before they appear based on medical records. Public health systems in many countries now provide electronic patient records with advanced medical imaging media. The practice of big data takes the future to meet the upcoming market needs and trends in healthcare organizations. Big data provides a great opportunity for epidemiologists, clinicians, and health policy experts to make data-driven judgments that will ultimately advance patient care.

IOT

The Internet of Things is an important part of the digital transformation of healthcare, as it allows new business models to emerge and enables business process changes, productivity improvements, cost containment, and improved customer experiences. Today's wearables and mobile apps support fitness, health education, symptom tracking, collaborative disease management, and care coordination. Sensors can provide a lot of information to support the development of pharmaceuticals. Engineering simulation solutions are making medicine participatory, personal, predictive and preventive (P4 medicine) over the medical Internet of Things (mIoT).

AI

The rapid explosion in AI has made it possible to use aggregated healthcare data to produce powerful models that can automate diagnosis and also enable an increasingly precise approach to medicine by designing treatments and targeting resources most effectively in a timely and dynamic manner. also, it uses in performing operations for lots of patients with complications symptoms.

RPA

Robotic Process Automation (RPA) is a new wave of future technologies. Robotic process automation is one of the most advanced technologies in computer science, electronics, communications, mechanical engineering and information technology. Robotic Process Automation suggests physical robots roaming offices performing human tasks, and RPA is a software-based solution that has been used during the Covid-19 pandemic to provide food and medicine to a virus-infected patient.

XR

Extended Reality has been increasingly used in healthcare. IT is able to develop the technical skills, and capable of the professionals. It has been found that there is a medium to significant improvement in the skills of learners participating in virtual reality compared to traditional or other forms of digital learning. In addition , this technology used in healthcare facilities to interactive with the customers and for customers relationship goals.

List of transformations across the impact/difficulty matrix

Transformative impact on the healthcare sector by ensuring that big data technologies are routinely used across the healthcare sector to deliver high quality care while reducing costs. In this sense, the project will:

- First transformation initiative :

Contribute to reducing carbon emissions due to the use of telehealth services driven by big data technologies and thus contribute to the emissions goals in our country for the coming years

- Second transformation initiative:

Create lasting impact of big data in the healthcare sector

- Third transformation initiative:

Increase the market share of big data technology providers in the oncology, cardiology, radiology, hospital logistics and healthcare IT security sectors.

- Fourth transformation initiative:

Play an important role in training UAE's next generation of healthcare data innovators.

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Digital Platforms – Opportunities and Threats from A Managerial Perspective

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A B S T R A C T

The managers are facing challenges due to regulatory constraints, growth pressures, shifting of technology, technology disruption. The main purpose of this research paper is to evaluate the main benefits and disadvantages of digital platforms used by the managers.

The literature review highlights different forces of digital platforms, which are being used in other companies. It helps in better understanding digital platforms with other scholars' reviews. Further, in research methodology, effective data collection tools and methods are used. There is a selection of descriptive research design, primary qualitative data collection process and inductive approach. The interview is conducted among the three managers with 12 open-ended questions. Further, in the results, there is an analysis of the answers provided by them. It helps to find the answers to research questions and meets the research objectives.

Interview with three managers reveals that digital platforms have good ability to integrate and offer information within real-time. The results of the interview reflects that basic computer skills, web-research capabilities, idea related to social media platforms, effective analyzing of web-based research, better coding, setting of right programming and application development can help in handling the digital platforms. These platforms are enhances the overall performance of the employees. It contributes in organisation success by offering information to the employees and manager within real time and reducing confusion from workplace. However, some challenges like transaction cost, data theft and breach issues are face while using digital platforms, which can be manage by developing company culture and training programs. It can be said that digital platform create growth opportunities and empower employees to adapt with new technology. It has both pros and cons so manager should ultize these platforms rationally.

1. INTRODUCTION

Digital platforms refers to online space use for interaction and information exchange process (Sutherland and Jarrahi, 2018). It helps in streamlining the business process and operations by facilitating flow of information between internal managers of the organization (Presser et al., 2019). Social media platforms like Facebook, Instagram, Gmail, Snapshot and others are the most common types of digital platforms which are used to get engage with other people and maintain customer relationship (Ebrahim, 2020). Digital transformation has resulted in evolution of workplace and utilization of digital platforms by managers (Nuseir et al., 2023; Shree et al., 2021).

The following research has been prepared to understand the role of digital platforms in supporting manager's duty and evaluate the pros and cons of these platforms.

1.1. Problem Statement

Digital platforms provide value for everyone and are set within the ecosystem of platforms. It helps in turning a profit for the organisation. However, some challenges are faced by managers in setting up digital media (Baig et al., 2022; Zutshi and Grilo, 2019). Such issues include new regulatory constraints, growth pressures, shifting of technology, technology disruption and many more. These issues can affect the development of digital platforms for different businesses and managers. The digital platform holds the era of explosives and focuses on different strategies for developing the techniques (El Khatib et al., 2020b; Ibrahim et al., 2021).

These are the issues because these changes are rapid, and it changes the whole scenario of better digital platforms. For managers, the problems of digital platforms affect the different possibilities (M. T. Alshurideh et al., 2023a; Alzoubi and Ahmed, 2019; Bala and Verma, 2018).

It is presently a challenge as digital platforms are strong and help bring about fundamental changes. The platform landscape is set with different sections, which leads to future growth and productivity. The challenges also affect the technology reinforced over existing platforms, and it unleashes a new wave of players.

1.2. Hypothesis

H1: Digital platforms advantages, features and opportunities for managers and how to maximize them.

H2 Digital platforms disadvantages, and threats for managers and how to minimize them.

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1.3. Research Questions

The research questions include the following:

- What are the possible challenges faced by managers in setting up digital platforms?
- What are the recommendations for developing digital platforms for the employees?

2. LITERATURE REVIEW

2.1. Concept of Digital Platforms

The digital platform is mainly taken as the total of places for exchanges of information, goods, and services (H. M. Alzoubi et al., 2022a; Lee et al., 2023; Nadzri et al., 2023; Yasir et al., 2022). It may mainly occur between the producers and consumers. In digital platforms, the community is able to interact in the proper way (M. T. Alshurideh et al., 2023c; Muhammad Turki Alshurideh et al., 2022d). So, the community itself is taken as the essential piece of the digital platform. Without having that community, a digital platform plays little inherent value (M. Alshurideh et al., 2022; Arshad et al., 2023; T M Ghazal et al., 2023c; Mubeen et al., 2022). As opined by (M T Alshurideh et al., 2022; H. M. Alzoubi et al., 2022g; Taher M. Ghazal et al., 2023), the digital platform is set frequently, and it brings success to the digital platform approach (Khan et al., 2022). The digital platform takes many different forms, depending on the business model they employ. It also holds the specific purposes, which they mainly seek to serve. There are different digital platforms, which include social media platforms, knowledge platforms, media-sharing platforms and service-oriented platforms (Alzoubi et al., 2019; M. El Khatib et al., 2021). The digital platform helps to bring a new approach and is narrowly used in different terms taking the specific use of different cases (Aljumah et al., 2023; Nuseir, 2020)(Bawaneh et al., 2023). The digital platform mainly helps to provide value to everyone who is set within the ecosystems. Hence, it helps turn a profit for different people (Akour et al., 2023; I. A. Akour et al., 2022; A. Al-Maroof et al., 2021; Alzoubi et al., 2022). The digital platform brings better connectivity and provides value to all the parties involved (H. M. Alzoubi et al., 2022f; El Khatib et al., 2020a).

2.2. Role of digital platforms in different business

For different businesses, there is the use of different digital platforms (Nuseira and Aljumahb, 2020)(Nuseir and Aljumah, 2020). The different aspects of digital platforms are mainly considered throughout the business culture and practices of the organisation (H. M. Alzoubi et al., 2022b)(Akour et al., 2021; A I Aljumah et al., 2022a). In business, there is better adoption of the digital mindset through the medium of experimentation and willingness (A I Aljumah et al., 2022b)(El Khatib, 2015). The organisation's digital platforms are mainly set up through different business models. It includes advertising,

subscriptions, pay-as-one-go, and other profit-turning methods (Mohammed T. Nuseir et al., 2022). As stated by (M. El Khatib et al., 2022b, 2022a), the digital platform mainly talks about taking the necessary steps from the essential aspects. It helps in different ways taken by each company as per their models (El Khatib and Ahmed, 2020; M T Nuseir et al., 2022a). The critical aspects of digital platforms in companies help bring better ease of use and set the immediate appeal for users (Aljumah et al., 2021a)(Nuseir and Aljumah, 2022)(Alfaisal et al., 2022). It also sets the trustworthiness and security by setting clear terms and conditions with better privacy protection and assurances for having better intellectual property and data ownership (Aljumah et al., 2021b; T M Ghazal et al., 2023a)(Alfaisal et al., 2022). Besides, the digital platforms also bring better connectivity by using the APIs, which allows the third parties to extend their ecosystem of the right platforms along with its capabilities (Ahmad Ibrahim Aljumah et al., 2022b; El Khatib and Ahmed, 2018; Khatib et al., 2016). As commented by (Abudaqa et al., 2022; AlDhaheri et al., 2023), there is also the facilitation of exchanges between users, such as producers and consumers. Furthermore, the platform can also provide value to the community and also function to the size of the community (Ahmed et al., 2022; El Khatib et al., 2021; Varma et al., 2023). It also asserts over-developing the ability to scale without causing performance degradation (Ahmed and Nabeel Al Amiri, 2022; Louzi et al., 2022b; Mat Som and Kassem, 2013; Sakkthivel et al., 2022).

In the present day, the digital platform is more effective for marketing purposes (H. M. Alzoubi et al., 2022c; Gulseven and Ahmed, 2022; E. Khatib et al., 2021). They are designed in such a manner to express themselves, and this marks the use of different digital technologies. It builds a reliable network for adding value (Muhammad Turki Alshurideh et al., 2022c; El Khatib et al., 2019; Gaytan et al., 2023). It allows the users to exchange various information and is also connected with the platform's ecosystem (H. M. Alzoubi et al., 2022d)(Al-Kassem et al., 2012; Blooshi et al., 2023). It allows one segment of participation to benefit from the presence and interaction of others (M. T. Alshurideh et al., 2023d)(M. T. Alshurideh et al., 2023a).

2.3. Pros and cons of digital platform

There are both pros and cons of digital platforms (M. T. Alshurideh et al., 2023b). The digital platform helps bring better connectivity, making the communication process more software socialisation (Al-Dmour et al., 2023; Aziz et al., 2023; Louzi et al., 2022a). Besides, it also determines the quality of stored information. The stored information is set in the proper way, and hence there is no duplicate (M. Alshurideh et al., 2023; Farrukh et al., 2023; T M Ghazal et al., 2023b). Again, digital platforms are learnt in a pre-defined manner (Muhammad Turki Alshurideh et al., 2022b). With the help of platforms, one can find the solution to all the problems. The platform enables the private study and increases employee engagement that arose over specific platforms. As opined by (Al-Kassem, 2014; Aljumah et al., 2020; Muhammad Turki Alshurideh et al., 2022a), the digital platform brings a rewarding experience and benefits from faster innovation. Besides, the changes are laid down with higher quality with more reliability. There is also a cost structure reduction, which makes the employees happy (I. Akour et al., 2022; Al-Awamleh et al., 2022).

Well, on the other side, there are also some cons of digital platforms. There is excessive flexibility as it has been increased with smart contracts, used by hackers to manipulate, and attack the network (I. Akour et al., 2022; Al-Maroof et al., 2022b)(R. S. Al-Maroof et al., 2021b). The network also has a slower speed of 15 TPS (transaction per second) (Abudaqa et al., 2021; Al-Kassem et al., 2013; H. Alzoubi et al., 2020; H. M. Alzoubi et al., 2020; Amiri et al., 2020). Besides, there are also inefficient consensus mechanisms (Al-Maroof et al., 2022a). Often the transaction costs are much higher compared to other networks. There is also a lack of autonomy, as when the network goes down, it affects intelligent contracts (R. S. Al-Maroof et al., 2021a; Alzoubi et al., 2021). Besides, there can also be poor adoption of digital platforms (Aityassine et al., 2022; Al-Kassem, 2017; Alzoubi et al., 2022; Emad Tariq et al., 2022). There can be technical issues and vulnerabilities, which can be discovered in the form of platforms. As opined by (Ghazal et al., 2021; E Tariq et al., 2022), these issues can be faced by new users and launchers (Ahmad Ibrahim Aljumah et al., 2022a; Alshawabkeh et al., 2021)(Basheer et al., 2016; Hani Al-Kassem, 2021). Often, there is innovation and new projects in digital platforms, but such shortcomings affect the better functionalities and quick adoption of digital

platforms (Al-Kassem et al., 2022; Nuseir and Elrefae, 2022; M T Nuseir et al., 2022b; Nuseir, 2021). The practical implementation of new technologies for digital platforms always takes time (H. M. Alzoubi et al., 2022e; El Khatib and Ahmed, 2019). It ultimately leads to pressing issues for different entrepreneurs in better finding the right technology (Almasaeid et al., 2022; El Khatib and Opulencia, 2015; Kassem and Martinez, 2022; Khatib et al., 2022). Besides, the implementation of many optimising platforms can mainly lead to chaos.

2.4. Gap Analysis

There are some gaps in the literature review. At first, the literature review lacks information on better accelerating actions taken by different companies for digital platforms. There is also no pertinent information relating to the uncertainty faced by different employees in different companies. The digital adoption platform is also not well considered in the literature review.
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3. RESEARCH METHODOLOGY

3.1. Research Design

Research design is the arrangement of data collection with their conditions. The research design brings better considerations about different sites and methods, with that be used in data collection. It helps examine the variables' measures and is specific to the research problems. In the specific paper, the researcher has chosen a descriptive research design (Nuseir et al., 2021). The descriptive research design mainly permits the researcher to observe the respondents with different participants within the unchanged and natural environment. It helps in identifying different variables and hence allows the multi-faceted process and approach for better data collection.

3.2. Data Collection Tools

Data is collected for developing the research paper, and it includes the collecting of facts and figures and takes different forms of sources. The collected data helps to assert better taking of decisions. Here, data is collected taking different points and in a specific time frame over the selected topic. There are two different methods of data collection tools, which include primary and secondary. In the specific paper, the primary qualitative data collection process is conducted. The interview is conducted among the three managers of UAE for a better understanding of taking analysis about digital platforms. The interview process helps to understand the digital platforms set within the organisation.

3.3. Research Approach

The research approach is taken as the process or plan and includes different stages of broader applications. It brings detailed data congregation, with better analysis and interpretation. In the specific research paper, there is an inductive research approach. The inductive research approach helps bring observations and completes the development of hypothesis statements. It helps better analyse patterns and develops an understanding of the relationship between the different variables. It helps to gain knowledge about the interrelationship with designing hypotheses. The inductive approach helps to consider suitable exploration of the hidden facts.

3.4. Data Analysis Techniques

The data analysis techniques are significant for better-analysing data, which has been collected from the data collection process. In the paper, there is an interview conducted on primary data. Here, the research is conducting the interview in the face-to-face interactions, which is further drawn in tabular form. Besides, the interview is further analysed, taking the employees' considerations about the digital platforms of different employees. Quantitative data analysis techniques bring the accuracy and organising of data. It brings the sense of data collection methods and boosts the correct information—the techniques in extracting relevant conclusions to get the correct answers to the research questions.

4. RESULT ANALYSIS

The interview has been conducted among the three (add 2 more) employees working in different organisations. They know about the digital platforms being activated in the organisation for better functions and actions.
From the first question, it can be considered that digital platforms significantly influence daily working activities. With concern to the first manager, the digital platforms help in integrating

rapid and personalised responses. On the other hand, the second manager considers that a digital platform helps in analysing quick responses to meeting customer requirements. The third manager accepted that digital platforms helps in gathering information within real-time to make easy decisions. Hence, it can be considered that digital platforms are quite effective and significant in daily working functions. In the second question, the determination of digital platforms is mainly considered and helps change performance. As per the first manager, the digital platform mainly allows for quick and rapid growth of performance, and it is summed up with technological changes. The second manager is concerned that digital platforms help to keep them more updated on the different technology and process. The third manager said that digital platforms empower to adapt with new technology and changes in management process. The third question, there is analysing different skills which can be required for handling digital platforms in the workplace. As per the first manager, handling digital platforms in the workplace needs to be more effective. It brings better analysis of web-based research for better solving of problems. As per the second manager, a better structure for digital integration helps to bring more sustainment of holding the right frameworks. Such factors help in building and encompassing future innovations. According to the third manager, basic computer skills, web-research capabilities and idea related to social media platforms are enough to handle digital platforms.

In the fifth question, there are the main advantages of using digital platforms in the workplace. Well, three managers bring more effective determinations of digital platforms. Here, they have considered that digital platforms help improve the employees' experience with the proper expansion of digital culture. The second manager is concerned that digital platforms bring more revenue growth with the setting of the digital workplace. All these factors help in setting a dramatic positive impact on the company. The managers have considered that digital platforms help to step up shaping revenue streams. In the sixth question, there is a consideration of the role of digital platforms. Here, digital platforms have been considered for monitoring and controlling managers. First manager opinion, it can be considered that digital platforms bring more revenue growth with the setting of the digital workplace. Second and third manager said that digital platforms create trustworthy transaction and offer information to the employees and manager within real time and reducing confusion from workplace. The employees are also able to combine different controlling systems and are further included in the monitoring of technology. Such aspects help manage employee turnover and improve the employee's working habits. It can be considered under the uplifting of employees' functions and focuses on developing working habits. In the seventh question, there is the determination of digital platforms which can help to contribute to organisational success. Organisational success is mainly set up from digital platforms and has been employed in different organisational functions and activities. As per first manager, it can be considered that digital platforms help in better identifying and accessing management. It helps to bring a better experience for different users in creating the best internal and external experiences. As per the second manager, digital platforms help to bring better ease of use, hold trustworthy transactions, and help in protecting different users. As per third manager, digital platforms offer information to the employees and manager within real time and reducing confusion from workplace. Such factors help in holding the ability to provide incredible levels of success for better managing actions. Hence, digital platforms take different regards in correct figures of functions. Digital platforms bring different approaches, and these are the most critical actions for better functions.

In the eighth question, digital platforms focus on influencing communication between managers and involving stakeholders. The first manager mainly considers digital platforms. It helps bring correct digital strategy and can appropriately target and inform stakeholders. The second and third manager marks that digital platforms have eradicated traditional forums and sustain more accessible modes of communication forms. Hence, communication helps focus on the possible sustaining of managers and stakeholder relationships. In the ninth question, there is a consideration of digital platforms helping in time management. The first manager states that the digital platform helps in time management, and it allows to get excellent work done in an efficient

manner. It helps in determining the range of optimisation not to waste time. As per the second manager, the digital platform brings the correct number of technologies and is also assisted with improving time management and resource management. It mainly allows for more transparency. The third manager said that accessibility of information is quite easy with the help of digital forums. In the tenth question, there is stating of practical challenges that have been encountered with using digital platforms. Digital platforms involve the issues of regulations, growth, and new technologies. The second manager states that lousy leadership decisions are involved in the digital workplace. This may lead to further business problems. The third manager said that autocratic leadership and restriction on flow of information can lead to failure of digital platforms. In the last question, there is a drawing of proper planning shaped by the organisation to deal with different challenges. As per the first manager, the organisation mainly brings the effective drawing of schedule planning to deal with the challenges. Here, schedule planning mainly affects the individuals and departments in a coordinated manner. As per the second manager, the organisation also goes with a better communication approach and is further articulated the withholding of value propositions. The third manager said that training to the managers regarding usage of advanced digital platforms can help in preventing challenges. Hence, all the managers hold adequate information relating to digital platforms. The interview helps to consider digital platforms set up in the organisation.

5. DISCUSSION

From the primary qualitative data collection process, there is the propagation of a better understanding of digital platforms. It can be considered that digital platforms hold significant patterns in shaping organisational functions. Digital platforms change the performance of the company in different ways. With considering three managers, the digital platforms in the workplace involve better designing and setting of the right actions. As justified by Nooren et al. (2018), developing quick responses can help integrate with rapid and personalised responses. Besides, digital platforms also help in setting comprehensive customer journey capabilities and hence propagate broad integrative functionality. Digital platforms play a significant role and are integrated into the different working of employees. The employees mainly help to take regard for holding the right abilities. Digital platforms help to sustain the success factor for managing employees.

As opined by Grossi et al. (2021), digital platforms mainly bring the correct contributions for better organisational success. It can be considered that there is a system with the protection of different users. It helps to feature a delicate balance of proper actions. It can be shaped by communication channels and offer information within real-time. The communication channels with digital platforms help to sustain managers and stakeholders (Cenamor, Parida & Wincent, 2019). It holds the correct formation of digital strategy, and hence it also targets and informs the stakeholders. Digital platforms also help in time management, and hence there is involvement with more range of optimism in not wasting time (Steinberg, 2022). In drawing time management, the digital platform holds an acceptable range of time management and is resourceful. There are different challenges which are mainly encountered in using digital platforms.

Such challenges mainly include many issues. It involves regulations, growth, and new technologies. These challenges help in holding transaction costs and affect solving fundamental business problems. There are some reasons for the failure of the digital workplace. As opined by Zutshi & Grilo (2019), the failure in the digital workplace may be due to different reasons. It is placed with different factors and failures in the workplace. It involves a lack of company culture and lousy leadership decisions. This lack of propagating challenges affects the failure of digital platforms. It mobilises the different factors and meets with company culture. Digital platforms primarily influence daily working abilities (Kraus et al., 2018). Digital platforms affect daily working functions and hence sustain quick responses. Besides, there is also the involvement of skills for better handling digital platforms in the workplace. It shapes digital platforms, such as quick starting of growth and keeping good updating to set the different technologies (Croxson et al., 2022).

From the primary qualitative data collection process, it can be summed up that digital platforms have pros and cons in the workplace. As opined by

Zutshi & Grilo (2019), the digital platform changes working habits in the setting of technological workplaces. It marks the primary influence in different workplaces, and it propagates several technologies. The consideration of solutions from the employees can formulate the possible changes in digital transformations.

6. CONCLUSION

Hence, it can be considered that digital platforms play a significant role in different businesses. It helps to consider more platforms and helps to take the fastest ruling of competitive necessities. So, it can be considered that there is a foundation for new value creation. There are different developing factors in digital platforms, and it has mainly avoided physical touchpoints. It helps both employees and companies with better propagation and actions. In the present scenarios, there is more development of digital platforms in different manners, and it can further regulate the possible changes and design of working scenarios.

6.1. Future Research

In future research, there can be more focus on the significant challenges faced by the different UAE companies while setting up digital platforms. It will take examples of different companies and can help understand the challenges or future challenges due to digital platforms. Besides, in future research, excellent propagation and solutions can be considered to meet the challenges in the proper manner. So, future research will mainly understand the challenges and determine to regulate the associated applications with better boosting the functionality of websites. The present research is unable to consider all these factors to understand more about digital platforms.

6.2. *Recommendations*

There is a drawing of practical recommendations for overcoming the challenges and developing digital platforms. It includes with:

- There must be propagation of more of the platform's offerings, which involves more applications.
- There needs to be better interfacing over the platforms, which can help to draw better access to mobile devices and providers.
- There needs to be an effective drawing of data strategy, mainly defined as end-users' rights around privacy.
- There needs to be a shifting of the platform model, which can help to serve the foundation of a new business model.
- Designing training plan for managers to help them adapt with new digital platforms.

6.3. Limitations of Research

There are some limitations in the research paper. At first, due to lack of time, the researcher is unable to go with the primary quantitative and secondary qualitative data collection process. Besides, there can also be more consideration of taking more employee interviews. Besides, in the research paper, there is also a lack of articles reviewed in the literature review. The data collection process needs to be more propagated. There was also a lack of money, so researchers could not meet with different channels and factors. Besides, there were some articles which needed to be bought, and they have not been bought. So, there is a limited source of information in the whole research paper.

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Appendix

Q.1 How have digital platforms influenced your daily work?

Employee 1	In my daily work, I am able to integrate my rapid and personalised response.
Employee 2	Digital platforms mainly help to analyse about quick responding to meet the customer requirements.
Employee 3	Digital platforms helps me in gathering information within real-time to make easy decisions.

Q.2 How have digital platforms changed your performance?

Employee 1	Digital platforms allow me for quick growth by taking different technological changes.
Employee 2	Digital platforms help me to keep updating to different technology and processes.
Employee 3	It has empowered me to adapt with new technology and changes in management process.

Q.3 What skills are required to handle digital platforms in the workplace?

Employee 1	For handling the digital platforms in the workplace, there is effective analysing of web-based research for better solving of problems.
Employee 2	Well, there needs some user experience design, better coding, setting of right programming, web, and application development along with data analysis.
Employee 3	I believe basic computer skills, web-research capabilities and idea related to social media platforms are enough to handle digital platforms.

Q.4 What are the key features of digital platforms?

Employee 1	The key feature for digital platforms mainly helps to bring comprehensive customer journey capabilities and brings the broad integrative functionality.
Employee 2	For better structuring of digital integration, the digital platforms mainly sustain to hold the frameworks to build encompass future innovation.
Employee 3	Ability to integrate, real-time data, open and shared data and ease of use are the

	key features of digital platforms.

Q.5 What are the main advantages of using digital platforms in the workplace?

Employee 1	In the workplace, the digital platform helps to improve employees' experience for expanding the digital culture.
Employee 2	It helps in revenue growth by adopting the digital workplace for dramatic positive impact over the company revenue streams.
Employee 3	It will boost the performance of workplace by keeping everyone up to date.

Q.6 Explain the role of digital platforms in monitoring and controlling employees.

Employee 1	The digital platform helps to improve the communication for better monitoring and controlling of employees.
Employee 2	The employees are able to combine different control systems with monitoring of technology. It helps in managing employee turnover and hence improves the employee working habits.
Employee 3	Digital platform create scope for monitoring and controlling of employees by providing analytics for measuring performance.

Q.7 How do digital platforms contribute to organisational success?

Employee 1	Digital platforms help to better identify and access the management. It brings a better experience for users to create the best internal and external experiences.
Employee 2	Digital platforms bring better ease of use, trustworthy transactions and also protections for users. It marks the delicate balancing of act, and it holds the abilities in providing the incredible levels of success for better managing the actions.
Employee 3	It contributes in organisation success by offering information to the employees and manager within real time and reducing confusion from workplace.

Q.8 How have digital platforms influenced the communication between managers and other stakeholders?

Employee 1	Digital platforms help to bring correct digital strategy and are able to target and inform stakeholders.
Employee 2	Digital platforms have eradicated traditional forum and have made easier forms of communication.

Employee 3	Digital platforms have established clear line of communication between managers and other stakeholders.

Q. 9 Do digital platforms help in time management? If yes, explain why?

Employee 1	Digital platforms help in time management as it allows to get work done in an efficient manner. It determines the range of optimisations for not wasting time.
Employee 2	Digital platforms bring a number of technologies, assisted with improving the time management and resource management. It allows more transparency.
Employee 3	Yes, it helps in time management by offering 24*7 hours accessibility to information and helps in instant decision-making process.

Q.10 What kinds of challenges are encountered while using digital platforms?

Employee 1	While using digital platforms, there are issues of regulation, growth, and new technologies.
Employee 2	There are many expenses in transaction costs, and it affects the solving of basic business problems.
Employee 3	Data breach issues, data theft issues and hacking are common challenges encountered while using digital platforms.

Q.11 Highlight some of the reasons behind the failure of the digital platforms.

Employee 1	One of the concerned reasons for failure is lack of company culture. It affects the proper success measures in the digital workplace.
Employee 2	There are also bad leadership decisions in the digital workplace, leading to further business problems.
Employee 3	Autocratic leadership and restriction on flow of information can lead to failure of digital platforms.

Q12. What planning does your organisation adopt to deal with the challenges?

Employee 1	Organisation brings effective and proper schedule planning to deal with the challenges. The planning is mainly considered through various individuals and departments in a coordinated manner.
Employee 2	Organisation also goes with better communication approach, which is being articulated with a value proposition.
Employee 3	Training to the managers regarding usage of advanced digital platforms can help

	in preventing challenges.

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Emotional Intelligence as a Success Factor for Project and Project Manager

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A B S T R A C T

This research paper examines the importance of emotional intelligence skills for project manager communication skills and project success. The main problem is that the number of complex projects has increased across different sectors such as aerospace and infrastructure. In addition, the projects are different in nature and each project requires certain skills and resources, and most companies focus on hiring people based on their experience or technical skills without paying attention to their soft skills. The research is based on gathering various data from primary and secondary sources. The primary data were collected through formal interviews with three managers in the ministry of health and prevention while the secondary data were obtained from different academic articles and e-books. The results showed that the ministry of health and prevention started focusing on emotional intelligence skills during the last few years only. Also, some managers consider it as an additional skill that can add value to project manager communication skills, and it is not an important factor for the project success. On the other hand , other managers from human resources department confirmed that recruiting a project manager with high understanding of emotional intelligence is important for them .Also , results showed that top-managers focus mainly on the organizational performance (50%) .However , they must improve their listening skills which were represented by 35% of the sample size, and they should focus more on creativity and empathy to enhance their interrelationships.

1. INTRODUCTION

The concept of Emotional Intelligence was first coined by peter Salavoy and John Mayer and later popularized by Dan Goleman in 1996. By definition, emotional intelligence refers to the act of understanding and managing ones emotions and being able to influence of other people. (Lim and Kim, 2020; Salovey and Mayer, 1993) mentioned that project manager needs to understand emotional intelligence, because it helps people to understand and recognize feelings and emotions and use the same understanding in decision making and actions (Deepa, 2013). In the same way, a project manager should have adequate knowledge in tracking schedules and budgets because this is the basis on project science and management. Therefore, for any modern-day project success, emotional intelligence is critical because it helps project managers define scope, schedule, budget and track quality project milestones (O'Connor et al., 2019). The uncertainties in project management requires effective emotional intelligence because it beget a

series of emotional activities which a project manager must handle (Batool, 2013). The ability to manage these emotions will determine the success or failure of the project. In addition, project managers with high emotional intelligence are aware of the emotional situations of others, and they interact with project team in a manner that draws them to the participant.

Managers can use emotional understanding to enhance strong relationships, lead a more fulfilling life and attain great success at work (Cherniss, 2000). In project management, emotional intelligence is made up of four characteristics namely social awareness, relationship management, self-management and self-awareness which promotes self-confidence and allows people to identify their strengths and weaknesses (Alshawabkeh et al., 2021)(Cuéllar-Molina et al., 2019). Alternatively, self-management is the ability to control impulse feelings and behaviors, manage emotions healthily, take initiatives, adjust to changing circumstances and follow through on commitments.

According to (Scott-Ladd and Chan, 2004), emotional intelligence is the ability to perceive, identify, comprehend and successfully manage emotions. Therefore, it is the effective management of activities and relationships. In addition, emotional understanding and skills impact the success and happiness in the work place besides, our personal lives (Kassem and Martinez, 2022; O'Connor et al., 2019; Ugoani et al., 2015). Moreover, project managers can direct emotional power to improve project team's satisfaction. Emotional intelligence grants the ability to be present and listen to somebody when they require the most. It is that sense of internal balance that enables one to maintain the composure, engage in good decision making, successfully communicate and enhance effective leadership even when he is under stress. In project performance, emotional intelligence adds value to cognitive intelligence merely turning good performers into stars (Hussain Rahim and Imran Malik, 2010; Louzi et al., 2022b). This research project is conducted to answer the following questions:

1- How EI skill is a necessity to project manager communication skills?
2- Are project managers with better EI skills are more successful project managers in delivering successful projects?

2. LITERATURE REVIEW

Emotional intelligence has been found essential for improving managers` communication skills. (Cuéllar-Molina et al., 2019) questioned 284 students to examine the relationship between emotional intelligence and communication skills and he published that successful individuals must possess good communication skills. (Ghazal et al., 2021)(I. A. Akour et al., 2022; Al-Kassem et al., 2022; R. S. Al-Maroof et al., 2021a) stated that managers need communication skills to be able to initiate and mobilize resources for a project, and he indicated that a project manager spends at least 90 percent of his time communicating (Kurdi et al., 2022b)(Al-Awamleh et al., 2022; M. T. Khan et al., 2022). Therefore, effective communication skills are inevitable (Bawaneh et al., 2023)(Akour et al., 2023; Hani Al-Kassem, 2021). The manager must always be there for other members and make sure that they are in touch with the changes taking place in the project (A. Al-Maroof et al., 2021; Al-Maroof et al., 2022b). They need to communicate well with the team to be able to understand the emerging issues and know other project stakeholders point of views (Aityassine et al., 2022; Al-Kassem, 2017; Aljumah et al., 2023; Ahmad Ibrahim Aljumah et al., 2022a; Mohammed T. Nuseir et al., 2022; E Tariq et al., 2022). The author also observed that it is not enough to just speak and hear from people, rather understanding the complete message and acting upon it is vital (Nuseira and Aljumahb, 2020). The project manager must thus be able to convey the message using a specific an appropriate tone (Aljumah et al., 2020; El Khatib et al., 2021; El Khatib and Ahmed, 2020; M T Nuseir et al., 2022a). (Abudaqa et al., 2022; Ahmad Ibrahim Aljumah et al., 2022b; Alzoubi et al., 2019) stated that emotional intelligence (EI) play a critical role in modern-day's work setting. Emotional intelligence has been proposed as an important predictor in organizational outcomes (H. M. Alzoubi et al., 2022c)(Al-Kassem, 2014; Amiri et al., 2020; Gulseven and Ahmed, 2022). The success of managing a project lies in the ability of the manager being able to easily realize or recognize and effectively manage their emotions (Ahmed et al., 2022). They should be able to understand their emotions, discriminate between them and be in a position to use the information they get to guide their actions and thinking (Al-Kassem et al., 2013;

H. Alzoubi et al., 2020). This is the core of emotional intelligence that every other manager requires to be able to steer their projects to completion(Nadzri et al., 2023)(M. Alshurideh et al., 2023)(Muhammad Turki Alshurideh et al., 2022c; T M Ghazal et al., 2023a; Mat Som and Kassem, 2013). With proper emotional intelligence management skills, managers are able to successfully maximize the effectiveness of communicating with the team and the stakeholders and at the same time listen and consult on various issues surrounding the project (Al-Dmour et al., 2023; Blooshi et al., 2023; Lee et al., 2023; Varma et al., 2023). The author observes that most projects tend to fail because of project managers not being able to articulate the vision and success criteria of the project, and also lack the prerequisite communication skills. Powerful communication skills allow project managers to be effective in their work and more especially in situations that involve relationships with different members of the organization (M T Alshurideh et al., 2022; Louzi et al., 2022a). Emotional intelligence facilitates effective communication hence these two elements are intractably entwined (Al-Kassem et al., 2012; Muhammad Turki Alshurideh et al., 2022b). Therefore, with proper emotional intelligence skills, the project manager can easily communicate with the various stakeholders in the project and hence been in apposition to visualize the ultimate result so that they can work towards achieving it (H. M. Alzoubi et al., 2022e; A. Khan et al., 2022).

According to (Ahmed and Nabeel Al Amiri, 2022; Almasaeid et al., 2022), communication is an important tool in the management of organizations and a key determinant of their success. Managers in every organizations have always viewed communication as a key success factor (El Khatib et al., 2020b; M. El Khatib et al., 2021). Through effective communication, managers are able to add value to their organization. This is because communication enhance relationship through uniting workers, managers and decision-makers, and also helps to improve teamwork (T M Ghazal et al., 2023c; Taher M. Ghazal et al., 2023; Sakkthivel et al., 2022). However, to effectively communicate and use communication to enhance relationship between stakeholders, managers must possess emotional intelligence (El Khatib and Ahmed, 2018; Nuseir and Aljumah, 2022; Emad Tariq et al., 2022). Emotional intelligence encompasses self-awareness and social-awareness. With those attributes, managers can effectively manage their behaviors in the manner in which they approach issues and situations in the organization. (Al-Maroof et al., 2022a; M. T. Alshurideh et al., 2023c) added that managing the feelings of different employees in the right manner is a display of proper management skills. The different feelings and emotions harbored by employees greatly determine the success of their performance and work (Alhamad et al., 2021; Nuseir and Aljumah, 2020). Happy employees will tend to perform well unlike the unhappy ones. According to (H. M. Alzoubi et al., 2020; Khatib et al., 2022; Khatib and Opulencia, 2015; Nuseir, 2020; Yasir et al., 2022), managers who are well equipped with the right emotional intelligence are most likely to perform well in as far as communicating with their employees is concerned, and this is important, because it brings synergy and cooperation among various stakeholders in the organization (Mounir M El Khatib et al., 2019; Nuseir and Elrefae, 2022; Nuseir et al., 2020). Therefore, hiring employees with excellent emotional intelligence is important, because it will improve their communication skills that are imperative in the modern-day world where managers must constantly share their ideas and organizational processes on a regular basis (Abudaqa et al., 2021; El Khatib et al., 2022; Khatib et al., 2016).

The success of a project depends on how well managers' report the progress of their projects to the concerned parties. Monitoring the progress with stakeholders in a precise manner is crucial, because it facilitates an understanding on how well the project is progressing. (Mubeen et al., 2022) demonstrated the relationship between leadership and emotional intelligence and its effectiveness in emotional intelligence. According to the author, the nature of many projects today needs project managers who possess the right emotional intelligence skills (Aziz et al., 2023; Farrukh et al., 2023). Since projects need a lot of interactions between different stakeholders, they need a manager who have exceptional emotional skills to be able to adapt different situations in the project as quickly as possible and offer guidance (H. M. Alzoubi et al., 2022a; El Khatib et al., 2020a; Nuseir, 2021). Once the project is completed, the managers is also required to deliver the status of the project

to the upper managers. (AlDhaheri et al., 2023; Gaytan et al., 2023) stated that emotional intelligence is the key to improve the performance of a project manager (M. T. Alshurideh et al., 2023a; Alzoubi and Ahmed, 2019; Nuseir et al., 2021). The study showed that emotional intelligence levels have been associated with better project performances than those with low emotional intelligence (A I Aljumah et al., 2022a; Muhammad Turki Alshurideh et al., 2022a; M. El Khatib et al., 2022). They are able to handle complex projects more effectively and with ease and hence they are likely to succeed (I. Akour et al., 2022; H. Alzoubi et al., 2022). Tasks that involve interpersonal actions such as communication is directly linked to emotional intelligence more than those that need cognitive abilities. In this regard, therefore, project managers must be equipped with adequate emotional intelligence because the role of project manager generally included communication and interpersonal actions that are critical to the completion of a project (Abudaqa et al., 2021; Aljumah et al., 2021a)(E. Khatib et al., 2021).

According to (M. Alshurideh et al., 2022; T M Ghazal et al., 2023a), at least 80% of the project failures that have so far been documented are related to the human elements of project management that mostly include personal skills, social intelligence, bad teamwork, inadequate communication, and poor leadership skills (M. T. Alshurideh et al., 2023b; Arshad et al., 2023). Managers might possess excellent professional and technical skills and knowledge, however, without adequate emotional intelligence skills, they might not be able to handle certain aspects of the project that are related to interrelationships and communication with members of the project team (El Khatib, 2015). In addition, work teams tend to collaborate more easily and smoothly when members are able to exchange knowledge and skills between them. In this regard, emotional intelligence is one of the most important skills that is attributed to increase the organizational performance (E. Khatib et al., 2022). Several studies have pointed out that emotions are an important facilitate when it comes to thinking processes, posseting high emotional intelligence raises the competencies of the manager in managing teams and solving conflicts within the organization.

High emotional intelligence levels tend to allow work teams to accommodate one another's feelings and deal with them appropriately. Also, it makes them motivated to share their concerns and weaknesses that contribute to the overall success of the project (H. M. Alzoubi et al., 2022b). Emotional intelligence also helps to create an environment of trust within the workplace and this allows individuals to manage their emotions and anxiety when they encounter unexpected challenges or situations. High emotional intelligence enables team members to engage in productive discussions that help them address the various conflicts arising in the workplace.

(El Khatib and Ahmed, 2019; Nuseira and Aljumahb, 2020) mentioned that emotional intelligence has been found to contribute to leadership efficiency. Transformational leaders have been found to have high emotional intelligence that explain why transformational leadership in project management is associated with successful projects. Transformational leaders are more competent and able to handle difficulties in workplaces more effectively and because of their ability to recognize and manage emotions (Mounir M. El Khatib et al., 2019). In addition, transformational leaders are capable of developing and nurturing relationship between project team members that inspires and motives them to perform exemplary well in the project. (T M Ghazal et al., 2023b) stated that project managers are responsible of the ultimate success or failure of a project. To attain success, project managers must interact more frequently with stakeholders and project team members. Research indicates that about 88% of the project managers spend over half of their time communicating and interacting with project team members.

The frequent interaction throughout the course of the project requires managers to possess special skills and knowledge that will enable them manage conflicts on a regular basis through building and strengthening relationships to ensure success of the projects. Project managers must also possess teamwork skills to effectively lead the project teams in a project. In this regard, human skills are essential in project management and as a result, emotional intelligence is recognized as an important tool for workplaces because of its close links with outstanding job performance. Emotionally intelligent workers tend to perform better on projects as compared to managers with lower emotional intelligence.

(Kurdi et al., 2022a) noted that self-awareness and emotional consciousness are closely related. This implies that excellent project managers tend to understand their strengths and weaknesses and hence are aware of their emotions. They understand that the emotions have an impact on their decision-making process and perceptions as well as on team members. Excellent project managers possess the ability to assess themselves and manage their emotions in a manner that make it easier to perform various tasks. (Akour et al., 2021; H. M. Alzoubi et al., 2022d) explained that project managers need to improve their soft skills to build good relationships with their clients and staff, and to manage change properly.

(A I Aljumah et al., 2022b; Aljumah et al., 2021b) noted that emotional intelligence skills are an important element for project managers, because it is an integration of self and social skills that managers rely on to make important decisions and judgments and also communicate effectively with team members. Organizations nowadays consider project management to be significant differentiator and determiner of success. Moreover, 70% of project success have been attributed to the ability of managers to apply emotional intelligence while managing their projects. The author also mentioned that at least 90% of the top performing managers have been found to possess high emotional quotient in addition to excellent technical skills that enable them to succeed in executing their projects (R. S. Al-Maroof et al., 2021b; T M Ghazal et al., 2023b; M T Nuseir et al., 2022b).

3. RESEARCH METHODOLOGY

The research is based on collecting qualitative and quantitative data from primary and secondary source. The primary data were collected through formal interviews with three managers in the ministry of health and prevention while the secondary data were collected from various academic articles and e-books. In addition, a formal questionnaire was distributed randomly among the selected departments in order to know employees' opinions about their managers` skills. Thus, a stratified sampling method was applied first then the random distribution method. The collected data were used as an evidence to support the research questions that have been mentioned earlier. There are various methodologies in project management such as the Waterfall, Agile, Adaptive, Scrum, Lean, and Kanban methodologies. The Waterfall methodology was selected for this research project, because it provides a better understanding of project stages and it is simple and easy to make and measure. This research focused on mangers` emotional skills and the hiring process in the ministry of health and prevention. Finally, the qualitative data were compared with the quantitative data to make the final interpretation of data

3.1. Collected Data

3.1.1. Qualitative Data

In order to develop better understanding of whether hiring a project manager who better understands emotional intelligence results in the project success, we interviewed three different managers from the Ministry of Health and Prevention in order to obtain their point of view pertaining the emotional intelligence trend. Therefore, we focused on the following questions:

1. What do you think of emotional intelligence trend?
2. How EI skill is a necessity to project manager communication skills?
3. Are Project Manager with better EI skills are more successful project managers?
4. Is EI an important factor for project success?

Initially, we started our interview with Mr. Munad who manages project managers specifically the public private partnership. Mr. Munad advised that understanding emotional intelligence is essential that adds value to the project manager communication skills but is not an important factor for the project success. Additionally, he confirmed that while hiring a project manager he focuses on the capability of the project manager to plan, schedule and execute the project rather than having a high understanding of emotional intelligence. Our second interview was conducted with Mr. Ayman from Human Resources who confirmed that based on the recent studies, human resources do focuses on recruiting a project manager with high understanding of emotional intelligence considering the importance of maintaining well relationships with all stakeholders involved within the project. Also, he confirmed that project success depends on having an effective relationship to ensure that all goals are met. Therefore, the human resources do focus on

the characteristics of the individual during the interview and observe how well they are as certain about dealing with their emotions and others. Furthermore, a project manager success is essential with way they deal with their team and engage them for better outcomes. The final interview was conducted with Dr. Abdalla – Manager of Medical Support Services, who agreed that a project manager with high emotional intelligence awareness is the key to deliver success since they are involved with decision making, building an effective team and managing them. For that, while hiring a project manager he does ensure the manager's capability of having an effective communication skill as well as high emotional intelligence understanding considering that being an effective negotiator with all stakeholders involved will result in better outcomes. Additionally, he confirmed that people are the key factor for any project, so having a project manager who is able to understand his team emotions and have the ability to manage them effectively will affect their achievements as well, because they are managed by a well oriented individual who can perceive the emotions of himself and others and understands how to deal with challenging situations. To conclude, with the different feedbacks received from three interviews held within the same workplace, we infer that there are different traits perceived for a project manager depending on the departments' heads and work processes. Some advised that emotional intelligence is vital for any project manager to get his full capabilities within the project workflow, others confirmed that emotional intelligence does not verify the skills of the project manager and thus will not affect the process throughout the project.

3.1.2. *Quantitative Data*

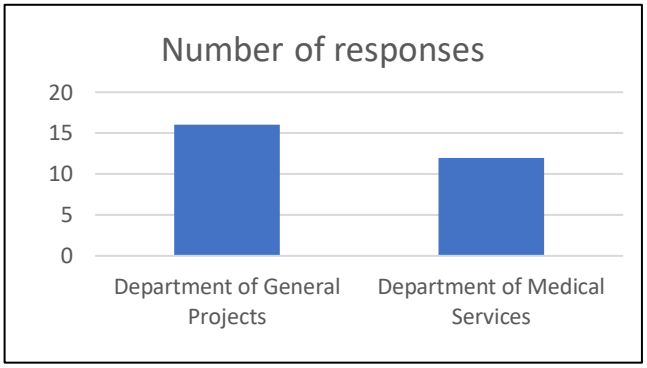

Figure 1 : Number of Responses

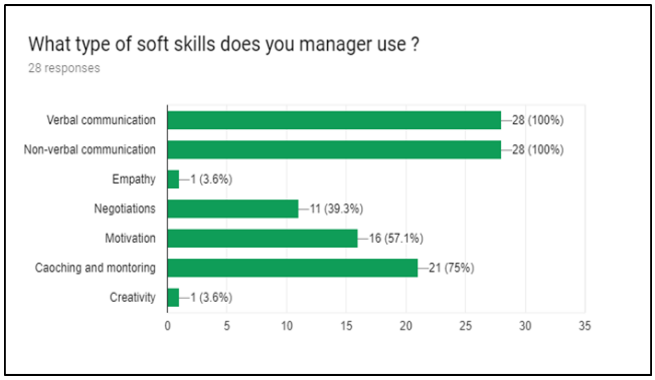

Figure 2 : Manager Soft Skills

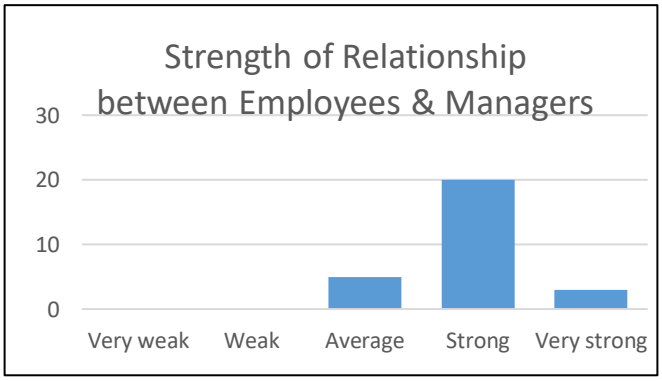

Figure 3: Focus of Management

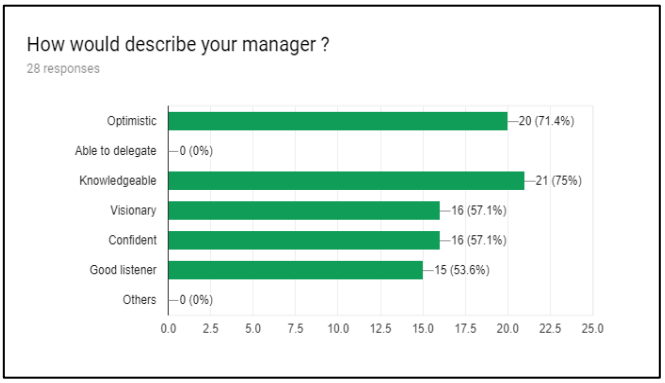

Figure 4: Manager Characteristics

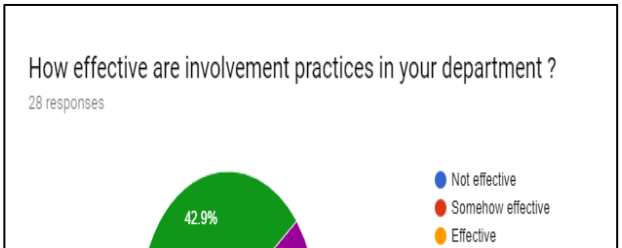

Figure 5: Manager Soft skills impression

Figure 6: Relationship Strengt

4. DATA ANALYSIS AND DISCUSSION

Based on findings, it can be concluded that the ministry of health and prevention started focusing on emotional intelligence skills during the last few years only. Also, some managers consider it as an additional skill that can add value to project manager communication skills, and it is not an important factor for the project success. On the other hand, other managers from human resources department confirmed that recruiting a project manager with high understanding of emotional intelligence is important for them. Also, they added that it is essential to maintain well relationships with all stakeholders involved within the project, and they assured that project success depends on having an effective relationship to ensure that all goals are met. Moreover, the manager of medical services agreed that a project manager with high emotional intelligence awareness is the key to deliver success since they are involved in decision making, building an effective team and managing them. Additionally, he confirmed that having a project manager who is able to understand his team emotions and have the ability to manage them effectively will positively affect the performance of his team. The quantitative data shows the number of responses in the department of general projects and medical services. The total number of responses was 28 responses.

The results indicated that both managers use various soft skills in the daily work. All of them agreed that their managers use verbal and non-verbal communication to interact with them, and 75 percent of them focused on coaching and monitoring. Also, 57% of them chose motivation as one the noticeable soft skills in their managers` attitudes while 39 % selected negotiations, and only 3% chose empathy and creativity. Thirteen employees showed that their managers have good soft skills, and only 4 of them consider their skills excellent. In addition, the results showed that 14 out of 28 employees selected performance as the main focus for the upper-management while the second group which consists of 10 employees showed that the applied management style of leadership is relationship-oriented, and none of them showed that is detail oriented.

Moreover, the percentages of the personal characteristics of the selected managers were as followed: knowledgeable (75%), optimistic (71%), visionary and confident (57%), and good listener (35%). The level of effectiveness of involvement practices and the strength of managerial support were examined based on five-point scale. 46% of the sample size showed that the applied involvement practices are effective while 75 % of participants showed that the managerial support is strong, and around 18% of them showed that the managerial support is average. However, the plot shows that the data are positively skewed which means that the managerial support has a positive effect on the employees which in turn will embrace their ability to deliver successful projects.

5. RECOMMENDATIONS

Based on the different opinions sought from the interviewed managers within the Ministry of Health and Prevention, majority agreed the importance for a project manager to adopt emotional intelligence skills. For that, in order to adapt this trend, it is recommended that Human Resource department conducts a test for all new

joiners for "Project manager" position to obtain how well they are aware of emotional intelligence. Upon which the project manager within the Ministry of Health and Prevention will have a full understanding of emotional intelligence which is not only a factor of the project success, but also for maintaining a well-balanced relationship with all stakeholders involved within the project assigned either internally or externally. Furthermore, existing project managers should strive to improve their emotional intelligence skills, for that the organization should conduct a training session for the project managers and ensure a follow-up session is being maintained regularly with these managers to ensure that they utilize the key skills learned within their day to day duties and projects. Following which assessment to be conducted in order to verify if expected outcomes was achieved with managers who managed to utilize their emotional intelligence skills and whether it aimed to achieve the desired outcomes.

Our second advise for the Ministry is to focus more on creativity and empathy and conduct a peer review analysis to measure the team productivity who are involved within the project, considering that project managers should not only be capable of communicating properly with external partners involved in the project but how capable they manage their team by understanding the five main core categories of emotional intelligence which includes importance of social skills, motivation, empathy, self-awareness and relationship-management which may lead to project success if they are implemented properly.

6. CONCLUSION

The purpose of this study was to determine whether hiring a project manager who better understands emotional intelligence results in project success. From the interviews that were conducted, emotional intelligence was found to be an important aspect for project managers with good communication skills. However, some managers conflicted on the impact of emotional intelligence on the success of a project. A survey was conducted in the department of general projects and medical services, and had a total of 28 responses. The results of the survey showed that most managers relied on both verbal and non-verbal communication methods to interact with their employees. However, only few managers were reported to employ empathy and creativity while interacting with the employees. In terms of personal characteristics, managers were found to focus on being knowledgeable, optimistic, visionary, and confident, rather than being a good listener to the employees. These results showed that most of the managers lacked emotional intelligence, as their focus was on employee performance.

Despite these results, most of the employees felt that the managers were supportive enough. However, according to the study, managerial support was associated with high performance among employee. The study revealed that emotional intelligence contributed to the development of effective communication skills among project managers. This is evident where only a few employees stated that the style employed by the management was relationship-oriented or people-oriented. Most of the employees identified the management as supportive enough. The study revealed that the success of the project depends on the managerial skills of the manager. To sum up , it can be concluded that the null hypothesis which states that " project manager`s EI skill is important for his communication skills " and the alternative hypothesis which states that " project manager`s EI skill is positively linked to project success" are both accepted .In addition , the upper-management should transfer its main focus to people, to build strong inter-relationships and improve the collaboration among project teams, in order to ensure a successful project delivery.

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Appendix

Topic: Project Manger`s Emotional Intelligence and Project Success				
Hypotheses H1: Project manager`s EI skill is important for his communication skills. H2: Project manager`s EI skill is positively linked to project success.				
Concept	**Category**	**Elements**	**Sub - Elements**	**Attributes**
Emotional Intelligence	Self-Management	Characteristics	Type	1. Optimistic
				2. Able to delegate
				3.Knowledgeable
				4. Visionary
				5. Confident
		Concerns	Type	1. Details
				2. Tasks
				3.Performance
				4.Relationships
				5. Others
	Relationship Management	Soft skills	Type	1. Verbal communication
				2.Non-verbal communication
				3. Empathy
				4. Negotiations
				5. Motivation
				6. Coaching and monitoring
				7. Creativity
			Employees` impression	1. Very poor

				2. Poor
				3. Good
				4.Very good
				5. Excellent
			Strength of relations	1. Very weak
				2. Weak
				3. Average
				4. Strong
				5. Very strong
			Effectiveness of involvement practices	1. Not effective
				2. Somehow effective
				3. Effective
				4.Very effective
				5. Extremely effective

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Design Thinking Skills for Senior Managers from Business and Technology Perspectives

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A B S T R A C T

Design thinking is regarded as a non-linear iterative process that is applied in a bid to understand users, identify problems and develop innovative solutions to problems. The concept of design thinking has attracted interest from professionals across sectors. Although design thinking has been traditionally applied by design professionals the tool has proved effective in managing organizations. Several leading businesses have reported having applied design thinking to achieve organizational success. The strategy is emerging as a critical tool for businesses seeking to advance their competitive strategy. The paper seeks to create an understanding of the concept of design thinking and how it is applied in business management. Consequently, the paper seeks to analyze the advantages and disadvantages of design thinking in relation to enhancing business performance.
Methodology: This section outlines the techniques that will be used in collecting information. The study will make use of interviews from business leaders and professionals in the field. Questionnaire is used as a guide for undertaking the interviews. Qualitative and quantitative analysis is be used in analyzing the data obtained. Design thinking has been an instrumental strategy in promoting business success. Business leaders are benefiting from the application of this strategy in realizing success for their organizations. However, the strategy has not received much appreciation from small organizations and hence suggested as a turnaround concept in business performance. The findings successfully answer the question regarding the pros and cons of applying design thinking strategy in business. The study finds that design thinking is a contributing factor to business success and hence a concept that should be applied in facilitating business operations.

1. INTRODUCTION

The concept of design thinking emanates from the design field and has attracted significant interest from academicians and practitioners due to its capacity to provide a novel approach to problem-solving a d innovation (Wilden and Gudergan, 2017). In an environment that is increasingly growing in all aspects of development including technological innovations and the existence of complexities in the field of enterprise design thinking comes in handy to offer the solution. Design has an indispensable role to play in enhancing progress within a society by transforming the prevailing conditions to match the evolving circumstances in a complex world. Designing thinking constitutes the understanding of expertise and the component of expertise in design thinking (Foster, 2021). Additionally, design thinking constitutes the ability to equip an

individual with the requisite knowledge of developing new means to solve existing challenges. Design problems are a challenging and complex concept and consist of various challenges in the practice arena (You, 2022). Regardless of its structure and complexity designs provide creative ways of solving problems and as such creative designers are important contributors to solutions. The concept of design thinking is gradually evolving into a paradigm that is aimed at solving various problems in various sectors of the economy including business (Razzouk and Shute, 2012).

Practitioners have put across various views concerning the concept of design thinking (Al-Kassem et al., 2022). For instance, in a growing world of business design thinking has been defined as a discipline that makes use of the designer's methods and sensibility to match the needs of the consumers with a technologically feasible solution that will enhance the adopted business strategy to achieve consumer value as well as strengthen the market opportunity (Lor, 2017). Design thinking is, thus, viewed as a means of identifying people's needs and consequently providing new solutions through the use of the mindset and tools of design practitioners. Due to the massive benefits accrued to design thinking, there is a growing interest to develop design thinking skills in students at an early stage for future application. Researchers have also argued that design thinking can also be presented to non-designers as this concept proves a crucial element in solving existing life challenges (Fabri, 2015). Several projects have been launched to ensure the upcoming generation of business leaders has requisite design thinking skills (Muhammad Turki Alshurideh et al., 2022d; Colbert et al., 2016; Farrukh et al., 2023; Kassem and Martinez, 2022). The projects include incorporating design thinking as a modern learning paradigm. The objective is to ensure the students are equipped with critical thinking skills and gradually adapt to this form of thinking in solving problems from an early stage. Businesses are increasingly adopting this approach and hence a critical tool for managers in the existing world of business (M. Alshurideh et al., 2023; Elsbach and Stigliani, 2018).

Design thinking is viewed as an iterative process that seeks an understanding of the challenges, user, and assumptions and consequently redefines the problems as a means of providing alternative strategies that may not be apparent to the initial understanding in solving the challenges (Muhammad Turki Alshurideh et al., 2022a; Khan et al., 2022; Lee et al., 2023). Due to its broad application design thinking cuts across various sectors within an economy and hence is not exclusive to designers (M. T. Alshurideh et al., 2023a, 2023c; Louzi et al., 2022a). Great innovators and business leaders have adopted the strategy of design thinking in influencing changes within the various facets of life. Design thinking portends that the work process by designers can assist in systematically extracting, teaching, learning, and consequently applying the skills to solve challenges innovatively (Abudaqa et al., 2022; Hani Al-Kassem, 2021). The domain of design has a significant impact on value creation for the users. The complexities in the evolving globalization strategy have increased competition in the business arena. Companies are struggling to adopt competitive strategies to cut a market niche. Various modern strategies have been employed by businesses in enhancing competition in the market. Design thinking has been one of the emerging competitive strategies adopted by managers in the leading world. The 20th century saw businesses adopting certain models and strategies for enhancing business such as business process re-engineering and supply chain management. The modeling of business processes has been a response to emerging challenges in the business world. However, the success of business in the 21st century which is characterized by innovation is pegged on superior uniqueness and creativity (Arshad et al., 2023; T M Ghazal et al., 2023b).

The recent decades have increased the necessity of redefining skills allowing actors to understand and respond to the rapid changes in the environment (Al-Dmour et al., 2023; Al-Kassem, 2017; Aziz et al., 2023). The world has increasingly become inter-connected and complex making design thinking the best tool to solve challenges (H. M. Alzoubi et al., 2022b; Blooshi et al., 2023). Design thinking provides a means of influencing thinking change in the leadership of an organization. The process of design thinking assists designers in carrying out the right form of research in creating prototypes and testing products and services to produce new ways of meeting existing needs (R. S. Al-Maroof et al., 2021b; Alshawabkeh et al., 2021; H. M. Alzoubi

et al., 2022d; Kurdi et al., 2022; Mohammed T. Nuseir et al., 2022). Most of the leading organizations such as Airbnb, Google, and Apple are examples of businesses that have adopted design thinking as a strategy to achieve global success. The increasing technological advancement has forced the leading giant in technology to innovate to remain competitive (M. Alshurideh et al., 2022; Louzi et al., 2022b). These companies have also adopted best practices that aim at strengthening their staff through skill development. By realizing the value of employee and investing in them these companies have recognized the critical aspect of each individual to the success of an organization (Aljumah et al., 2023; Bawaneh et al., 2023). The successes achieved by these high-profile businesses have influenced the concept of design thinking to be incorporated into a learning institution (Al-Kassem, 2014; A. Al-Maroof et al., 2021; R. S. Al-Maroof et al., 2021a; E Tariq et al., 2022).

Design thinking has been valued in the adult world as well as in higher education. However, the discipline of design thinking has been introduced even to younger scholars (Al-Maroof et al., 2022; Aljumah et al., 2020). Design thinking has been introduced into k-12 education and serves as an innovative way of imparting knowledge to the younger generation (Mat Som and Kassem, 2013). For younger learners, design thinking is taught by incorporating it with other subjects such as engineering, science, and technology (Aljumah et al., 2021a; Nuseir et al., 2021). Design thinking integrated learning incorporates design thinking and is a new approach for the nonprofessional design fields aiming at enhancing problem-solving skills among students (El Khatib and Ahmed, 2020; M T Nuseir et al., 2022a). Through this approach, students are expected to grow practical and thinking capabilities. The role of design thinking in the learning process aims at developing learners' competencies critical for leadership in the 21st century (Al-Kassem et al., 2013; El Khatib et al., 2020b; Nuseir and Aljumah, 2022). The design thinking process has been used in an extensive field of education through its incorporation in various learning models such as the four-step Double Diamond Model (Discover, Define, Develop, and Deliver) (El Khatib et al., 2019; Gulseven and Ahmed, 2022; E. Khatib et al., 2022, 2021). As an innovative strategy, the model has accomplished a lot in changing the mode of thinking and delivering change in various institutions (Ahmed et al., 2022; Al-Kassem et al., 2012; Amiri et al., 2020). Instilling the knowledge of design thinking for students at young ages prepares them to handle complex problems in future and consequently make better leaders.

1.1. The Research Problem

This research seeks to address the limited understanding of design thinking skills and how it is enacted in real practices. Additionally, the research undertakes to address the pros and cons of design thinking skills as well as the challenges and opportunities that the strategy faces. A core component in solving the research problem requires an in-depth understanding of how the different components of design thinking relate. The research problem emanates from the increasing complexity of the globalization process that has a significant influence on the performance of businesses. There is a need to undertake an evaluation of challenges faced by managers and the approaches that have been previously used to handle the challenges. Such an approach helps in unearthing the impact that design thinking strategy has in solving 21st-century management problems in enhancing decision-making.

1.2. Problem Justification

The practice of designing thinking has not been rampant among many managers as it has been left to professionals in design. However, the tool is effective in enhancing and sustaining the growth of businesses as is the case for Google and Apple among other business giants. There exists limited research that examines the concept of design thinking in applicability and hence limited information on the influence the applicability of design has on business performance. There is an increasing desire among young professionals and leading business managers to understand how design thinking can be enacted in practice. Additionally, these professionals need to understand the design's capability requirements and how they can inform the design thinking process. Having a better knowledge of design thinking tools and problem-solving as well as value creation assists in broadening economic knowledge.

1.3. Hypothesis

1: Design thinking brings immense benefits in turning around managers business performance

2: The cons in design thinking hinder business performance by managers

2. LITERATURE REVIEW

A design thinking literature review is provided in the chapter and provides an insight into the current understanding of the concept and practice of design thinking in line with the advantages and disadvantages. The literature review focuses on the design thinking tool as an approach used by large organizations to influence change in their performance (Ahmed and Nabeel Al Amiri, 2022). The chapter also provides how the concept of design thinking has achieved wider recognition and applicability by multiple organizations and how this approach has been promoted as a panacea aimed at addressing business problems. It is, therefore, critical to undertake an analysis of the design thinking concept from various perspectives and analyze the advantages and disadvantages of the same.

2.1. Perspectives on design thinking

Design thinking has been evolving over time and hence understanding the perspectives of design thinking skills is critical in appreciating the pros and cons following the applicability of the process (Alshurideh et al., 2020; H. M. Alzoubi et al., 2022c). Various perspectives of design thinking skills have been adopted and include the cognitive style, the general theory of design, and in its context as an organizational resource (H. M. Alzoubi et al., 2022a).

2.2. Cognitive style

One of the advantages of cognitive style in design thinking helps organizations to have a clear understanding on the methods and processes used by designers to solve existing challenges (Almasaeid et al., 2022; Alzoubi and Ahmed, 2019). The understanding of design thinking from this perspective assists the professionals to initiate processes that will influence positive change in the performance of an organization. According to the cognitive style the origination of design thinking emanates from a stream of research undertaken in the 1960s with its focus on understanding the methods and processes that designers use when engaging in design (M. T. Alshurideh et al., 2023d; Taher M. Ghazal et al., 2023; Nadzri et al., 2023). This concept has grown over time to encompass investigations aimed at understanding cognitive processes used by successful and expert designers in solving problems. From the cognitive perspective, design thinking is applied in exploring the decision-making process by design experts a process termed as design thinking. The term was initially noticed by (Varma et al., 2023) while studying the thought process of designers when undertaking urban planning and architectural works(Abudaqa et al., 2021).

Another advantage of this perspective is that design thinking aims at creating an understanding and describing the thinking process by the designers in action. This assists the designers to modify the process to meet set objectives. Further (M T Alshurideh et al., 2022) termed the thought of the designers and the end product as the designer's way of knowing. (Alzoubi et al., 2020) uses the terms design-as-practice and design-in-practice in describing the various forms of practices in research design. The focus of design-as-practice is on the design, accomplishment, and embodiment of the design involving the people and artifacts. On the other hand, design-in-practice recognizes the design outcomes and acknowledges that there may be multiple solutions to addressing the desired outcomes (Muhammad Turki Alshurideh et al., 2022c). This focus offers an extension to the understanding and description of design thinking through the separation of the two components with one focusing on the designing practice while the other focuses on the process outcomes (Alzoubi et al., 2019; Sakkthivel et al., 2022).

A major disadvantage in this approach is that although the results of these designing activities are straightforward, the process in these examples is insufficient for understanding the general concept of design thinking. The understanding in this context is only for the tangible things and hence fails to explain the intangible things such as the thought process that molds human behavior and emotions. (Ahmad Ibrahim Aljumah et al., 2022b; Nuseir, 2020; Yasir et al., 2022) notes that although various studies have been undertaken in a bid to understand and offer a description of what professional designers do in designing their work it fails to yield an informed knowledge on describing design thinking (Abudaqa et al., 2020; El

Khatib et al., 2021; M. El Khatib et al., 2022b, 2022a). Additionally, the research fails to yield sufficient information to describe how the designers adopt a certain cognitive style. (H. M. Alzoubi et al., 2022f; El Khatib and Ahmed, 2018) make use of a different strategy to understand the cognitive aspect of design thinking.

2.3. The general theory of design

A critical advantage of design thinking as posited by the general theory of design is that it major focuses on the aspects surrounding the real problems and consequently engages in developing solutions targeting on the specific problems (M. T. Alshurideh et al., 2023b; Muhammad Turki Alshurideh et al., 2022b). Under such a strategy, the professionals are able to focus on the real problems rather than instating general strategy that may fail to address existing problems. The basis of the general theory is that the design of an idea cannot be developed without the existence of problems. The idea of liberal art makes it possible to apply design thinking to both tangible and intangible systems. (T M Ghazal et al., 2023a, 2023c; Mubeen et al., 2022) argues that several design problems are wicked problems and much creativity is needed in acquiring solutions. The nature of problems is that they tend to generate certain wicked demands that seek a solution to social problems (El Khatib, 2015; Khatib and Opulencia, 2015)(El Khatib et al., 2020a; M. El Khatib et al., 2021). The design approach must be in a position to solve complex problems in environments and ecosystems that are faced with complex problems. The design thinking approach is, thus a tool that is fundamentally engaged in solving a wicked problem. (El Khatib and Ahmed, 2019; M T Nuseir et al., 2022b) argues that various professionals have different aspects of design applicable to solving complex problems facing humanity. Every individual undertakes to innovate and create a design to solve an existing problem. As such every action is aimed at creating a better world with fewer problems and complexities (Nuseir, 2021).

Another advantage of design thinking is that it can be incorporated by organizations and by professionals who are not design professionals in enhancing success for their organization. (AlDhaheri et al., 2023; Khatib et al., 2022) cites Henry Ford and Thomas Edison as good examples of design thinkers who have employed the practice of design thinking in their practices and are not professionals in the field. (H. Alzoubi et al., 2022; Gaytan et al., 2023) further argues that designers can incorporate design thinking in their work and this provides them with an innate capability to work systematically and to achieve their vision. There is need to undertake integration of design thinking into the curriculum by creating a connection between what things ought to be and how things are. The difference in the two aspects of how things are and how they ought to create a problem that requires a solution (Ghazal et al., 2021; Nuseir and Aljumah, 2020). Incorporating design thinking in higher education thus challenges and assists students to develop solutions to problems being realized. This idea has been reinforced by other scholars who feel that behavioral economics and artificial intelligence must be incorporated to produce a broader value that complements science and plays a useful underpinning in challenging solutions to various professions (Nuseira and Aljumahb, 2020). The argument posited by these scholars is that the domain is not an exclusive concept of designers but can be executed by individuals across disciplines to yield the desired change (Akour et al., 2021).

2.4. Organizational Resource

The organizational resource has emerged as a third discourse that scholars have pursued to understand the concept of design thinking. The growing business world creates significant challenges for leaders that require them to make informed choices for the betterment of their organization. Design thinking is beneficial through its integration in business performance as a means of solving an array of business challenges such as difficulties in technological integration. The 21st century places design thinking as an approach used by organizations to solve existing business challenges. Additionally, (I. A. Akour et al., 2022) identify design thinking a strategy that enhances capability across a company and contributes to enhancing the responsiveness of a business to changes. However, little information exists as to how responsiveness occurs in practice. There is a need to undertake studies to determine the relationship between design thinking and organizational models (I. Akour et al., 2022). The possibilities as well as the situation facing an organization can be explained from the perspective of design thinking (AlHamad et al., 2021). Design

thinking skills make it possible for business leaders to evaluate the root course of a problem, develop a mechanism that can solve the problem, and consequently implement the desired strategy. Business leaders seek to maximize the growth of their companies by solving certain problems facing the market as well as by addressing the internal challenges that a company may be facing (Al-Maroof et al., 2022; Ahmad Ibrahim Aljumah et al., 2022a).

Research design appears to be complex especially for employees who do not have experience in designs. The disadvantage in this is that most organizations find it hard to integrate the concept into their operations. Additionally, although this discourse is widely discussed little is known about how it has impacted the performance of various businesses. There has been continuous research in this field with practitioners and academicians trying to define the challenge. The literature on this field draws from academic research as well as from the practitioner's point of view (A I Aljumah et al., 2022a). The information, thus, emanates from the opinion as well as experience of diverse scholars in the study. The concept of design thinking emanates from the IDEO (Discovery, Interpretation, Ideation, Experimentation, and Evolution) process model (Emad Tariq et al., 2022). The concept of design thinking under IDEO explains the work of designers and is a significant component of design thinking. The concept adds value to innovation and plays a critical role in delivering solutions to global challenges. However, its complex nature makes it difficult for small organizations to incorporate the concept in their processes.

(Akour et al., 2023; H. M. Alzoubi et al., 2022e) outlines the concept of organization resource as a revolutionary strategy in business growth. The design thinking concept has been gradually evolving as an organizational resource. Although there might be disparities in literature among various scholars there are consistent sentiments concerning the concept of design thinking as an organizational resource. One of the sentiments is that design thinking is purposed to create innovations and solve problems. Another sentiment is that design thinking is centered on humanity and hence puts the need of people first. Design thinking is, thus, viewed as an iterative and collaborative process that starts with generating insights intended for the end user, to the generation and testing of ideas, and implementation of the same. It is, therefore, an integrated approach that has major components of engagement and participation. Although there is a congruency in the definition of design thinking there exists uncertainty as to what the tool can achieve and to what extent

(A. Al-Maroof et al., 2021) outlines lack of clarity as a disadvantage of the concept and hence not useful in influencing positive change among businesses. The article notes that although design thinking is impactful in revolutionizing business performance the process is discussed simplistically. Business leaders must change their perspective in applying the new concept in management. Design thinking is not just a tool for professionals but should be trained for people across platforms. The achievement of an organization depends on overall input by every player in an organization. The concept of design thinking has received criticism from certain quarters with certain scholars describing it as a passing cloud (Aityassine et al., 2022). This is because there is a lack of clarity on the value and the ability of design thinking to effect changes in business processes.

Various weaknesses have been identified concerning the concept of design thinking from the perspective of an organizational resource. One of the weaknesses is the presence of little empirical depth since the majority of the information is based on opinion and experience and is either semi-practitioner or semi-academic motivated. The idea of it being semi-academic and semi-practitioner provides room for authors to report positively on the concept rather than engaging in critical analysis on the value and ability of the concept to influence change. Due to these reasons, researchers tend to portray design thinking as a panacea to innovation and a tool to solve organizational problems. There is little evidence of direct input and output causation as a result of the application of the design thinking concept. The lack of consensus on the definition of the concept also creates doubt as to the impact and value of the concept (Al-Awamleh et al., 2022). However, this study adopts the definition of design thinking as a collaborative and human-centered approach that aims at solving problems and enhancing innovation.

2.5. Application of design thinking in practice

Various aspects appear under the application of design thinking in a practice in a bid to review how the process has been applied to stimulate changes in organizations. This segment starts with exploring the design thinking process, followed by a discussion on design-led professionals, and then an analysis of the environment under which the design thinking process is applied. Undertaking an analysis considering the interrelationship between the three aspects provides an in-depth understanding of the operationalization of design thinking in yielding the required results.

2.6. Design thinking methods and process

The design process according to (T M Ghazal et al., 2023a) is linear and encompasses two components. The first component is the definition of the problem. At this stage identification of various challenges that design thinking is poised to solve is undertaken. The actor at this stage outlines the various problems and considers various ways in which solutions can be obtained before arriving at a specific choice of solution. The second component of the design process is the problem solution. The solution emanates from a well-thought-out strategy that has been designed following the identification of a challenge. A major disadvantage on the methods and process is that it provides a weak overview on how it is poised to solve existing problems. Critics argue that this simplistic definition of the design process is weak and that the design process has no predefined steps and as such are no-sequential. (Arshad et al., 2023) note that the identification of problems and establishment of solutions to the problems is a representative of a practice that defines managerial duties. The critics feel that although definite stages may be identifiable in the design process there is no single agreeable sequence of the stages. The stages from the identification of the problem to the solution end are dependent on the nature of the problem. Different issues will require varied stages and sequences. (Gulseven and Ahmed, 2022) affirms the same scenario by arguing that there are no definite steps in which the various stages can be navigated.

(Nuseir et al., 2020) outlines the lack of insight as to what tool should be used at what stage in the design process to enhance innovation and business growth as a major limitation of the process. Various methods such as visual thinking, prototyping, and brainstorming have beenenumerated as perfect tools in the design process (Nuseir and Elrefae, 2022). Although the available literature agrees that a design process is a systematic approach there is a lack of agreement as to which phase should follow the other. There is also limited insight concerning the tools to be used in each stage. There is a need to have an understanding of how design-led professionals undertake certain activities in identifying with the thinking process.

2.7. Advantages of the design-led professional influencing change

The design-led professional has a certain impact on the design thinking process. Getting the right design does not entirely require a designer but the right designer who will apply a design thinking approach in establishing a solution to existing problems based on their capabilities. Given this perspective, a design-led professional can bring a significant influence on the application of the design thinking process. The design-led professional is a significant game changer in the achievement of business objectives by influencing positive change in strategy (El Khatib, 2015). Positive results can only be realized depending on the capabilities of design-led professionals. The mindset of the professional is, thus, critical in ensuring the adopted strategy realizes the projected goals.

The creation of successful design solutions requires the design-led profession to have the right mindset. The right mindset influences the processes and steps taken in addressing a certain problem. The mindset of the leader and the team where a team is involved can make or break the process of design thinking. (Khatib et al., 2016) affirms the importance of mindset after identifying that many people desired to have a mindset change following a design thinking experience. Although mindset has been described as vital in influencing the design thinking process little information is available on how the right mindset can be achieved and applied in the design process. (Aljumah et al., 2021b) argue that design mindsets can be learned but it takes discipline and encouragement to acquire full development. The capabilities of the professional are another attribute that is key in determining the effectiveness of the design thinking process. Different individuals have different understandings and professional

capabilities. While designing the solution to existing problems it is vital to consider the capabilities of the design-led professional and match them with the correct strategy. Characteristics of the individuals are another important aspect for consideration (Cooper et al., 2009). Certain individuals possess varied attributes. Some individuals accept correction in a positive manner and others will take criticism negatively. Other individuals will possess traits that allow them to change their mindset. Such individuals have an open mind to acquire knowledge and are flexible to change with changing circumstances (Alzoubi, H MAlhamad et al., 2021). Achieving success in business management requires individuals open to criticism and flexible to learn new things without the feeling of being undermined. Such individuals will be proactive as they will also be able to identify problems before they arise and consequently develop the right strategies to address them.

The literature concerning who can apply the design thinking process is diverse. Although the design thinking process is recognized as part of the skills and expertise possessed by a professional designer, the knowledge can be applied by diverse professionals. The design thinking process starts with the recognition of the skills that the designers have gained over time to meet human needs through the application of available technical resources considering the constraints of a business. In this context, design thinking can never be a substitute for professional design but is rather associated with the application of a designer's method and sensibility in solving problems.

2.8. Positive and Negative impact on Environment

The environment and especially the culture of an organization have a significant influence on the value and application of the design thinking process. Cultures that have not been changing in an organization often act as a constraint to design. There is a need to have a flexible organizational culture that changes with the changing demands in the market. There are certain conditions that organizations must meet to enhance success in design thinking. A major barrier to organizational success is the presence of low tolerance for risk. Another barrier observed in the literature is the high resistance to the adoption of a human-centered approach. Other factors that may contribute to failure include poor technology, lack of resources, and the constraint of time. All these factors determine the environment in which different facets of an organization interact to yield change. In addition to having a design-led profession organizations have to demonstrate characteristics and mindsets relevant to design thinking and integrate the same these traits into work activities. Organization leaders must apply a design attitude that will bring about transformational leadership and consequently yield positive changes to the organization.

Lack of human interactions is a major hindrance in ensuring success of the design thinking process. There is a need for organizational leaders to maximize human interactions and enhance increased cooperation and communication to work as a team to achieve the desired end. Such an approach breaks down the traditional culture where individuals are concentrated in a closed office set-up to perform duties only prescribed in their job descriptions. The traditional approach presents little opportunity for engagement and consequently minimal chances for individual growth. The results in such a scenario are poor performance by an establishment. An example of the breakdown of traditional organizational culture is explained by (Cooper et al., 2009) involving the culture of the Australian Tax Office. The office is set to undertake the integration of design thinking as well as developing the core competencies in design among the staff in the office. The Tax Office achieved this by organizing skill development programs aimed at improving the capability of individuals as well as influencing a positive change in the mindset of individuals. These programs are impactful as they challenge individuals to engage in design thinking. The aforementioned example is an indication of how the cultural environment of an organization can impact the results of the particular organization (A I Aljumah et al., 2022b; Foster, 2021). A positive environment is a catalyst for positive change in any establishment.

Sufficient literature is also lacking on the aspect of a project environment. The project environment possesses significant implications for the success of an initiative. There is a need to consider the environment in which a project is initiated and how the process and progress are affected by the environment and hence affect the outcomes. The

earlier example of the Australia Tax Office has a physical design that reflects a conducive environment for work. Environment alters the motivation of an individual and consequently the outcome of work. It is vital to have an understanding of the role an environment has on the performance of an organization and in the design thinking process. The employee composition within an organization influences the adaptability of an organization to the design thinking process. A lean staff makes it easier for the management to impart design thinking strategy to the employees. However, this is disadvantageous since a huge employee base provides an array of varying ideas which can be combined to develop prototypes. The treatment of the employees by the management also influences their motivation and consequently their willingness to fully utilize their potential for the benefit of their organization.

3. METHODOLOGY

Data for the study can either be primary or secondary data. Secondary data will be obtained from the literature review. Various scholars have raised their views on their practicability in the application of the design thinking process in the business field. Secondary data provide the research with information that has been previously verified. Secondary data is verifiable and has been subjected to analysis and criticism. The gaps in secondary data can be filled through the use of primary data. Primary data provides fresh information concerning a subject and aims at filling an existing gap in research. This study will make use of primary and secondary data in achieving the objective of the study.

3.1. Literature Analysis

The study has conducted a systematic review of the literature in a bid to identify the themes, connections, and patterns of the design thinking process. Sources that have been included in the literature have an in-depth analysis of the emergence of the concept and how it has been involved over time to be applied in various dimensions. Sources that have been included in the literature review connect the evolution of design thinking to the current application in business. Information obtained from the literature review will serve as a source of information for this study in addition to conducting interviews.

3.2. Sample

In conducting the interviews a sample of 20 business leaders was used. The selection of the sample base is based on the organizations that are applying the design thinking process in their operations. The sample is effective in obtaining relevant information concerning the importance of design thinking and the benefits and cons of the same. Information from experienced practitioners is an indication that the conclusion identified from the research is reliable. The chosen sample size consists of innovation managers who are involved in the operationalization of the activities of the business. These innovation managers are the key informant as they are involved from the designing phase through the application phase to yield the targeted outcome. The information managers selected in the study have a diverse knowledge of the various aspects of the projects that include prevailing mindsets that may be based on experience or reflection of their behavior.

3.3. Demographics

The participants selected for the study possess a minimum of ten years of experience working for the respective industry under consideration in the interview. The industries considered in the survey include finance, business services, real estate, and health care. Six of the selected respondents were females while 14 were males. The age distribution of the respondents was from the ages of 30 years to 50 years while the levels of their education ranged from undergraduate to doctorate degrees. Given their level of education coupled with their work experience, the respondents are in a position to offer verifiable information. The respondents selected from the study have been selected come from companies that are amongst the innovation leaders within the respective organizations. The sample, therefore, is capable of providing a benchmark concerning the presence of design thinking mindsets and how they are supportive in the implementation of a design approach.

3.4. Data Collection

This study makes use of structured interviews administered through questionnaires to obtain relevant information concerning application design thinking in business operations. Opened-ended questions were drafted to provide an

opportunity for the respondents to give their views without limitation. The advantage of open-ended questions is that they provide the respondents with an opportunity to raise their points without being constrained to follow a certain direction. The semi-questionnaires were administered through interviews with the respective respondents. Prior consent to participate in the study had been sought from the selected sample hence making the process easier. By conducting interviews, the interviewer can read the mood and their opinions concerning a certain subject. The interview process also enables the interviewer to ask follow-up questions in the event there is no clarity. The advantage of interviews is that they involve direct contact between the interviewer and the respondents thus eliminating instances of non-responses. In conducting, the interview in these study semi-structured questionnaires is developed to act as a guide. Certain questions are prepared such that the respondents have the requisite knowledge of the subject matter and can guide the interviewer. To be certain about the object of the study, only the pre-determined questions in the questionnaire are used during the interview. The questions are set with the objective to achieve the desired objectives. The interviews using the guided questionnaire lasted for about 45 minutes for each respondent. The respondents were required to reflect on their design thinking practices concerning a certain innovation they are involved in and to also describe the mindset they have observed in others or they have practiced. The questions aimed at obtaining information regarding how design thinking has been used in the business arena and how it has influenced the specific achievement of organization-set objectives. In addition, the study sought to determine the challenges and disadvantages encountered during the application of design thinking in real practice. Probing questions were asked on issues that did not have clarity. The approach used by this study is critical in identifying the important concepts of design thinking and how they interrelate with business performance. Verbatim transcripts obtained from the interviews as well as the field notes were coded with the use of qualitative guidelines in research.

The study undertaken has been cognizant of the various ethical considerations. A major ethical consideration for the study is to ensure that participants engage in the research following written consent. This ensures that the respondents have not been coerced to give information. The signing of the consent letter served to affirm that the respondents have not been coerced. Further, the study stresses the need for anonymity. The details of the respondents were not revealed nor neither the details of the organizations they work for. This creates a conducive and relaxed environment for the respondents to provide the requisite information to assist in the achievement of the research objective.

4. RESULTS

4.1. Statistics

Various questions were set aimed at acquiring the requisite information to address the research objective. One of the answers sought by the study is to determine the extent to which the selected respondents have applied Design thinking in their practices. Of all the respondents, 3 individuals representing 16% of the respondents indicated having introduced design in their practice to a greater extent. This proportion of the respondents also noted having achieved significant success in their operations observed in the increased growth of their organization. The study also found that 2 individuals representing 10% of the total respondents indicate that although the design has assisted the company to achieve increased growth it has done so to a lesser extent. 58 % of the respondents have indicated to having their organization apply design in their operations is an afterthought having faced challenges in achieving predetermined objectives.

The majority of the business executives from the study findings indicated having applied design as well as design thinking in conducting business management operations. 84% of the respondents affirm the contribution that design has in achieving business objectives. 905 of the respondents feel that the process should be introduced to employees across departments. However, 10% of the respondents feel the exercise might be expensive, especially when having training nonprofessionals on issues to do with design and consequently the design thinking skills. As such these respondents feel that design and design thinking strategies should be introduced to relevant professionals within the various departments. Although the sample selected consisted of business leaders in the organization

that apply design and design thinking approaches in their operations, 45% of the respondents provided information that they have not applied but have observed it being applied by colleagues within the respective organization.

The general observance by the respondents on the concept of design and design thinking in various organizations but outside the organizations they work for portrayed varying information but tended to approach a common divergent. 75% of the respondents feel that most organizations in the market industry considered the design thinking process as a stylistic element that is only poised to the improvement of products. The majority of players in the various business sectors do not recognize that design needs to be applied in a broader sense in enhancing organizational performance. The expert opinion provided indicates that there is a low level of awareness of design-level applications and the value that design thinking has on organizations and consumers.

38% of the respondents argue that the major challenge of incorporating design thinking in an organization emanates from a lack of expertise. The limited number of professional leaders in an organization leaves the design thinking process to a limited number of individuals. The respondents also feel that bringing multiple people on board while developing the prototype and in the process of engaging end users may be time-consuming slowing down the activities of an organization.

The expert interview revealed that the majority of the people lack professional knowledge in design thinking hence making it difficult for them to offer top not solutions. Business leaders feel that there is a need for an organization to engage employees through a process of knowledge and skills development in the field of design thinking.

4.2. Correlation Results

The results sought to determine the impact of design thinking skills on business managers. As such a correlation between design thinking and business growth is performed. Correlation results indicate a direct relationship between design thinking and business growth. As such business growth is directly proportional to design thinking among other variables. Incorporating design thinking skills by businesses and leaders assists in solving business problems and consequently enhances efficiency in the performance of businesses. This leads to an increase in the growth of the business.

5. DISCUSSION

Design thinking has the capacity of influencing how people think and consequently how they act toward solving a certain challenge. The agreed-upon concept of design thinking is that it is geared towards identifying a problem and consequently finding a solution to solve the problem. By presenting an opportunity to think outside the box, design thinking presents practitioners with the capacity to invent new ways of addressing the emerging complexities in the world of business. Business leaders are presented with an ever-changing business environment that necessitates the existence of innovative ways to address emerging issues. Business leaders feel that the evolving concept of design thinking offers immense advantages to the performance of an organization. These benefits can only be enjoyed if members of an organization appreciate the emerging concept and can work as a team.

Design thinking professionals possess a creative approach to duty performance and hence display their expression and thinking. Business leaders encourage their colleagues to engage in behaviors that nurture as well as inspire the creation of new ideas. Creativity is vital in design thinking as it enables individuals to connect with the intangible aspect of organizational resources. Encouraging the development of behavior aimed at solving a foreseeable problem is a critical aspect of building an organization. A major benefit realized through the application of design thinking is the increased growth of businesses. Businesses are faced with ever-emerging complications emanating from an array of factors including globalization and growth in technology. Leaders with the ability to apply design thinking skills have the capacity of applying creative solutions to solve the expected challenges. The research findings indicate that organizations that have fully embraced design thinking in their practice realize increasing growth in their organizations. Although authors place the role of design and application on the professionals every employee of an organization is challenged to apply design thinking. Although the professionals play a leading role all members of the establishment have a role to play in building the success of an organization.

Design thinking provides a means for the organization's leadership to offer a solution for existing challenges. Design thinking functions as a structured approach and is thus able to solve different types of challenges. The thinking process involves an interactive exercise that seeks to identify creative solutions to solving various business challenges. The respondents argue that business leaders should always place themselves in the place of consumers and thus develop solutions that meet the need of end consumers. The process can also be used in the development of new products aimed at filling an existing gap within the market. The changing tastes and preferences of consumers require continuous product development that calls for the existence of an innovative solution. Design thinking provides a systematic approach that enables an organization to solve problems. Companies have been struggling to create as well as maintain an innovative culture using lean and sustainable business models. Successful integration of design thinking and sustainable business model creates a competitive advantage for organizations. The integration of design-led personalities in leading the agenda of a business is a good addition for businesses. Businesses are seeking to align their strategies with the evolving concepts of the design thinking process.

The design thinking approach aims at developing strategies and innovations from the user end. The design approach seeks to empathize with the consumers. As such the approach can capture the consumers' real problems and expectations. Creativity techniques help in generating various ideas that assist in the development of solutions that meets consumer expectation. Another advantage of design thinking is the reduced risk of launching new ideas. The focus on design thinking is on developing prototypes and outlining them to sponsors early in advance. By developing new ideas, business leaders can stay on course to address any emerging needs of an organization. Development of ideas early in advance assists in eliminating costs incurred through the development of bad ideas. Prototypes developed early in advance produce an end product that is backed by data with more confidence. A challenge that is faced by businesses is the creation of ideas that provides just incremental improvements to the existing products and services. Although such improvements are crucial for businesses it puts the business at risk of disruption from external factors. Design thinking comes in handy to solve this challenge by providing innovative offerings and solutions. The component of creativity derived from design thinking helps businesses to establish strategies that meet the long-term needs of an organization.

There is an increasing trend by organizations to apply design thinking as an afterthought. The study found that 58% of the respondent's organizations applied the process as an afterthought. The implication is that businesses indulge in other strategies to foster growth but midway realizes that chosen strategies do not make huge progress as would have been desired. These companies are forced to resort to design thinking aimed at developing an innovative strategy that will address the challenges being faced in addition to offering long-term solutions to the challenges faced by a business. The respondents agree that design thinking creates a faster pace of learning. The outline of the design thinking process is that it attracts multiple people from varying departments to generate several prototypes. Since everything developed at this stage is a prototype, an organization can stage and test the prototypes to determine if it accomplishes the desired end. If it does not meet the objective stipulated the prototype is abandoned and another one is pursued until the right prototype is established. By having multiple people in this exercise bring varying ideas the process is quick and serves to meet the demands quickly. The result of this strategy is quick learning and the development of creative solutions to existing challenges. Enduring benefits accrue to organizations that can sustain an increasing rate of innovation and hence can quickly respond to the challenges that may arise.

The design thinking approach to solution creation yields widely acceptable results. The process includes the user's right from the process of identifying the problems facing the users. The involvement of the users makes them own the result given that their input has already been considered while developing the solution strategy. Although designs may seem like obvious innovations for organizations they serve as tools that break down the wall that separates the actual users and the leaders. The inclusion of end users in the development of creative solutions makes the

end product acceptable in addition to making a happier user.

A significant percentage of the respondents feel that most organizations use design just as aesthetics and hence the process of developing the design does not encompass multiple players or even the users of such design. The disadvantage of this form of thinking by organizational players is that design think does not yield any significant value to the performance of an organization. The critics argue that design think adds nothing new to what research and development practices have been achieving. In this light, it is good for organizations to focus on the approach of research and development in developing strategies to steer a company. However, these critics fail to understand research and development strengthens the design thinking process as the process involves the collection of data right from the users and identifying the prevailing needs which the desired solution seeks to address.

6. CONCLUSION

Design thinking needs to be conceptualized as well as its application in managing businesses. The globalization process and the advancement in technology are some of the opportunities presented in the current business world. Technology is constantly evolving forcing companies to change their operation strategy. To keep in length with the developments businesses must engage in a process that enables them to be proactive. Design thinking is a major strategy that comes in handy to offset the challenges faced by the organization. Through design, thinking leaders can conceptualize the problems that users face and consequently involve users in information gathering in a bid to create a worthy solution. Involving the end users in the development process of design thinking increases the acceptability of the end product by users. Wide acceptability means the efficient application of the products among consumers. Business leaders need to make innovations that are in tandem with solving the problems being faced by society.

6.1. Study Limitations

Previous studies did not have much focus on the application of design thinking in the business arena. Although this study sought to enumerate the concept of designing thinking for managers with a focus on the collection of primary data, there is a lack of empirically grounded information from previous research. Selecting businesses that have fully incorporated design thinking as a management tool was a challenge given that most businesses view design as a stylistic innovation for attracting consumers. As such, the study incorporated business leaders who have professional expertise in the concept of design thinking and are working in organizations that have not fully adopted the use of the design thinking process in problem-solving.

Another limitation of the study entails the composition of the respondents. The research made use of twenty respondents who are professionals in various organizations and sectors with varying educational backgrounds. Although the respondents have a diverse knowledge of the matter theoretically and in practice, the sample size may not be sufficient to offer a real representation of an entire population in the design thinking practice. Further, from a pragmatist point of view, the study made use of convenience sampling, and hence participants were selected based on accessibility, timing, and opportunity. The expert interview in particular relied on referrals in some instances. The implication is that some of the referrals may have a common form of thinking and approach given they are colleagues in the same sector. Another study limitation concerns the distribution of respondents. The respondents were not globally distributed and hence the probability of providing information based on a given region.

6.2. Future Research

While undertaking this research recognition has been observed of the need for undertaking further research. The main aim of this research was to analyze the concept of design thinking and how the skills are intertwined in ensuring the progressive running of businesses. The study, therefore, sought to unearth the pros and cons of using design thinking in an organization. Although this has been achieved, the study was not without limitations. Undertaking further research is necessary to seal gaps within the study as well as advance the findings of this research. Undertaking validation and exploration of the various components of design thinking as well as testing of the resultant model would provide a requisite and valuable

insight into understanding each of the components and their application in real practice. Such an exercise would provide a deeper understanding of the concepts and their practicability.

Design thinking is not just a strategy for professionals and business leaders but an approach that needs to be adopted by individuals across sectors while solving arising problems. As such, further research should focus on how organizations can incorporate professional development among employees through design thinking studies. Empowering employees to be innovative in developing solutions to work challenges not only grow the professional expertise of the individual but also enhances the overall well-being of the establishment. When employees are well-versed with expertise and experience in the dynamically evolving business world businesses tend to reap growth benefits and acceptance within society. Incorporating design thinking to be part of human resource strategy needs a strong foundation that calls for further research.

6.3. Recommendation

Design thinking has created a wave among educators and practitioners. The increasing interest in this topic has enhanced concerted efforts among researchers to discuss how the phenomena can influence change and how it can be interconnected to the goals and objectives of an organization. Despite the ranging interest this concept is not properly understood by the public and the majority of the practitioners claim to have an understanding of the same. There is need to develop a framework that cuts across organizations on how successful implementation should be undertaken.

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Robotics Process Automation (RPA) and Project Risk Management

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A B S T R A C T

The Robotics process is a technological software program to improve digital technology systems. The robotic process identifies the factors to process data in a digital security system to mitigate risk in managing projects. Atisalat is a renowned company that successfully utilizes a robotic process in their service, and they are the pioneer in using the robotic system in UAE. By adopting the process, they have facilitated the digital model development objective of UAE through VISION 2021.
Digital transformation in project management is analyzed to change adaptability and shift of cultural processes both in adopting new technologies and project management. The robotic process also helps Etisalat to secure the position of the 4th strongest brand in the world. Technological innovation changes the system of network channels. The company implemented Pega centralized decision engine through the robotic system for implementing the best-personalized action and to address the gap in professional communication. The software robots used by the company support to make the back-office task 70% faster than before with accuracy. The robotic process enhances telecommunication systems and also develops the industry related to telecommunication. Technology adaptation through the introduction of an RPA system improves customer experience and serves excellence to get revolutionized with AI. Society also gets accustomed to using technology for fun.

1. INTRODUCTION

The Robotics process management is a software technology process that makes it easy to evaluate human-robot actions to interact with digital technology systems (Ribeiro et al., 2021). Robotic process automation understands a data action process that is identified as a risk management project.
Risk management can help Robotics process automation to identify prime areas where robots can increase accuracy (van der Aalst et al., 2018). Robotic process automation is an executive structure that is based on a task by taking action on an existing human-robot system process (A. Al-Maroof et al., 2021; Aloini et al., 2007). Robotic process automation in risk management can reduce risks by increasing compliance and decreasing errors. Risk management can expose customers' data for Robotics process automation (Baryannis et al., 2019).
Digital Disruption to project management deals with aggressive action and identifies an alternative market opportunity (Al-Dmour et al., 2023; Al-Kassem et al., 2022; Fosso Wamba et al., 2020; Khan et al., 2022). Project managers consider that

they are executing specific project disruptions on project management using robotic processes. Digital Disruption can lead a digital innovation to bring device movement to project management; it is healthier for overall company management (Madakam et al., 2019). During a Digital Transformation that is required to change adaptability and shift cultural processes, both new technologies are Project management. Digital Transformation journey access the current capabilities of project management (Muhammad Turki Alshurideh et al., 2023b, 2023c; Annarelli and Palombi, 2021; Kassem and Martinez, 2022).

1.1. Digital Transformation to Project

Management digital challenges are frequently to better understand the marketplace and across intelligence data sharing processes (Aljumah et al., 2023; Eikebrokk and Olsen, 2020). Robotic process automation makes data analysis more accurate than any other data entry process (H. M. Alzoubi et al., 2022e, 2022a)(I. Akour et al., 2022; Hani Al-Kassem, 2021). The Robotic process backed up by an AI software system can reduce human error, which is essential for the project study, but another system cannot do it better and more easily than the Robotic system (Ivančić et al., 2019). Robotic mechanisms empower Etisalat to provide digital solutions, cloud talk, meeting platforms, business edge, telemedicine platforms etc., to their customers (Alzoubi et al., 2019; Marnewick and Labuschagne, 2009).

2. LITERATURE REVIEW

2.1. Impact of robotic process on telecommunication

As per (T M Ghazal et al., 2023c) the robotic process plays an important role in effective telecommunication systems and covers a huge market share in the Middle East and Africa.

2.2. Market covering the Middle East and Africa, it is the 4th strongest brand in the world

The robotic process also helps Etisalat to secure the position of the 4th strongest brand in the world. (Ahmed and Nabeel Al Amiri, 2022; Al-Kassem, 2017; M. T. Alshurideh et al., 2022b; H. M. Alzoubi et al., 2022d) says that, technological innovation changes the system of network channels (Al-Awamleh et al., 2022; H. M. Alzoubi et al., 2022h; Sakkthivel et al., 2022). Previously, network channels had faced the problem of disconnection randomly, and for this reason selling process of Atisalat got interrupted (M. Alshurideh et al., 2022; El Khatib, 2015; T M Ghazal et al., 2023b). Etisalat maintained a previously solo data system, which could not address the communication gap (M. El Khatib et al., 2022a), and it seemed difficult to identify products which were not suited for individual needs (Al-Kassem, 2014; H. Alzoubi et al., 2020; Amiri et al., 2020). To remove this hurdle, the company implemented Pega centralized decision engine through the robotic system for implementing the best-personalized action (Abudaqa et al., 2022; H. M. Alzoubi et al., 2022b).

2.3. Pricing of new models to support the freedom lines

The robotic process, according to (M. El Khatib et al., 2021; Nuseir, 2021) made a revolution in customer service with the introduction of AI technology. Etisalat has introduced a new pricing policy for their new model of robotic service process to support the customer base and their freedom line (Al-Kassem et al., 2013; R. S. Al-Maroof et al., 2021b; H. Alzoubi et al., 2022; El Khatib et al., 2021; Nuseir and Aljumah, 2020). To influence customers through their new pricing models, the company has given unique offers to customers, like buying e-life (television services) online by saving AED199 (R. S. Al-Maroof et al., 2021a; Bawaneh et al., 2023). They also have offered free 1GB of data to the customers for opting first online research system (Taher M. Ghazal et al., 2023)(H. M. Alzoubi et al., 2022c; Mat Som and Kassem, 2013).

2.4. Delivery with efficiency using various software

Through this new mechanism, the service delivery of Etisalat becomes efficient (Aityassine et al., 2022; H. M. Alzoubi et al., 2022f; M. El Khatib et al., 2022b). Other Robotic mechanisms offered by Etisalate are digital solutions, cloud talk, meeting platforms, business edge, telemedicine platforms etc (Al-Kassem et al., 2012; Aljumah et al., 2021a; El Khatib and Ahmed, 2020; Nuseir, 2020).

2.5. Technology Opening of RPA centre of excellence to revolutionize customer experience with AI

For using various software, they have opened RPA centres for the improvement of service speed and efficiency in service delivery (Akour et al., 2021; I. A. Akour et al., 2022). (AlDhaheri et al., 2023; El

Khatib et al., 2019) said that, the software robots used by the company support to make the back-office task 70% faster than before with accuracy (H. M. Alzoubi et al., 2020; El Khatib and Ahmed, 2018; Varma et al., 2023).

2.6. Invention to provide a digital future

They have introduced Malaffi software to include a cloud mechanism in the smiles app and smart stores (Almasaeid et al., 2022). The company wants to make a revolution in providing the best customer experience by using robotic processes backed up with AI processes (M Alshurideh et al., 2023; Lee et al., 2023)(H. M. Alzoubi et al., 2022i; El Khatib et al., 2020a)

2.7. *Design for achieving the targets*

This initiative is also meant to make a revolutionary change in UAE. Through the initiative of technological innovation, Etisalat helps UAE to drive towards digitization in the future through the project vision-2021 (Ahmad Ibrahim Aljumah et al., 2022b; Blooshi et al., 2023; M T Nuseir et al., 2022a). The company launched six RPA robots in 2021. To facilitate the objective presently, they are operating with 76 robots to perform 745000 transactions in order to ensure management care and to influence back-office functions (Alshurideh et al., 2017)(Aljumah et al., 2020; Ahmad Ibrahim Aljumah et al., 2022a; Tariq et al., 2022a).

2.8. Usage of the 5G mobile and broadband service

Attaran opined that the robotic process can make the operational function simple and speedy and make technology accessible to everyone with fun (Akour et al., 2023; Al-Maroof et al., 2022b). The impact of robotic process can be seen on usage of the 5G mobile and broadband service in modern society (AlHamad et al., 2021; Ghazal et al., 2021; Yasir et al., 2022)(Tariq et al., 2022b).

2.9. The industry is related to telecommunication

This process can make a funny user experience which keeps them more engaged in using technology (A I Aljumah et al., 2022a; El Khatib et al., 2020b). The target of Etisalat is to meet the purpose of deploying robots in a productive way to increase customer satisfaction and improve the working condition of the company by making possible the reduction of FTE and LHT (Gaytan et al., 2023; Gulseven and Ahmed, 2022).

2.10. Standard maintaining AI service

Radke opied in 2020 that technology innovation backed up by AI technology can reduce waiting time and save working hours (Abudaqa et al., 2021; Alzoubi and Ahmed, 2019; Louzi et al., 2022a). It definitely can improve industry to telecommunication in a moderate and standard way and data protection system under the legislation (Ahmed et al., 2022; El Khatib and Ahmed, 2019)(Khatib and Opulencia, 2015; Mubeen et al., 2022; Nuseir and Aljumah, 2022).

2.11. The process to reduce the errors

As the data gets secured with the robotic process, errors can be reduced, which can ensure data security (Khatib et al., 2022; E. Khatib et al., 2021). The company is using AI for better customer experience and giving empathy (Louzi et al., 2022b).

2.11. Methods using AI technology

Thus a positive change has occurred in society, and Etisalat has used that procedure for its own development as well as to encourage the technological development of the UAE (Blooshi et al., 2023; Farrukh et al., 2023; T M Ghazal et al., 2023a). AI is in the process of continuous evolution and continuous change to ensure sustainable customer service in UAE (Muhammad Alshurideh et al., 2023).

- *Society using the technology*

The AI-based robotic process prepares society to use technology.

- *Culture in the young generations*

The culture of the young generation gets influenced due to close intimacy with social media like Twitter, Facebook and Instagram. Technology makes them more open towards the world (M. T. Alshurideh et al., 2022c).

- *Habits of people*

Technology changes the habit of a new generation. Social media acts as an ecosystem which is popularly known as viral (Muhammad Turki Alshurideh et al., 2023a; Nuseir and Elrefae, 2022).

- *Movements that lead the influencers*

Du also launched its RPA and hiring for developers. The company also launched several autonomous networks with CAI and WAE (Al-Maroof et al., 2022a; H. M. Alzoubi et al., 2022g).

3. RESEARCH METHODOLOGY

The research methodology usually refers to the different strategies and approaches that is used by your research in order to justify the research objectives and for testing the hypothesis. For this research a qualitative approach has been adopted that deals with collection of data through open-ended questions the study has also employed a deductive research approach in order to test the existing theory. In regards to this a survey questionnaire with a sample size of 20 was created and responses were created from different working employees of Etisalat.

Collection of both primary and secondary data has been collected and the responses gathered have helped Tim testing the hypothesis in order to fulfill their research objectives the secondary data was collected by conducting a literature review approach wherein information was collected from different platforms and journal articles across the telecommunications sector of UAE.

4. DATA ANALYSIS

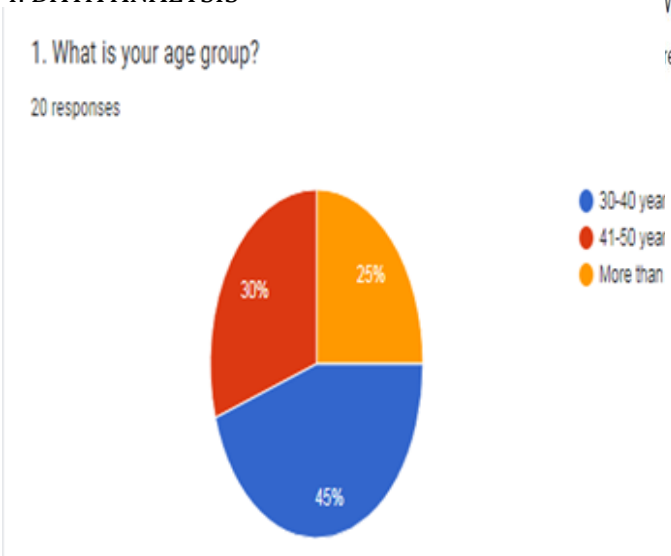

Figure 1: Demographic

The majority, or 45%, of the respondents, is from the age group of 30-40 years, and another 30% of the respondents are from the age group of 41-50 years. Thus most of the responses have come from some individuals who are at least 30 years of age and are expected to have substantial experience in the relevant field.

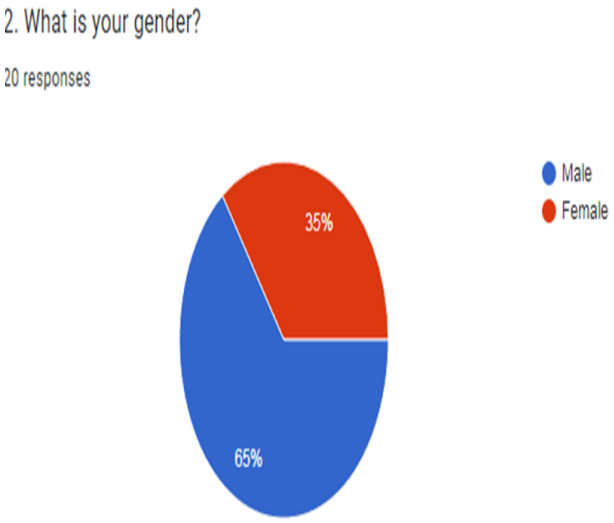

Figure 2: Demographic Gender Details

The respondents have been dominated by male respondents as 65% of the respondents are male, and the rest are female.

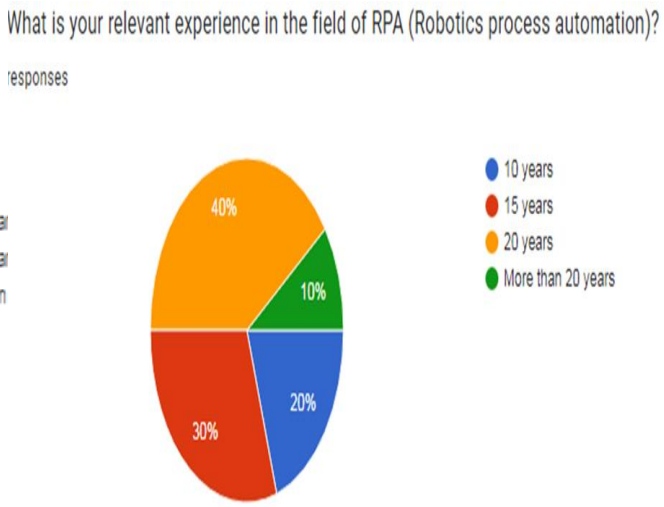

Figure 3: Respondents Experience

20% of the respondents are of the opinion that they have 10 years of experience in the field 0f RPA. Again another 30% are saying that they have 15 years of relevant experience, and the majority 40% are defining that they have 20 years of relevant experience in the field of RPA. Thus the respondents of are having long years of relevant experience, where the minimum years of experience of the respondents are 10 years. Therefore the respondents are supposed to have substantial experience in delivering detailed,

reliable information (Aljumah et al., 2023).

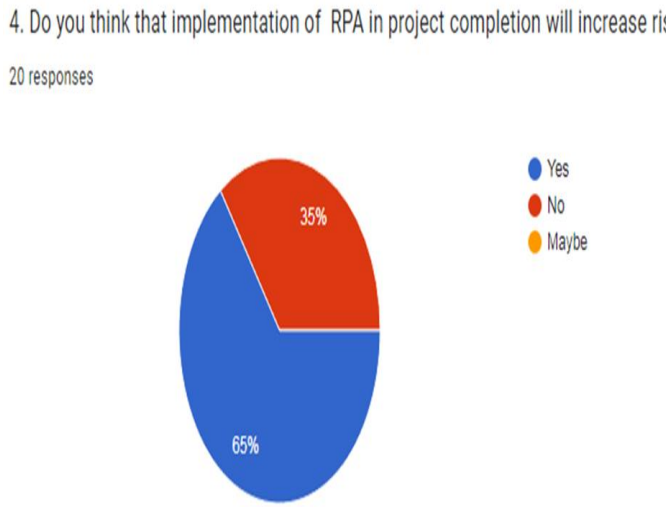

Figure 4 : Implementation of RPA

65% of the respondents are defining the fact that it is quite risky to implement RPA in the process of project completion as the wrong implementation of RPA to the project can bring disaster.

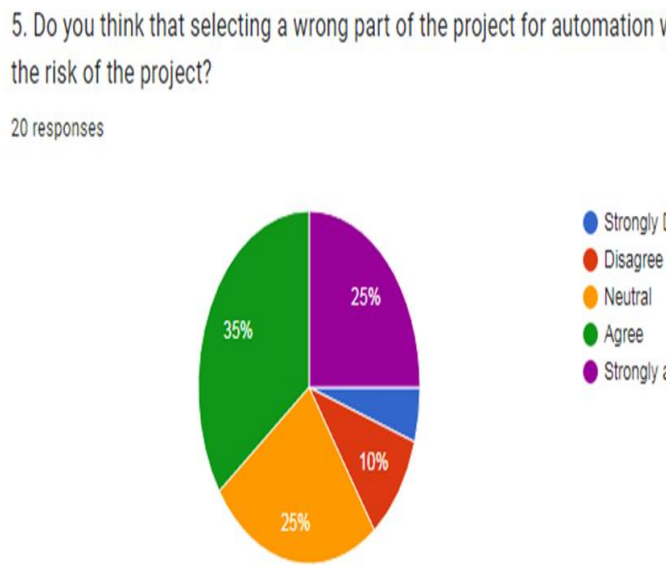

Figure 5 : Automation in Project Risk Management

35% of the respondents are of the opinion that selecting the wrong part of the project for automation enhances the risk of project failure as the whole operation of the project will be carried out in a wrong way with the lack of synchronization in time management between the automated work and human work (Muhammad Turki Alshurideh et al., 2023b; Nadzri et al., 2023).

The majority of the respondents are of the opinion that for successful implementation of RPA in the completion of the project, it is essentially required to properly choose the part of the project work that has to be automated. Generally, the most complicated and time-consuming parts of the project are supposed to automate using RPA, and the less complicated and time-consuming are supposed to be left for human operation (Aziz et al., 2023). However, if the less complicated portion of the project is being automated, then there will be a lack of synchronization between the outcome of the automated arts and that of the manual or part, and therefore the project is supposed to incur more time and cost for completion in comparison to the situation where the right part or the complicated operation of the project has been successfully automated.

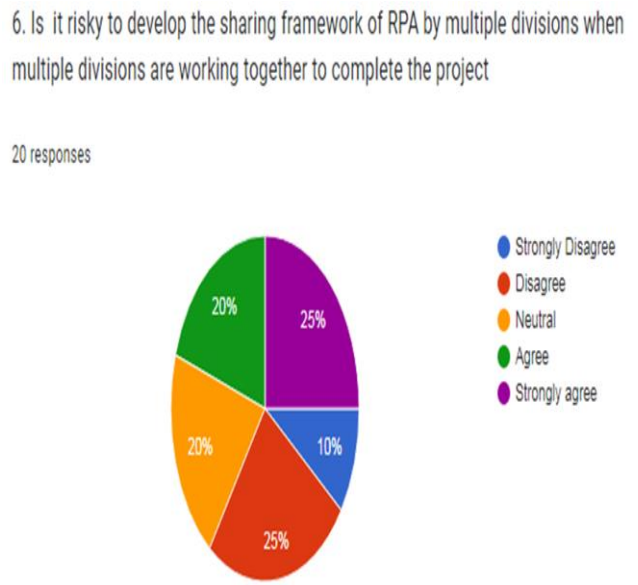

Figure 6 : Sharing Framework of RPA

20% of the respondents agree with the fact that implementation of RPA is more difficult and risky when it has to be implemented in a network of several departments that are working together for the completion of the project. Another 25% strongly agree with the fact.

However, it is not worth mentioning that 35% (10% strongly disagree & 25% disagree) do not at all support the opinion.

The survey responses come up with a crucial fact regarding the implementation of the RPA in an

environment of departmental collaboration where there is a strong opinion that it is very risky to implement RPA for project completion when several departments are in participating in the process as in such a situation the successful completion of the project entails that there must be a strong understanding among the departments regarding how they will share the automated part of the project for the completion of the share of the task that has been allotted to that department. Any lack of understanding and synchronization between the departments can make the whole project fall apart due to the mishandling of the RPA technology.

However, another group of respondents are not supporting the opinion, and they are of the opinion that the application of a little efficiency and good understanding can lead to the successful implementation of RPA in the multi-handler project. The most crucial requirement is that there should be regular communication and coordination between the departments with respect to the precise time frame that will be used for utilizing the automated operation by each of the departments and such activities will definitely lead to the successful implementation of RPA for project completion in a multidepartmental framework

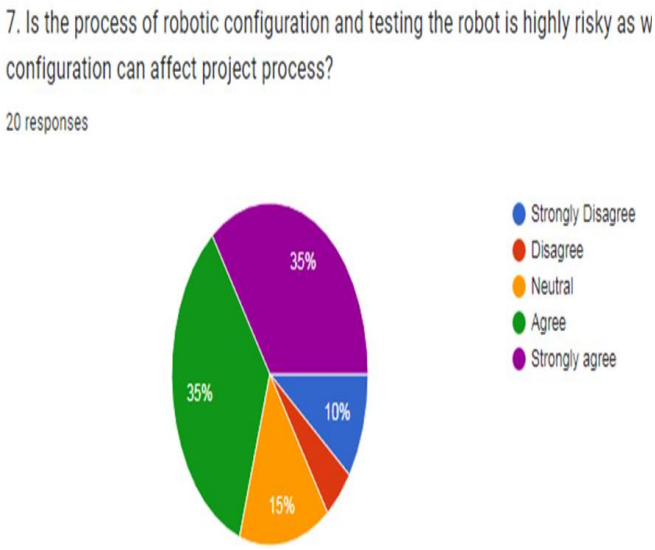

Figure 8 : Process of Robotic Configuration

35% of the respondents agree, and another 35% strongly agree that if the wrong configuration is being set with the robot, then the whole process of the automatic project completion may go in vain (Mohammed T. Nuseir et al., 2022).

The wrong configuration of the robotic machine is probably the biggest risk that a project manager may face while dealing with the implementation of RPA in a project process (A I Aljumah et al., 2022b). Due to the wrong configuration, the automated action by the robot will not be able to deliver the required quality of work and the whole performance of the project is supposed to decline drastically. A wrong configuration in the robotic system may result in the development of poor-quality products and thus leads to project failure and loss of reputation for the business organization.

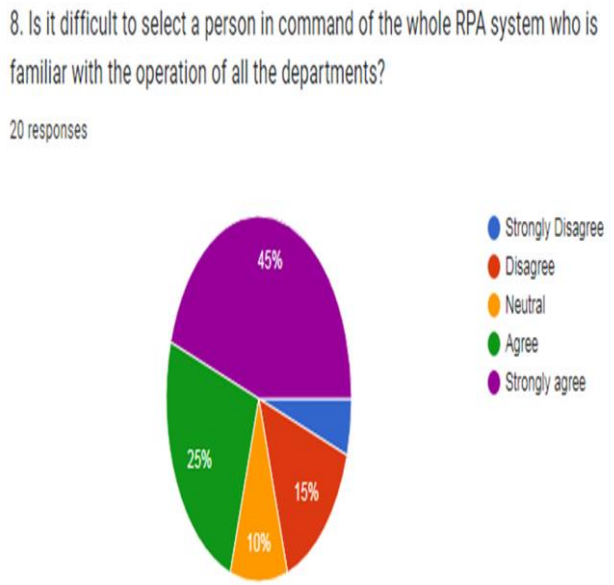

Figure 9 : RPA System Command

45% of the respondents strongly opined in support of the fact that it is quite difficult to employ a person in the commanding position who has knowledge about all the departments in the organization, especially when the RPA system has to be entered into a working situation where several departments are working together for the completion of the project and is supposed to share the RPA system (M. T. Alshurideh et al., 2022a; Nuseira and Aljumahb, 2020).

One of the crucial revelations of the survey is that apart from the wrong configuration, one of the significant risks in the process of implementing RPA can be identified as the getting a proper person to regulate and overview the whole process or mechanism in an efficient way. In other words, the application of the RPA system for project management can go wrong if there is no person to

decide which department is when supposed to access the RPA system and what should be the time limit that should be set for the application of the RPA system by each different units engaged in project completion to ensure systematic and synchronized working.

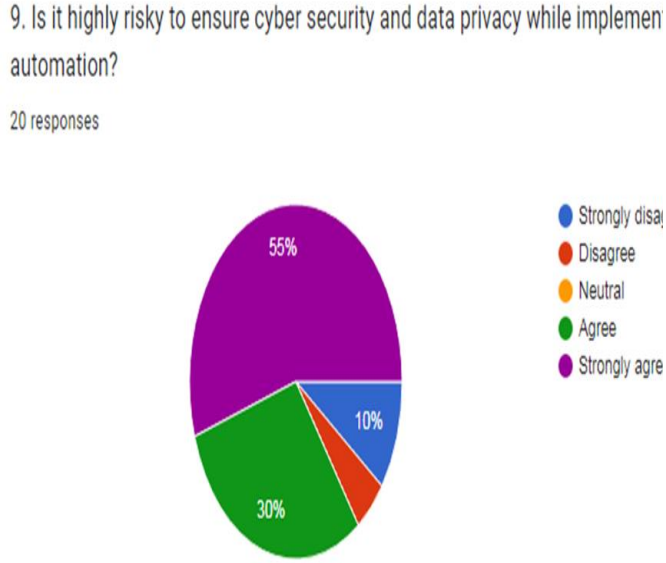

Figure 10 : High Risk to Ensure cyber Security

55% strongly agree and 30% of the respondents agree with the fact that it is very difficult to maintain data privacy in an RPA system and therefore is enhancing the risk associated with the use of the RPA system for project automation (Arshad et al., 2023).

In most common cases in case of large projects several internal departments and sometimes some external expertise works for the completion of the project and therefore there arise a huge scope of sharing project data by multiple parties when multiple parties are sharing the RPA system. Therefore if without proper measures being taken for ensuring the cyber security then application of an RPA in an environment of multiparty project management may appear as a disaster (Alshawabkeh et al., 2021; M T Nuseir et al., 2022b).

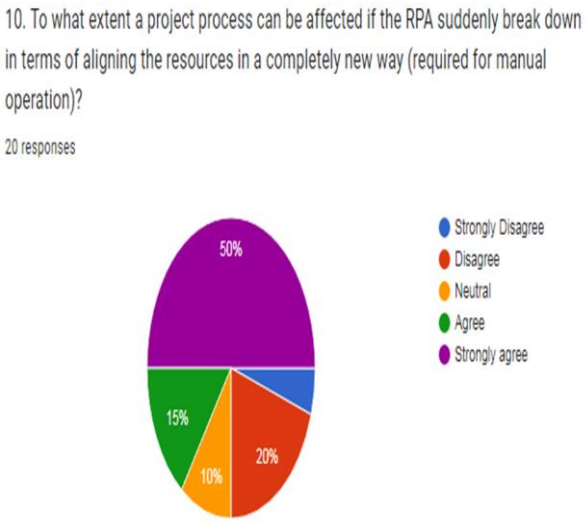

Figure 11 : Project Process during RPA brekadown

50% of the respondents are of the strong opinion that if the RPA process breaks down, then the progress of the project may get completely stopped if the project resources are to be arranged in a completely new way for carrying out the project operations manually. Another 15% of the respondents completely agree with the fact.

However, to what extent the project progress will be affected due to the breakdown of the RPA system depends upon the need of the alignment of the resources while shifting from the automated mode to the manual mode (Aljumah et al., 2021b).

STEP 1: Create a list of top 10 digital transformations in your industry and then do a SWOT analysis of your industry or organization.

This part will discuss top key digital transformation which is: Distract the network elements that are automatically managed to communicate virtualised infrastructure (Fan et al., 2015; Nuseir et al., 2020). Specific product security to reactive becomes a central transformation in anticipation and Limited data exploitation development approach for analyzing the collecting data. Also, close management system delivers to access open platform architecture. While, a limited portfolio of traditional services is expanded to offer new digital services as well as managing limited suppliers that are existing in a vibrant ecosystem in the digital economy (Nuseir et al., 2021). The business model is set to multiple business models to optimize the value of new business models. Where digital telecommunication organization is a

digital culture organization. The last key, is to focus on the traditional channels that are adapted to the multiple channels in a market and dimensional customer relationship management of the customer experience .

5. DISCUSSION

5.1. SWOT analysis

- *Strength:*

The telecommunications company has excellent customer service to boost its industry resource capabilities. Their customer services sales are attributes that enhance this industry to their competitive advantages (Ullah, 2019). The telecommunication industry has high tech technology that can help to increase their business. Fiber-optics technology is the most powerful technology for their industry.

- *Weakness:*

Telecommunication companies offer better services that will switch to angry customers. Telecommunication services are not replaced and their services are very slow in the marketplace (Zarca, 2020). Slow services can hurt their customers in a competitive marketplace.

- *Opportunities:*

Telecommunication has new technology for their customers that increases customers' interest to help this industry (Chen, 2021). The telecommunication industry has a big marketplace for its customers to keep rapidly adopting new technology. Their marketplace was especially introduced to speed up their services.

- *Threats:*

The telecommunication industry's economical condition threats this industry that creates to the company's future success. Government regulation against the telecommunication company to increases their business industry. The telecommunication company offers their customers the same new features which is an external threat for this company.

STEP 2: Create a list of top 10 digital initiatives by digital native disruptors most relevant to your organization and or industry.

The top keys initiative used are: Automatically managed to communicate virtualized infrastructure that distracts the network elements in anticipation of specific product security reactive become a central transformation. The collecting data-limited exploitation development approach for analyzing developmental management and use the Open platform architecture to access a close management system delivers. New digital services of traditional services are expanded to offer a limited portfolio while, Limited suppliers that are existing in a vibrant ecosystem in the digital economy is to manage the systems. Business model is set to multiple business models to optimize the value of new business models. At the end of key point, digital telecommunication organisation is a digital culture organisation. To the multiple channels in a market focus on the traditional channels that are adapted and Dimensional customer relationship management of the customer experience.

The key digital transformation initiatives taken by Etisalat are the automatically managed virtual infrastructure that distracts the network element. Anticipation of specific product security to became the center of transformation. The limited exploitation of data development and its management is huge. The suppliers are limited in the existing and vibrant ecosystem. The focuses on traditional channels are adapted as well. Digital telecommunication has a digital cultural organization in the dimension of customer relationship experience.

STEP 3: Create a list of the top three digital disruptions across all four elements – business, technology, industry, and society – most relevant to your organization and/or industry.

In Business: the impact of the element relevant in Business telecommunications for employees make it possible to accomplish the company work. also, Digital disruptors in telecommunication companies will have long term business with the next generation business increasing process. The Telecommunication companies despite increasing their business demand for new technology and changing the customer preference that is forcing community company operators to adopt a new business model.

- *In Technology*:

Digital disruptor technology system replaces habits though attributes are recognized the superior. The largest video services by the telecommunication company to advertising largest business that leading to the global requirement business. Digital disruptors in telecommunication

technology causes are economic and social changes that are generated by many circumstances together Telecommunication companies' technologies are 5G networks and the internet of things. This company's technologies are widely used in data mining and forecasting.

- *In Industry:*

A telecommunication system consists of a receiver that receives the signal back into useful information. A transmitter that takes to a signal transmission that carries the signal information and the technology in the telecommunication industry has seen primarily related to changing business to being able to adapt to the technology industry

- *In Society*:

The scope of communication that is enabled the people to enhance to stay their organization in Contributing good communication information in new technologies. Telecommunication technology keeps to more aware of their environment and the government's push up to be more accountably and encourage the efficient system to more participation.

STEP 4: Create a list of the top three digital initiatives by your competitors.

First Competitor is ATCOM: ATCOM technology has great technology as a companion, especially for an event. ATCOM guest's technology is fascinating to the installation awaited on the innovative launch of their technology. Atcom is particularly proud of its technology responses that are significant to its positive messages. ATCOM bought a new technology that is life through an initiative to focus on the automation of featuring solutions to improve the customer experiences. ATCOM presented a technology that is envisioned by the company. ATCOM also shared the stage that gives an audience glimpse of what social media will bring forth.

Second Competitor is 3Wnetworks: The 3W network process is forced to join with Elsewedy Electric to integrate information in the future is driving the force that is connecting companies by joining their 3W networks that is a valuable business technology to their industry growth and increasing their industrial development. 3W networks have multiple sectors offering the best technology that is available in a market of technology. 3W network is a leading system integrator whose strategic position is their ideal choice for the technology industry.

Third is Axiom Telecom: It is contextual information that provides a customer's insights that are applied to an enterprise and a software system. New suppliers identify the industry's overall digital parts to stay a competitive project. Axiom telecom has developed supplier relationship management that is related to making decisions. It is analyzed that the revenue that is aggregating massive industry data points is from the forecasting technology. Communication is an initiative undertaken by business technology. Axiom telecom technology identifies those that are being used in cloud applications.

And Last is Ooredoo: This can be planned to travel enabling staff with leave days. They look forward to seeing the continued benefits of being an initiative institution and seeing their international communication to operate the company across their technology system. This technology has been the strategic digital initiative by Ooredoo. The company's strategic plan is to advance by increasingly adapting its way of working methods. Employees are being given flexible initiative work. This technology has been initiated by Ooredoo. Ooredoo technology announced a flexible working initiative that has been pioneering for the last years.

STEP 5: List of top three digital disruptions across all the five key areas of disruption that are most relevant to the organization.

The top three digital disruptions happen after big data, the internet of things (IoT) and machine learning (ML). The factors of digital disruptions in telecommunication are economic, geopolitical, natural disasters and social changes. In order to fight these disruptions, Etisalat has transformed itself towards a digital agenda and launched a 5G network. However, the digital disruptions help in gaining the competitive markets.

The company faced disruption with the pandemic and announced it would meet its digital goals. There was a drop of .4 billion from 2019 to 2020. The chairman put forward that the performance that the company gave during the unfortunate circumstances are more than what was expected.

Understanding of the digital initiatives

The core strategy for a sustainable economy and customer satisfaction of the customers is digital

transformation. It includes cloud-based products, the development of digital channels and the adoption of an RPA system. The channels like mobile apps, customer portals and websites play an important role in the maintenance of the brand name.

The company is committed to digital innovation. This would meet the changing needs of stakeholders and meet their goals. The process involved in digital initiatives is robotic centers, Digital bots, cloud express, digital innovation centers, trade finance platforms, Cloud talk platforms, Business edge and SD-WAN. The apps like digitization of processes and product integration with new features within this transform the experiences of customers. The company uses Central Feedback Management which is a system to control the usage data and set the limit for Talk time.

It is registered that the company has achieved 300,000 registered users on its consumer mobile app and records 55,000 B to B customers. The existing stores have been transformed into smart stores to give a unique customer experience with the latest touchpoints. The number of digital stores has increased to 10 across UAE. Etisalat selected Ericsson for BSS (Business Support System) and IoT to improve traffic.

Let's look at each of the key areas of digital disruption one by one using the trend-benefit framework

The key elements of digital disruptions are email, video streaming, mobile or smartphones and online references. The digital disruptions could make a better workplace. It enables growth, and customer satisfaction. The cryptocurrency based digital banking disruption also includes the key elements of disruptions. However, there are risks involved with the growth. They are the increased use of technologies like mobile computing, cloud computing and AI.

5.2. List the top three initiatives across all five areas of digital disruption.

- *Marketing and Distribution:*

Competitor like Du are gaining power with the launch of AI for their products. The video streaming issues, data usage and remote working disruptions are some of the disruptions. The company also partnered with NICE for the CXone cloud platform for its entry into the UAE. Etisalat joins hands with Samsung mobiles for the distribution of smartphones. It was marked with a MoU agreement.

- *Product and service:*

The company launched cloud gaming services which is an HD game directly brought to TV. The broadband services like Al Shamil and eLife became popular. The eLife service offers unlimited data usage with superfast download. Etisalat launched its 5G service, to manage the disruptions faced by the consumers during the pandemic (Majithia, 2020).

- *Processes:*

The plug and play issue could be solved by Linksys routers. The complaint against broadband services and internet usage is a common problem which is solved with higher connectivity cables under the sea via Sri Lanka Mumbai seaways.

- *Ecosystems:*

The IoT is committed to connecting to revolutionized the companies and making smart cities with world-class health care system. The company is committed to developing an 'Internet of Things' ecosystem inside the country. The ecosystem of telecommunication services includes the vendors and the enterprise. With the disruptions, the relationship between them is disturbed

- *Supply chains:*

The Company enhanced its supply chain strategies to shift from the isolated units. The supply chain integration has reduced cost and increased the customer service quality. In the pandemic, there was a disruption of customers buying new sims of Etisalat due to the restriction.

STEP 6: Create a list of top three transformations across the following key technologies that are most relevant to your industry.

Platforms- Etisalat has joined hands with Ericsson to improve its Business Support System in Egypt. It gives smart district platforms, digital healthcare platforms, tourism platforms, and oil gas and entertainment platforms. It also provides online marketing services like website creation, managed website solutions and online presence.

Customer Network- The customer base of Etisalat is more than 5 decades old and has a strong network of customers. In order to optimize the customer network Etisalat has deployed ADNOC Sour Gas and Union Insurance for customer

satisfaction. The customers are helped with admissions to universities, holding the companies, providing healthcare services and convenience stores.

Business Analytics and Big Data- It helps to attract millions to the ecosystem. It is also an intelligent marketing strategy. Its social media analytics solution is based on product suits. It helps to realize their opinion of the products and services. The company understands the importance of social media presence with their sentiments.

AI and machine learning- Artificial intelligence is considered a prerogative. The virtual personal assistance, maps and traffic with the GPS, online customer services (like bill payment, web solutions). Social media, search engines and the product recommendations are all that machine learning could serve to the customers.

Blockchain and IoT- It also joined with 300 cubits of Hongkong for the reduction of transactional. it gives access to the digital resources of Etisalat. It also joined with the Yitu technology of china for the development of surveillance systems. Etisalat has taken the blockchain IoT development. The programme has been named “Future Now” with Telco.

Robotic Process Automation- RPA has reduced the boring work of the back office with activities. It is used to process the high volume and route tasks like billing and new sim delivery. The software robots of the company have increased the accuracy of the job. RPA technologies use technology that could reduce the workload of data entry jobs and after-sales services.

XR- As a part of Dubai's future program, Etisalat has launched AR and VR to change the experiences in virtual. XR training creates a multisensory environment that is more interactive and engaging. Augmented reality is the extended term of virtual reality, mixed reality and augmented reality.

Edge Computing- It would help the customer with their transportation, logistics, manufacturing and oil and gas industry it gives power to Core Orchestration which is commuted with the plug and play feature. Etisalat launched 5G for edge computing with Microsoft in 2021.

Drones- Smart delivery reduces the time between the production and delivery. The company has launched triple drop drone delivery for logistics. It gives security The drones technology launched in 2019 at GITEX is the new technology used to capture the views from anywhere.

The AI robots were there for a long but the digitization and the pandemic made their presence significant. The audience also experiences digital news bots which could be translated into several languages for single worldwide news. This reduced the workload of translators. Various companies are incorporating AI which makes the work look simple. Customer service is the top priority of any company. Around 90% of the survey showed customers opt for products with the best after-sales services. In this world, the service is given 24*7. This reduced the cost and increases service efficiency.

TAF is an automated framework having built-in features which provide solutions to some of the common problems of automation. It consists of an enhanced page of the object model. It also has plug and plays model of automation that drives the keywords. Ti does help in the maintenance of test codes to make them readable.

The key elements of the TAF framework are equipment, procedure, testing tools, test automation and scripts. Three components are management, service designs, automated deployment, serendipity management and the user.

The benefits of the TAF framework are faster return, concentrated storage of tests, retention of the data, rapid results, separation of duties and lower maintenance through reuse. This framework has an experience of more than 50 years which supports java-based scripting.

STEP 7: Based on the previous steps, compile a list of all key transformations.

First, The 5G was first launched at the iconic tower of Burj Khalifa which marked the digital transformation journey and created a new milestone. Meanwhile, The RPA model has created a greater solution to enhanced customer experience and efficiency. The collaboration with Accenture and oracle has led to give better digital transformation experiences. It went to MOW with Oracle for SMB which targets the enterprise clients. It has rebranded its e& group which accelerates the journey for the empowerment of the society. Comvive, the leader in digital solution has partnered with Etisalat to offer caller tune services. It is considered the adoption of new digital services. The company partnered with the Dubai

police for the delivery of the Oyoon project. It was raised to increase awareness of safety for the citizens. The B2B services of Etisalat, especially in the cybersecurity and cloud connectivity with the Help AG operation enabled secured and digital transformations for all its customers. The company also worked with DMCC for a smart and sustainable network. Maroc Telecom has invested in digital technologies for the education sector and distributed more than 10,000 books that were available on the Etisalat platform. The Etisalat cloud express is in collaboration with Amazon web services and Microsoft Azure. The Ministry of Interior, along with Etisalat continues with the Hassantuk project to make a smarter fire alarm solution which covers 40,000 villas

STEP 8: Make a list of transformations across the impact/difficulty matrix.

- *First Transformation Initiative:*

The first transformation that is carried out across the Etisalat market for digital innovation with the company strategy. Most valuable customer brand is focus on digital channels. 5G network uses cases are tasted. And the exploiting of 5G technology in enable to new services.

- *Second Transformation Initiative:*

Second transformation that is carried out across the Etisalat market for digital innovation with the company strategy is the RPA model. RPA model has created a greater solution to enhance customer experience and efficiency. Robot process automation use case are initiates. The exploiting power of robot process automation technology is enabled to new services.

- *Third Transformation Initiative:*

Third transformation is carried out across the Etisalat market for digital innovation with the company strategy is MOW. MOW with oracle for SMB which targets the enterprise client. The exploiting the power of MOW will enable to new services.

STEP 9: Identify the most relevant digital transformation plans.

At the Final Step, will identify a plan of digital transformation strategy with the priority for each. In smart connectivity: High-speed internet is the right which offers the consumers the proper working environment. It offers cloud computing and wifi called as Smart connectivity. While In business devices: It combines the form of business models to make a value to discuss the role of devices that is the Business devices. In communication and collaboration: Employees need to access more productive and more efficient to make a digital transformation company for Communication and collaboration. However, in office productivity the Digital transformation should lead to high employee management that is empowering employees to make a decision quickly and the Digital transformation in digital marketing is about harnessing using technology to evolve all aspects of Digital marketing. Digital transformation is a new process to secure their data system process is disappearing security responsibility and security. Also, Digital business edge offers an advantage to the small businesses to innovate and customize their products for the individual customers of Business edge. In analytics the data transformation data analytics is composed includes diagnostic and prescriptive that have the different objective processes. The Digital transformation intelligence to make changes through the introduction that collects data using the machine and Intelligence. At the end, The digital transformation marketplace have managed all-trans marketplace

6. CONCLUSION & RECOMMENDATION

The analysis highlights the major risk of the implementation of the RPA system as per the current trend for minimizing the cost and time in project management and for expediting the whole process of project management, especially when the organization is walking on the path of digitization. According to the primary data information as gathered through the survey, selection of the wrong part of the project for automation, wrong configuration, inefficient regulating and monitoring, breakdown of the RPA system, data security breech & inefficient sharing of the RPA system are the major risks in the process that can lead to massive loss in the process of project management and the project may fail with a substantial business loss. The research reveals that among the different risks of applying the RPA system the risk of wrong configuration and automation of the wrong part of the project appears as the most difficult risk to handle and only employees who are having relevant experience in the field can deal with the issue by taking proper

decisions.

When an organization is looking to implement the RPA system in the business operation process then the business must look for the relevant expertise from inside or can hire outside for developing the framework of operational method on the basis of which a specific or most suitable RPA system will be implemented for a particular business organization depending upon the nature of operation.

Only the opinion of the experts who have long years of experience in the field should be taken for automating the part of a project. The experts with long (say at least 10 years) years of experience should be taken under consideration to decide the part of the project to be automated and accordingly the configuration codes will be developed for the implementation of the project

Rigorous coding based security to be undertaken for preventing data breach when the RPA system is gong to be shared by multiple units who are part of project completion.

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Highlights on Program Governance through AI and Blockchain

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A B S T R A C T

This research studies the effect of two of the main disruptive technologies – mainly AI and Blockchain – on program governance and management. He aim is to highlight the positive potentials for digital transformation in governance approaches and practices including roles and responsibilities. The research approach utilises quantitative and qualitative methods. The data collection and analysis methods used in the study are interviews, surveys, and document reviews. The research findings highlight the potential of conducting program governance without a centralised entity, could help avoid conflicts between organisations and maintain a single data source, centralisation of financial resources will be necessary in the future, improve governance efficiency and increase transparency.

1. INTRODUCTION

This research aims to introduce a new technology based on artificial intelligence (AI) and a new business model that goes beyond the scope of previous governance approaches (Roll and Wylie, 2016). It will describe how artificial intelligence can help in effective program governance through blockchain technology, characterised by transparency and efficiency (Nasim, S. F. et al., 2022). The research paper introduces blockchain applications in education management systems, insurance claims adjudication, and token-based global philanthropy platforms (Utami, 2021). The first technology is artificial intelligence, an ultra-fast algorithm that uses data to create the most logical conclusions based on determinations on values, beliefs, and sentiments (Yu et al., 2018). It can quickly identify trends and information that will help in effective program governance (Hanford, 2005). Artificial intelligence calculations are more than 10x faster than a person, and it also works without any human intervention and can automatically analyse data and draw conclusions (Sakız and Gencer, 2019).

The second technology that goes beyond the scope of previous governance approaches is blockchain technology which makes transactions transparent, verifiable, and accurate (Mondol, 2021). This technology also helps in effectively managing electronic money and ensuring transparency in transactions. Both individuals and companies can develop their financial management systems to enable better decision-making and governance (Al-Tahat and Moneim, 2020). The essay then defines the approach of developing a new business model through artificial intelligence and blockchain technology characterised by transparency and efficiency (Nurova and Freze, 2021). It will explain how artificial intelligence can help in effective

program governance through blockchain technology, characterised by transparency and efficiency (Boyle, n.d.).

2. LITERATURE REVIEW

A previously done research study on effective program governance through artificial intelligence and blockchain technology reveals that company governance is a process of decision-making and coordination (M. Alshurideh et al., 2023; M. T. Alshurideh et al., 2023d; Lee et al., 2023). It has a significant impact on all the other activities in a company because it determines precisely how decisions are made, who makes them, how they are enforced, and how they affect the organisation's strategy (Farrukh et al., 2023)(T M Ghazal et al., 2023b). According to the generally accepted accounting principles (GAAP), which is the accounting standardisation and financial reporting system in the United States, effective program governance is "The ability to foresee potential trends and developing risks, making necessary adjustments, and monitoring the effects of any problems, which allows organisations to stay ahead of their competition (Muhammad Turki Alshurideh et al., 2022b; Blooshi et al., 2023)." This means that effective program governance is the process of decision-making and coordination within a business organisation (H. M. Alzoubi et al., 2022h; Arshad et al., 2023)(Al-Dmour et al., 2023; Louzi et al., 2022a; Mubeen et al., 2022).

The process of governance can be done by leadership or management. In a sense, governance manifests the leader's vision and values, reflected in their leadership style and management approach (M T Alshurideh et al., 2022). Program governance may require an integrated system to manage programs and projects at all levels at a higher level. The integration will depend on institution-specific issues such as project accountability and similar concerns in the post-award phase (Alzoubi and Ahmed, 2019; H. M. Alzoubi et al., 2022e; Khatib and Opulencia, 2015). When we think about governance, we consider essential features: the strategic framework and framework for decision-making, appropriate policies and procedures, and an appropriate monitoring system (Louzi et al., 2022b). From a methodological perspective, program governance is not a single entity but rather an integrated set of activities that implement or realise the corporate strategy (Ahmed et al., 2022).

The most common approaches to effective program governance include: Program objectives are defined in the strategic plan (Ahmed and Nabeel Al Amiri, 2022; AlDhaheri et al., 2023; Yasir et al., 2022). Programmatic plans are developed following the strategic plan (Abudaqa et al., 2022; Amiri et al., 2020). Programmatic plans are reviewed periodically against strategic goals. Program objectives are regularly reviewed to ensure that they remain relevant to the business (H. M. Alzoubi et al., 2022c; El Khatib and Ahmed, 2018; Khatib et al., 2022; Nuseir and Elrefae, 2022). Decision-making is structured around the program's key strategies. Risk management protocols are established for all programs and projects, including risk assessment and rating of all programs and projects (Ahmad Ibrahim Aljumah et al., 2022b; El Khatib et al., 2020b). Risk management strategies and action plans related to the risk rating of programs and projects (El Khatib, 2015; El Khatib et al., 2019). Tracking, monitoring, and reporting of all risk rating changes for programs and projects (A I Aljumah et al., 2022a; M T Nuseir et al., 2022a)(Aljumah et al., 2023)(Mohammed T. Nuseir et al., 2022).

The program plan is the cornerstone of the program (Al-Maroof et al., 2022b)(H. M. Alzoubi et al., 2022f). It is an integrated document that outlines the program's essential features, including scope, time frame, cost estimates, resource estimates, risks, and milestones (Aljumah et al., 2020; Bawaneh et al., 2023). The program plan should be comprehensive enough to incorporate all components of other plans required for the effective operation of the program (H. M. Alzoubi et al., 2022g; Tariq et al., 2022a). Programs should have a "plan-do-check-act" cycle Programs are defined as portfolios (I. Akour et al., 2022; Tariq et al., 2022b). Program plans should include a statement of how the program will be used to implement the strategy and an action plan of how the program will be implemented (I. A. Akour et al., 2022; A. Al-Maroof et al., 2021). The form of governance varies from one type of organisation to another. In some organisations, governance takes place through a formal organisational procedure, and in others, it may occur through a formal or informal process involving multiple individuals (R. S. Al-Maroof et al., 2021b; H. Alzoubi et al., 2022; El Khatib, 2015).

While each approach has advantages and disadvantages, no single approach is superior across all types of organisations (Al-Kassem et al., 2012; R. S. Al-Maroof et al., 2021a; Aljumah et al., 2021a). The form of governance varies from one type of organisation to another (Alshawabkeh et al., 2021; Nuseira and Aljumahb, 2020). As mentioned before, governance affects all the other activities of the business (Mat Som and Kassem, 2013; Nuseir, 2021; Nuseir and Aljumah, 2020). The effectiveness of governance depends on its level of integration with other areas. Effective program governance can contribute to an organisation's short-term, medium-term, and long-term goals (El Khatib et al., 2021; Kurdi et al., 2022; Nuseir and Aljumah, 2022). Governance is essential for programs to integrate with other business functions within an enterprise effectively (El Khatib et al., 2020a; Khatib et al., 2016). Effective program governance is accountable for the completion of key strategic objectives and corporate performance (Al-Kassem et al., 2013; A I Aljumah et al., 2022a; Nuseir et al., 2020).

Effective program governance ensures that the organisation's strategy is effectively executed through multiple projects and programs (Alzoubi et al., 2019; Gulseven and Ahmed, 2022; Khatib, 2022). Effective program governance provides organisations with a practical framework to organise, plan, and implement strategic goals (Akour et al., 2023; H. M. Alzoubi et al., 2022d; M. El Khatib et al., 2021). Effective program governance delivers the capability to effectively execute programs and projects, thereby helping to realise the company's vision (Al-Kassem, 2014; Almasaeid et al., 2022; Ghazal et al., 2021; Louzi et al., 2022b; M T Nuseir et al., 2022b). Effective program governance establishes responsibility for risk management activities across the entire enterprise; it encourages better information sharing; it increases trust by repeatedly building on successes; it protects vital infrastructure; it reduces operating costs and improves customer satisfaction. Effective program governance creates advantages for the entire company, not just for a single project (M. T. Alshurideh et al., 2023b, 2023a; Muhammad Turki Alshurideh et al., 2022a; Nadzri et al., 2023; Varma et al., 2023).

A process of effective program governance is built with a framework for decision-making and coordination (H. M. Alzoubi et al., 2022b; El Khatib et al., 2022; Nuseir et al., 2021). In short, the framework is a set of rules or norms to guide decision-making processes within an organisation. These rules involve several factors, including –The scope of decision-making at different levels of management and the critical decisions that different managers in the organisation may take (Al-Kassem, 2017; T M Ghazal et al., 2023a). Additionally, effective program governance is concerned with how business leadership and management can ensure that effective program governance occurs in an organisation (Aityassine et al., 2022; Akour et al., 2021). It examines the key factors that must be present for effective program governance to occur, the key indicators of effective program governance, and how these indicators should be measured (Alshurideh et al., 2022; Gaytan et al., 2023; T M Ghazal et al., 2023c; Nuseir, 2020).

Effective program governance can help organisations to accomplish their objectives and realise their vision (El Khatib and Ahmed, 2020, 2019; Hani Al-Kassem, 2021). Effective use of programs can help organisations address the complex issues that they face today. These issues include: Management can use program governance methods to manage challenges effectively (A I Aljumah et al., 2022b; H. M. Alzoubi et al., 2020). There are various methods available today that were not available in the past. Initiative governance is a relatively new approach in which a group of managers in an organisation agrees to jointly make decisions in a specified area of business. In this approach, a small group of managers in the organisation forms an initiative governance team (Ahmad Ibrahim Aljumah et al., 2022a; M. T. Alshurideh et al., 2023c; Aziz et al., 2023; Taher M. Ghazal et al., 2023). It meets periodically to make decisions and take action on critical issues concerning the program. It has two main advantages: All members of the initiative governance team have the authority to decide and authorise actions on behalf of the initiative.

3. RESEARCH METHODS

3.1. Study design and data collection

The objective of this research study is to explore the application of artificial intelligence and block chain in program governance with an emphasis on data collection. The data collection and analysis methods used in the study are interviews, surveys,

and document review. The data obtained in the study will be used in the suggestion of Artificial Intelligence and Block Chain application in effective program governance. The results of the analysis will be compared with the existing literature to gauge the value of this research study.

3.2. Quantitative Research

Quantitative research shows that more than 60% of financial institutions surveyed expect to use or implement blockchain technologies for their services and operations, with many already implementing it in various ways (E. Khatib et al., 2021). The fact that blockchain technology has been showing up on investors' radars lately is no coincidence; it's a unique tool for companies of all sizes. However, one of the primary reasons it is so valuable is that it empowers management teams to do what they are not able to do in the past. Program governance in all organisations includes effective execution control (Al-Kassem et al., 2022; Khan et al., 2022; Sakkthivel et al., 2022). Current oversight mechanisms are primarily reactive frameworks, primarily based on check-and-balance principles. However, this process can be very time-consuming and costly in terms of money and workforce (Alshurideh et al., 2022). At the same time, it does not guarantee the proper functioning of the business effectively (Al-Awamleh et al., 2022; Al-Maroof et al., 2022a; H. Alzoubi et al., 2020). The solutions vary, but all these approaches require the employee and management to spend time and money on tracking and correcting mistakes. These processes also increase the possibility of fraud and corruption (Abudaqa et al., 2021; H. M. Alzoubi et al., 2022a; Kassem and Martinez, 2022).

3.4. Qualitative Research

The qualitative research method used during the study was a survey using questionnaires, which were sent to all participants through an online survey with the selected respondents. This study used 30 respondents from several institutions. The results of the research showed that there is a testable hypothesis. The hypothesis was that, in addition to traditional measures of effectiveness, the information provided by blockchain technologies enables companies to develop new metrics of effectiveness. This technology can help identify issues and blockages in processes to prevent or detect fraud and corruption (Aljumah et al., 2021b; Alzoubi et al., 2021). The researchers said that this shift is essential for improving program governance. Using qualitative research method, the main goal of this study was to determine whether companies that use blockchain-based solutions for program governance issues and help increase effectiveness.

Table 1: Interview Participants Details

No.	Institutions Members Positions	Gender	Age	Experience in Blockchain technology
1	Manager	Male	35 to 45	6
2	Manager	Male	35 to 45	2
3	Manager	Male	35 to 45	5
4	Manager	Male	45 to 55	3
5	Superintendent	Male	35 to 45	1
6	Superintendent	Female	25 to 35	2
7	Customer Support	Male	20 to 25	1
8	Customer Support	Female	20 to 25	0
9	Engineer, consultant	Male	35 to 45	8
10	Engineer, consultant	Male	35 to 45	8
11	Engineer, Specialist	Male	35 to 45	6
12	Senior Engineer	Male	20 to 25	5
13	Senior Engineer	Male	20 to 25	4
14	Junior Engineer	Male	20 to 25	2
15	Junior Engineer	Female	20 to 25	2

16	Junior Engineer	Female	20 to 25	2
17	Analyst	Female	35 to 45	3
18	Analyst	Female	35 to 45	3
19	Analyst	Male	20 to 25	2
20	Analyst	Male	20 to 25	2
21	Analyst	Male	20 to 25	2
22	Specialist	Female	35 to 45	4
23	Specialist	Female	35 to 45	4
24	Specialist	Female	35 to 45	3
25	Specialist	Female	35 to 45	3
26	Accountant	Female	35 to 45	3
27	Accountant	Male	20 to 25	3
28	FCO	Male	45 to 55	8
29	Senior Technician	Male	35 to 45	3
30	Junior Technician	Male	20 to 25	1

Keeping the participants' names confidential and classified to not identify any of the participants following the ethical considerations. Also, all contact and personal details of the participants will not be shared with any third party. Further, prior the interviews, all participants signed and informed consent form that provided them with the purpose of the research and apprised them that they were free to quit at any time that they feel to comfortable with the quaternary.

4. RESEARCH FINDINGS

From the quantitative research findings on effective program governance through artificial intelligence and blockchain technology, researchers found that a program's governance can be conducted without a centralised entity using these two new technologies. The two technologies that the researchers examined were artificial intelligence and blockchain technology. Through artificial intelligence and blockchain technology, the research was able to find that the governance of a program can be conducted without a centralised entity. Using these two technologies, researchers found that artificial intelligence and blockchain technology could help avoid conflicts between organisations and maintain a single data source. Researchers also found that the governance process, specifically the centralisation of financial resources, will be necessary for the future because it is difficult for organisations to reach agreement in decentralised systems.

However, it is easier for decentralised systems to respond to change than centralised ones by implementing changes quickly through artificial intelligence and blockchain technology rapidly. The researchers were able to find that the governance process of a program through artificial intelligence and blockchain technology can improve the efficiency of governance and increase transparency by avoiding conflicts between organisations. In addition, as more companies continue to implement these two technologies, it will become easier for government agencies to trust them because they have been proven to be trustworthy. These two new technologies have already been implemented in some programs and have been successful.

Both technologies can serve as one method of governance, which is more effective than traditional ones because it reduces internal and external conflicts between different agencies. One of the downsides of governance with traditional methods is a lack of transparency. However, artificial intelligence and blockchain technology reduces the number of conflicts and external effects because it decreases the need for centralised entities to govern programs. In addition, these two new technologies help to avoid internal conflicts because they can quickly amend data within a program. This is the main reason why artificial intelligence and blockchain technology have been suggested as a solution to governance problems in the future.

Despite the advantages of artificial intelligence and blockchain technology providers, researchers also found that some disadvantages come with these

technologies. One of the main disadvantages of artificial intelligence and blockchain technology is that they are still new and may be misunderstood by program participants. Another disadvantage, however, is that artificial intelligence and blockchain technology are still being developed. As more programs begin to use these technologies, organisations will need to set up better governance processes that guarantee participants' autonomy. Although artificial intelligence and blockchain technology can serve as an effective method of governance, some constraints need to be taken note of. Researchers were able to find that one of the disadvantages of this technology is that it is difficult for organisations to reach a consensus on decisions in decentralised systems.

Several advantages can be gained through the use of artificial intelligence and blockchain technology. Organisations can increase efficiency through artificial intelligence and blockchain technology by using one central authority to government programs implemented by many agencies. This method will also prevent conflicts between different organisations if they share information because it allows them to do so instantly. As more programs continue to implement these technologies, organisations can reach a consensus on the future of their programs without much difficulty. Artificial intelligence technology can reduce corruption at different levels of government. The use of artificial intelligence technology can help governments improve the efficiency of their policies by using data provided by private companies. One of the main objectives of artificial intelligence is to provide government agencies with data to make informed decisions, which will ultimately reduce corruption in the future. Researchers have found several ways in which artificial intelligence can help reduce corruption in various levels of government.

5. CONCLUSION

From the study, it is clear that there is no single or universal way to implement program governance. No single answer exists for optimal governance of programs or development of new ones. It would be best to implement each strategy with a custom-made algorithm that populations the most successful results. This concludes the research study on effective program governance through artificial intelligence, blockchain technology and other technologies. Artificial intelligence should handle decision-making for problem-solving and data processing while leaving the task of governance to blockchain technology. If this were to be implemented, blockchain technology would handle contract administration and execution while artificial intelligence would be responsible for user identity and accountability. The combination of the two technologies could achieve optimal governing of programs and the development of new ones.

6. RECOMMENDATIONS

The increased importance of artificial intelligence and block chain technology for governance is growing rapidly. Law, finance, natural resources management, healthcare, industry and trade are all undergoing major change as they apply these new technologies to governance. The recommendations in this research provide an overview on current research pertaining to the challenges facing program governance within this context of dynamism and innovation (AlShamsi et al, pp 223). These recommendations aim to support equitable policy-making in the turbulent environment emanating from the intersection of digital transformation with advanced technology like AI and the blockchain. Researchers have found so much evidence to support the benefits of blockchain technology in areas such as management, voting, and data authentication. It has also been proven that artificial intelligence is helpful in supporting decision-making processes related to how best to approach program governance using these technologies.

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Managing Outsourcing in IT Software Services - A study of 3 Perspectives and 3 Industries in UAE

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A B S T R A C T

Depending on outsourcing software services is increasing so it became important to understand the idea fully and know how to manage it. This paper aims to identify and prioritize software outsourcing problems facing organizations in the UAE and to propose a solution for keeping these services under control. Thus, to meet project's objectives and answer research questions, qualitative research approach was used to cover "what" and "how" questions of the paper. The research's data were collected through employing semi-structured interviews done with IT managers, business managers and vendors from three organizations and three service providers so a total of nine interviews were conducted. The results indicated that organizations are outsourcing their software services because of some common reasons and in the same time they are facing issues with their service providers. The discussion revealed shared problems among participants and prioritize them according to their repetition. The value and originality of this research comes from revealing the set of problems facing each one of three studied groups: IT manager, business manager and vendors to provide a clear image of the reality of software outsourcing in the UAE and to help future researches about the topic. Based on findings and relevant literature a set of practical implications were suggested to control software outsourcing services and eliminate their risks on clients and vendors.

1. INTRODUCTION

The original outsourcing word from a business perspective is defined as "the strategic use of outside resources to perform activities traditionally handled by internal staff and resources" (Fraihat, 2006). The concept was not formally identified as a business strategy until the early 1990s. However, as other business concepts being affected by the information technology revolution, IT outsourcing emerged. IT outsourcing means outsourcing the information technology related work of the organization to other companies externally. Organizations are focusing on their core business and are relying on outsourcing their IT activities in areas that they had no or low competency internally (Jayatilaka and Hirschheim, 2009).

Companies and organizations are depending more and more on outsourcing IT to cut costs and concentrate on their core business. However, outsourcing IT has brought up its problems and its

increasing as mentioned before (Hopwood, 2018). Outsourcing IT services include hardware, software and infrastructure services according to the contract (Al-Kassem et al., 2022; Varajão et al., 2017). Outsourcing vendors should fulfill their responsibilities based on the agreed quality and time wise. As a result, "outsourcing IT increases the complexity and scope of IT audit" which will be examined later in the paper as the solution for the proposed problems (Farrukh et al., 2023; T M Ghazal et al., 2023a)(Kalbasi et al., 2021).

The UAE as one of the fast growing countries is encouraging the organizations to move towards electronic and smart functions (Muhammad Turki Alshurideh et al., 2022c). Consequently, organizations here are depending on external companies to provide them with technological solutions (H. M. Alzoubi et al., 2022d; Bongomin et al., 2020; Kassem and Martinez, 2022; Khatib, 2022). They are outsourcing their software services from expert vendors because they can't build it internally (M T Alshurideh et al., 2022). This research will be about outsourcing software services in the UAE, the problems they are causing and the solutions which can help in reducing problems or eliminating the negative effects of these problems. (M Alshurideh et al., 2023) All that based on the results of interviewing three organizations in the UAE (Hani Al-Kassem, 2021; Straub et al., 2008).

According to (Muhammad Turki Alshurideh et al., 2023c; Mtsweni et al., 2021), few papers looked at outsourcing relationships from both clients and vendors viewpoints. (Al-Kassem, 2017; Kalbasi et al., 2021; M. El Khatib et al., 2021) also suggested that using the viewpoint of some other stakeholders as well like IT and business managers or staff would provide some new ideas (Rimba et al., 2020). It was decided after reviewing many recent articles that the research done in this paper tries to fill this gap as it is based on several interviews done with IT managers, business managers and vendors (H. M. Alzoubi et al., 2020; E. Khatib et al., 2022; M T Nuseir et al., 2022a). The value and originality of this research comes from revealing the set of problems facing each one of three studied groups: IT manager, business manager and vendors. The objectives of this research are (Al-Dmour et al., 2023; H. Alzoubi et al., 2020; Aziz et al., 2023): identifying and prioritizing problems from IT managers' perspective, identifying and prioritizing problems from business manager's perspective (Al-Kassem, 2014; Lee et al., 2023; Nadzri et al., 2023), identifying and prioritizing problems from vendors' perspective and recommending a solution for the discussed problems (A I Aljumah et al., 2022a; El Khatib et al., 2020b; Rundquist, 2009).

This paper started with a general introduction about outsourcing and a literature reviewing previous work done about the topic (Almasaeid et al., 2022; H. M. Alzoubi et al., 2022c; Mat Som and Kassem, 2013; Nuseira and Aljumahb, 2020). Most of the used references in the literature review were recent and done after the year 2004 as the topic is a new one while only few of articles done from 2000-2004 were used (A I Aljumah et al., 2022b; Alzoubi et al., 2019). After that the research covered a detailed research methodology done for the project (M T Alshurideh et al., 2022; Arshad et al., 2023; Blooshi et al., 2023; Louzi et al., 2022b), results and findings from the conducted interviews and a section for discussing these results and commenting on the findings. Also, research limitations and recommendations for future work will be pointed out after suggesting a solution for the proposed problems (T M Ghazal et al., 2023c, 2023b; Varma et al., 2023).

2. LITERATURE REVIEW

The global status report on the governance of enterprise IT (GEIT) of the year 2011 which included more than 800 respondents from 21 countries across the globe, (Al-Kassem et al., 2012; El Khatib et al., 2021; Nuseir and Aljumah, 2020) found that outsourcing IT services is one of the major nine IT-related initiatives planned for next 12 months by respondents with a percentage of 26 (Abudaqa et al., 2022; Ahmed and Nabeel Al Amiri, 2022; H. M. Alzoubi et al., 2022b; Gulseven and Ahmed, 2022; Sakkthivel et al., 2022). Since outsourcing was studied as a topic of special interest in the survey, the report (2011) revealed that outsourcing is widely utilized: "73 percent of respondents have fully outsourced some of their IT activities and another 20 percent use partial outsourcing (Abudaqa et al., 2021; Ahmed et al., 2022; H. M. Alzoubi et al., 2022a; Amiri et al., 2020; El Khatib and Ahmed, 2019). Full outsourcing of some IT activities is more prevalent in larger enterprises, enterprises with a centralized organization model, and those in which IT is

considered important or very important to the delivery of the business strategy or vision" (AlDhaheri et al., 2023; H. M. Alzoubi et al., 2022g; Gaytan et al., 2023; Khan et al., 2022; Nuseir and Elrefae, 2022). The report also examined the percentage of outsourcing each IT activities separately, it shows that application development and/or maintenance activity was 38.4% fully outsourced, 43.1 was partially outsourced and 15.1 was not outsourced (Muhammad Alshurideh et al., 2023; Nuseir, 2020). As outsourcing IT software services became one of the current trends locally and worldwide, problems associated with such practice are reported frequently (Ahmad Ibrahim Aljumah et al., 2022b; Alzoubi and Ahmed, 2019; Nuseir et al., 2020). According to the previous edition of global status report of GEIT done in 2008, problems with outsourcers increased from 74 in 2005 to 127 in 2007 (El Khatib, 2015; Nuseir and Aljumah, 2022). Some of the key problems are repeated which means they have been encountered by number of organizations. Problems being confronted not only by clients but also by vendors (Muhammad Turki Alshurideh et al., 2023b; El Khatib et al., 2019). The following paragraphs will go over key points of software outsourcing based on previous researches (Alshurideh et al., 2022; El Khatib et al., 2020a; Louzi et al., 2022a; M T Nuseir et al., 2022b).

IT outsourcing has many advantages and disadvantages for the clients (organizations) and vendors (the outsourcing providers) (Muhammad Turki Alshurideh et al., 2022b; Nuseir et al., 2021). A number of studies indicate that saving cost is the main and major reason behind software outsourcing (Aljumah et al., 2021a, 2021b). Other possible advantages are the need to improve management focus and access technical talent not available in-house besides centralizing the efforts on core business (Mohammed T. Nuseir et al., 2022). Even though outsourcing of development and implementation of IT projects was seen as a popular risk mitigation option for organization which offers the benefits of risk transference (Khatib et al., 2016), cost reduction and improved performance either the projects are outsourced within country or offshore, there are on the other side hidden risks (Ahmad Ibrahim Aljumah et al., 2022a; Ghazal et al., 2021; Khatib and Opulencia, 2015; Yasir et al., 2022).

Like anything else, outsourcing software services has pros and cons (Al-Kassem et al., 2013; H. M. Alzoubi et al., 2022e; Nuseir, 2021). Although IT outsourcing is saving costs for organizations, it has its own risks too so it has advantages but in the same time it has disadvantages (Taher M. Ghazal et al., 2023; M. El Khatib et al., 2022). Clients or organizations which ask for outsourced software services are facing number of problems. (Tariq et al., 2022b, 2022a) listed some problems in outsourcing from customer point of view as follows: outsourcing contract does not bring savings it was intended to, dependence on supplier and loss of control over essential function (R. S. Al-Maroof et al., 2021a; Alhamad et al., 2021; Mubeen et al., 2022). Also, intellectual property protection, quality, communication-language barrier and communication-time zone difference are some of the risks confronting organizations as mentioned by (A. Al-Maroof et al., 2021; H. Alzoubi et al., 2022). Also stated that organizations are facing problems with IT outsourcing like "problems in evaluating outsourcing contracts and ability to manage contract" (Al-Maroof et al., 2022b; R. S. Al-Maroof et al., 2021b)(I. A. Akour et al., 2022). While (Al-Maroof et al., 2022b, 2022a) discussed confidentiality, integrity and availability as risks of IT outsourcing.

On the other hand, vendors who are providing software outsourcing services are facing problems too (H. M. Alzoubi et al., 2022f). That's because when we think that outsourcing decisions is a challenging business action, we must also realize that uncertainties are equal for clients and outsourcers (Al-Awamleh et al., 2022; Muhammad Turki Alshurideh et al., 2023a). Possible problems from vendors' perspective are "the potential of disagreement relating to interpretation of requirements and difficulties in contract monitoring" (Aityassine et al., 2022; Kurdi et al., 2022). Other problems came from demand uncertainty facing vendors like sequential short-term contracts, divide orders and engagement of multiple vendors (Akour et al., 2023; I. Akour et al., 2022). A detailed research done by (Bawaneh et al., 2023) studied the different problems and uncertainties associated with outsourced IT projects from the vendor perspective and categorized them in three main categories. The research conclude and summarize vendors' perspective risks as: first: outsourcing outcome risks like client-side and vendor-side risks, location

risks and package risks. Second: outsourcing relationship risks like client expectations, trust, bad news and organizational culture (El Khatib and Ahmed, 2020). Third category is outsourcing environment risks which include: legal and credit risk, vendor's competition, reputation and contract terms (Aljumah et al., 2023).

Therefore, problems facing both parties have to be eliminated by early management and control or by finding a solution for mitigating them and reducing their negative impacts (Alshurideh et al., 2022; El Khatib and Ahmed, 2018). It was mentioned that "building collaborative partnerships with clients is helpful for reducing the probability and potential impact of risks before their occurrence". In addition, (Aljumah et al., 2020) suggested in his paper a framework to guide the structure of service level agreement (SLA) because organizations lack well-developed service level agreements which are used to gauge and manage IT outsourcing activities and relationships effectively. (Alshawabkeh et al., 2021; Muhammad Turki Alshurideh et al., 2022a; E. Khatib et al., 2021) concluded their case study on risk management for software outsourcing with three advices to have a successful outsourcing project which are: project requirement (Akour et al., 2021), project planning and communication.

Specifically, this research will answer the following questions:

What are the identification and prioritization of problems facing organizations in the UAE due to outsourcing software services from three separate perspectives: IT managers, business managers and vendors?

How to keep outsourcing software services under control?

3. RESEARCH METHODS

The aim of the investigation is to look at the current issues regarding the use of software outsourcing services in number of cases in the UAE. The studied cases of the clients' perspective include one governmental organization specialized in financial sector, one semi-governmental organization specialized in banking sector and one private organization specialized in aviation sector besides three companies which provide outsourcing services. It worth noting that each one of these organizations are located and operating in different emirate and some has branches in other emirate too. This expands the range of the research to cover different sectors, specializations, locations, organizational culture and structure. Also, it will come across what has already been done regarding the issues and what needs more to be done to find solutions for these problems. Thus, to meet project's objectives and answer research questions, qualitative research approach was used to cover "what" and "how" questions of the paper. The qualitative methodology employed for this study aimed to gather an in-depth understanding of topic using both secondary and primary data. Secondary data collected from articles at journals and reliable websites to assist in writing the literature review and we tried to depend on most recent ones. While the main tool to gather primary data was through conducting semi-structured interviews with people concerned from selected organizations and companies. The data analysis used here was the thematic analysis which is a widely-used qualitative data analysis method that emphasized on identifying patterned "themes" within a dataset. General purpose of such method is to find out repeated points and create a pattern to provide an answer to the addressed research questions. The need for identifying detailed information gathered from the interviews and prioritizing them according to the research questions required applying thematic analysis.

The research was carried out by a group of four members and three of them were responsible to collect the primary data. Each one of three members conduct a total of three interviews: one with IT manager, one with business manager and one with vendor. A standard set of questions were used to make sure that the gathered data from different interviews will be direct and easy for analysis and comparison. Therefore, we selected our questions very carefully to help us understand the reality of software outsourcing services taking place in UAE's organizations with the focus on research questions and objectives. Although interviewers were prepared with standard set of questions, the nature of clients' interviews were in-depth, semi-structured covering open and close questions leading to more questions based on the points discussed between interviewer and interviewee. On the other hand, vendors' interviews was quick and based on few fixed questions. Consequently, a total of nine interviews were conducted. The target respondents were luckily from different administration and

managerial positions from IT and business departments like: Project Manager, IT manager, Manager of Software Engineering, Systems and Applications Manager, Business Team Leader, and Financial Section Manager.

Due to unavailability and time-restrictions, the interviews were held in different manners as some were face-to-face and others were done through long phone calls and in case of needing more clarification about certain point, questions were sent via emails. Furthermore, keeping in mind that there will be restrictions of confidentiality for all participants, only approved information were shared and interviewers were asked whether they accept their personal and organizational names to be shared or not so some agreed and some didn't. In-depths interviews took about 30 to 45 minutes on average and each was recorded. After that it was transcribed and content analyzed to create categories and classify what was expressed in the data. Interview questions for IT managers, business managers and vendors is provided in the appendices along with the detailed transcripts of all the conducted interviews.

We utilized all of the above to achieve the objectives we aimed at as finding out the type of IT service provided by outsourcers, feedbacks of the clients and vendors. Also, since everything has a dark side, we get more into problems and issues that appear and what is the responsive action taken. Besides, how much effort is put into keeping everything smooth and under control. Such as, how organizations and service providers are communicating and cooperating with each other in order to deal with problems as they appear and take a preventive action.

4. RESULTS

As stated previously, we have conducted a qualitative study in the project to obtain the information pertaining to the managers who are outsourcing their software services. The information presented in this section is taken through the interviews conducted with the IT managers, business managers and vendors. Questions asked to IT managers include examples of services they are taking, problems caused in software outworking, reasons for outsourcing services, duration of solving particular problem through outsourcing etc. They were also asked to rate the services provided by the vendors on the scale of 1 to 5, varying from unsatisfied to very satisfied. Questions asked from business managers were: what services they ask from the IT firms, problems faced by the organization in taking services, why do not built those services internally and go for outsourcing, how outsourcing is making a difference for them etc. On the other hand, vendors were asked some question from their perspective, such as problems faced by them in providing services. Further, they were asked to rate their services and satisfaction on the scale of 1 to 5.

The interviews of the IT managers at SFD, banking sector and aviation sector organizations revealed the following. In SFD, IT managers claimed to be providing the financial system services and sub services such as financial accounting audit system, portal systems etc. According to IT managers, some of the problems faced in software outsourcing include issues of requirement details; it is observed that end users do not provide proper information pertaining to their needs and many times, engineer of outsourcing vendor requires end user to be present at the time of outsourcing the services. IT managers stated that they go for outsourcing services because they do not want their IT department to remain under the pressure and another reason given by them was desired services are provided by the vendors. IT managers provide services to the organizations according to their needs and within time assigned by them. Quality is the basis on which vendors are chosen by the IT managers.

In banking organizations, services provided by IT managers are software development, applications, systems, portals..etc. Main problems faced by them are related to losing control, quality of deliverables, clarity of requirement and time spent on managing vendors' issues, communicating and negotiating with them. In addition to that, some of the problems are related to the contracts such as changing requirements of the clients; it is observed that if project is of longer duration, requirements do change over a period of time so again they have to revise the contract, requirements and cost. Banking organization emphasized that outsourcing is cheap than producing the same services in-house. IT managers have rated their satisfaction as 3 which reflect neutral.

Moving to the aviation sector organization, IT manager there are facing the problem of the costs,

responses of the vendors, confidentiality issues etc. They claim that they are receiving required support from the managers and leaders of the organization. Some of the problems faced by them are related to staff.

Business manager at SFD stated that they ask for the financial services most of the time. According to business manager, some of the problems faced by them are related to the connection error, updating the system etc. According to business managers, taking outsourcing service saves money and time. Reponses for the service they get is based on the nature of problems. Where business manager at banking sector needs the alteration of some current used services, systems upgrade, private documents storage, access admin and any other technological service that benefit their business. Main problem, faced by them is of miscommunication to the vendors and IT managers besides time and integration issues. They do not mind getting outsourcing services until and unless they are getting what they want, so business managers at banks do not think about producing the service by their own. They have rated the services as highly satisfied, with the rating of 5.

Vendors were also interviewed to explore the problems from their perspective. A vendor at Synechron Company stated that major problem faced by them is of understanding the requirements or communication. Problem exists in providing services include changes in software, enhancement of software and contract negotiation etc. Services are rated at the scale of 4 by the vendors. Vendor at galaxy group said that major problem is of connection error. They are very fast in replying the clients. They have rated the services at the scale of 4. Lastly, vendor of "X" company were asked to share their opinion and views in the same questions. Major problem faced by "X" company is of Scheduling the responses. Other problems are same as faced by the Synechron Company. They respond to the client within 1 to 3 days. Same rating is given by vendor of "X" company like the other two vendors.

On the basis of results, we can conclude that some of the common problems faced by business managers, IT managers and vendors were related to the connection error, miscommunications and time. All the vendors of "X" company, Galaxy Company and Synechron Company were quick in providing the services to the business mangers through IT managers. Business managers at banking sector, aviation sector and SFD were getting services related to financial audit, banking operations and any systems updates. As opposed by IT managers, it saves time, energy and is advantageous to their companies. More or less, it was found that business managers are satisfied with the services provided to them by IT department where they provide services quickly to their clients. This way, we can state that there are some problems which are faced in managing outsourced software services. Problems are faced by all whether it is vendor, business manager, or IT manager. These problems can be solved by proper understanding of the others. Business managers should specify the changes to the IT managers and vendors. Also, there must be proper understanding of outsourcing requirements as improper understanding results in problems for company outsourcing the services. The following table provide a summary of interview results.

Table 1: Summary of interview results

	Organization A (SFD)	**Organization B (Banking sector)**	**Organization C (Aviation sector)**
IT manager	IT managers provide financial services and many sub services at SFD. The main problem faced by them is regarding the details of the requirements of the clients. They are not having any problems with the vendors.	Banking organizations provide services pertaining to the organization. The main problem faced by them is strategic decisions. Contract related problem in understanding their clients. The main reason for outsourcing services is monetary, followed by lack of staff. A rating of 3 was given to	IT managers of the aviation sector also faced problems such as costs, responses of vendors and confidentiality issues.

	They acknowledged providing services on the priority basis and given a rating of 4 to their vendors.	vendor by IT managers.	
Business manager	Financial services are often taken by the business managers and they face the problems of connection errors and updating of systems. Outsourcing services are taken for saving money and time. Vendors are replying to them according to the nature of the problems.	Alteration of services is needed by the business managers working in banks. Miscommunication is the main problem faced by them. They do not mind getting services outsourced, until and unless they are getting what they want. So, business managers at banks do not think about producing the services by their own. They have rated the services as highly satisfied with the rating of 5.	Time of response, not user friendly, misunderstanding
Vendor	**Vendor A (Synechron Company)**	**Vendor B (Galaxy group)**	**Vendor C (X company)**
	A vendor at Synechron Company stated that major problem faced by them is understanding or communication. Problems at the time of providing services include changes in software, enhancement of software and contract negotiations, etc. Services are rated 4 on the scale by the vendors.	Vendor at galaxy group said that the major problem is about connection error. Other problems are related to software enhancement and changes in the software. They are very fast in replying to their clients. They have rated the services at 4 on the scale.	Lastly, vendors of "X" company were asked to share their opinions and views on the same questions. Major problem faced by "X" company is of scheduling the responses.

5. Discussion

Making the decision to outsource is not new in the UAE, this became more obvious when interviewing three organizations in the UAE. The people interviewed expressed their need and eagerness in using IT outsourcing. Their reasons resembled in what was stated previously in the literature and reiterated by (Jayatilaka and Hirschheim, 2009). These reasons are as follows:

1. "Lower costs due to economics of scale". This point was agreed upon by all three members in three organizations which were interviewed.
2. "Lack of in-house resources and skill sets". The financial section manager pointed out that we don't have people who are skilled enough to be hired, so the organization prefer to outsource.
3. "Outsourcing risk versus keeping control of the process". In this regard they stated that although there are some risks of depending on IT outsourcing, yet the advantages are far more which in terms encourage them on depending on outsourcing more but with providing solutions for the risks and problems that occur frequently.
4. "Vendor and contract issues." This point was only stated by IT manager of banking system. Although there are issues regarding the understanding of contract between the vendors and organization. They keep looking for better vendors and try to deal with contract issues.
5. "The ability to focus on core competencies (strategic advantage)." This point is stated by both IT managers and business managers of three organizations. As they prefer to use outsource as this allow them to focus on core business of their organizations.

What is more, three organizations pointed out number of the issues faced. Here looked at number of issues from different perspectives, namely, from IT manager, business Manager and outsource vendors in the three selected organization for this study paper. Starting first with IT managers from three selected organizations, the IT managers

stated different problems. IT managers from SFD and banking sector were similar in facing issues related to miscommunications and requirement details. SFD IT manager indicated that the end users always miss out the detail for the requirement before vendor finish the design of the applications. Once the demo is ready, the users add more details to the requirements. This lead to have the applications to be created from scratch and this add additional cost for the SFD to pay. While the banking sector IT manager stated that the miscommunications are frequent for the vendors to understand fully of what is required from them. As well as there was declaration of changing requirements in case of long contracts due to market rapid changes in technology. Both of the vendors for these two organizations are providing services with applications, systems and programs solutions. For the aviation sector, problems emerged because they outsource but with no contract which led them pay more and have to pay for every time an engineer has to come to fix the issue, as they are paid per hour for coming. If error occurred with the service, he/she complained of the time of response and how the email needs to be sent in detail for asking for the solutions for any problem. The IT manager at aviation sector complained that the service is really costly, as whenever the issue occurred of its functionality. Interestingly enough, the IT manager at the aviation sector indicated the eagerness of their top managers for using new technologies which could enhance the work flow and helps "the work to be done on the right time and the right way".

Moving on with the business manager of three organizations, all three business managers expressed satisfaction with outsource services they receive from vendors through the IT department. Business managers indicated the resistance from end users on using new software applications or new technologies and require time for training and teaching them. The banking sector business manager pointed out the miscommunications occurring and how the vendors don't provide applications which meet their business need. Business manager at the aviation sector complained about the time of response and high price of fixing services. What is more, the solution is not user friendly. Even with these issues, the business managers are satisfied with vendors' services as these services enhanced their business processes and work which in turn led them perform greatly in this rapidly changing world.

Moving in with vendors, both Synechron Company and Galaxy group identified same issues faced during service providing. Both complained of not getting enough requirement detail from end users. Synechron faces other issues for having miscommunications with end users which are the cause for their delay and sometimes affects the quality of the final outcome. Galaxy group talked about minor issues they face frequently as network issue or slowdown in server which are solved quickly. Vendor C, however, explained their reasons for delaying their responses to clients' issues. They stated that they are only located in Dubai and Abu Dhabi so once email is received they need to check the nearest engineer to that location and a need of further details about the issue in order an engineer could be provided to solve the problem. Interestingly enough the three vendor companies stated that they are satisfied with their clients whom they are providing services to.

All in all, the identified common problems from the three cases are listed as:

- Contract confusion.
- Requirement confusion.
- Miscommunications leading to applications not meeting business needs.
- Not user friendly.
- End users' resistance and need more training sessions.

Consequently, from all the above and after analyzing the results the prioritization of faced issues are as follows based on their repetition:

- Prioritized problems faced by IT managers:
  - Clarity of requirements (2 organizations)
  - Cost (2 organizations)
- Prioritized problems faced by business managers:
  - Clarity of requirements (2 organizations)
  - Cost (2 organizations)
- Prioritized problems faced by vendors:
  - Time (2 companies)

7. Implications for practice

It is stated in the study done by Ren "the elements of partnership such us trust, cooperation, and communication are essential for outsourcing success" (2010). The case with SFD, as found from interviews, they have developed trust with

outsource vendor, which were galaxy group and developed partnership which led them have minor issues related to outsourcing management. For their issue of not very detailed requirements are given, the solution would be to think what applications they need and list all the requirements to give vendors as this will help save costs. One more point helped SFD to be able to manage the outsourcing successfully is since they involved the vendors and IT department in their business processes which helped the vendors to know in depth of what applications are required from them. The same is applied to banking sector as they select their vendors carefully and build a strong relationships with them, as they elaborate on that point the speed and quality of the deliverables depends on their relations together. Also, due to the high demand of software outsourcers, they are asking their vendors to provide them with expert who can work within organization to fix frequent and urgent issues which strengthen the relation between two parties. "There is now a growing realization that relationship is a crucial factor in the overall success or failure of an outsourcing arrangement".

Furthermore, frequent communication helps avoid misunderstanding and improves cultural understanding which in terms maintain trust. "It has been suggested that trust is crucial for all business relationships as it enables more open communication, increased performance, higher quality deliverables and greater satisfaction in the decision-making process". Organizations and companies could minimize the shortcomings and overcome complexities by establishing trust between vendors and sectors. Thus organizations needs to communicate more frequently as to make the requirements clearer to the service provider. IT department could use the strategy of choosing vendors who share same goals and objectives as sectors, as this will lead to successful outsource arrangements. Then establishing partnership and working effectively is assured.

Other important practical implication is having a clear and well-defined service level agreement (SLA). The SFD provided the vendors with contract stating clearly the SLA which also added to make them fully understand of their work. Although banking sector organization is also following SLA and signing contracts, they face some issues with long period projects because technology is changing very fast and requirements and contracts should be updated too. It is suggested that aviation sector organization needed to start right and start with clear contract since they are facing costs issue because no contracts were signed. It is believed that "contractual governance is the written contractual and management-initiated mechanism designed to guide behavior towards desire objectives". Therefore starting with good detailed contract could help any organization facing issues like uncertainties of what are the requirements or to have to deal with additional costs.

Having metrics to measure the performance of service providers and the productivity of clients is considered as a strategic solution for outsourcing software services along with reward system. Outsource vendors should be controlled as to ensure their performance. As we stated previously, "outsourcing IT increases the complexity and scope of IT audit". This could be done by involving outsource vendors into the governance structure of the organization. It is believed that governance is essential to the stability of client-vendor relationships. So ongoing management and frequent communications to share information are essential to notice problems earlier and solve them quickly. IT strategies and business strategies should be aligned in order to create an integrated frame work which could address these issues and provide "better risk management, the implementation of best practices and cost reduction".

Last suggested implication to be practiced as solution is the implementation of risk management concepts to outsourcing software project. Risk management has been studied a lot in software services outsourcing areas and proved the effectiveness of using risk management in such projects which carry number of uncertainties. Threats are faced by clients and vendors and identifying possible risks altogether with proper mitigation plans will help in preventing problems to happen or eliminate their impacts.

6. LIMITATIONS AND RECOMMENDATIONS FOR FUTURE WORK

Time is the main and major limitation in our research because we had narrow time and many activities to be done. It was started by forming a group, selecting a topic, searching the literature, writing the proposal and finally writing the paper.

While we were restricted with a limited time frame, we had the challenge of finding organizations which accept sharing their software outsourcing experience with us. It was time consuming to search for good cases, contacting them, waiting for their approval and setting a time for the interviews. Other limitation we faced is the lack of information and resources about the researched topic in the UAE although it is widely practiced in organizations in the UAE.

Accordingly, future works should overcome these limitations and use this paper as the base to expand the scope of the topic. The following are some recommendations for further researches:

- Increase the number of respondents (more managers from clients and vendors) so that findings can be more generalized.
- Use focus groups and surveys besides interviews to strengthen the results.
- Compare problems and solutions of IT managers, business managers and vendors.

9. Conclusion and lessons learned

This paper is designed to answer two questions. The first question is about the identification and prioritization of issues faced by organizations in the UAE due to depending on outsource software services. The issues here are looked from three different perspectives in three different selected organizations. For doing so, three types of interview questions were prepared to ask IT manager, Business Manager and vendor representative in each of the three selected organizations. The second question is to look at how to keep outsourcing software under control. This research paper looked at several related literatures and discussed the results found from the interviews. In summary, depending on outsourcing software services is very popular in the UAE specially and around the world generally as it allows organizations to cut costs, investigate technology solutions and move their business toward the 21st century. Few points became clearer and many lessons were learnt by conducting this research paper which are worthy to mention:

1. There are some risks for depending on outsource services, yet it is one of the crucial thing to do in order to be up to date with the advancement of technologies and applications.
2. Using outsourcing applications could add advantages to the firm, as follows:
   a. "Meet immediate business needs", as by outsourcing, IT department can work on finding solutions that meet today's business objectives.
   b. "Converting IT costs from fixed to variables", having outsource provider support the firm, IT department could develop new skills needed for delivering new systems.
   c. "Reducing time to market for new services" by having outsource provider, IT professionals are free to address new technology that can create and bring new services faster to market.
   d. "Managing application demand" it department are free to address the ongoing demand for business changes to system.
3. A successful outsource arrangement could only appear if a business partnership established through sharing a clear goals and objectives between two parties.
4. Having a clear and well defined service level agreement in very important to reach the desired outcomes by clients and service providers.

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1. Appendices

Appendix A: Main interviews questions

Questions for the IT managers:

1. What are examples of software services does your organization outsource?
2. What problems are caused by software outsourcing?
3. Why you go for outsourcing software services?
4. How long do you take for solving a problem with outsourced software? (How fast does the vendor respond)?
5. Please rate your satisfaction about vendor software outsourcing services? On a scale of 1 to 5 (1=very unsatisfied, 2=unsatisfied, 3=neutral, 4=satisfied, 5=very satisfied)

Questions for the business managers:

1. What software service you asked IT for?
2. What are the IT software services problems that you are facing?
3. Do you prefer services to be outsourced or to be done in-house or it does not matter?
4. Was it outsourced or built internally?
5. Does outsourcing this service make a difference for you?
6. Please rate your satisfaction about the provided service? (1-5)

Very satisfied 5

7. How fast does the vendor respond for service?

Questions for the vendors:

1. As an outsource vendor, what problems are you facing when providing software services for organizations?
2. The following problems were introduced by IT managers (software enhancement, changes in software, software limitation, clarity of requirements for both clients and vendors, quality of the deliverables, contract negotiations…) do you think that these problems exist?
3. How fast do you respond to clients?
4. Please rate your satisfaction about the software services you provide? On a scale of 1 to 5 (1=very unsatisfied, 2=unsatisfied, 3=neutral, 4=satisfied, 5=very satisfied)
5. Please rate your satisfaction about clients (the way how you are working together)?On a scale of 1 to 5 (1=very unsatisfied, 2=unsatisfied, 3=neutral, 4=satisfied, 5=very satisfied)

Appendix B: Transcript of IT managers' interviews

1) IT manager at organization A (SFD)

1. What are examples of software services does your organization outsource?

There is one main application provided which is financial systems.

There are other sub services in financial services and managerial services like employees' portal system, financial accounting audit systems.. etc. We develop any systems that we are asked by different departments of the government organizations depending on their needs and what makes their performance better.

2. What problems are caused by software outsourcing?

Yes we faced problems many times. Most of the times the issues are related to the requirements detail, the end users are mostly the cause for not providing detail of the requirements. After the applications are provided, the end users discover that they are missing things. This leads to go through the applications from the start with additional cost.

There are sometimes issues with networking and end-users' confusion of the applications, which requires the need for the engineer of the outsource vendor to be available in the organization all the time. That is why I believe the outsource vendor should provide engineer in our organization.

3. Have you ever found issues related to controlling the IT outsource?

No, we never face such problems since we signed a contract and we are using the same vendor every time. So we are happy with their services.

4. Why you go for outsourcing software services?

Because there is no guarantees that employees will stay forever in your organizations. You don't want to experience an outstanding engineer to resign which can leave an organization stiff and puzzled what to do as happened at Sharjah electricity and water association (SEWA). Outsource vendors provide you with highly qualified and skilled

employees to provide you with applications and services that you desire. Having IT outsource doing their jobs, give us IT department less pressure to focus on the business of the organization and provide IT support to many departments that don't work with outsource applications.

5. **How long do you take for solving a problem with outsourced software? (How fast does the vendor respond)?**

There are priorities and categorizations of applications like which once needs faster solving and response. These are classified in service agreement level. The highest level holds great importance to the work and needs faster response. The records are kept of the time each issue was solved. The number of late responses are recorded and vendor will get a penalty for late responses. All these are signed in a contract so therefore, I am satisfied with their speed of response to issues.

6. **Please rate your satisfaction about vendor software outsourcing services? On a scale of 1 to 5 (1=very unsatisfied, 2=unsatisfied, 3=neutral, 4=satisfied, 5=very satisfied)**

7. **How do you choose your software outsourcing vendors?**

We look at what we need from services and applications and then we search for vendor which has the qualities and skills needed for such applications. Usually the qualities of around 90 % is enough since there are no vendors that can provide you with every things you want 100%.

2) <u>IT manager at organization B (Banking sector organization)</u>

1. **What are examples of software services does your organization outsource?**

Development outsourced, software testing outsourced, some parts of operations; IT operations not fully but some parts like infrastructure..etc. When I said development it means like whatever development we do it is all outsourced like applications whether it is a core banking application, whether it is intranet, portals, whether it is online banking. Everything related to software development.

2. **What problems are caused by software outsourcing?**

Any organization when they decide to outsource, that's a strategic decision. There is nothing perfect in this world, so every strategic decision has some pros and cons. Now these pros and cons depends on how you see it, I might say this is more beneficial for me and you say this is more beneficial for me. So our organization when they outsource, definitely they also know that there are some advantages and there are some disadvantages coz see.

Now the disadvantages of outsourcing is that you lose control over things to some extent because you have dependencies upon external vendors. Another disadvantages is that sometimes the quality of work goes down because others are doing something and you yourself are not doing so if you yourself are doing something for yourself you will do it with a better quality because when someone else do it, the quality is not the same.

Other problems when you do outsourcing is that you have to spend lots of time managing those vendors. Spending time on something which is not productive, something like vendor negotiations, contract negotiations, there are lots of time and efforts you have to spend on those things.

3. **What about problems related to contracts?**

What happens in contracts specially in software engineering I mean when it comes to, the problems we are facing when contracts is that initially when we do the contract, at that point of time the requirements are not very clear, and when sign contracts with vendors we tell them that this is the work you have to do and they tell us that this is the cost that we have to pay. The problem is because the requirements are not very clear, so initially when the contract is discussed and signed off your requirements are something else, after some time when you actually go in the details you will know that oh my requirements are different or maybe the person who signed the contract didn't understand it properly. So these kinds of things normally happens especially with longer contracts or for long duration. For example, you started a project for two years and when started it you did the contract, now one year back, how you expect the requirements to be same for two years, so what happens that over period of time requirements get

changed so every time you go over your requirements and renegotiate with procurements and legal departments

4. Why you go for outsourcing software services?

As I told you everything has pros and cons. everything has advantages and disadvantages. Now when organization decides something, it differs from organization to organization. So our organization briefly, finds that there are more advantages than disadvantages, so yes there are disadvantages which I told you but these disadvantages can be overcome by some processes and controls. There are lots of advantages also which are:

First of all, everything is about money and outsourcing is cheap and this is first advantage. Second, you are not depending upon the capacity, so for example I have a development team but obviously as a banking sector organization you have a limited number of team and people, how many people you have.. 10.. 20.. 30.. 40.. then what? If some work needs more than 40 people then what you will do? When you outsource you have the advantage that you have unlimited number of resources because you have number of vendors and if you combine the work on them you have almost unlimited number of resources, no matter the capacity you need.. you will always approach it and you can benefit from their help and their experience too. Third advantage, for example you are dealing with ten different systems, if you don't outsource you need to have experts about all these systems in you organization, but if you outsource you don't bother because as a banking sector organization my objectives is focus on financial core business not on IT and all other things so I should be investing in these . So those are IT vendors and they are expert in IT and I should let them develop my IT needs and I should focus on my core business.

5. How are you dealing with the stated problems?

Again, because of the many pros of outsourcing our software we have to come up with solutions to outsourcing problems. We minimize the problems by selecting our vendors carefully, making the right contracts and trying to give specific requirements and I told you we spend lots of time managing and controlling the outsourced work.

6. How long do you take for solving a problem with outsourced software? (How fast does the vendor respond)?

It really depends on our relations with vendors and what type of contracts you signed with vendors. Like in our case, our vendors are very fast. We can have vendor resource virtually with no time delay and if I tell them I need this and it requires someone they will bring resource inside to fix. Even sometimes you work offshore, I don't need a resource, I just tell them this is the work which needs to be done so they will do it and just bring the work.

7. Please rate your satisfaction about vendor software outsourcing services? On a scale of 1 to 5 (1=very unsatisfied, 2=unsatisfied, 3=neutral, 4=satisfied, 5=very satisfied)

3

8. How do you choose you required vendors?

Depending on the requirements of each project (software service) we choose vendor who has skilled expertise about what we want, and also we check for the price of providing us with that service. But the most important thing is the quality so if they have skills and experience the quality of the deliverables will be better and we have to negotiate on the cost because we don't want to lose the quality.

3) IT manager at organization C (Aviation sector company)

6. What are examples of software services does your organization outsource?

Database, Simulation software, programs, smart applications.. etc.

7. What problems are caused by software outsourcing?

The main issue is that a contract was never signed because of the over cost and since there is no contract, just for coming in to fix an issue, they are paid per hour. For example, the company bought number of smart printers, both hardware devices and software services provided with it since it is smart but it does not meet our expectations. Also

we had problems in time of response as responding late leads to delays in work.
Other type of problems is related to end user resistance in case of updating the system or implementing new solutions, it happens all the time because in general people don't accept change.

8. **Why you go for outsourcing software services?**

Software usage is restricted due to vendor policy. Also, not enough training has been given to the customer employees due to time restriction & manpower availability. Since the product is very expensive & sensitive, unintentional mistake may damage the device. Therefore, to avoid such scenario external help is requested.

9. **Do you have staff working in your organization have enough skills required to handle outsource applications?**

Yes

Why didn't you utilize their skills?

The problem was that the staff had limits to what they can do. There were restrictions, and if anything goes wrong it will be costly. Therefore, most of the time the vendor engineer was called-in.

10. **How long do you take for solving a problem with outsourced software? (How fast does the vendor respond)?**

The process of calling them in is long. An email should be sent with details of the incident. If we were lucky we'll get immediate response & the engineer will show up at the same day. But, this happens once in a blue moon.

11. **Please rate your satisfaction about vendor software outsourcing services? On a scale of 1 to 5 (1=very unsatisfied, 2=unsatisfied, 3=neutral, 4=satisfied, 5=very satisfied)**

4

12. **Was there enough support from leaders and managers of the organization receiving outsource services?**

Yes

Could you elaborate the types of support received?

The most concern from managers and leaders are that the employees can use technology in such a way that they get things done in the right time and way by using the best tools in the market. Once staff was complaining from the usage of a specific services, it took less than a couple weeks to introduce new one from different vendor.

13. **Was there poor understanding of the contract between you and your service provider? When and was it solved?**

There was no contract

Appendix C: Transcript of business managers' interviews

1) Business manager at organization A (SFD)

1. **What software services you asked IT for?**

Software applications and the most important one is financial audit system and there are other systems that come out of it. It is a system used by 62 government organizations in Sharjah which go under SFD control. All money related activities are kept recorded in the system. Like how much each governmental organizations spent, and on what and how much profit they made. All the records and profit made goes back to the SFD.

2. **What are the IT software services problems that you are facing?**

IT is usually minor problems like network connection error. There are problems related to how people working in the departments react to any new systems developed, like slow at learning or don't feel comfortable with the systems. This takes time to teach and train people. Sometimes, there are problems faced when updating the system, as in need to inform the stuff and train them again. There are problems related to slow in recording or retrieving data from the system. Sometimes staff report the system does not work as excuse for why they didn't do their work.
Most of these issues were solved because the systems are working and it enhanced the departments' work successfully. Most of it because of the environment of the work where everyone have to learn, train and use the system, since the data are very sensitive and all the work cannot be

accomplished without them. Once the system is developed; it goes to a period of demo testing, where enough training and testing of the system occur before launching the system. All the other minor problems are easily solved as we do regular check on the systems.

3. **Do you prefer services to be outsourced or to be done in-house or it does not matter?**

Of course depending on IT outsource saves money better, since they take money for their services only. If you buy applications and hire people for it, you will need to send them for training and learning which will be costly. What is more, IT outsource have people specialist in the field of work to develop and solve applications. They are qualified for developing a system and training the users, while hiring people may not know the applications and their any mistake can cost us a lot. We prefer using IT outsources because we don't have people highly qualified enough in the field.

4. **Was your software outsourced or built internally?**

Outsourced.

5. **Does outsourcing this service make a difference for you?**

Yes because the performance became better with the outsourced systems.

9. **Please rate your satisfaction about the provided service? On a scale of 1 to 5 (1=very unsatisfied, 2=unsatisfied, 3=neutral, 4=satisfied, 5=very satisfied)**

I would give it a very good point, since we are doing regular check up on the systems to avoid delay of the work. Once the issue is reported we go to the department twice a week, day for training and day for giving feedback.

10. **How fast does the vendor respond for service?**

It depends on the nature of the problems, but generally fast.

11. **Give me a story of one of the problems you faced recently**?

We once had a system needed to be developed, so we took all the details of the requirements and developed the demo testing. While teaching and training the staff, we discovered that system needs further improvements, and with the updating processes staff gets confused on which version to use and this takes lots of time to retrain and teach.

2) **Business manager at organization B (Banking sector company)**

1. **What software service you asked IT for?**

It depends on our needs and new technologies emerging which will benefit our business. Sometimes we asked for existing applications with few alterations for our organization and sometimes we ask them to develop an application based on a new idea. And also if we are using a program, we receive feedback from end users, so if we find some suggestions good we ask the IT team to make these changes. For example one of the recent services we request is private document storage where users can have all their financial documents in a safe place which should be very secure because the files are very confidential. There are other applications we request like access admin and upgrading existing softwares.

2. **What are the IT software services outsourcing problems that you are facing?**

Okay from my perspective I can say we are having problems in miscommunication. There is misunderstanding about the basic requirements, they can't understand what we want.

Time and deadlines, we tell them the specific time frame in which we need the software but there might not be enough time for them so we have to negotiate till we reach the best deadline for all sides.

Integration, we found it many times that the requested application can't be integrated with other application.

We faced problems regarding business requirements where the developed software doesn't meet business needs.

Organization environment and end users when the provided solution doesn't fit the environment or it is too complicated that end users don't like it.

3. **Do you prefer services to be outsourced**

or to be done in-house or it does not matter?

It does not matter for us since we are getting what we want.

4. **Was your software outsourced or built internally?**

As I said before, if the program or application is already there then we just outsource or even if our IT team can't make it by themselves then we outsource it also. Like the example of private document storage which is already developed by vendors in the market so they ask them to provide it to our organization.

5. **Does outsourcing this service make a difference for you?**

Sure.. It was well developed and I think it was a very good solution for some of the issues we encountered regarding our customers' documents because as you know the nature of our job is critical as these documents are very confidential.

4) **Please rate your satisfaction about the provided service? On a scale of 1 to 5 (1=very unsatisfied, 2=unsatisfied, 3=neutral, 4=satisfied, 5=very satisfied)**

Actually we liked the software so I am very satisfied with this experience.

5) **How fast does the vendor respond for service?**

They are fast.

3) **<u>Business manager at organization C (Aviation sector organization)</u>**

8. **What software service you asked IT for?**

Simulation software, application..

9. **What are the IT software services problems that you are facing?**

Time of response if there are any issues to be solved. Sometimes they are not user friendly so it takes time to move from "A" to "B". With constant training and motivation this obstacle was overcome. Also problem of misunderstanding the requirements or what we need exactly.

10. **Do you prefer services to be outsourced or to be done in-house or it does not matter?**

Usually its completed in-house with the assistance of a vendors. So we call an engineer or developer to come and fix issues inside organization. All work should be done in-house.

11. **Was it outsourced or built internally?**

Outsourced.

12. **Does outsourcing this software make a difference for you?**

Yes, if fulfills the company's heavy needs.

13. **Please rate your satisfaction about the provided service? On a scale of 1 to 5 (1=very unsatisfied, 2=unsatisfied, 3=neutral, 4=satisfied, 5=very satisfied)**

4

14. **How fast does the vendor respond for service?**

It depends but usually it takes couple of days.

Appendix D: Transcript of vendors' interviews

1) **<u>Vendor A (Synechron Company)</u>**

1. **As an outsource vendor, what problems are you facing when providing software services for organizations?**

Major problems we are having are, first not having clear idea about the specifications or requirements of the software so there are difficulties in understanding what mentioned in software "project" related documents. Second, sticking to the timeline with the requested changes in later stages which is really because they don't know what they want "clear requirements".

2. **The following problems were introduced by IT managers (software enhancement, changes in software, software limitation, clarity of requirements for both clients and vendors, quality of the deliverables, contract negotiations…) do you think that these problems exist?**

Yes, I agree that these problems exist and we have come across some of them.

3. **How fast do you respond to clients?**

I can't answer!!

4. **Please rate your satisfaction about the software services you provide? On a scale of 1 to 5 (1=very unsatisfied, 2=unsatisfied, 3=neutral, 4=satisfied, 5=very satisfied)**

4

5. **Please rate your satisfaction about clients (the way how you are working together)?On a scale of 1 to 5 (1=very unsatisfied, 2=unsatisfied, 3=neutral, 4=satisfied, 5=very satisfied)**

2) <u>Vendor B (Galaxy Group)</u>

1. **As an outsource vendor, what problems are you facing when providing software services for organizations?**

Usually we face minor problems like network connection error. There are problems related to how people working in the departments react to any new systems developed, like slow at learning or don't feel comfortable with the systems. This takes time to teach and train people. Sometimes, there are problems faced when updating the system, as in need to inform the stuff and train them again. There are problems related to slow in recording or retrieving data from the system.

2. **The following problems were introduced by IT managers (software enhancement, changes in software, software limitation, clarity of requirements for both clients and vendors, quality of the deliverables, contract negotiations…) do you think that these problems exist?**

Yes nearly all the mentioned above problems occur occasionally.

Changes in a software and enhancement occur as the end users don't provide us with the detail of the requirements at once, once the software demo is ready and the end users check them, then they add other requirements which need to develop the software again from start.

No issues faced with the quality of the deliverable and contract negotiations.

3. **How fast do you respond to clients?**

Pretty fast as we deal with important and sensitive data and delay could affect the work in the governments of Sharjah.

4. **Please rate your satisfaction about the software services you provide? On a scale of 1 to 5 (1=very unsatisfied, 2=unsatisfied, 3=neutral, 4=satisfied, 5=very satisfied)**

5. **Please rate your satisfaction about clients (the way how you are working together)? On a scale of 1 to 5 (1=very unsatisfied, 2=unsatisfied, 3=neutral, 4=satisfied, 5=very satisfied)**

3) <u>Vendor C (X Company)</u>

1. **As an outsource vendor, what problems are you facing when providing software services for organizations?**

Scheduling immediate responses. Since we are originated in Abu Dhabi and Dubai, trying to provide our services to all customers on time. Our services are distributed across the UAE so finding an available engineer closest to location and keeping in mind providing their IDs as soon as possible for access.

2. **The following problems were introduced by IT managers (software enhancement, changes in software, software limitation, clarity of requirements for both clients and vendors, quality of the deliverables, contract negotiations…)do you think that these problems exist?**

Yes, they do.

3. **How fast do you respond to clients?**

Once an email/call is received from customer for service an engineer is assigned to the task. It takes between 1-3 days.

4. **Please rate your satisfaction about the software services you provide? On a scale of 1 to 5 (1=very unsatisfied, 2=unsatisfied, 3=neutral, 4=satisfied, 5=very satisfied)**

4

5. **Please rate your satisfaction about**

clients (the way how you are working together)?On a scale of 1 to 5 (1=very unsatisfied, 2=unsatisfied, 3=neutral, 4=satisfied, 5=very satisfied)

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Collaborative Systems: Management and Technical Barriers from Design and Implementation Perspectives- Cases from UAE Public Sector

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A B S T R A C T

Collaborative Systems have played major role developing performances in organizations, increase efficiency in taking right decisions, increase coordination and communication among various departments in the organization, and allow managers to detect errors and deal with them effectively. Collaborative Systems have provided link between organization and stakeholders and allow them to participate in decision making for better implementation and adoption.

Collaborative systems have great influence on companies working in governmental sector like DEWA, DU, and Dubai Municipality. Those systems have played major roles in increasing effectiveness, coordination among various departments, allow those companies to provide better services, reducing duplications of processes (save time), saving resources to reduce operating costs, and increase collaboration with private sectors and civil society to achieve what is best for the organization and society as well.

In this paper we will focus on the importance of collaborative systems in most successful public organizations in Dubai (DEWA, DU, and Dubai Municipality) by focusing on real situations or cases they face with collaborative systems and how they deal with it in order to develop a clear perspective that will benefit us in our future careers.

1. INTRODUCTION

Collaborative systems are defined as information systems used to facilitate managerial activities by allowing efficient sharing of data between various projects and departments, sharing knowledge and experiences at various levels within the organizations and among teams (Online, 2018; Quesado and Silva, 2021). Collaborative systems importance vary from industry to another, but all agree that it is an important tool to control operations at various locations and among different teams that will benefit company for achieving its goals and objectives efficiently and effectively, " collaborative systems are used to to facilitate efficient sharing of documents and knowledge between teams and individuals in an organization" (Blumenthal and Jannink, 2000).

Collaborative systems includes many communication tools like emails, video conferencing, project management software, and other tools that allow managers and people in charge to monitor performance, compare current results with preset goals and take

strategic/corrective actions to deal with problems (Tolone et al., 2005). Collaborative systems are considered effective and efficient for reasons related to removing time and location barriers, those systems are enabling for greater number of participants in various divisions, departments, and that will enhance collaboration between all departments for better results (Akkermans and van Helden, 2002; Alshawabkeh et al., 2021; Bordetsky, 2001). According to (Sadiq et al., 2016) the goal of a collaboration software application is to foster innovation by incorporating knowledge management into business processes so employees can share information and solve business problems more efficiently" (Bafoutsou and Mentzas, 2002; Scuotto et al., 2017).

The main idea that we will focus on in this paper is how Collaborative Systems are applied by three leading organizations in UAE; why and how they use it and what are the major problems they face during implementation and how they go over them.

2. LITERATURE REVIEW

The increase in the importance of I.T department during the last 20 years has allowed it to be a major department and partner in designing companies strategic plans, set objectives, and providing innovative solutions that other departments can't provide (Farrukh et al., 2023; Gaytan et al., 2023). The importance of I.T will continue to increase as more companies are expanding globally (Aljumah et al., 2021a; El Khatib et al., 2020b), as they need an effective tools to coordinate their activities in the local and international markets (T M Ghazal et al., 2023a), detect errors, and share experiences and needed information among various teams and departments (Abudaqa et al., 2022; AlDhaheri et al., 2023; Gulseven and Ahmed, 2022). According to (Al-Dmour et al., 2023; Aziz et al., 2023; Blooshi et al., 2023; Louzi et al., 2022a) Information technology (IT) benefits the business world by allowing organizations to work more efficiently and to maximize productivity (Aljumah et al., 2021b; El Khatib and Opulencia, 2015; Mubeen et al., 2022), in hard market conditions, strong competition, and market changes efficiency is a major factor to gain competitive edge over competitors (Ahmed and Nabeel Al Amiri, 2022; Nadzri et al., 2023; Nuseir, 2021; Sakkthivel et al., 2022).

Collaborative systems are one of the I.T innovative solutions that is based on connecting various company actors (teams, managers, departments, and many other related parties) in a simple network, according to (Abudaqa et al., 2021; Ahmed et al., 2022; A I Aljumah et al., 2022a) collaborative system is "a set of actors connected by a set of ties" with actors being "persons, teams, organizations, concepts, etc." (Haitham M. Alzoubi et al., 2022a; Amiri et al., 2020; Nuseir and Elrefae, 2022). Each company having its collaborative system or network will be able to achieve its goals effectively and efficiently, create a working environment where everyone shares his/her knowledge and information with everyone and all collaborate for company success (Alshurideh et al., 2022; M T Alshurideh et al., 2022; Alzoubi et al., 2020; Yasir et al., 2022).

Collaboration among teams, departments, outside partners, stakeholders is considered vital for company success regardless of its size, location, industry, and many other factors vary from situation to another (Alshurideh et al., 2020; Alzoubi and Ahmed, 2019; El Khatib et al., 2022). Collaborative systems have been the most important and innovative solution that has played major role in increasing the importance of I.T department in strategic planning and how its innovative solutions will create a difference. According to (Alzoubi et al., 2019) Collaboration has become the key issue to rapidly answer market demands and changes in all companies, through sharing competence and resources"; collaborative systems facilitate sharing of information, experiences, and many other things that will help company to run its operations smoothly and effectively (Lee et al., 2023; Mohammed T. Nuseir et al., 2022).

Collaborative solutions can be obtained from external sources and that is important to reduce R&D development costs and time needed to design your own collaborative system (Akour et al., 2023; Bawaneh et al., 2023; M T Nuseir et al., 2022a); many companies prefer to go for external vendors to buy a collaborative system that best fit their needs and operations (Aityassine et al., 2022; Al-Maroof et al., 2022b; Haitham M. Alzoubi et al., 2022g; Khan et al., 2022). Cisco is one of those vendors that provides the companies with interoperable solutions allow you to take advantage of new cloud services and 'cloud-connect' them with your existing infrastructure (I.

Akour et al., 2022; Muhammad Turki Alshurideh et al., 2023c; Khatib et al., 2022). We offer a wide range of solutions from the Cisco Cloud, private cloud solutions, and Cisco Powered cloud services from certified partners (Muhammad Turki Alshurideh et al., 2022a; Louzi et al., 2022b). The reason behind those collaborative solutions are to Improve employee engagement (Nuseir et al., 2021), increase customer satisfaction, reduce costs, and accelerate innovation and growth (Almasaeid et al., 2022; Muhammad Turki Alshurideh et al., 2022b; Haitham M. Alzoubi et al., 2022c).

3. METHODS OF DATA COLLECTION

3.1. Interviews

Interviews are considered as qualitative method of data collection where the interviewer ask direct questions to interviewee regarding specific issues for the sake of collecting information about the issue. The interview will be conducted with I.T professionals to discuss how I.T is considered a major factor behind the company success (H M Alzoubi et al., 2022).

a. I.T people from the three companies (Refer to appendix 2)
b. I.T vendors (Refer to appendix 1)

3.2. Web researches

Companies websites and other related websites to collect information about various related topics mentioned in the project, surf the net for related managerial/I.T theories for the reasons of comparison and emphasis.

3.3. Hypothesis

- How does Collaborative system designed by I.T Department help in managing companies and solving managerial problems?
- What are the major problems in designing and implementation processes?

3.4. DEWA (Dubai Electricity and Water Authority) Company profile and industry

DEWA is formed in 1992 to be responsible for producing and distributing electricity and water to Dubai. The company has succeeded to execute its mission and has developed itself to meet the expectations of its customers and cope with the huge expansion in the city (Al-Kassem et al., 2012; A I Aljumah et al., 2022b; Arshad et al., 2023; Varma et al., 2023). DEWA has increased its projects and crews to cover Dubai growth era and the need for updated organization to cover the increase in demand for electricity and water (Khatib et al., 2016; Nuseir, 2020). It is a hard task for senior managers at the organization to cover every single detail related to tens of projects conducted at the same time; the solution was designing a new collaborative system that help the company and managers to run the organization effectively and efficiently (T M Ghazal et al., 2023b; Mat Som and Kassem, 2013; Nuseir et al., 2020). " DEWA employees a workforce of over 9,000 employees who constantly endeavor to see that both the quantity and quality of services provided are of the highest standards in consistency and reliability (El Khatib et al., 2021). In Dubai, DEWA provides over 600,000 customers with electricity and over 500,000 customers with water (Al-Awamleh et al., 2022; Muhammad Alshurideh et al., 2023; Kurdi et al., 2022). Looking and analyzing those numbers we can realize the need and the importance of collaborative system at DEWA and how it helps the company to manage its activities (Muhammad Turki Alshurideh et al., 2023b), various teams, and many projects effectively with minimal errors (Al-Kassem et al., 2013; Al-Maroof et al., 2022b; Haitham M. Alzoubi et al., 2022f; El Khatib and Ahmed, 2019).

3.5. Current Situation at DEWA

DEWA is developing and depending on its "Collaborative System" to meet the challenges of EXPO2020 (data presented in this paper have their reference in the interview conducted with Senior I.T Manager at DEWA). DEWA is expanding its network to cover various and remote areas in the city, DEWA is expecting a huge increase in demand before and during the EXPO2020 and the company must deal with this problem by focusing on new system that allows DEWA to detect problems during peak hours and find solutions (El Khatib and Ahmed, 2020), DEWA engineers and teams are working at different locations the existence of collaborative system the coordinate and organize their efforts is vital for the DEWA success (Taher M. Ghazal et al., 2023; Mohammed T. Nuseir and Aljumah, 2020). DEWA projects are focusing on designing networks and connecting them together; any problem in one unit will influence the whole system and will be negatively reflected on over company performances, and here comes the

importance of I.T department at DEWA that is responsible for designing collaborative system that allows managers to control and teams to communicate for outstanding and efficient performance.

3.6. The Identified Problem

As presented above DEWA is under pressure to finish its projects before expo2020 where the company is considered a major partner in this international event (Ahmad Ibrahim Aljumah et al., 2022b; M Alshurideh et al., 2023; T M Ghazal et al., 2023c). Since the beginning of operations (the core of the problem) managers have realized many problems in the inventory system where some locations have to stop working waiting for materials that will come from the main storage area in Jabel Ali, or getting the wrong material that doesn't consistence with material in the order-slip, and sometimes location managers will receive an email that there is a delay in delivery without any previous notice that will allow managers to put contingency or emergency plans. Senior managers (including I.T Manager) at DEWA have realized the huge size of the problem and the vital need for an innovative solution to deal with "inventory problems".

How does Collaborative system designed by I.T Department help in managing companies and solving managerial problems?

Inventory management is considered a critical problem that has its influence on both time (delay) and cost (increase costs and expenses) (I. A. Akour et al., 2022; Al-Kassem, 2014; Al-Maroof et al., 2022a). I.T department at DEWA has suggested a solution that is based on Collaborative system or network the allowed the company to maintain and keep enough stock of inventory to avoid shortages, meet increase in demand, and at the same time avoid storage costs (excess supply) (Haitham M. Alzoubi et al., 2022d; El Khatib and Ahmed, 2019; M T Nuseir et al., 2022b). The collaborative inventory management system designed by I.T is based on connecting POS (Point-of-Stock) to purchasing department at DEWA; that is each time inventory is going out of the stock area, the purchasing department will receive an automatic notification regarding the decrease in inventory (specific amount, location, and price) (Alshurideh et al., 2022; E Tariq et al., 2022). Purchasing department is also connected by the same system to what is called "Minimum Inventory Quantity" where any decrease in quantity below the minimum required a direct message to CEO and financial department asking for permission to buy new inventory to avoid shortages and loses (Haitham M. Alzoubi et al., 2022b; Khatib, 2022). Location managers are also connected to CEO where demand for materials are send first to CEO for approval; the approval is sent to POS and the location manager will be notified for approval by the POS (A. Al-Maroof et al., 2021; R. S. Al-Maroof et al., 2021b). The POS Collaborative Inventory System designed by I.T ensures that each time inventory is used, this amount of inventory will be deducted from the inventory count, purchasing department must be informed to cover up the inventory gap, and that what will lead to a closed information loop between many departments to have things run effectively and with highest levels of coordination (Akour et al., 2021; Al-Kassem, 2017; R. S. Al-Maroof et al., 2021a; Alzoubi, H MAlhamad et al., 2021).

What are the major problems in designing and implementation processes?

The major problems regarding the POS Collaborative Inventory System designed by DEWA can be summarized as follow:

The short time to design the prototype directly after winning expo2020, where the system didn't go under intensive testing before adoption.

The need to allocate needed inventory to specific location to avoid excess inventory returns and avoid shortages (E. Khatib et al., 2021).

Absence of time schedules regarding needed time from POS to various locations to avoid delays.

Human Resources are not prepared to design training programs to cover all the needed staff and the lack of I.T staff to run the training program (Aljumah et al., 2020; Haitham M. Alzoubi et al., 2022e; Emad Tariq et al., 2022).

the huge size of employees and managers involve in the implementation process (the bigger the number of employees and the size of the company the harder implementation will be).

3.7. DU Company profile and industry

DU is considered new to its main and only competitor Etisalat and that what makes the market duopoly where the customers have few choices to choose from them (Muhammad Turki Alshurideh et al., 2023a). The company has started

its operations in 2006 and since this period DU is striving to provide its customers with highest quality services, latest technologies in communication industry (El Khatib et al., 2020a; Hani Al-Kassem, 2021), and providing its customers attractive packages that fit their needs. DU main activities are in Dubai and for that reason the company is considered a strategic partner in preparing for the world expo2020 that is hosted by Dubai; for the followings reasons, I did emphasize on DU and how it uses its I.T department to deal with this current situation.

3.8. Current Situation at DU

Du and Dubai Silicon Oasis Authority (DSOA) has signed an agreement in 2014 to develop the communication infrastructure at Dubai Silicon Park. Du senior managers have realized the importance of developing collaborative systems that link Du headquarter with various teams involved in planning and implementation processes, developing teams from (DSOA), Municipality authorities, and stakeholders involve in this huge project (Aljumah et al., 2023; H. Alzoubi et al., 2022; El Khatib and Ahmed, 2018; Ghazal et al., 2021). Du senior managers have ask I.T Department to design Collaborative system map that provide link with various parties involved in the implementation process; at this stage I.T Department at Du is collaborating with other I.T departments at external vendors to build and design a map that organize the flow of data and communication, asset management, and coordinating various activities (Ahmad Ibrahim Aljumah et al., 2022a).

3.9. The Identified Problem

At the beginning of operations Du was not in vital need for a software that allow the company to coordinate its extended operations, the number of customers was small, and the company projects across Dubai were limited (Mohammed T. Nuseir and Aljumah, 2020). After expo2020, Du has realized the importance of finding a collaborative system that allows Du to manage and track its operations, data basis, manage its assets, and coordinate its expansion projects; I.T department at Du lacks the experience and logistics to find a solution by itself (start operations in 2005) (Nuseir et al., 2023). I.T department at Du has received the permission from senior managers to start looking for external vendors that will help Du in finding suitable solutions that will help it to finish its expansion process effectively and efficiently before expo2020 (M. El Khatib et al., 2021). The problem can be summarized as the vital need for Du to manage its rapid expansion process, coordinating its spreading activities, and the absence of software that is allowing it to do so; according to Du vice president Abdulhadi Alalyak" the company has undergone a widespread roll out of new facilities and infrastructure, mobile masts and base stations, landing stations and data centers (Al-Kassem et al., 2022; Nuseir and Aljumah, 2022). To give some idea of the scale of operations, having built out its presence across the Emirates, du now has over 3,000 separate real estate contracts related to facilities in the country; for those reasons the company assessed solutions from a number of vendors" .

How does Collaborative system Adopted by I.T Department at Du help in managing companies and solving managerial problems?

Du has asked many vendors to provide it with suitable collaborative solution that allows it to manage its operations effectively and efficiently. Du has decided to take the software designed by IBM and it is called IBM's Maximo Asset Management; the importance of this solution according to Du are related to the followings:

Du Business activities and processes are mapped carefully to ensure that operations would align with pre-set goals and objectives; where all departments and teams are connected together.

This collaborative solution will allow Du to adjust and update its procedures atomically and with minimal costs.

The system gives us a complete end-to-end enterprise and project asset lifecycle management, that includes the main offices, back offices, retail shops, technical and data centers, and warehouses (El Khatib, 2015).

The new collaborative solution provided by IBM and adopted by Du will insure highest levels of transparency, better collaboration functions, and will lead to more tangibility of the efforts of each function (M T Nuseir and Aljumah, 2020).

IBM's Maximo Asset Management will standardized performance and procedures across all functions, this will lead to greater uniformity in operations and performances.

What are the major problems in designing and

implementation processes?

The major problems regarding new collaborative solution called Maximo that is designed by IBM Computers can be summarized by the following:

As mentioned previously, it is an external solution where Du has to pay huge amount of money to benefit from it.

Time needed to install Du procedures and operations in the system, " some areas have been completed, some areas are in the process, which will take a few months" .

Training staff and the related costs and time needed for that process.

This solution can be used and adopted by competitors (El Khatib et al., 2019; Kassem and Martinez, 2022).

The time needed for updating and installation.

Maximo is focusing on internal operations and procedures with less focus on external issues related to customers' satisfaction and relation with stakeholders.

3.10. Dubai Municipality

- *Company profile and industry*

DM is considered one of the most important national organization in Dubai due to the size of responsibilities allocated to it. DM municipality is founded in 1954 with seven members and limited responsibilities; DM responsibilities have increased to deal with every single aspect related to Global City of Dubai and employing thousands of people and conducting hundred of projects across the city.

- *Current situation at Dubai Municipality*

Dubai Municipality in vital need for a tracking system that allow the municipality to track, control and complete destination projects at the Emirate. According to municipality senior managers "all projects at design stage or under construction to be ready ahead of Expo 2020", but this rapid implementation requires a well designed security and collaborative system that will allow municipality to track those projects at different locations, reduce waste and abuse of resources, organize team participation and efforts, increase safety measures regarding database and information regarding customers and projects, take quick actions when needed, and finally provide communication with various authorities involved in the project implementation like DEWA, Etisalat, Police Department, and other governmental agencies. The interview conducted with Mr. Abdulmajid AlMulla will clarify how the municipality has designed the required collaborative system and for what reasons, who design the system, and how it is implemented.

3.11. The Identified Problem

Dubai Municipality can summarized its problems by the following points and the focus will be in finding an I.T solution that will help the company to find effective solution,

1. Rapid implementation requires a well designed security and collaborative system that will allow municipality to track those projects at different locations
2. Reduce waste and abuse of resources where the company needs a tracking system that allows it track resources from storage areas to it final destination.
3. Organize team participation and efforts
4. Increase safety measures regarding database and information regarding customers and projects
5. Take quick actions when needed
6. Finally provide communication with various authorities involved in the project implementation like DEWA, Etisalat, Police Department.

3.12. How does Collaborative system Adopted by I.T Department at DM help in managing companies and solving managerial problems?

The I.T department at DM has decided to go for external vendors for the sake of saving time, efforts, and achieve its goals effectively before expo2020. According to Khalid Abdul Rahman Al Awadhi, head of DM's I.T section " Dubai Municipality (DM) has successfully executed a firewall consolidation and upgrade activity for its critical infrastructure using Fortinet's FortiGate network security virtualization. It said the consolidation of multiple firewall clusters and virtualization of the upgraded infrastructure will substantially achieve long term cost savings, ease of maintenance and provide a robust and single layer of IT security" . The adoption to this soft ware from Paramount (external vendor) will help DM to achieve the following:-

1. Reduce timely completion
2. Meticulous planning
3. High-level management engagement and

technical brain-storming were the key factors in the early stages of the project.
4. Coordination between managers at various locations
5. Sharing experiences, knowledge, and resources
6. Direct reports are send directly to the selected people based on levels and areas of responsibilities as assigned by senior managers and updated on continuous basis.

3.13. What are the major problems in designing and implementation processes?

As mentioned previously, it is and external solution where DM has to pay huge amount of money to benefit from it.

1. Time needed to install DM procedures and operations in the system, this require huge efforts and collaboration between I.T department at D.M and Paramount team regarding implementation process, training people (coordination with H.R), and other procedures.
2. Training staff and the related costs and time needed for that processes.
3. Time needed for updating, implementation and installation.
4. Paramount Team experience with DM all activities and projects is limited and need hard efforts from both companies to implement the software effectively and efficiently for better results.

4. RECOMMENDATIONS

Information Technology functions and importance have changed during the last 20 years. Companies must realize that I.T is a major tool for expanding globally and coordinating internal operations as well.

Information Technology will provide managers at all levels with needed information and data regarding internal and external operations, information about customers, market threats and opportunities, changes in environmental business forces ; the collected information will help senior managers in Designing company future plans and draw scenario planning that will help the company in avoiding future threats and benefit from future opportunities.

The success of I.T department in designing an innovative technology solution is measured by the ability of this solution to achieve company goals and objectives, "selecting the right information technology to support business objectives sometimes involves carefully measuring whether the technology offers a tangible return on investment"(Schuerenberg, Beckie, Kelly, 2008).

For effective I.T solutions, senior managers must identify the problem or the specific need for I.T department in order to find the right solution that best fit the problem for the problem.

Sometimes external vendors are better than finding internal solutions for reasons related to time consumed in Research and Development, more effective solutions, and achieve intended results faster.

Collaboration with I.T and non-I.T managers (through collaborative systems) is considered major factor for achieving company goals effectively and efficiently; collaboration is a key factor for better performance.

5. CONCLUSION

We are living in the age that I.T department is major factor in company management, success, and management resources for achieving goals effectively; Impact of information technology has increased to touch every single aspect of companies, societies, and individuals and has changed the way of how the companies are managed, " Impacts of information technology upon individuals, organizations and society - Citizen science - Social computing - Open source - Business model innovation - Pervasive information services-Resources and people management".

I.T importance has increases since the last two decades, local governments and businesses have used it to transfer information among various departments and units, and to build good relations with customers. The use of I.T technology by governments and businesses has developed to deliver more services and increase efficiency to their own work process; those improvements have led to high productivity levels, greater customers' satisfaction, more efficiency and transparency where are considered major factors in building successful and strong stricture that is able to achieve goals and objective effectively and with less cost," Through the use of technology, governments have improved the delivery of services to constituents and increased the

efficiency of their own work processes. These improvements have led to greater citizen satisfaction, increased government transparency and significant reductions in operating costs" (How Information Technology Enhances Government Innovation,2007).

Each company having its collaborative system or network will be able to achieve its goals effectively and efficiently, create a working environment where everyone shares his/her knowledge and information with everyone and all collaborate for company success and better performance, "Adopting to an entrepreneurial collaborative orientation is accepted as strategy through which to improve the performance of firms" in a global/local contexts with many projects implemented at the same time, strong competition in the same industry, and market changes.

I have realized the importance of I.T department during the last two decades and how this department has changed from jut data collection and analysis to a major partner in strategic planning for company future, change agent by providing the innovative solutions to current problems, increase transparency, and major tool for achieving goals and objectives. I have realized that 2 from the three companies included in the research paper have decided to go to external vendors to provide them with I.T solutions and design collaborative system that best fit their operations and processes; I.T vendors are able to design and tailor quick solutions that best fits the need of each company and that is another advantage regarding the flexibility of I.T solutions.

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Appendices

Appendix 1

(vendors interview)

1- **Mr. Ahmad Achakzai** , HR Manager at Grand Technology Resources, Information Technology and Services, GTR company

2- **Mr. Ajay K Nair,** Team Lead – Support Department ,CAD Gulf Company

3- **Mr. Alexander Sokolov,** Head of IT Department, First Bit Company

Interview Questions

1. How does your company adjust *Collaborative systems to make them fit the needs of different industries and companies*?
2. Who design Collaborative systems at your company and on what bases?
3. What are the advantages and disadvantages of Collaborative system in new market challenges?
4. Do you provide training to your customers?
5. Do you target private or public sectors and why?
6. Do you provide maintenance and implementing services to your customers?
7. *Collaborative systems may confuse managers due to* many projects and many departments involve in it, how you deal with this?
8. How does your company test new

prototypes and why testing is considered important in this business?

9. Do one collaborative system applied to all governmental organizations in UAE and world-wide?

10. What is the relation between *Collaborative systems and* Company infrastructure and capabilities?
11. What are the major problems in designing and implementation processes regarding new collaborative system?

Appendix 2

(Interview with I.T people at local organizations)

1- Mr. Abdalla Alhammadi, Vice President - IT Infrastructure Operations- Du company

2- Miss Fatima Faris, Engineering Planning Performance Management**,** DEWA

3- Mr. Abdulmajid Almulla, Assistant Director Department of Information Technology, Dubai Municipality

Interview Questions

1. How does your company deal with Hardware problems in case of updating existing *Collaborative systems*?
2. How does Collaborative system designed by I.S Department help in managing companies and solving managerial problems?
3. What are the advantages and disadvantages of Collaborative system?
4. Who is responsible for assigning responsibilities, designing Groups, and reporting system that all related to *Collaborative system applied at your company?*

5. What are the departments involved in the company collaborative system and why?

6. *Collaborative systems may confuse managers due to* many projects and many departments involve in it?

7. How does your company involve new staff with Collaborative system used in the company?

8. How does your company test new prototypes and why testing is considered important?

9. Who is responsible for training staff how to use Collaborative system?

10. Do one collaborative system applied to all governmental organizations?

11. What is the relation between *Collaborative systems and* Company infrastructure and capabilities.
12. What are the major problems in designing and implementation processes?

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Project Quality and Project Risk Management: Correlations and Interdependencies

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A B S T R A C T

This research aims to identify and develop a framework on how to correlate the project risk and quality management to achieve better results. The research assumes that there is a correlation between project quality and project risk management; and the outcomes of the project quality management and the outcomes of the risk management have mutual correlation. The research utilizes qualitative approach and case study based using open structured interviews. The research concludes that there is an invisible line between risk management and quality management when it comes to integration there where many managements get lost to manage their projects on a strategic level, it all maters when budget and scope to be met.

1. INTRODUCTION

Project risk management and quality management play a vital role in project management processes. They both are part of the project management body of knowledge, which can determine the success or failure of a project (Aloini et al., 2007). Project risk management is the process of dealing with uncertainty by identifying, prioritizing, and responding to these risks (whether positive or negative risks) in a project (Paksoy et al., 2019). Project quality management is the process of following standards and frameworks to develop a product that satisfies the customer requirements every time (Molina-Azorín et al., 2015). Having a lousy quality management plan is a risk by itself. They both heavily depend on the requirements of the client and have related processes (Alzoubi et al., 2020; Ibrahim, 2019; Kassem and Martinez, 2022; Yeung, 2008). The integration of risk and quality management can provide an enhanced impact on a project (Caniëls and Bakens, 2012; Yang et al., 2021). A study

conducted on the combination of those two processes in the information security sector, showed that the integration resulted in higher quality data and more reliable risk plan this integration can lead to a reduction in cost, eliminating rework, and higher customer satisfaction (Khatib et al., 2022; Sanjuq, 2014). (Meulenbroeks, 1998) also argues that the Failure Mode and Effect Analysis and Six Sigma are the results of this integration. (Leong et al., 2014) suggests that the integration can provide better results, and it will be the future practice.

1.1. Aim and Objectives

This research aims to identify and develop a framework on how to correlate the project risk and quality management to achieve better results (Al-Kassem et al., 2022; H. M. Alzoubi et al., 2022b; El Khatib and Ahmed, 2018). To reach the aim of the

project, the following objectives are to be met:

- explain how project requirements can impact the risks and quality, and how they are related;
- illustrate how compliance with the requirements will reduce the chances of work rejection or rework, and will improve the quality of project product and deliverables;
- identify the critical success factors (CSF), and key deficiency factors (KDF) in the integration; and
- demonstrate and assess case studies.

1.2. Research Hypotheses

The following hypotheses are the base of the research:

- there is a correlation between project quality and project risk management; and
- the outcomes of the project quality management impact the outcomes of the risk management and vice versa.

2. LITERATURE REVIEW

2.1. Risk in Project Requirements: Quality Inside

According to (A I Aljumah et al., 2022a; Mohammed T. Nuseir et al., 2022), risk in the project is referred to any uncertainty that might affect any of the project objectives. To accurately identify those uncertainties, one must understand the requirements. According to (Alshawabkeh et al., 2021; H. M. Alzoubi et al., 2022f; Hani Al-Kassem, 2021), the requirements are the project needs, and requirements management is the process of understanding, formulating, and documenting all the requirements (M. T. Alshurideh et al., 2023a; El Baz and Ruel, 2021). The requirements are like a compass that directs the project. Fully understanding the requirements will assist in a better understanding of the uncertainties involved in the project (Al-Kassem, 2017; M. T. Alshurideh et al., 2023b; T M Ghazal et al., 2023b). Project risk management is the process of dealing with risks, and it consists of three main processes:

- identify (identify all possible risks);
- prioritize (prioritize the risks based on their impact and probability of occurrence); and
- respond (make a response plan for the risks and implement them when needed) (Aljumah et al., 2021a).

Quality has many definitions. Some define quality as the excellence of a product (A I Aljumah et al., 2022b; M. Alshurideh et al., 2022). Another definition is meeting customer requirements, or the number of features in a product (Louzi et al., 2022b). Even though there are different definitions for the quality, but they all revolve around the "requirements" (Ahmed et al., 2022; Al-Kassem, 2014; AlDhaheri et al., 2023; Amiri et al., 2020). Similar to risk management, quality management is heavily dependent on an adequate understanding of the requirements. Project quality management has three main processes:

- quality planning (identify what level of quality needed to satisfy the requirements);
- quality assurance (planning all required activities to ensure meeting the right level of quality; and
- quality control (monitor the project progress and try to eliminate any issue that will negatively impact the project before it happens) (H. M. Alzoubi et al., 2022h; Aziz et al., 2023).

According to (Al-Kassem et al., 2013), poor understanding of the requirements is the key source for most of the issues related to risk and quality management in the project (Aljumah et al., 2023; H. M. Alzoubi et al., 2022c; El Khatib et al., 2021; Mat Som and Kassem, 2013). Both quality and risk management heavily depend on requirements, and the risk management processes are very similar to quality management processes (Al-Kassem et al., 2012; El Khatib and Ahmed, 2020; Lee et al., 2023; Mohammed T. Nuseir et al., 2022). Low quality is a risk by itself, and a poor risk plan will lead to bad quality as well. Based on the above information, it can be concluded that using the correlation between quality and risk management can increase both efficiency.

2.2. Project Product and Deliverables: Risk of Compliance to Requirements

The project is divided into phases, and phases are divided into sub-phases, into deliverables, until we reach to the work packages (Nuseir and Aljumah, 2020). To have the right project product, one must have an excellent deliverables. To have excellent deliverables, the requirements of each deliverable

must be clear and agreed upon since the beginning (El Khatib et al., 2020b). Failing to meet the requirements of a deliverables will lead to rejection of work and rework. From the project risk management perspective, risks can be on the project level, and task level (Aljumah et al., 2021b; M T Nuseir et al., 2022a). To deliver the project successfully, all the uncertainties on the task level must be dealt with. After identifying the risks on each deliverable and prioritize them, the risks are to be avoided before they happen if possible (Blooshi et al., 2023; El Khatib et al., 2019; El Khatib and Ahmed, 2019). Avoiding harmful risks can improve the quality of work and reduce the chances of work rejection. The same goes for quality management (Al-Maroof et al., 2022b, 2022a; Muhammad Turki Alshurideh et al., 2022b; Khan et al., 2022). Each deliverable must achieve the right level of quality to have a successful final product and avoid rejection of work (Abudaqa et al., 2021; E. Khatib et al., 2021). The quality assurance allows planning the right approach to attain the required level of quality, and quality control ensures avoiding mistakes before happening (similar to risk prioritizing and respond) (M. T. Alshurideh et al., 2023c). The table below further
illustrates how the risk and quality are correlated.

Table 1: Possible Risks From Quality Requirements

Building a Wooden chair				
Risk 1: Get cheated by the wood supplier (wrong type of wood, infected wood, ..etc.).	To avoid →	Buy the wood from an authorized dealer who has a good market reputation.	To meet ←	Quality Requirement 1: Type of wood is solid cherry wood.
Risk 2: Damaging the wood while transferring.	To avoid →	Use a wood specialized delivery company to deliver the wood.	To meet ←	Quality Requirement 2: The wood must be transferred in an appropriate environment to prevent any possible damage.
Risk 3: Damaging the wood while storing.	To avoid →	Store the wood in the right conditions (temperature, humidity, …etc.).	To meet ←	Quality Requirement 3: The wood must be stored in an appropriate environment to prevent any possible damage.
Risk 4: Damaging the wood operating.	To avoid →	Choose the right machinery to use to build the chair, as well as the right level of labor expertise.	To meet ←	Quality Requirement 4: The final product must meet the agreed-upon design.

The table above shows how we can identify possible risks from quality requirements and vice versa. It also show how addressing a possible risk can achieve a quality requirement (Kurdi et al.,

2022; Nuseir et al., 2021).

2.3. Project Quality Management Methods and Approaches to Handle Risk

(Nuseir and Aljumah, 2022) talks about how quality is subjective and can vary from person to person (Varma et al., 2023; Yasir et al., 2022). Hence it is essential to look into what quality means to the majority of the people while managing a product or a service (Akour et al., 2021; R. S. Al-Maroof et al., 2021a). The majority viewpoint will give the decision-makers several aspects of the product, which are deemed necessary by the customers (Ahmad Ibrahim Aljumah et al., 2022b; Arshad et al., 2023; Nuseir, 2020).

Similar to (M. El Khatib et al., 2022b; Mubeen et al., 2022; Nuseir, 2021) has also talked about quality and how industries can make the most of it. He has focussed on how the quality management processes need to be active and efficient to complete several projects under a stipulated time frame and a fixed budget (Abudaqa et al., 2022; Ahmed and Nabeel Al Amiri, 2022; Aljumah et al., 2020; Gulseven and Ahmed, 2022; Sakkthivel et al., 2022). Most of the quality management processes are on paper, which makes them very time consuming and inefficient (R. S. Al-Maroof et al., 2021b; T M Ghazal et al., 2023c). Therefore, the author suggests the use of BIM-cloud and BIM 360 cloud software to boost up the quality management processes and make them more efficient (A. Al-Maroof et al., 2021; A I Aljumah et al., 2022a; Alzoubi et al., 2021).

The relationship between quality management processes and inter-organizational processes was studied by in their paper on the same. Most of the studies prove an inconsistent result about the relationship between the two. However, a few studied still show some contextual factors which exist between quality management processes and inter-organizational processes (Blooshi et al., 2023; T M Ghazal et al., 2023b; Taher M. Ghazal et al., 2023). Most of the organization involve external participants while conducting their quality management processes to ensure fair and neutral results of the same (Alshurideh et al., 2020; Alzoubi and Ahmed, 2019; Alzoubi et al., 2019).

- Approaches to Handle Risk

Cloud computing is proven to be an advantage to the users of data storage and much helps for risk assessment and handling approaches. The authors (Ahmed et al., 2022; H. M. Alzoubi et al., 2022d; Gaytan et al., 2023) have talked about how cloud services have helped risk assessment and management in data science. Traditional access control is not risk-based, which might cause problems for several users.

(Dr. Mounir M El Khatib, 2015)have also talked about the approaches to handle risks in the cloud computing industry. The authors have reviewed extensive literature on the increasing use of cloud computing and the various approaches taken to handle risks. They have also synthesised an integrated model which executes the risk management plan to undertake while innovating the cloud services.

On the contrary, (M T Alshurideh et al., 2022; M T Nuseir et al., 2022b) have focussed on the risk assessment management one has to take care of while content curation and presenting themselves online (H. Alzoubi et al., 2022; Ghazal et al., 2021). They have talked about the dark side of social media and given tips on how to make your content curation and online presence safer for themselves and their users (Muhammad Turki Alshurideh et al., 2022a, 2022c; T M Ghazal et al., 2023a).

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2.4. Critical Success Factors (CSF) and Key Deficiency Factors (KDF) in Project Quality Management Risk Handling

The critical success factors of any project refer to the factors that influence and promote the success of any project. These critical success factors are significant to consider while assessing the risk management and quality management of any project. (M. T. Alshurideh et al., 2023d; E Tariq et al., 2022; Emad Tariq et al., 2022) have discussed the CSFs in construction projects in their study. Forty-Two success factors were recognized with the help of factor analysis (Ahmad Ibrahim Aljumah et al., 2022a). The research was focussed on the construction projects in Nigeria, and all the success factors have been analyzed based on the categories in which these projects were divided.

(H. M. Alzoubi et al., 2022a) have emphasized upon the use of BIM technologies in the quality management in the higher processes of design, construction, and operations. They have talked about the role of the BIM technologies in the quality control management and the improvement of the safety of the buildings (Farrukh et al., 2023; M. El

Khatib et al., 2021; Nuseir and Elrefae, 2022). The authors have reviewed several examples which show the success use of this technology and promote the same to other professionals in the field (M. Alshurideh et al., 2023; Gulseven and Ahmed, 2022; Nadzri et al., 2023).

(Akour et al., 2023; I. Akour et al., 2022; Bawaneh et al., 2023; Louzi et al., 2022a) have talked about the critical success factors of the public participation in the urban renewal projects. They have discussed as to which elements make the general public to participate in the decision-making process of the urban renewal projects (Khatib and Opulencia, 2015). The factors which ranked the highest were (i) the clarity of information disclosure (ii) timely responses to public inquiries (iii) necessary avenues and equipment (iv) diversity in the ways of disclosing information and (v) results in the presentation

(Almasaeid et al., 2022; H. M. Alzoubi et al., 2022e; Dr. Mounir M. El Khatib, 2015; Nuseir et al., 2020) have talked about the importance of Building Information Modelling (BIM) similar to the study conducted by . They talked about how having BIM will increase efficiency and integrates the processes in any project (Aityassine et al., 2022; Al-Awamleh et al., 2022; H. M. Alzoubi et al., 2022g; Nuseira and Aljumahb, 2020). The authors conducted a quantitative study with ninety-six respondents, and the respondents consisted of both public and private sector participants. The investigation was concluded by the drawing out of 16 CSFs of the use of BMI in any sector.

3. METHODOLOGY

3.1. Selecting the Right Model and Approach

Selecting the right model to build the research is one of the vital things to success in getting your goal of the research. By starting to identify the issue which we as group discuss with our instructor to get the approval.

At this point we started analyzing to get more details then we designed the approach to get our project complete by developing the interview methods and type of communication and the questions with its form finally we implemented the research and in each step we had to evaluate the outcome and the progress.

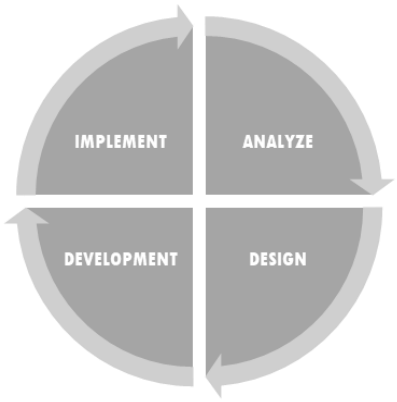

Figure 1: Quality Management

Selecting the right model for the research we are conducting had to go through some research itself where we had to identify the main approaches of the research and its goal to understand more how to illustrate on our research between risk management and quality management integration (El Khatib et al., 2020a). So we started with naming the main approaches as it follows:

- Quantitative
- Qualitative
- Pragmatic
- Advocacy/participatory

Quantitative research is the gathering of numerical data in order to use it for a statistical conclusion that will give some calculated insights.

In the process it would show that conducting the research would have one or more hypotheses to study and due to that an action plan will be provided. This will require data gathering primary or secondary that will give an outcome in a quantitative approach.

Therefore, this approach helps in controlling the emotional interfere of the research that it does not involve any feeling due to the facts that comes as numerical form and its known as top bottom approach.

On the other hand, the qualitative approach where it relays on the data gathering from experience or knowledge that does not require any numbers also it helps on understanding the uncalculated ways of researching in the same approach and it has many ways that in our research will rely on as it will come furthermore. This approach build itself bottom up reasoning deductive to understand the detail of in how it comes to conclusion so it does not move in one direction its move flexible in collecting the data

and in the same time it does not need a large number of people to participate due to the interview approach in the qualitative approach.
Also one of the approaches is Pragmatic approach to research which will mix different ways of the research in a scientific approach that will be accumulated towed the goals of the research.
Here the interview would not be individual it will be a group interview or focus group that will analysis the fact with the research by using sources of variety data, diversity of researchers, many perspectives to conclusion and multiple studies to research problem.
One last approach in our study is the Advocacy or the participatory approach to research which focuses on calling specific individuals with in same category to identify outcomes at the same analysis research that would be conducted on the same group.

3.2. Case Demonstration

- Maintenance Department in Dubai Municipality.
- Abu Dhabi Water & Electricity Authority (ADWEA)/ Now Department of Energy (DoE).
- DUBAI SOUTH.

Interview is a technic that allows to get some answers to gather data which has many methods and types such as:

3.3. Three methods

- Structured interviews
- Unstructured Interviews
- Semi-structured interviews

Structured interviews are questions that organized in a systematic order same questions different answer to maintaining uniformity. It comes as open end questions which gives more detail or as close end questions that direct to an aimed understanding.

3.3.1. Advantages

- accuracy of the responses.
- Analyze collectively.
- Large target sample.
- Easier for the interview.
- The bigger the scope the accurate the result.
- Faster the implementation of the result.

3.3.2. Disadvantages

- Limits to the scope of the result.
- Accuracy of the information outcome the details.
- The limitation of the researchers.
- Longer time for the interviews.

Unstructured interviews are informal and untrusted method gathering the information. Also the format of the questions does not help to have clear insights any result find can go side way in some researches with unstructured method.

3.3.3. Advantages

- Friendly insights.
- Deep explanation.
- Flexibly of the answers.

3.3.4. Disadvantages:

- Longer time.
- Less trusted of the result.

Semi-structured interviews are mix between structured and unstructured interviews it uses the same technic preparing the questions at the same time it can add some questions within the interviews to get more insights and understanding.

3.3.5. Advantages

- More time due to the questions prepared previously.
- Somehow flexible.
- Trusted information.
- Flexible structure.

3.4. Four Types:

- Personal
- Telephonic
- Email
- web page

3.4.1. Disadvantages:

- Trust can be questioned.
- Hard to unify information.

Personal interviews: It's the most common type face to face meetings, the questions can be prepared ahead and the researcher can get some emotional insights by the body language and the voice tune to add the comment to the highlights within the interview.

3.4.2. Advantages:

- Higher interactive to the interview.
- Clear questions and answers to be understandable.
- Body language.

3.4.3. Disadvantages:

- ✓ Needs more time.
- ✓ Costly.

- ✓ Due to the awareness of the interviewer they tend to be dishonest.

Telephonic Interviews**:** It's very common in the advertisement company or for sale that can easily show an insight.

3.4.4. Advantages:

- Easy to target.
- Cheaper.
- Faster to gather information.
- Can be used for more explanation.

3.4.5. Disadvantages:

- ✓ Many interviewers tend to avoid participating.
- ✓ Less control.
- ✓ Vitality of communication.

Email and web page interview: It's the most common on the world due to the shift of lifestyle towered information technology in a mass movement this makes the scope gets bigger because of the advance services that gives more insights to understand the trends.

3.4.6. Advantages:

- Faster to get the data.
- Flexible of the respond time.
- Merge the research with the trends.
- Can use many ways to answer.

3.4.7. Disadvantages:

- No limitation to personal life.
- Too often to conduct.

Our approach in this project is qualitative due to our research would focus on interviewing some of the key project management that will give us some of the insights regarding risk management and quality management integration and its value according to the institutions that they work in and its effects on their projects, so by using Structured interviews method with an open end questions where the interviewers can answer openly, also we had to use the four types due to pandemic of corona virus so we did a personal interview on cam which did not allow as to analyze the body language on the same time the answers were given through the email and telephonic were made for illustrate on some of the questions and answers.

3.5. Case Assessment, Analysis, and Judgement

The objective of the study is developing a framework on the correlation between project risk and quality management to achieve better results in organizations. Risk management is a necessary process when undertaking any project. Based on the interviews conducted, Salim Zid (Senior Civil Engineer, Dubai Municipality) and all participants agreed on the ideology that risk management involves a method of identification, exploration, and response to risks within any project. Often, the knowledge of the relationship between projects and threat management is a systemic process. The process includes the identification of risks, assessment, response development, and implementation of a mitigation and contingency plan. The purpose of risk management is to ensure that project output is maintained and organizational culture factors, including teamwork, are promoted (I. A. Akour et al., 2022). An interview from participants of Dubai South gave a more elaborate answer regarding risk management. In their perception, risk management can only be beneficial if compounding questions are asked about a project (M. El Khatib et al., 2022a).

The participant openly explained that quality is subjective and that it is not defined by one single entity. It can include tasks and deliverables. Other participants regarded quality as critical to teamwork and incorporation of the interests of stakeholders. Nevertheless, according to Durga Devi, in any project, the impression of project risk administration and achievement of success requires a quality control check that ensures that members and tasks are well coordinated.

Quality and risk management are often integrated within any organization's project. Participants indicated that risk management and the quality of a project are interlinked. A risk is defined as an ambiguous occurrence that can affect the success of a project. Risks, as such, can occur from different perspectives. According to Salim Zid, risk can be an opportunity. From the researcher's point of view, an opportunity may be argumentative based on the results of the study. Regardless of whether it is defined as an opportunity or problem, quality implies the use of management protocols that safeguard the tasks, individuals, and variables of the project from sabotage. For instance, illuminated that the process of risk management is crucial to handling any risk and finding the best solution to deal with the risks both in the short-term and long-term purposes. His opinion was similar to all other participants' positions. An

example of a risk management protocol is the PDCA cycle, which entails the identification of risks, potential sources of the risk, and pre-emptive solutions.

The study also investigated the integration concept of quality against risk. In particular, the interviews needed a professional perspective about risk integration. All participants seemed to agree on the integration of risks as a natural concept. However, the participant from Dubai South provided a coherent explanation as to why it can be difficult sometimes for companies to handle risk and realize quality at the same time. The information retrieved explains that quality is a differential concept within a business. In most organizations, different departments manage various risks.

The way each department mitigates the risks presents a unique problem of what quality entails. A silo-type of management for risks exists, which may explain why companies often find themselves in trouble over matters that they could have handled through different lenses. The research investigated the impact of training workers and its impact on risk and quality management for organizations. One interviewee (Dubai South) indicated that training is not a significant concern with regard to quality and risk management. In support, all participants agreed that training cannot be categorized as a risk in risk management and quality assurance. In fact, it is a beneficial component in ensuring that employees understand the idea of risk and how to manage it. In their view, it improved the integration of risk management, including the set of practices and processes used in handling risks. Similarly, the other two agreed that training could never be a hindrance to risk management.

However, quality management and risk management often result in minimal achievements in projects within businesses. The interviewer was interested to know why that was the case. From a professional perspective, the participants suggested that companies rely on individualized documentation on quality as well as risk management. Theories, on the other hand, recommend the use of one source documentation. The participants agreed on this premise, suggesting that it prevents over documentations, limits obsolete documents, and improve on risk management protocols, systems, and criteria. Therefore, the participants agreed that it is necessary for companies to have individualized risk management systems. To achieve this, companies should have specific critical success factors and parameters . These parameters include communication, adequate project control, resources, teamwork, and realistic time and cost estimates. Durga Devi suggested the inclusion of all employees at all levels in risk and quality management. Knowledge of specific key factors is dependent on the organization, as seen in the data retrieved, including skills, communication, teamwork, planning, and execution process.

In general, the participants appeared to be knowledgeable based on their perception of risk and quality management. However, based on the industry or sector of employment, each participant was proficient in their fields. Therefore, they offered similar positions but had differing ideologies.

4. RESEARCH LIMITATIONS AND RECOMMENDATIONS

The limitation of the research is the sample size. The objective of the study was to understand how project risk and quality management are interlinked. The reliability and credibility of the study would have been optimum if the researcher focused on concepts of the across numerous organizations to provide specific views on the goals of the study. The maim challenge in this research is arranging interviews with people due to lock down imposed by UAE government because of Corona Virus. In recent days, many organizations start to implement working from home strategy so arranging interviews was so difficult. Time management is one of the main challenges in this research. The research shall be completed with one month and half which is a short period. To overcome this challenge, effective plan and work load distribution among team members was placed in order to compete the research before the deadline date.

Nonetheless, the project was a success. However, given the scope of the study, recommendations are necessary to improve research information. An exploitative study that focuses on each firm and its perspective on risk and quality management based on its project performance is recommended. If a quantitative data analysis can be provided, this would improve the information relayed by the participants. Also, it is recommended that the

researcher refine the interview questions that focus on the example of risk management in these organizations and how they are mitigated according to theoretical analysis and practical system integration. Such knowledge will significantly impact the analysis of the correlation between risk and quality management from both standpoints.

5. CONCLUSION

There is an invisible line between risk management and quality management when it comes to integration there where many managements get lost to manage their projects on a strategic level, it all maters when budget and scope to be met.

At the same time with the realty of the project history due to the failures of the most project, therefore quality management is a most to control risk.

It's all start with strategic analysis from SWOT to get a full understanding of the gaps and the uncertainty to be discovered and action plan was ready to manage it in the right time.

So by planning and interviewing we got to an understanding to which level the integration was synchronized to enhance the deliverable.

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Appendix

Dubai Municipality

- **How can risk management increase the success rate of a project?**

Proactive is considered eminent rather than being reactive. Identifying risks for a project means, possibilities of failure is known, assessed, and we have counter measure to overcome in case if the risk arises.

When we have clear treatment measures to treat the risk, why not take risk?

If the same or similar project is already completed by someone, lessons learnt can be shared. If a project is not attempted by anyone, with known treatment measures, its good to attempt the project.

Therefore risk management increase the success rate of any project irrespective if this is new or already attempted.

- **How can quality management increase the success rate of a project?**

Quality management means, quality in total. Needless to say, systematic procedures and assurance process laid fortune for businesses example: Blue chip companies. Process and procedures streamlines the activities in a structured day (best way) which minimizes failures, or we know what we have to do, when failure occurs. If things prolong in a structured way, it would also become a culture of doing things in a best way. When we do the best way, we get the best results. Success rate is most certain.

- **Do you think that we use the correlation between risk and quality management to enhance the success rate of a project further? How?**

All process and procedures must be in place to overcome risk and enhance success rate of a project. If a process or procedure is not correlated with identified risks, then the process or procedure is redundant and does not add value to it.

- **Do you think that integrating risk with quality is difficult? Why? If yes, how to make it less difficult?**

Yes. It is not easy to integrate the risk based thinking. It is 'culture' that makes it difficult. Culture is fostered by 'people'. When people understand and stand together, integration is easy. This would require imparting right information in the form of training in effective way.

- **When adopting a new approach, training can hinder or delay the success of the approach, will training do the same if risk and quality were to be integrated? Why?**

Training alone is not sufficient. Risk and quality is integrated in order to facilitate the process. A newly trained personnel would still have fear during execution, because it is done for the first time. But if the risk and quality is integrated, personnel would know what should be done in case of failures and therefore, he or she would be more confident and not worrying about executing a task even if it's for the first time.

- **Many theories suggested that one of the short comes in risk management and quality management is excessive documentation. To overcome this issue, some researchers suggested that the combination of risk and quality management can reduce the documentation. Do you agree or disagree? Why?**

People think excessive documentation because it is difficult to memorize and remember everything written on a procedure. Many at times, procedures require to rehearse again and again so it sticks to a person's memory and culture. Also when a procedure is documented, people think what is good or best way to do this. But when they actually do it may or it may not be good. This changes the practice on a long run, and different from what was documented. Combining risk and quality management and rehearsing procedures gives immense feeling that, procedures are more, but it is necessary.

- **One of the critical deficiencies in quality management and risk management is the rare update of the plan once approved, can the integration of risk and quality reduce this issue? How?**

If a plan is updated again and again, its not planned properly in the first place. All over the world, plan versus actual progress for any big project is 50-60%. This means most of the projects don't undergo as per the plan.

Integrating risk and quality minimizes the failure, and commensurate with contingencies therefore the delays are manageable and treated.

- **What are the CSF & KDF to judge a successful integration between the quality and risk?**

Following indicators are critical success factors:

- Risk prediction was good and contingencies worked well
- Risk based thinking integrated in to process and now it became a 'culture'
- Lessons learnt from previous failures were helpful to minimize failures in the project.
- Customers are happy, as the quality was good and never compromised.
- Project completed effectively and efficiently (timely, cost was under control)
- Sense of satisfaction with overall execution.

Dubai South

- **Can you introduce yourself and your role in your organization?**

I am working as Manager- Technical & Operations. My role is to provide training to professionals on project management, Quality management; Prepare training manuals, prepare and maintain necessary documentation for accreditation from certification bodies; provide support to marketing team on technical aspects.

- **How can risk management increase the success rate of a project?**

Identification and evaluation and planning for risks ensure schedule , budget are not affected and ensures customer satisfaction. It also helps in maintain the quality of output and ensure safety to team members.

- **How can quality management increase the success rate of a project?**

Reduces customer complaints, prevents defects and rework and thereby reduce non value added cost, failure costs. and helps to achieve profitability.

- **Do you think that we use the correlation**

between risk and quality management to enhance the success rate of a project further? How?

Yes. Implementation of right quality procedures, quality management system keeps product and process risks in check.

- **Do you think that integrating risk with quality is difficult? Why? If yes, how to make it less difficult?**

No. It is a natural integration.

- **When adopting a new approach, training can hinder or delay the success of the approach, will training do the same if risk and quality were to be integrated? Why?**

I do not see training as hindrance. Training is the first step for any transition would prepare the team in transition.

- **Many theories suggested that one of the short comes in risk management and quality management is excessive documentation. To overcome this issue, some researchers suggested that the combination of risk and quality management can reduce the documentation. Do you agree or disagree? Why?**

Yes .As Many quality documents also includes risk information such as failure modes, preventive and corrective actions, mitigation plan etc., integrating them may
decrease documentation.

- **One of the critical deficiencies in quality management and risk management is the rare update of the plan once approved, can the integration of risk and quality reduce this issue? How?**

Yes. To some extent. Reduced documentation would motivate team to update appropriately. But efficient document control system is important to keep documents to date.

- **What are the CSF & KDF to judge a successful integration between the quality and risk?**

Management commitment, sponsor support, training , effective documentation system, employee involvement at all levels

DoE

- **Can you brief us about your organization?**

Organization: Abu Dhabi Water & Electricity Authority (ADWEA)/ Now Department of Energy (DoE)

Company: Shuwiehat CMS IPC Privatized by Abu Dhabi Power Corporation, which is a subsidy company by ADPC, having 60 % shares for the government and 40% for the private company. It is the heart of the western region due to the essential role of power generation and water production which sold to the procurer in order to support the grid requirements and consumer demand.

- **How can risk management increase the success rate of a project?**

Having up to date procedures and work instructions that are being modified based on changes in the rules and policies can lead to being ready for any risk. The same has been discussed in regular meetings between the business Continuity management (BCM) committee members.

In addition, all the entities are being gathered in a unified platform having the risk register of very event or action. This risk register is being categorized from the highest risk to the lowest and the same is reflected in to the planned yearly capital and operating budgets.

- **How can quality management increase the success rate of a project?**

Planning the technical, engineering and financial aspects led to solid total quality management control without any counted significant deficiency. Finally, I have to say that Deming wheel played the main role to organize managing the risk via having the PDCA cycles and managing every single stage effectively.

Following and obtaining the necessary of ISO 9001 certificate requirements which is pertaining to quality and some ISO certificates pertaining to safety and environment for instance ISO 18001, 14001 & 45001. All the mentioned ISO certificate along with the renewal procedures followed have participated a big role in this success.

Finally, not only obtaining the certificates but also implementation of the same on every department, section and in all technical and admirative aspects.

- **Do you think that we use the correlation between risk and quality management to enhance the success rate of a project further? How?**

Well, yes indeed. Actually, both are integrated together in our management, in a way that all the risk management are elaborated in the emergency response plan and business continuity

management plan. On the other hand, quality management has a direct intervention on every step or procedure in engineering, technical, safety and financial control.

In another word, every clause in the obtained ISO certificates are being checked and audited twice, once internally by the employees and the second time by a third party. So we do correlate the current risk management procedure with the ISO requirements, once the auditing is done all the non-conformities are being gathered in order to put in place or to be modified as per the procedure. The same is done semi annually or sometimes directly upon any incidents or any findings.

- **Do you think that integrating risk with quality is difficult? Why? If yes, how to make it less difficult?**

Yes and no!

No if the risk is manageable within the available resources for instance the manpower, engineering tools and financial requirements. This is via following the predefined BCM plan and emergency response process.

Yes, if it is unpredictable risk (eg. Oil spell, red tide, war..etc) that has newly came to the power plant or even to the country. This unpredictable risk needs new procedures to be created and then amended into the company policy.

The way to make it less difficult is to rate the defined and predicted risks in to categories, high, moderate and low. The same to be ranked with records out of 5 or 10m and then to reflect the chances of any equipment failure in to the capital and operating budgets either in to a maintenance intervals or a full system replacement.

- **When adopting a new approach, training can hinder or delay the success of the approach, will training do the same if risk and quality were to be integrated? Why?**

Training is the only solution in case of adopting new approach, but it will not delay the success if it is in advance way and inline with the current agreed risk and quality integrated management requirements. The reason that it will not effect the success is that training can enhance awareness of the new approach and make the risk and quality management updated and aligned to the overall company vision, mission and objectives.

- **Many theories suggested that one of the short comes in risk management and quality management is excessive documentation. To overcome this issue, some researchers suggested that the combination of risk and quality management can reduce the documentation. Do you agree or disagree? Why?**

I do agree to some extent, as I believe that the procedures documentation has to be segregated between risk and quality management in order to go quickly to the desired clause in case of **obtaining ISO certificates and recertification purposes**. Even though, integration of the risk and quality can definitely reduce the documentation as every selected and followed step can lead to the right approach with the desired quality, in faster manner instead of going to 2 different documentations and **numerous forms to be filled**.

So to sum up, having such critical asset which is power sector, better to integrate both risk and quality in to one integrated document for less hassle, that can save time and efforts.

- **One of the critical deficiencies in quality management and risk management is the rare update of the plan once approved, can the integration of risk and quality reduce this issue? How?**

Yes it is possible as once the risk and quality managements are being integrated, it is mandatory to revise every single clause in both policies in order to be aligned together properly.

Although, this deficiency can be resolved in case of having yearly reviews, internal and external auditors, in which all the raised comments can be tackled and improved. These reviews and comments attendance to be done department and sections wise with counter checks by the departments' heads and managers.

- **What are the CSF & KDF to judge a successful integration between the quality and risk?**

The main key success factors to perform world class of high standard quality with high secure assets to ensure sustainability of power generation and water production for Abu Dhabi city are as follows:

1. Having a regulator, who states the policy and regulation based on UAE law, world health organisation and internationally

approved procedures, practices and work instructions. This regulator control all the companies starting for the generation companies, transmission till ended up to the distribution companies where all users benefit from the products (electricity and water).

2. Implementation, including auditing of the above-mentioned points are controlled by another power corporation to ensure that all are in line with the procedures.
3. Follow up of the above to ensure that all steps are in line with the international power and water purchase agreements are done by another additional entity which buys the power and water for the consumers.
4. All of the generation companies are having full security as the company that buys the product already signed agreements that there will be no interruption for the fuel sources during the agreement. In addition, the generation companies signed agreements to have suitable power generation and water production.
5. Additionally, all the companies signed agreements with insurance companies in order to claim any losses for all the assets in case of any catastrophic incidents.
6. All the security and safety related for the asset and employees are secured by another entity belong to the army and Abu Dhabi government.
7. Risk and crises management is also managed and coordinated between all the entities via another authority keen on managing, controlling and providing risk mitigation solutions.

KDF:

I'll not consider it deficiency as the return on investment of the entity is too high and never reduced at all from the time lunched till date. The demand of power and especially water has been dramatically increasing which is a true evident of having no deficiencies.

The following can be improved:

1. Reduced the number of entities to have the sector more focussed as these entities are keeping changing from time to another. Additionally some of the key employees and decision makers are keeping changing, but since the procedures and agreements remain the same that can be followed.
2. Emiratisation is a very difficult and complicated file that requires proactive steps to enhance work security via sustainability of power and water particularly during major crises when no expatriates exist in the country and the need will be for only UAE National to operate the power sector.
3. Moderate speed to synchronization for those different entities as every company wants to seek for maximum profit rates.
4. Sometimes every company willing to work independently, but they face the fact that they have certain important tools but still there are lack of other important tools that are available with other companies!

Lack of training centres dedicated for the employees to practice generation, transmission and distribu

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The Sustainability of TQM in an Innovative Environment: The Quality of Virtual Organization

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A B S T R A C T

This research study looks at application and sustainability of Total Quality Management in virtual organizations based on the ever-increasing number of virtual organizations in United Arab Emirates and internationally. TQM has been successfully implemented to enhance performance, profitability and sustainability of the traditional brick-and-mortar organizations. But can this implementation be replicated successfully in virtual workplaces:
This research reports have a background on the development of TQM and its relevance to both the brick-and-mortar as well as the virtual organizations. It lays down the objectives and hypotheses of the study. The hypotheses include determining how virtual organizations can improve and sustain performance and quality, establishing the TQM approach needed in virtual organization and determining how to measure the quality of the products and services of the virtual organization.
Further, the study reviews literature regarding TQM, organizational performance and virtual workplaces. It traces the genesis of the virtual organization in mid-1980s and its development to today, with a focus on the advantages and disadvantages. The research method is laid out.
Finally, the research report discusses the findings, making recommendations on how to ensure sustainability of TQM in virtual workplaces. There is a list of references at the end.

1. INTRODUCTION

Many organizations are using Total Quality Management (TQM) to improve structures, processes and performance. Moreover, innovation has become crucial for organizations wishing to enhance needs fulfillment, customer satisfaction and profitability (Prajogo and Brown, 2006). In light of this, the United Arab Emirates has set itself the target to be one of the top innovating countries by the time of its jubilee in 2021 through the National Innovation Strategy (Revere, L. & Black, 2003). While achieving higher organizational performance through innovation is important, more important is sustaining the positive outcomes (Alsughayir, 2016). This is where TQM becomes important since it enables sustenance and continuous improvement of the good outcomes. With organizations evolving through innovation, there are now many organizations that have adopted the virtual environment so as to improve performance through more efficiency and bigger target market (Ittner and Larcker, 1995). Some retain their brick-and-mortar status whilst

incorporating the virtual environment whereas others are totally virtual workplaces. But can these partial or completely virtual workplaces embrace TQM to improve and sustain performance? This research will look at the role and sustainability of TQM for improved performance in an innovative environment with a focus on the virtual workplace (Munizu, 2013).

Founded on the economic turmoil of the Western world (also referred to as the Great Depression) in the 1920s that led to statistical quality control, TQM was consequently a result of these countries' efforts to optimize quality within organizations. Japan upped the game in the 1940s when it invited various quality control gurus such as Deming, Juran and Feigenbaum to improve the quality of its hitherto shoddy imitations (Abbas, 2020). This led to rapid development of quality control and management leading to the subsequent commencement of quality circles in the 1960s. The quality circles were volunteer worker groups that looked at how to improve various aspects of an organization, making recommendations to the management (Hoang et al., 2006). Quality circles gave rise to employee motivation and total quality to encompass quality of all aspects of an organization rather than just product quality. The initiatives led to high quality products and services from Japan (Siam et al., 2012).

To counter this, Western countries evolved the Japanese concept to TQM to cover strategies, programs and techniques focused on quality. This involved quality management, employee involvement, continuous improvement and focus on the customer (Ellitan and Dihardjo, 2021). TQM reached its zenith in the 1980s and 1990s, but has since being overshadowed by ISO 9000, Lean manufacturing and Six Sigma. Nonetheless, the enduring strength of TQM, that is now also referred to as business excellence, is its fluidity to suit the quality needs of an organization or environment with a focus on customer satisfaction (Ehsan et al., 2022). Moreover, modern TQM, Lean manufacturing and Six Sigma have similar tools and techniques and also share significant parts of their philosophies. There are various awards globally aimed at adoption of quality management principles as espoused by TQM.

The fluidity of TQM renders itself to innovative environments. One of the major innovations in the recent past is the evolvement of the workplace to embrace the virtual workplace. There are now virtual organizations that exist in the cloud rather than the traditional brick-and-mortar organizations (Aityassine et al., 2022; R. S. Al-Maroof et al., 2021a; H. Alzoubi et al., 2022; Mubeen et al., 2022). Some of the best-performing organizations worldwide are a hybrid of virtual and brick-and-mortar organizations; including such companies like Microsoft, Amazon and Facebook (A I Aljumah et al., 2022a; E. Khatib et al., 2021; M T Nuseir et al., 2022a). Moreover, it has been noted that virtual workers are more productive and more loyal to a company than office-bound worker (M. Alshurideh et al., 2023; Alzoubi and Ahmed, 2019; Blooshi et al., 2023; Khan et al., 2022).

Virtual organizations are a relatively recent innovation that is increasingly gaining prominence worldwide. Having started in the 1990s with the worldwide spread and use of internet, they have gained traction with the innovation and use of cloud computing over the past ten years (Ahmed and Nabeel Al Amiri, 2022; H. M. Alzoubi et al., 2022c, 2022b). Innovation of virtual organizations renders itself to the need for a new approach of management, employee relations and customer focus in organizations (Abudaqa et al., 2021; Aziz et al., 2023). TQM comes into its own in such an innovative environment since it consists of efforts by the entire organization to continuously improve the quality of the organization's products and services by enhancing processes, procedures and performance (AlDhaheri et al., 2023; M. T. Alshurideh et al., 2023a; Farrukh et al., 2023; Gaytan et al., 2023; Khatib et al., 2022b).

1.1. Objectives

In an environment where most organizations are adopting the virtual workplace, the objectives of this research are to:

- Introduce the concept of virtual organizations.
- Study the difference between implementation of TQM and concomitant performance in the traditional brick-and-mortar organizations and the virtual organizations.
- Establish suitable model to enhance and or sustain high quality in virtual organizations.

1.2. Hypothesis

This research study will look at whether classical TQM applies to the virtual organization. Specifically, it will answer the following questions:

1) How can virtual organizations improve and sustain performance and quality?
2) Does the virtual organization need the same classical TQM approach as the brick-and-mortar organization?
3) How do we measure the quality of the products and services of the virtual organization in an ever innovative and competitive global environment?

2. LITERATURE REVIEW

Since 1994, many organizations have adopted innovation into their processes and ways of performing work (El Khatib et al., 2019; Nuseir et al., 2020; Nuseira and Aljumahb, 2020). The innovation has resulted to most organizations adopting internet technology with many becoming web-based organizations (Al-Kassem et al., 2013; M. El Khatib et al., 2021; Nuseir and Elrefae, 2022). Nowadays, there are a lot of opportunities that allow the organizations to adjust their work scope and services according to the customer demand. With the rapid improvement and transformation in technology, it's even easier now (Abudaqa et al., 2022; M T Alshurideh et al., 2022; Lee et al., 2023; Yasir et al., 2022). Especially, after the development of what is known as the virtual organizations that have been widely recognized and linked with innovation (T M Ghazal et al., 2023a; Louzi et al., 2022a).

The term "virtual organization" was first used in 1986 (M. T. Alshurideh et al., 2023b; H. M. Alzoubi et al., 2022h). Since that time, a lot of researches have been conducted on this type of online organizations and how they can create a revolution in the 21stcentury (Nadzri et al., 2023). Many people have defined virtual organizations in different ways, using different terms and expressions. Some have defined it as the form of dynamic collaboration of usually legally independent partners (M. T. Alshurideh et al., 2023d; H. M. Alzoubi et al., 2022g; Arshad et al., 2023). Another definition is that virtual organizations are the communities, establishments, institutions or clubs' institutions that are created by totally or partially communication technologies; they are connected to cable-laid or wireless systems (I. A. Akour et al., 2022; H. M. Alzoubi et al., 2022e; Bawaneh et al., 2023; Nuseir et al., 2021; E Tariq et al., 2022). Others yet view virtual organizations as being far from the central attribute communities, and constituting of those workers who do not have to work in the same area, and they are in the process of a product or service of different firms, by using the computer and communication systems all the time and service its customers as if the organization is a body (Aljumah et al., 2021a; Alshawabkeh et al., 2021; Alzoubi et al., 2019; Khatib, 2022). Most other definitions have the same concept that virtual organizations are those organizations that contain employees that can-do things without the need of premises through the use of online technology (Akour et al., 2023; Ahmad Ibrahim Aljumah et al., 2022a; El Khatib and Ahmed, 2020).

When this term firstly occurred, a lot of business owners and managers thought about moving to a virtual type of organization instead of just having brick-and-mortar organization (Ahmad Ibrahim Aljumah et al., 2022b; H. M. Alzoubi et al., 2022a; Khatib et al., 2016). Some of the reason behind this was that many managers thought that by converting to a virtual organization they will access a wider range of specialties, reduce bad performance by choosing better and cheaper alternatives, reduce overheads in organizations by removing inefficient internal services and show an integrated face for better superior corporate buyers (Al-Kassem et al., 2012; A. Al-Maroof et al., 2021; Nuseir and Aljumah, 2020; Emad Tariq et al., 2022).

As per (A I Aljumah et al., 2022b; El Khatib et al., 2020b), the virtual organization's lifecycle consists of 4 different periods: identification, formation, operation and termination. In the first period, the organization starts identifying the opportunities and they communicate those opportunities to other organizations (Ahmed et al., 2022; I. Akour et al., 2022; Ghazal et al., 2021; Mat Som and Kassem, 2013). In the second period of formation, they divide the role of each organization in the process of delivering the services after setting the opportunities. The third period of operation involves everyone working to achieve the common set targets, while the last period of termination is where the final report orproject is completed and it is ready to be sent out or delivered to the right

person (Al-Dmour et al., 2023; Al-Kassem et al., 2013; Almasaeid et al., 2022; T M Ghazal et al., 2023c; Sakkthivel et al., 2022).

Although this type of technologies adds a lot of improvements to the typical work environment, it is similar to any other technology. Nonetheless it has some advantages and disadvantages. And basically, we can summarize advantages in the following points (Muhammad Turki Alshurideh et al., 2022b; Varma et al., 2023).

- Overcoming any barriers related to the area and boundaries, where work can be done in any place such us home or onboard.
- Since the virtual organizations are much smaller than the normal organizations, the response will be faster and the work will be done in a better manner and in a flexible way.
- The employee's level might be better since there is no strict rules and limitation when it comes to the working hours, especially that the employees mainly will feel more comfortable dealing with people behind the screen (Al-Kassem, 2014).
- Improve the global interaction with other companies which allows the organization to have a better focus and good improvement opportunities from previous mistakes.
- Employees feel more comfortable since they don't have to appear formal to people (customers) that they deal with (Muhammad Turki Alshurideh et al., 2022a; H. M. Alzoubi et al., 2022f; El Khatib and Opulencia, 2015; Taher M. Ghazal et al., 2023; Nuseir, 2020).
- Costs are reduced.

Moreover, some other researchers have summarized the advantages of the virtual organizations into three main advantages: adaptability and flexibility, dependence on federation and temporal and spatial independence (Mohammed T. Nuseir et al., 2022).

And when it comes to the disadvantages, the following are the disadvantages of the virtual organizations (Al-Maroof et al., 2022b; Aljumah et al., 2023; H. M. Alzoubi et al., 2022d; Gulseven and Ahmed, 2022; Khatib et al., 2022a):

- Self-control is a must in similar organizations, where each employee should control his/her own work.
- Not having a good consequence to maximize the interest between the departments, and that might create some sort of conflicts between the individuals which makes the virtual organizations not capable of handling conflicts.
- This kind of organizations are built on trust, so basically if the customer lost the interest or did not trust the company he/she will not bring repeat business to the company (Al-Kassem, 2017; Nuseir, 2021).
- Not having a good connection to the internet, depending on the area.
- The risk of being joined with an incompetent organization.

Where other researchers said that the disadvantages of the virtual organizations (H. Alzoubi et al., 2020; Amiri et al., 2020), it's not a real disadvantage but it creates some limitation to the proper work delivery process and that because of the lack of physical equipment and incomplete knowledge communication (M. Alshurideh et al., 2022; Muhammad Turki Alshurideh et al., 2022c; Hani Al-Kassem, 2021).

If we looked at the virtual organizations as a system or a work flow, it should be delivered at the highest level of quality to meet the customer expectation (Akour et al., 2021; Alzoubi, H MAlhamad et al., 2021). After viewing the overall process of virtual organizations and after studying the characteristics we can say that the following are the main problems that might occur in terms of quality:

- Efficiency problems.
- Product design problems.
- Process design problems.

From here we can stress on how important is the quality management. Mainly training is as important as quality management specially in such an organization but, training can lead to the organization management specially if it was done through a role play simulation where the owner or the quality team study how the employees react in different situations or different scenarios (H. M. Alzoubi et al., 2020). Also, that will help in detecting the very minor issues that might destroy the organization image, and it will keep a record of all possible errors in order to avoid its re-occurrence. Accordingly, we can say that related organizational

skills are the greatest source of information that provides a really good advantage (Aljumah et al., 2021b). A complex process such as the quality management concept role play is very important to any organization moving toward being a virtual organization, because this will keep the same set of quality kit that the organization used in order to ensure quality in the first place but, things will be added to suit the new concept of the organization (El Khatib et al., 2021, 2020a; Kassem and Martinez, 2022; Nuseir and Aljumah, 2022). Generally, to ensure and sustain the quality of a virtual organization is not easy. The challenge is in how can the organization instill a good quality management approach into the organization and that will be linked to a good model of communication since it is all about having a proper communication to success (R. S. Al-Maroof et al., 2021b; El Khatib and Ahmed, 2018). The reacting changes in activities or tasks when organizations are converting to a virtual origination should be quick and flexible (Al-Awamleh et al., 2022; El Khatib, 2015). Therefore, there is a set of features that aims to create a kind of quick respond to the environmental changes when it comes to the virtual organizations (Al-Kassem et al., 2022; Muhammad Turki Alshurideh et al., 2022d; Louzi et al., 2022b). And those features are: timeline of tasks execution, geographical dispersion, having a client-oriented organization, intensive use of information technology, creates a good network system that suite the nature of virtual organizations, using the key competencies of the participants (Al-Maroof et al., 2022a; Aljumah et al., 2020; M. T. Alshurideh et al., 2023c; El Khatib and Ahmed, 2019; M T Nuseir et al., 2022b).

Additionally, a lot of research has shown that impact of virtual organization comparing to the real organization is more effective in many aspects such as reliability, performance, satisfaction and organization effectiveness (T M Ghazal et al., 2023b).

3. RESEARCH METHOD

Usually, moving to the virtual organization after using the traditional organization process is not easy. A lot of organizations before they convert to the virtual organization think about the general image of their unit. What really motivate them is very important because otherwise they won't think about moving to the virtual organization. Therefore, this research is to study the virtual organizations from a quality prospective, and to know how can the quality level would sustain the same or improve after converting to the virtual organization.

This research will also give as a brief introduction to this kind or organizations, and how do people manage it. And all of that will be done using a Retrospective method, were we will review some previous researches to have a wider look about this topic also to prove and conclude the virtual organizations way of management and quality improvement or sustainability. Data are collected from previous studies and academic reliable sources, where researchers either introduce this concept or new technology or they show some examples of what have been used or managed previously on the same topic.

Table 1: Comaprison between Traditional and Virtual Organization

4. DISCUSSIONS

Moving toward a virtual organization is not a negative step if it was along with the improvement of the organization itself. But, insuring the quality of the services is very important as well. Regarding the quality of the process, the quality management team should address the objectives of such an initiative. Not only when it comes to the enterprise network but, they should go beyond the statistics focusing on what can really happen, in those organizations. Therefore, an advance quality practices should be there to upgrade the organization from a firm-center that was focusing on the product, to an inter-organizational prospective that focus on communication and how do things, got understood. In the table below, there is a comparison between the traditional organization verses the virtual organization that studies those two organizations from different aspects, which will allow us to know more clearly the differences between these two types of organizations:

Comparison points	Traditional Organizations	Virtual organizations
Premises	It has its own available premises.	Boundary- less organization that delivers it

		services online.
Employees	- Departmentalized and follow the chain of command. - Each employee has his/her own job description. - Stick to their work requirements. - No space for quick improvement. - Job oriented organization.	- Flexible working hours and they can work from any place. - Focus on teamwork. - Employees are required to continuously upgrade their knowledge. - High employee morale
Reporting system	The head of department report to the manager.	Sharing experiences, system-based reports.
The system	- Very hierarchical, organized and disciplined. - Each department follows its own set of regulations. - Strictly follows the business strategy. - Goals are settled a head of time, and it's very hard to change. - Fixed, inflexible and planned - More into paper-based work type.	- An innovative system, that suits the current organization requirements. - Accept new challenges. - Diversity and connectivity of activities. - Focus on understanding and listening." Soft skills " - Taking the teal along with you no matters in which level you are. - More flexible and it's all about communication. - More technology based.
Stability	More stable activities and progress	More dynamic in dealing with multiple tasks.
Hierarchy	Tall hierarchy	Flat hierarchy
Risk management	Maintain a specific policy to protect any kind of risk.	Employees are trained, and they are willing to take any challenge they might face.
Diversification	Less diversity and the workflow maintain the same traditional process.	More diversity is there, where thy keep having some modifications and rescheduling.

To the success of the virtual organization, three activities are required. The first activity is the networking, which is can be done through using the Information and communication technologies. That will help in increasing the relation between employees and also it will eliminate the geographical bounders. And that will create a good virtual space through the internet using whether it was between employees, customers or other organizations. The second activity is the restructuring, which can be achieved through using the networking opportunities to create a complex organization that offers a good cost and operational flexibility. This activity may include changing in the horizontal coordination, organizational unit and changes in changes control processes. And that might affect the organizational performance negatively or positively depending on how do they really apply the changes to the organization. Also, it depends on to which level they understand their organization. The last activity will be the, learning organization. In this activity, knowledge will be shared with people from same organization internally and any other external organizations. Sharing knowledge and learning is mandatory in any virtual organization, especially that they don't deal with customers or other organizations physically. But, they do communicate a lot through the internet "boundary-less" system. Although, those who convert their work organization type to a virtual one like to depends on a totally new trend in term of processes but, in this activity, they might need to refer to the traditional members selection processes and rewording system to insure the quality of the performance (J. Hemingway, C. and Breu, K. (2003). Finally, we can say that managers or business owners can't decide to move to the virtual organization before checking on what cans this new form of organizations adds to them. Therefore, organizational tasks should be a top priority to them. Managers and business owners can check the organization nature and type of tasks whether it can be converted to a virtual process or it is necessary to be achieved through the traditional process? Also, checking on how capable are the

organization employees of dealing with the same tasks through a virtual system is very important to insure and sustain a good quality level of provided product and services.

Performance measurement in virtual organizations is very essential. Specially, that it will give a good indicator about work accomplishment. There is 3 types of performance to measure in the virtual organizations the overall performance of Virtual organization, the performance that created between customers and the organization members and the performance and performance of members collaboration. To insure the quality of the provided services, a performance management approach should be used. One of the good approaches is the BSC which refers to the balance scorecard. Its a analysis approach that study the indicators and provide the best opportunity when it comes to the quality and how quality can influence the customer satisfaction. This approach can provide many details related to quality measurements such as: number of problems, frequent of collaboration with customers, problem compensation "studying the overall process from the start to the delivery time. Moreover, there are 3 dimension of quality in virtual organizations. The first dimension is the labor market and its relation to the job security. The second dimension is the job rewords. The third one is the skills work intensity and self-control. Additional to that, tracking the frequent of visits, customers feedback and the duration of each process can be a good quality management method that serve the virtual organizations.

5. CONCLUSION

The recent appearance of technologies, created a competitive environment where everyone wants to improve to meet the current market and customers expectation. Especially when we are talking about the virtual organization that became most of organization targets because of the lower required cost and faster responses to the customers. What makes this kind of organization different that, it's not only focusing on the technology itself but it required additional knowledge from the owner or the managers of the business, they have to be fully aware of what made influence them to move to this kind of organizations and how can they manage the same tasks without changing the scope of services. Also, it's much linked to cyclical process where things keep happening in the same order. Indeed, we can't deny that learning and effective communication is the top two requirements for those who want to move from traditional organizations to the virtual organizations. Finally, since the services or the products will be handled online, a clear effective communication should be always there to insure the fully understanding from both parties.

6. RECOMMENDATION

- Improving the communication process will insure the right delivery of services and, it will help in building a good relation that based on trust with the customer in the virtual organizations.
- Follow the activities of virtual organization without ignoring some small process that were used in traditional organizations.
- Learning and sharing experience especially between employees in the same organization, because that will help in improving the performance an eliminating the errors.
- Trust is very important in virtual organizations therefore; a trustful environment should be their whither it was between the employees or between other partners "customers or other organizations.

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How Blockchain Technology can add Value in Project Management Information System (PMIS)

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A B S T R A C T

This paper focuses on one of the rapid evolving technologies – Blockchain technology. The blockchain technology is one of the efficient technologies that will help the organizations in managing the various industry challenges related to data management. This research focuses on the use of blockchain technology that works of the principle of decentralization in the PMIS. In this context, a qualitative research has been conducted with the help of interviewers. The findings of the qualitative research indicated that blockchain technology has now become a major need of the project based organizations with the increasing threat of data loss, data tempering and attacks etc. The blockchain technology in PMIS will help in ensuring the integrity and value of the data along with ensuring a systematic communication among the stakeholders involved in the project. The findings also indicate that the blockchain will equally distribute the power among the stakeholder and improving the effectiveness of project in terms of meeting the time, cost and quality objectives. Lastly, the paper recommends that there is a critical need of blockchain experts and personnel who can effectively use this technology not only in PMIS but other areas as well such as the banking and finance. The training and development of the people in the area of implementing and integrating the blockchain technology with the information systems has an important relevance.

1. INTRODUCTION

The blockchain is one of the undeniable ingenious inventions that are positively influencing a number of industries. A blockchain can be defined as the chain of blocks that are the list of records that are linked with the help of cryptography (Velmurugadass et al., 2020). Each of the blocks in the blockchain includes a cryptographic hash associated with the previous block or the transaction data. A cryptographic hash function can be referred to as the hash function that takes a message (input) and returns an output that is a fixed-size alphanumeric string (Stevenson and Aitken, 2019). A string is also known as the 'message digest', 'hash value', 'digital fingerprint' etc. In context of design, blockchain is specifically resistant to data modification (Othman et al., 2020). Blockchain is a distributed ledger that is open and it efficiently records the transactions between two parties in a permanent way that is also verifiable (Kassem and Martinez, 2022; M. El

Khatib et al., 2021). Blockchain is a distributed ledger that is managed with the help of a peer-to-peer network that collectively adherers to a protocol for communication (inter node) and validation of new nodes. Once the data are recorded in the block, no retroactive alteration can be done in the same without altering the subsequent blocks (Pankratov et al., 2020). The records in a blockchain are unalterable and are also secured in terms of design along with being a distributed computing system (Al-Kassem et al., 2022; Kurpjuweit et al., 2021; Wei et al., 2020).

The blockchain technology is used in different industries. This technology is potential in terms of facilitating complex financial transactions, money transfer across borders (Coyne and McMickle, 2017). This research will therefore, focus on the usage of blockchain technology in the Project management information system. A project management information system (PMIS) can be defined as the consistent and logical organization of the information that is required for executing the project successfully (Papke-Shields and Boyer-Wright, 2017). PMIS is one of the software applications that use a methodological process for collecting and using the information (Caniëls and Bakens, 2012). Project managers can use the technology of blockchain for providing solution to a number of complex problems in a project. PMIS is an integrated approach that is used for managing and distributing the project information and is widely used by the project managers across the world (Al-Kassem, 2017; A I Aljumah et al., 2022a; Jung and Wang, 2006). The paper will particularly focus on the ways in which blockchain technology can be used in the PMIS so as to improve the efficiency and effectiveness of PMIS.

The research is divided into chapters such as - literature review, research methodology, data collection, data analysis, conclusion and recommendations. The literature review chapter will focus on the past studies and articles related to blockchain and blockchain in PMIS. The research methodology chapter will focus on the research methods and techniques that will be used in the research. The data collection chapter will highlight the data that will be collected for the research. The data analysis chapter will focus on analysing the data collected with the help of primary and secondary research. The last chapter will focus on concluding the research along with providing the recommendations.

The major objectives of this research are listed below:

1. To explore the concept of Blockchain technology
2. To determine the benefits of Blockchain technology in PMIS.
3. To determine future challenges and recommendations related to implementation of Blockchain technology in PMIS.

The major research questions of this research are listed below:

1. What is Blockchain technology?
2. What are the major advantages of Blockchain technology in PMIS?
3. What are the future challenges and recommendations related to implementation of Blockchain technology in PMIS

2. LITERATURE REVIEW

This section of the research will focus on the past studies and articles related to the use of blockchain technology in different information systems and areas. (El Khatib, 2015; Gulseven and Ahmed, 2022; Hani Al-Kassem, 2021; Nuseir et al., 2020) conducted a study on blockchain technology. The authors in the study highlighted that the blockchain technology is the technology that manages the blocks that are uniquely identified and linked in a chain of records (M. Alshurideh et al., 2022; Aziz et al., 2023; Lee et al., 2023). The findings of the study also indicated that the blockchain technology is growing faster as a distributed and shared ledger of blocks that are sealed cryptographically (Almasaeid et al., 2022; M. T. Alshurideh et al., 2023c; Blooshi et al., 2023; Farrukh et al., 2023; T M Ghazal et al., 2023a). The authors in their study have highlighted a number of advantages of using blockchain technology in a system (M. T. Alshurideh et al., 2023d). For example: a system utilizing the blockchain technology is resilient and operates as decentralized systems that do not require any central server and the risk of single point failure is also eliminated (Al-Kassem, 2014). Such systems have integrity and there is no need of a third party for transaction execution. In addition, the blockchain functionality also offers a high degree of confidence as no alterations can be made in the

transactions.

(El Khatib et al., 2020b; Nadzri et al., 2023; Nuseir and Elrefae, 2022) also conducted a study on Blockchain Technology in Business and Information Systems Research. The authors in their study indicated that blockchain technology in future will become one of the valuable enabler of both the social and economic transaction (Al-Maroof et al., 2022a; Aljumah et al., 2021a; H. M. Alzoubi et al., 2022d; Gaytan et al., 2023; Khatib et al., 2022). The distributed transaction data along with the cryptographic logic makes this technology tamper-resistant extraordinarily (Akour et al., n.d.; A. Al-Maroof et al., 2021; Bawaneh et al., 2023; E. Khatib et al., 2021; Nuseir and Aljumah, 2020). In addition, the authors have also focused on the potential of blockchain technology for the social and business arrangements such as pharmaceuticals, shipping etc.

(T M Ghazal et al., 2023c) focused on the importance of blockchain in the project management. In this context, the author has focused on the importance of blockchain technology for the industries such as insurance, finance, supply chain management, information security etc (Al-Kassem et al., 2013; Khatib et al., 2016). The article however, indicates that the blockchain technology will disrupt the normal functioning of the project based industries (M. Alshurideh et al., 2023; Alzoubi and Ahmed, 2019; Louzi et al., 2022b).

(El Khatib and Ahmed, 2018) in his another article associated with the usage of blockchain as the platform for management focused on the point that the blockchain technology is extremly helpful in context of improving the communication between project managers and other stakeholders with the help of setting a private network (Ahmed and Nabeel Al Amiri, 2022; Muhammad Turki Alshurideh et al., 2022b; Mat Som and Kassem, 2013). The blockchain technology will help the manager in communicating the important aspects of a project such as – scope, requirements, budget, deliverables, deadlines etc (Abudaqa et al., 2021; I. Akour et al., 2022; Alzoubi et al., 2019; El Khatib et al., 2021; Mohammed T. Nuseir et al., 2022). In other words, the blockchain technology will help the project managers in solving the issues that involve – intermediation, arbitration and reconciliation.

(Al-Awamleh et al., 2022; Al-Kassem et al., 2012; Alshawabkeh et al., 2021; Alzoubi et al., 2022; Ghazal et al., 2021) in their paper focused on the use of blockchain technology in the information system. The authors in the study have considered blockchain as one of the most impactful inventions of the century that is used in several industries (Aityassine et al., 2022; A I Aljumah et al., 2022b; El Khatib and Opulencia, 2015; M T Nuseir et al., 2022a). The authors however, focused on the use of blockchain technology in the information system. One of the most important feature of blockchain technology that was highlighted by the authors is its ability associated with decentralization of transactions (Ahmad Ibrahim Aljumah et al., 2022b; Emad Tariq et al., 2022). The authors in this context have focused on the drawback of traditional information systems that are centralized in nature (R. S. Al-Maroof et al., 2021a; Nuseir and Aljumah, 2022). This particular drawback can be eliminated with the use of blockchain technology in the information system that will make the information systems decentarlized in nature (Aljumah et al., 2021b; Alzoubi et al., 2022). Blockchain technology has resulted in several developments in the area of information systems such as the human resource management systems, logistic management systems, payroll management systems, medical information systems etc. The authors focused on the need of more research in the area of blockchain technology and information system (Abudaqa et al., 2022; H. M. Alzoubi et al., 2022a; Taher M. Ghazal et al., 2023).

(Al-Dmour et al., 2023; Varma et al., 2023) in his study also focused on the need of future information systems in context of the blockchain technology. The findings of study conducted by (M. El Khatib et al., 2021) are consistent with that of (E Tariq et al., 2022) in context of blockchain technology in the information systems. The traditional information systems have also been criticized because of the centralization involved in the same. The centralized database are criticized because they are dependent highly on the network connectivity and increased interdependence (Muhammad Turki Alshurideh et al., 2022c; Amiri et al., 2020).

(Muhammad Turki Alshurideh et al., 2022a; Alzoubi et al., 2020; Khatib, 2022)in his article also focused on the importance of blockchain technology in the process of information

management. The author indicated in his article that blockchain technology is redefining the traditional business models along with changing the paradigms around transparency, accountability and data security (Muhammad Turki Alshurideh et al., 2022d; El Khatib et al., 2022; Louzi et al., 2022a). This technology can be used to manage the information of the information management systems related to different areas such as human resources, project management logistics etc. In addition, the author focused on other advantages associated with using blockchain technology in the information systems. The blockchain technology helps in preserving the integrity of the data that is logged on in the information system. The traditional information system face the issue of corrupted or the tampered data (I. A. Akour et al., 2022; Nuseira and Aljumahb, 2020). The blockchain technology is potential enough to provide a cost efficient, independent and trusted mechanism that ensures that the entries cannot be altered or deleted. The blockchain technology will revolutionize the way in which information in the information system is protected against the malicious parties or administrators who have motive of modifying or tempering the information (Akour et al., 2023; Aljumah et al., 2020). In addition to the advantage of preserving the data integrity, the author has also focused on the advantage of cost savings. In this context the findings of (M. T. Alshurideh et al., 2023a; Arshad et al., 2023; Sakkthivel et al., 2022) are consistent with that of (El Khatib et al., 2020a). The authors indicated that the blockchain technology in a system can help in achieving three major types of efficiencies such as the operational efficiency, efficient services and the economic efficiency (El Khatib and Ahmed, 2020; M T Nuseir et al., 2022b; Nuseir et al., 2021; Yasir et al., 2022).

In context of the future growth and trends associated with the blockchain technology, the author (Alshurideh et al., 2020; Nuseir, 2020) stated that the blockchain technology in future will ensure the data integrity along with maintaining the compliance standards so as to ensure profitability and efficiency of the systems in future. The blockchain technology has the potential to revolutionize the process of information management with the help of information systems (Ahmed et al., 2022; H. M. Alzoubi et al., 2022g).

The blockchain technology is a type of record system or a ledger that helps in keeping the record straight. This technology helps in maintaining the records along with preserving the integrity of the information. An unbiased blockchain also has potential to improve the trust between the parties along with strengthening the relationships (Ahmad Ibrahim Aljumah et al., 2022a; H. M. Alzoubi et al., 2022f; Mubeen et al., 2022).

The above literature review has critically focused on the blockchain technology that is used in a number of industries. The articles discussed in the literature review indicate that blockchain technology is one of the effective strategies that can be used in the information systems so as to eliminate the major disadvantages of traditional information system such as cost and centralization. The blockchain technology has also been identified as the useful technology in context of protecting the information present in the information system (Al-Maroof et al., 2022b; H. M. Alzoubi et al., 2022e). The above literature review has provided important information and deep insights related to the blockchain technology in the information systems and other areas of the organization. The findings of this section will be combined with the findings of primary research so as to answer the research questions and achieve the objectives of research.

3. METHODOLOGY

This chapter focuses on the research methodology and the techniques that will be utilized in this research. For example - research method, data collection methods, sampling design and the process followed for conducting the research.

3.1. Research method - Qualitative versus Quantitative techniques

There are two types of research methods – qualitative research and quantitative research method.

- *Qualitative research:* is the research method that focuses on developing the understanding on social and human sciences along with determining the feelings and thinking of people. Qualitative research relies on the written data or the verbal narratives. Qualitative research is the research that provides an in -depth understanding and insight of a problem setting. Qualitative research is an

exploratory and unstructured method of research. The qualitative researches help in generating the hypothesis or ideas for quantitative research. In this form of research, more weightage is given to participant's views (Key Differences, 2016).

- *Quantitative research:* is the research method that focuses on generating the hard facts and numerical data with the help of mathematical technique, logical and statistical techniques. The research method focuses on establishing a relationship between the variables of the study, specifically the cause and effect relationship with the help of statistical methods, computational and the mathematical models. Quantitative research is also known as the empirical research in which the data are presented in the form of tables and graphs. In a quantitative research, tables and graphs are used for analysing the results (R. S. Al-Maroof et al., 2021b; Aljumah et al., 2023).

For this particular research, where the focus is on exploring the concept of blockchain technology in Project Management Information System, qualitative research will be used. Qualitative research will help in gaining an in- depth knowledge and information about the use of blockchain technology in the Project Management Information System. Qualitative research has also been chosen for this research because it is flexible in nature and is suitable for the research objectives that do not focus on finding a relationship between the variables (El Khatib et al., 2019; Nuseir, 2021). A qualitative research method has been chosen for this research because of its open- ended structure that will help in extracting the maximum information from the participants involved in the research. A qualitative research method has also been chosen because the sample size of this study is small but, there was a need of a complete description and analysis of the blockchain technology in PMIS (AlDhaheri et al., 2023; Khan et al., 2022).

3.2. Sampling design

A sample can be defined as the number of individuals selected from the overall population for the research purpose. Sampling method is the method that is used for determining the sample of the research. There are two major methods of sampling- probability sampling and the non-probability sampling. A probability sampling is the one in which the probability of inclusion of all the units of the population is equal. In the non-probability sampling, on the other hand, the probability of inclusion of all the units of the population is not equal.

In this particular research, a non-probability sampling method will be used – purposive sampling. Purposive sampling has been chosen according to the research objectives that focus on gaining deep knowledge about the research topic i.e. blockchain technology in the PMIS. A purposive sampling method is a non- probability sampling in which the sample is chosen on the basis of characteristics of the population. The purposive sampling is also known as the subjective or selective sampling. The overall goal of this type of sampling method is to focus on the population characteristics that can answer the research questions in the best manner.

The purposive sampling in this research is used so as to choose the Blockchain technology experts and the project management managers and the information system managers. These people are the core people who have a deep knowledge about the blockchain technology and its implementation. The sample size of this study is 10 experts in field of Blockchain technology.

3.3. Research Process

The experts were contacted with the help of emails. The experts were then requested to participate in the research that is related to the blockchain technology. The experts were explained about the objectives, nature and scope of the research in detail. The experts were given a choice to either accept or reject their participation in the research that would be conducted with the help of interviews. The mail was sent to 10 experts and 5 of them accepted the participation in the research. In other words, these are the participants who were willing to share their knowledge and experience related to blockchain technology. The notes were kept during the process of interview with the experts so as to critically analyse the data and achieve major objectives of research.

3.4. Data Collection

The data collection can be defined as the process of gathering as well as measuring the data for the research that will be used to answer the research questions and achieve the research objectives. In the process of data collection, the information from all the relevant sources is collected for the research. The methods of data collection can be divided into two categories- primary methods of data collection and secondary methods of data collection. In this research, both the primary and secondary methods of data collection have been used. The description of these methods is given below:

- *Primary data collection:* The primary data is the original or the first hand data that is collected particularly for the research on the basis of its research objectives. The primary data are collected by the researchers who are conducting the research. In this, the primary data from the respondents is collected with the help of interviews. Interviews can be defined as the face to face or telephonic interaction with the interviewees regarding the research objectives and research questions. The primary data were an effective means of eliciting the important information related to blockchain technology in the Project Management Information System.
- *Secondary data collection:* The secondary data are the second hand data that are collected by other researchers. The secondary data helps in providing a theoretical background to the research along with providing the knowledge about its basic concepts and theories. The secondary data included in this research also helps in increasing the overall level of research validity and reliability. In this research, the secondary data have been collected from a wide range of sources such as journal articles, website articles, books and reports.

4. ANALYSIS

This chapter of the section focuses on the analysis of the data that are collected with the help of qualitative research. Data analysis can be defined as the process of application of statistical or the logical techniques for describing and evaluating the data. (M T Alshurideh et al., 2022) in their study defined data analysis as the procedures that are used for drawing the inferences from a particular set of data. Data analysis is one of the important aspects that ensure the integrity of data in terms of accurate analysis of the findings of the research. An improper analysis of the data in research may lead to distortion of findings and may mislead the readers as well (M. T. Alshurideh et al., 2023b; T M Ghazal et al., 2023b). The methods used for analysis of qualitative and quantitative research data are different. The quantitative data are analysed with the help of statistical techniques and the qualitative data are analysed with the help of logical methods (H. M. Alzoubi et al., 2022c).

In this research, qualitative research was conducted so as to gather the qualitative data related to blockchain technology. There are different ways in which qualitative research data can be analysed such as the content analysis and the frame work analysis. In this particular research, the data collected with the help of interviews will be analysed with the help of thematic analysis. Thematic analysis is the analysis that is used for analysing the qualitative data (H. M. Alzoubi et al., 2022b; El Khatib and Ahmed, 2019). The method of thematic analysis focuses on examining and recording the patterns or the themes in a given set of qualitative data. Themes across the data are identified and described so as to answer the research questions and achieve the objectives of research. According to (Aljumah et al., 2023; Alzoubi et al., 2021) defined thematic analysis as the method that is used for identifying, analysing and reporting the patterns in the given set of data.

A thematic analysis has been chosen for this research because it is one of the simple and effective ways of analysing the data without any complexity. This data analysis method is flexible and allows to gain an in -depth knowledge of the research topic. The thematic analysis will help in gaining a deep knowledge about blockchain technology in PMIS, its benefits, challenges and other aspects.

The discussion below will focus on the detail description of the themes that have been determined from the data collected from the interview of blockchain experts. The responses of the interviewees have been divided into several themes so to analyse the data with help of a thematic analysis.

4.1. Blockchain Technology and Information Management

One of the first themes that were obtained from the interview data is the blockchain technology and the information management. The interviewees were asked about the role of blockchain technology in managing the information. The responses of the interviewees were consistent in terms of the benefits for using the blockchain technology in managing the information. One of the respondents Mr Abdulla Abass working in Abu Dhabi Islamic Bank (ADIB) in this context stated following:

"*Yes, Blockchain technology is one of the revolutionizing technologies that can be used in number of industries including the information management. This is because it offers an ability to encrypt the data and ensure the integrity of data*."

Another respondent Mr. Emad Al sherbaji working in Al Mashreq Bank for the same question stated following:

"There is no doubt that blockchain technology that evolved from the bitcoins has revolutionized the way in which information is managed and stored. This technology helps in storing the data in the form of ledger along with preventing the issues such as hacks and data leaks."

Mr. Ahmed AlJasmi is one of the respondents of interview whose working in Dubai municipality provided important and deep insights associated with the role of blockchain technology in managing the data. The respondent stated that:

"yeah Blockchain technology is revolutionizing because of its "sweet spots". One of the most important and useful sweet spots is its ability to offer an integrity and confidence related to data. In addition, this technology also improves the traceability of data."

4.2. Principle of blockchain technology

The interviewees were then asked about the major principles of the blockchain technology that are making it a revolutionary technology. In this context, the interviewees provided a view of the major principles of this technology. One of the interviewees focused on the principle of decentralization. The principle of integrity was highlighted in the responses of interviewees in the above questions. In this question, respondents focused on other principles related to blockchain technology. One of the respondents Mr. Mohammed Obaid Al Ramithi who's working in National Electronic Security Authority (NESA) stated that:

"There are number of principles on which the blockchain technology works. One of which is "decentralization". Decentralization in simple words indicates that the blockchain technology works on the mechanism of decentralization that free from hacks and frauds. The power in a decentralized system is distributed among the participants in the network. This is the reason this technology is best for the information systems".

Another respondent Mr. Emad stated that:

"I think one of the most important principles of blockchain technology is the high level of security as well as authenticity offered by the blockchain technology. This is possible with the power of cryptography. This technology is fair for everyone using it."

Once the principles of decentralization and integrity have been highlighted by the interviewees another principle highlighted by an interviewee was the principle of security.

Mr Mohammed stated that:

"There is no central point in a blockchain technology system that is the major cause of failures, fraud and damage. A single point could damage the overall system or the chain of network. The data in the system involving a blockchain technology is protected with the help of encryption mechanism."

The above questions helped in gaining a clear understanding of the basic concepts and principles associated with the blockchain technology especially, in terms of managing the data. The questions were further asked about the efficiency and application of the technology in PMIS (Project Management information system). The respondents were asked that why blockchain technology is a trusted technology. In this context, one of the interviewees Mr. Abdulla Abass stated that:

"Undoubtedly, blockchain technology is a trusted approach that is gaining momentum and will soon become a technology that will be accepted worldwide. This is because the blockchain offers the advantage of transparency, storage and privacy."

Another interviewee Mr. Ahmed Al Jasmi for the same question indicated that:

"Yes of course blockchain technology is a trusted approach because it offers that advantages such as decentralization that are demanded since long. The

role and importance of data and information has increased significantly. The organizations are using the management information systems for different departments such as the human resource management system, project management system etc. The blockchain technology is extremely beneficial for such organizations."

The interviewees were further asked about the use of blockchain technology in the PMIS (Project Management information system). The interviewees offered different insights associated with the same. One of the interviewees indicated that blockchain technology can be used successfully in the PMIS.

In this context, Mr. Ali Alhammadi is one of the respondents working in Department of Urban Planning and Municipalities in Abu Dhabi stated that:

"Blockchain technology is a technology that is used in a number of areas and industries and it can be used in the project management information system too. The technology is known for its abilities associated with offering the data security, integration, transparency etc. These abilities will help in managing the project information system effectively according to the needs to customers and without the fear of data tampering and leakage. In addition I think the blockchain technology will also help in improving the quality of governance in the information system along with minimizing bureaucracy."

Another respondent Mr. Ahmed Aljasmi in the same context stated that the blockchain technology is an effective platform for the project management information system. In this context, the respondent stated that:

"I think that in context of project information blockchain technology can offer a technical superiority along with an operational efficiency. Technically the technology is resilient and none of the stakeholders of the project can tamper the information present in the PMIS. The blockchain technology will also help the project managers in saving the costs and reducing the time and risks in managing the information present in the PMIS."

The interview with the blockchain experts provided deep insights about the use of blockchain technology in PMIS. In this Mr. Ali stated that:

"The project managers can focus on setting a private blockchain network in the PMIS so as to communicate effectively with the stakeholders or participants without a fear of data loss or data tampering. A timely and efficient communication between the participants of project will help in controlling the cost, quality and time of the project. Blockchain technology also helps in defining the requirements, budget, deliverables, scope and verifying and validating the transactions related to project."

The technology can help simplify any issues that involve reconciliation and arbitration. The respondents further focused on the benefits of using blockchain technology and stated that: intermediation. But, it will always be the project manager who can talk with any person regarding their concerns and provide the needed explanations. And in the end, it is the project manager who delivers the news that the project has been completed, and that the customers are happy.

4.3. Benefits of Blockchain technology

Moving further, the interviewees were asked about the benefits of blockchain technology especially in context of PMIS. The interviewees provided different but consistent responses regarding the same. Mr. Mohammed Obaid indicated that:

"If blockchain technology will be used in the PMIS it will help in creating a robust cloud storage system with important information related multiple projects without a fear or threat of human errors, data loss, attacks etc. In addition a project involves number of transactions between the parties that can be managed effectively with the help of blockchain technology. A permanent decentralized system along with the documented records will help project managers in monitoring all the factors that can have impact on the project."

"The blockchain technology is extremely beneficial in PMIS in terms of simplifying the issues related to – intermediation and arbitration. This is because the technology offers the ability to project managers to define their concerns along with providing the explanation for the same to the stakeholders. This will also help in increasing the satisfaction of the customers."

Once the basic concept and benefits of blockchain technology were determined, the focus was on exploring the major challenges associated with using the technology in PMIS. The interviewees provided an in- depth view of the challenges associated with implementing blockchain technology in PMIS. In this context, Mr.Ali stated

that:

"It is true *that the blockchain technology offers number of benefits if implemented effectively in the PMIS. There are however some challenges that should be considered before adopting the blockchain technology for the PMIS. The initial cost of adopting this technology is high. The software that is used for run the blockchain technology has to be customized and therefore it becomes expensive. The blockchain technology not only requires the expensive software but also hardware."*

In the same context, another interviewee Mr.Ahmed stated that:

"*Like every coin has two faces "head" and "tail" there are two aspects of the blockchain technology – positive and negative. I have already focused on the positive aspects of the technology but we should not forget to consider their negative aspects or the challenges associated with the blockchain technology. One of which is to find the people or personnel who can manage and integrate the blockchain technology in the organization or a system such as PMIS."*

Further, some other challenges associated with blockchain technology in PMIS were also highlighted by the interviewees. MR.Abdulla Abass indicated that:

"The cost of implementing such as technology is extremely high as it is difficult to find the personnel or the blockchain experts and once an organization finds such people it has to pay them extraordinarily large salaries."

Mr. Mohammed Obaid also stated that:

"it is difficult to integrate the blockchain technology with the existing information system of the organization. If an organization wants to integrate its existing PMIS with blockchain then it has to completely overhaul its existing system or it need to find an innovative ways of integrating the information system with the blockchain solution."

Lastly, the focus on interview was on determining some major recommendations for the implementation of blockchain technology in PMIS. In this context, one of the interviewees Mr. Ali stated that:

"*There are many technical ways that can help in managing the challenges associated with this technology but firstly there is a crucial need of using a collaborative approach for the same, In other words the integration of PMIS and blockchain technology should be done in across the project based industries."*

Another interviewee Mr.Ahmed in the same context stated that:

"A pilot project should be implemented before actually integrating the PMIS with the blockchain technology. A test on a smaller scale will help in validating the benefits and outcomes of the integration."

The above discussion has clearly presented the data collected with the help of interviews from the blockchain experts. The discussion has provided a deep insight associated with the blockchain technology along with benefits and challenges associated with integrating PMIS with the blockchain technology. The findings obtained from the interview are consistent with that of the secondary research.

5. CONCLUSIONS AND RECOMMENDATIONS

The above paper has critically focused on the blockchain technology along with its integration with the PMIS (Project management information system). In this context, qualitative research was conducted with help of interviews that were conducted with the blockchain experts. In addition, a secondary research done on this topic also helped in providing deep insights associated with the use of blockchain technology in PMIS.

The overall findings of the study indicated that blockchain technology is one of the revolutionary technologies that can help organizations across the industries in context of helping them in managing and protecting their data along with improving their overall efficiency. The findings of primary and secondary research are consistent in terms of benefits of blockchain technology in PMIS. (M. El Khatib et al., 2021) indicated that blockchain technology is a revolutionary technology in context the way it manages and protects the data from external threats such as frauds, attacks etc. One of the interviewees also indicated in the interview that blockchain technology is the trust worthy approach. There are some major challenge associated with the implementation or integration of this technology with the PMIS, but once implemented/integrated it will provide a number of benefits to the organization.

Qualitative research conducted in this paper clearly indicated that the blockchain technology is setting the pace for using the technology that is distributed in nature rather than the traditional

centralized technology. The technological advancements and rapid changes in the information technology make it essential for the industries to adopt a decentralized or distributed system for managing their information systems that involve crucial information about the organization and stakeholders. Blockchain technology in the PMIS will help in providing a database that is secured, shared and provides a true view of the organization.

Some of the major recommendations that can help in managing some of the challenges associated with the blockchain technology are discussed below:

In order to integrate blockchain technology with the PMIS, it is essential to find the blockchains from across the world who have varying degree of knowledge and experience related to the same. In addition, the industries or the organizations should focus on developing the experts of blockchain technology with the help of training and development. The challenges that have been highlighted in this research are the long-term challanges that need long- term solutions.

Further, there is a need of industry standards regarding the use of blockchain technology. The industry standards will help in encouraging the organizations in integrating their PMIS with the blockchain technology effectively along with making sure that all the regulations and compliances have been adhered.

Another important recommendation associated with blockchain technology is that the engagement with internal stakeholders should be high. This can be achieved with the help of different communication channels and engagement strategies.

In addition, it is also recommended that the future researchers should focus on the ways that can help in integrating the Blockchain technology with PMIS in the best possible manner.

The above research paper has provided deep insights associated with the blockchain technology in the PMIS along with providing an overview of the challenges associated with the same. The recommendation offered in this research can help the organizations in integrating their PMIS with the blockchain technology in the most effective manner. The challenges however, have to be managed with the help of continuous research in the area of blockchain technology. The rapidly transforming information technology world will continue to pose several challenges before the blockchain experts. Enough potential and skills should be developed in context of managing these challenges and developing new leaders and experts in the area of blockchain technology.

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How Artificial Intelligence can Leverage Project Management Information System (PMIS) and Data Driven Decision Making in Project Management

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A B S T R A C T

This article focuses on the opportunities of utilizing Artificial intelligence in project management in general. Special emphasis to project management data driven decision making and the relevant tools represented in processes, tools and techniques of PMIS. The data used to support this research is collected from primary and secondary sources to emphasize the research paper results. The approach used in data collection was a qualitative method where interviews conducted. Advanced projects and cases from Dubai and UAE were also investigated. The results showed that with the creation of big data, AI can now be more than just technology and is capable of performing more complex tasks using advanced techniques and algorithms. AI helps more effectively through integrating project management phases and the entire project lifecycle process. Bringing AI to the project management domain across the world can provide a sustainable world for future generations. It also assists in faster and smarter decisions. It is recommended to monitor AI until users are satisfied and can trust the systems outcome. AI will have a tremendous growth as projects in smart cities are growing bigger, complex and demanding.

1. INTRODUCTION

There is no doubt that artificial intelligence plays a vital role in various sectors and dimensions in most countries around the world. Artificial intelligence is commonly known as AI. AI is widely used in our societies and it has a huge impact on the social, economic, and political sectors. Some of these impacts of implementing AI are benefits and optimistic, while others are not, and there are some ethical issues as well related to AI (Koroteev and Tekic, 2021). Artificial intelligence can be defined as the machines that are created to simulate human intelligence to do and learn as a brain of human do (Mentzas, 1994). These machines can perform multi-tasks in intelligent ways by adapting to several situations (Hani Al-Kassem, 2021). AI has the potential influences on the project management field in a positive way. Implementing AI in the project management field will help in a wide range of missions and tasks, such as increasing automation, productivity, help in making intelligent decisions, solving complex problems, managing repetitive missions and tasks, enhancing lifestyle, and assisting in complex analysis (Jiang et al., 2017; Ribeiro et al., 2021).

The Usages and Serving of AI Tools in Project Management and implementing AI tools in the project management field comes with a different number of utilizations and they are as following:

1. AI in engineering design. The usage of AI in PM helps in developing applications that will assist project managers to use them through Artificial Neural Network and Genetic Algorithm tools (Al-Kassem, 2014; Sun et al., 2019). These tools help to select the best structure system for the building, and it has been used to optimize the building life cycle cost in changing climate like hot weathers.
2. AI in planning and scheduling. Some of these tools are:
    - Knowledge Based Expert System (KBES) provides the estimation of the resources needs and the duration of project activities based on the knowledge of experts (Ghazal and Taleb, 2022).
    - Fuzzy Logic which decides the project priorities in the process of portfolio management.
    - Artificial Neural Networks (ANN). Provide the sequence automation of the project activities based on functional needs (Abiodun et al., 2019; Al-Kassem et al., 2013).
    - Genetic Algorithm (GA) optimizes the schedule of the project activities in construction to reduce total cost and resource constraints.
3. AI in estimating cost. ANN and Fuzzy Logic tools have the same benefits and effects as they do in planning and scheduling.
4. AI in risk management. Assigning risks, estimating the probability and assessing the impact of the risks via using ANN, the integration between ANN and Monte Carlo Simulation, and Fuzzy Logic (Mat Som and Kassem, 2013).
5. AI in performance prediction management. Fuzzy Logic, KBES, and ANN help to improve the efficiency of the project management and provide a better prediction of the future project performance based on the previous projects that have been done (Asadullah et al., 2020).
6. AI in monitoring and controlling project which can be used to better manage the monitoring process in a project lifecycle.

The varieties of AI applications and tools enable better project performance as well as enhance the efficiency of the project management implementation (Al-Kassem, 2017; Caniëls and Bakens, 2012; Elkhatib, M., Al Hosani, A., Al Hosani, I., & Albuflasa, 2022). This research paper will try to answer the following research questions:

- How can AI effect Project Management?
- How to improve AI effect on Project Management?

This research will identify initially the literature review, the types of projects that require AI, demonstrates how AI can serve and improve PM. Finally, it discusses the challenges of AI implementation which draws the conclusion and recommendations.

2. LITERATURE REVIEW

One of the main essential concerns in construction is how to make buildings smart and sustainable (I. Akour et al., 2022) stated that automation based on artificial intelligence has a significant role in adopting smart cities and buildings. These hardware and software are capable of doing things automatically, which will save time, effort, money as well as generating sustainability (Al-Awamleh et al., 2022; Al-Dmour et al., 2023; M. El Khatib et al., 2021; Mubeen et al., 2022; Sakkthivel et al., 2022). AI tools and techniques are helpful and essential for the project manager in controlling and monitoring the project. The integration between different types of AI tools will provide the highest benefit of the strengths tools and obtain the best outcomes in some particular projects, such as:

- Continuous Assessment of Project Performance (CAPP) is providing the actual time analysis.
- Project Definition Rating Index (PDRI) is assessing the definition of the project in the early phases before starting the project.

Nowadays, the implementation of AI is expanding in different fields in order to assist and make our jobs better and more useful (M. Alshurideh et al., 2023; Khan et al., 2022). AI tools and techniques are very expensive, so, AI has been invested in the most viable and commercially huge projects like machine learning field that has great consumption

in AI-powered, project management, complex and sustainable projects, innovative fields, supply chain and logistics, chatbots, streamlined manufacturing, and many more (Ahmad Ibrahim Aljumah et al., 2022a; M. T. Alshurideh et al., 2023a; Bawaneh et al., 2023; Louzi et al., 2022b; Nuseir et al., 2020; Yasir et al., 2022). In addition, assessing the effect of implementing AI tools initiatives is significant. This can be achieved through assessing the labor and cost saving, generating revenue, increasing productivity, reducing errors and biases, and many other operations (A I Aljumah et al., 2022a; Amiri et al., 2020).

(Aljumah et al., 2021a; H. M. Alzoubi et al., 2022d; El Khatib and Opulencia, 2015; Khatib et al., 2022b) reported that AI is capturing what the human is doing to automate these processes through using machine learning in order to build models. An example of implementing AI tools is making the decisions faster based on the enormous volume of data (Al-Maroof et al., 2022b; Ahmad Ibrahim Aljumah et al., 2022b; T M Ghazal et al., 2023a; Nuseir, 2020). In addition, these big data from the smart building systems provide an organization's infrastructure the intelligent controls for buildings, for instants grid stability, reducing energy, and occupant comfort (H. M. Alzoubi et al., 2022a, 2022e). Also, the integration between the AI technology and the smart building system enhance to intelligently analyze, interpret, and distribute effective and efficient actions in real-time (Al-Maroof et al., 2022b; Khatib, 2022). According to Sinclair (2019), there are four core values to make a city intelligent including sustainability, workability, learnability, and livability (AlDhaheri et al., 2023; Alzoubi and Ahmed, 2019; Louzi et al., 2022a).

Furthermore, Software Defined Networking (SDN) is an example of a smart city deployment (M. T. Alshurideh et al., 2023b; Taher M. Ghazal et al., 2023; Varma et al., 2023). The SDN creates and deploys the systems as well as the programmable networks to logically centralize controller to the program network equipment (Abudaqa et al., 2021; El Khatib et al., 2021, 2020a). The operation of SDN can be achieved through using the protocol and the well-known interface (Akour et al., 2023; Al-Kassem et al., 2012; R. S. Al-Maroof et al., 2021a; H. M. Alzoubi et al., 2022f; Khatib et al., 2016; Nuseir and Aljumah, 2020). So, SDN can support and enhance the project developments of the smart city among the three deployment levels; physical element level, communication level, and application and big data level.

3. RESEARCH METHODOLOGY

This research paper aims to identify the core benefits of AI in Project Management aspects and find how using AI can help improve the way project management is handled. The data used to support this research is collected from primary and secondary sources to emphasize the research paper results. The approach used in data collection was a qualitative method where an interview was conducted with an employee in Smart Dubai to discuss AI implementation, benefits and challenges involved. As a result, this choice was made to give a better understanding of the effectiveness of implementing AI in project management in real life and to find ways to better make use of it. In addition to the interview, Google Scholar and HBMSU Library databases were both used to find more about the topic to support the research.

4. TYPES OF PROJECTS THAT NEED AI

4.1 Complex Project

Why innovative/Strategic project need AI? In the current hi-tech world and with the existence of competitiveness among the entrepreneurs, companies intend to move towards developing strategic and innovative projects to benefit by adopting innovation and complexity to their plans. In large projects, innovation is taking part in several elements including big data to emphasize their distinctive (A I Aljumah et al., 2022a; El Khatib and Ahmed, 2020; Emad Tariq et al., 2022). Complex innovative projects defined as the ability to implement a business strategy using different frameworks and tools to integrate challenges of innovation, complexity and deal with uncertainties (A I Aljumah et al., 2022b; H. M. Alzoubi et al., 2020; Gulseven and Ahmed, 2022). Projects with big data are classified based on process technology, degree of complexity, speed, and how do all these categories relate to innovation (Abudaqa et al., 2022; Almasaeid et al., 2022; T M Ghazal et al., 2023b; Nadzri et al., 2023). Each independent project has a specific nature and its level of complexity and variability. In order to simplify such elements, there is a need for utilizing AI (Al-Maroof et al., 2022a; M T Nuseir et al., 2022a; Nuseir and Aljumah, 2022). Furthermore, human

beings are likely to make mistakes and they lack experience. Such projects can't afford these faults; therefore, AI has to be equipped when the business is planning for critical goals (Ahmed et al., 2022; Alzoubi et al., 2019; El Khatib et al., 2020b; Raja et al., 2020).

4.2 Areas of using AI

Artificial Intelligence can be adopted in industries that create a good and sustainable environment for Artificial Intelligence. Big projects can benefit from utilizing AI due to the complexity of their systems, particularly if the industry is shifting towards smart technology (Muhammad Turki Alshurideh et al., 2022c; H. Alzoubi et al., 2020; Aziz et al., 2023). Innovative projects experience potential challenges in implementing new business processes. For these reasons, AI can be viewed in such areas as a solution (A. Al-Maroof et al., 2021; M. T. Alshurideh et al., 2023c; Alzoubi et al., 2021; Ghazal et al., 2021; Kassem and Martinez, 2022).

Complex strategic projects have the nature of developing projects tasks with highly innovative output. Smart city as a complete strategy is a clear example of a complex project that needs the use of AI (El Khatib et al., 2019; Khatib et al., 2022a). Dubai City is planning strategically to move towards developing an integrated smart city. In the following section case studies in UAE will be demonstrated.

4.3 Innovative, strategic projects: The cases of Smart City and Smart Building

In past decades, UAE set a vision in looking ahead toward prospecting future and devoting this to future generations, today, citizens are able to realize the mission implemented in reality. This section shows the findings of two case studies that implement a smart city (R. S. Al-Maroof et al., 2021b; H. M. Alzoubi et al., 2022c, 2022h; Farrukh et al., 2023; Gaytan et al., 2023). Smart Dubai has been a success in achieving its goals by implementing integrated systems using artificial intelligence. In addition, New York University in Abu Dhabi, launched fully integrated smart building system to support the adoption of AI.

4.3.1 Smart Dubai

Due to the developments and fast businesses entering the local market, Dubai City detected issues in the city old processes, where it reduces efficiency because traditional processes take long durations. Dubai came to a solution by implementing the new technologies in the business and adopting innovative smart projects that transform the city into a digital city that serve the citizens. In the beginning of the journey in 2016, and in cooperation with DED and IBM, Smart Dubai guided to establish the first AI-based machine called 'Saad'. Saad works for the businesses community where it enables the other businesses to get the latest documents on businesses accreditations and authorizations. Saad is an integrated system that provides a solution to the clients on decision makings (Aljumah et al., 2021b; E Tariq et al., 2022). Smart Dubai explored the latest innovation and their possibilities to develop this city (Ahmed and Nabeel Al Amiri, 2022; E. Khatib et al., 2021). The adoption of the blockchain strategy in the smart city resulted in an increase in investment by 1.1 billion in 2016. Smart Dubai main mission is the implementation of innovative technologies that lead in making Dubai the happiest city. This mission made Smart Dubai set its goals that reflect this mission (Al-Kassem et al., 2022; M. T. Alshurideh et al., 2023d; Muhammad Turki Alshurideh et al., 2022a; Arshad et al., 2023). In the next step of implementing big tasks, Smart Dubai came up with launching the AI road-map, its task is to rapidly support serving Dubai citizens by the use of AI. Smart Dubai also released the strategy to build the 'AI Lab' to be the first AI supportive lab that supports all the AI processing in Dubai. Dubai Government was involved in this by enabling its employees and clients to apply all their needs through AI-enabled services (H. M. Alzoubi et al., 2022b; Nuseir, 2021).

4.3.2 Smart Building-New York University in Abu Dhabi

The second case covers the development of smart buildings in Abu Dhabi. As part of developing a smart city, there should be construction and maintenance of smart buildings (H. M. Alzoubi et al., 2022g; El Khatib and Ahmed, 2018; Mohammed T. Nuseir et al., 2022). It requires to take into consideration smart living and environment in the building. smart buildings require intelligent monitoring of the building elements such as structure. New York University in Abu Dhabi has created a smart environment by integrating the structure of the campus with the interior and exterior design. When the University management is done with the construction phase, they began

addressing an intelligent system for security (Aityassine et al., 2022; Akour et al., 2021; Lee et al., 2023; Nuseira and Aljumahb, 2020). They created the Smart Lift Control System. that included a smart card scanner. Its main function is to identify the residents of the building and calculate the number of available residents. Besides this card, a security monitoring control system, SEC is added, and it functions smartly. The smart integration between the structural elements in New York University defined the campus as an Intelligent Building (H. Alzoubi et al., 2022; El Khatib, 2015; M T Nuseir et al., 2022b).

5. HOW CAN AI SERVE/IMPROVE PM

5.1 AI in complex decision making

The use of Artificial Intelligence in constructing smart cities help to ensure infrastructure lifecycle management, operational management, and delivery performance align with the project portfolio and objectives. Due to its vital necessity because such projects considered complex as they contain big data that requires more attention from project managers. Therefore, project managers should be able to provide real-time information on cost, schedule, and risks to stakeholders and be able to track processes and workflows of the project. From smart cities perspectives and while managing such complex projects with variety of parameters, managers and planners should consider number of capabilities to ensure a successful project such as ease of use, accessibility of project information, and having an enterprise wide-view for a holistic view to ensure efficient portfolio management and be able to identify opportunities to help in decision making (Alshawabkeh et al., 2021; M. Alshurideh et al., 2022; Muhammad Turki Alshurideh et al., 2022d; T M Ghazal et al., 2023c). Having this amount of data can be a helpful asset in adopting AI for such projects.

In most project activities and areas there is the availability of data that helps in using resources for decision making which can be seen in adopting the Internet of Things in smart cities development projects. The availability of connectivity led to the mass creation of data around the world and data became the most important source of a leading economy and innovation (Aljumah et al., 2020; El Khatib and Ahmed, 2019). A report published by Smart Dubai stated that the amount of data created will be around 180 zettabytes by the year 2025 which is equal to a billion terabytes (I. A. Akour et al., 2022; Nuseir et al., 2021). The huge amount of data available will need to be interpreted and analyzed in order to help in making the decisions, therefore, artificial intelligence can be utilized as a tool for such role. An example of using big data can be seen in the city of Calgary in Canada where they developed a PI System to gather updated information about the city water system to be able to monitor it and take preventive actions against flood (Muhammad Turki Alshurideh et al., 2022b; Blooshi et al., 2023)as cities are being digitized using technologies and AI to analyze data allowed planners and decision makers to collect data and formulate suitable policies to help solve different kind of issues.

From another perspective, how can big data and AI help in the development of smart cities? Smart Dubai can be used as an example to illustrate the creation of a Smart city using big data management. A smart City as defined by (M T Alshurideh et al., 2022; Nuseir et al., 2021) is not about technology but it is more like a set of complex interrelated city areas each with its own constraints and adoption possibilities. The authors explained further the big data concept and its use in Smart cities as a utilization tool for innovative and creative solutions for digitized wealth. Dubai as well has developed an open and shared Data framework and a special department that is focusing on Data management as they believe that technologies should be fed with as much data as possible to reveal their real abilities (Aljumah et al., 2023). It can be observed from Smart Dubai that the available data alone and technology alone will not be sufficient, however, they should be combined as data should be interpreted and provided to technology to make better use of them and help in making decision regarding different areas in the city.

5.2 Reasons of utilizing AI in PMIS

The use of artificial intelligence in project management can drive the industry toward a magnificent project outcome. Using AI in managing projects can help identify critical issues, make predictions, speed up processes, and many more. AI will affect project management in all its disciplines using machine learning algorithms through risk management and project estimation.

Project management then will rely on artificial intelligence in assessing project performance to help in predicting risks through the project life cycle (Khatib et al., 2016). Including artificial intelligence is an essential involvement in managing projects as new technologies are arising and depending on old style tools and techniques will no longer work for new complex projects. The reasons of utilizing artificial intelligence in project management information system are to help make better use of data and be more productive. For example, many companies like Amazon and Ocado are using artificial intelligence in managing their warehouses and many other firms in examining legal documents and record through data analysis. Moreover, AI can help in the integration process as it can be seen form cost management perspective in where budget updates in databases are simultaneously updated in the forecast report without any human input. AI can also be applied in what is called the autonomous project management system where it has to understand the stakeholders' communication and be able to meet their satisfaction criteria.

Moreover, AI will be a big help in project management throughout the project planning phase where project manager will need to plan and assign activities and resources to better achieve project goals. In addition to that, changes might happen to the project timeline so activities' assignment will be a recurring process, but this is not the issue. The main challenge in here is having wrong estimation and as a human being might overlook some details, AI can take this responsibility in managing project plan, predicting duration and cost, and maintaining project schedule through the use of big data. Another advantage of using AI in project management is in risk management where risks exist and that can lead to the project failure, therefore, adopting AI in predicting risks through historical data analysis and issue logs can save effort, resources, cost, and identify possible project threats to plan for preventive actions or redevelop a better mitigation plan.

5.3 Use of AI in Decision Making in PMIS

Due to the huge amount of complex data and information, Decision Support System tools help project managers analyze these data to assist in better decision making. According to (Nuseir et al., 2021), decision support systems, information technology, and artificial intelligence can all be utilized for knowledge and data management purposes. These 3 combinations can make a support system that helps in analyzing data, finding relationships and patterns, and new information that can be a help in making decisions in projects. For example, Artificial intelligence can be used in complex data analysis as according to report publisher, AI can help in detecting issues and alert users when they need to interfere, and plan and schedule resources based on the project goals. Artificial intelligence can be used as a collaborative design tool as well to help in managing projects and the Tangible User Interface (TUI) system can be an example. The TUI system is a control and visualization tool to help novice users to design neighborhoods to ensure building high-quality communities. The tool has been used to simulate and help improve decision making process for urban planning in many cities around the world. It helps identify better cities' solutions as it encourages machine learning and search algorithms to assist non-experts in having accurate and cost-effective approach to deliver real-time information that can contribute to performance and decisions evaluation. The Tangible User Interface was used in designing one of the neighborhoods in Riyadh city. The project included many parameters that the developers need to consider when planning such as energy efficiency, walkability, and daylighting. As a result, the system helped the planners to visualize their ideas and provide them with design feedback regarding their parameters, accuracy planning, and costs to help them make better decisions.

5.4 How can AI improve project selection criteria?

Project selection is quite a complex type of decision-making process as it requires to look at variety of criteria that can influence the selection process. Artificial Intelligence can be used in different project management areas and phases like selecting projects. Artificial Neural Network can be one tool to help in selection process and it is a knowledge base tool that uses learning algorithms to use and store data. Artificial Intelligence in that case, can help in project selection criteria through the use of artificial neural network (ANN) in predicting the success rate of a project for example. A study conducted in Nigeria

to test the efficiency of using ANN, the study was done to solve the issue of the increasing number of accidents and as ANN learn from historical data the tool used data from 1998 to 2010. The study included number of parameters that can be a cause of accidents such as population, vehicle quantity, and traffic. To train the tool to function, data sets of car accidents were clustered and mapped to a specific type of accidents criteria and then used by the ANN. As a result, the ANN provided them with feedback regarding their study and comparing it to the other models used, using ANN showed its advantage in suggesting solutions for the problem they had through connecting input with output. Such tool helped them to decide what policies or procedures to regulate in order to reduce accidents rate which consequently will decrease death and injuries rate which is a big concern for the government of Nigeria. Adopting AI in project management areas can support in such complex decision making and selection management.

5.5. Challenges of AI Implementation

Artificial intelligence can improve project management in many ways and at the same time, implementing AI in project management can encounter number of challenges. One major challenge when implementing AI in project management is receiving wrong data due to insufficient system training. (Khatib et al., 2022a) suggests that implementing AI in PM should be taken slowly and carefully otherwise project details might be false or incorrect. Moreover, implementing artificial intelligence in project management might require high level of project management maturity and heavy set of data to help in implementing it efficiently. Another challenge is the integration of the AI into our communities. Changing to a smart city using AI requires the community to adapt to the changes in management aspects of transportation and buildings. The adopting of AI in such aspects will require residents to follow the new regime regulations. One obvious issue that struggle the process are considered the global challenges like climate change and migration. The environment department would address significant suffer from applying a quick response in the time the city is changing fast. The new developments require high capacity of data storage and effective management of data to be able to use them as a value-based toward the technologies.

6. CONCLUSION AND RECOMMENDATIONS

In conclusion, this research discussed the use of Artificial Intelligence in project management and how it can help and improve project in its wide and different areas. It also discussed some of the challenges that can prevent the beneficial use of AI. The demonstrated case studies show that there is a need for AI in the implementation of new business management. The case studies indicated that much more is yet to come by the beginning of 2021 following the UAE Vision 2021. Previously or maybe even now, most people are thinking that artificial intelligence is about robotic system and they are programmed to do certain activities. However, with the creation of big data, AI can now be more than just technology and is capable of performing more complex tasks using advanced techniques and algorithms. AI helps more effectively through integrating project management phases and the entire project lifecycle process. Bringing AI to the project management domain across the world can provide a sustainable world for future generations. The AI capabilities and features can help the project managers on gearing the project management through developing a list of the project concerns until deciding the team training needs. It also assists in faster and smarter decisions making. Managing projects can use the benefits of AI, at the same time it still needs to be monitored at least at the beginning of the implementation as users are still not confident about the performance of such AI system. Therefore, it is recommended to monitor AI until users are satisfied and can trust the systems outcome.

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