Contents available at the publisher website: G A F T I M . C O M

International Journal of Business Analytics and Security (IJBAS)

Journal homepage: https://journals.gaftim.com/index.php/ijbas/index

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

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A R T I C L E I N F O

Keywords:
Project Management, Risk management, Healthcare, Digital Transformation, Digital Disruption, Disruptive technologies, Big Data, data analytics.

Received: Jan, 13, 2023
Accepted: Mar, 21, 2023
Published: May, 08, 2023

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.

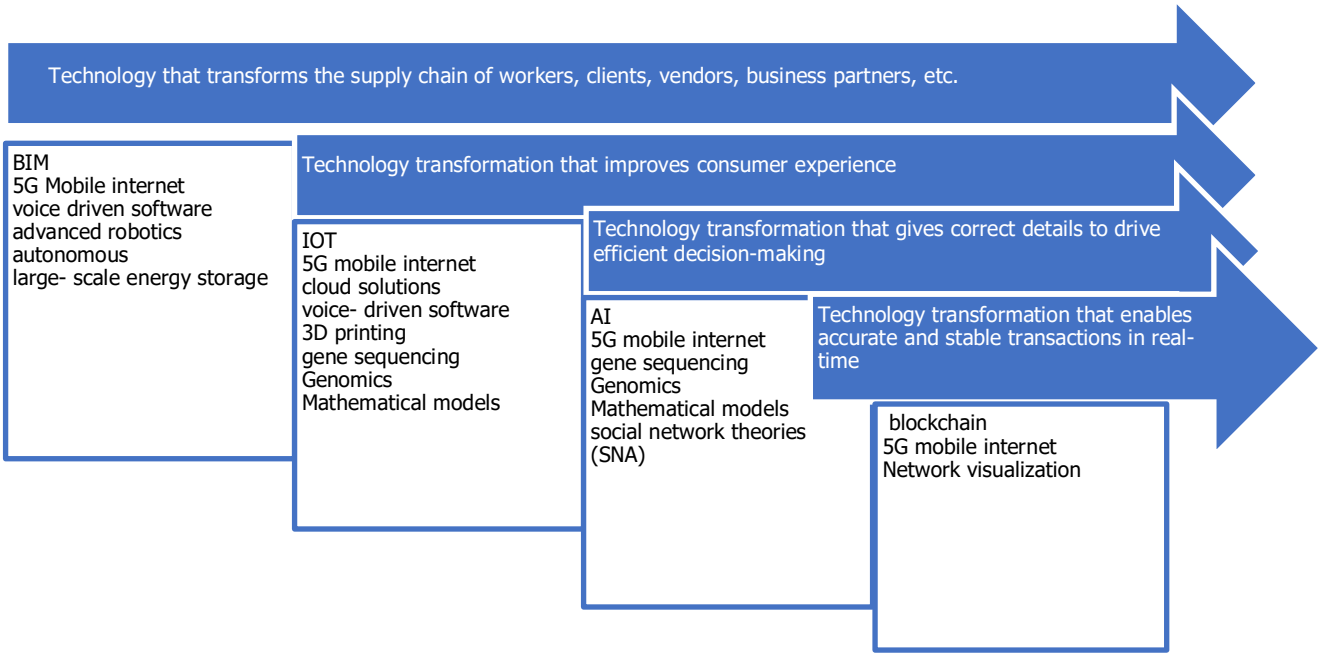

Figure 1 : Technology Transformation

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.