THE IMPACT OF BLOCKCHAIN TECHNOLOGY ON CRISIS MANAGEMENT: THE CASE OF COVID-19

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ABSTRACT

Blockchain sector has advanced as a recourse can be used in numerous ways by global health tacticians and policy experts to reduce the disastrous impact of coronavirus disease (COVID-19). The COVID-19 pandemic has spawned many blockchain-related ideas and initiatives, but to the best knowledge, no in-depth studies have been performed to uncover and summarize the key features of these technologies. The SARS-CoV-2 pandemic started at the tail end of 2019 when a new coronavirus was identified as an unidentified pneumonia-like illness. Our suggested high-level, decentralized architecture makes it easier to manage massive amounts of data and stores the data on a blockchain under government control. There are considerate difficulties faced if institutions are to regain their trust and have hope again, given today's distrust, last year's fear of the pandemic, and the emergence of technology that enables the production of standard sample.

Keyword: *Blockchain, COVID 19.*

1. INTRODUCTION

Humanity has experienced pandemics before. It has, in fact, been numerous cases when epidemic wave would have to be handled with, sometimes for years at a time. SARS-CoV-2 is a present threat, but infectious illnesses have played a key part in human history from the beginning of civilization and the formation of sections of the population living together [1], [2]. It became necessary to begin recording the first pandemics as the global population expanded and illnesses spread, posing a hazard to the population [3], [4]. As a result of these pandemics, the civilizations in which they arose were frequently reshaped, and the path of history was virtually or decisively altered by them [5]. Pneumonia cases with an unknown cause were reported to the WHO Country Office in China in December 2019. SARS-CoV2 was discovered a few weeks later to be a coronavirus and was renamed [6], [7]. There has been an exponential rise in the number of persons infected and killed as a result of the new coronavirus outbreak that was sparked by the COVID-19 sickness [8], [9].

The early detection of the disease's rapid spread led to the development of more effective techniques to manage activities in order to limit the disease's potentially fatal consequences [10]. The outbreak in Italy mostly affected the country's northern regions [11]. In order to cope with a sanitary situation that quickly became a full-blown national disaster, swift action was required [12]. To stop the infection from spreading, extreme measures of seclusion were necessary [13]. Global hygiene and disease control methods, such as contact investigation and infection control in health care facilities as well as community containment were proven to be key tactics during the SARS epidemic in 2003 [14]–[16]. When Italy plunged into a 2-month lockdown in 2019, it was evident that the SARS experience had not been forgotten, as seen by the countermeasures implemented [17]. All non-essential activity were restricted while the school was under lockdown [18]. Hospitals overflowing with patients battled for their lives, while the remainder of the populace was kept inside in dread and unease due to the pandemic's uncertain conclusion and its terrible effects [19].

In the last 20 years, a number of digital and technical tools have emerged that have had a profound impact on our lives. Some of these might be utilized to enhance the current SARS-CoV-2 containment measures, hence boosting their effectiveness [20], [21]. One of them is the

blockchain. Since its inception in 2008 as a means of enabling Bitcoin's technology, blockchain has found use in a variety of areas [22]. The fundamental properties it has with other block chain systems explain why it is so widely used: Through the use of encryption and a consensus method, it ensures data inalterability and high levels of security [23]–[26]. In the event of a pandemic emergency, we want to promote the use of blockchains to streamline the flow of information between healthcare facilities and to document contributions of cash, equipment, and medical supplies.

2. LITERATURE REVIEW

In addition to people's excitement for blockchain's potential applications and its function in decentralizing society, as well as the independence it confers from centralized power, after 2008, it started to polarize a lot of scholarly and media attention [19], [27]. Many people have paid attention to the potential beneficial or negative effects that widespread use of this technology might have on our society [28]. Since Bitcoin has the greatest user base and is now the most widely used and relevant blockchain technology, the majority of research is being conducted in this setting [29]–[31]. Ongoing research questions the long-term viability of Bitcoin's blockchain-based infrastructure due to its effects on the environment, societal challenges, and economics, among other things [32]. Even though blockchain technology has been around 13 years. Only a few additional uses of blockchain had been developed by period of the COVID-19 outbreak had spread [33]. This is noteworthy [34].

For the last several months, blockchain has been and continues to be a key component in the battle against COVID-19, as it provides efficient control and tracing solutions, guarantees a traceable supply chain of crucial items and contributions, and safe payments [35], [36]. Improve clinical studies, monitor contributions, manage supply chains, and more using blockchain technology, which can be used in all sectors of healthcare touched by the epidemic [37], [38]. There have been several solutions proposed to the problems that arose during the epidemic, but many of them remained only ideas with no real assessment of their efficiency [39], [40]. In addition, there are great hopes for the potential usage of blockchain since its applications may be found in practically every human endeavor [41]. In spite of the recent rise in the popularity of blockchain technology in recent years, much of the literature on this technology has remained focused on its technical aspects, therefore ignoring to address the various difficulties it offers [42], [43].

After the technology has been solidified, the issue arises as to whether it should be used in other similarly complicated and critical situations, such as the pandemic management [44], [45]. Due to the fact that it can handle a wide variety of different requirements, including data exchange, data security, and data access, blockchain might be very valuable [46]. Managing the epidemic is becoming more and more feasible because to blockchain's ability to provide a cost-effective, trackable, and secure method for determining which line of action is the most beneficial [47]. Today's blockchain might be a tremendous tool in the battle against the virus because of its excellent tracking and monitoring characteristics, ensuring the visibility of both the supply chain of needed supplies and the safe handling of contributions [48]–[50].

2.1. Block chain current and future uses

The Bitcoin blockchain is a decentralized public record that can be accessed by anybody who is prepared to put their trust in it [51]. It was designed to keep track of Bitcoin exchanges. A brief introduction and explanation of this technology is provided below in order to better explain how we want to use it in our software architecture application [52], [53]. A predetermined number of new bitcoins is created every minute on average in the Bitcoin economy [54]. For all intents and purposes, bitcoins are always linked to specific Bitcoin addresses, and may be moved from one location to another via transactions [55]–[57]. Anyone may create new bitcoin addresses, receive bitcoins, and then transmit those bitcoins to others. It's possible for everyone to take part in the race to create new bitcoins in principle [58]. Neither the minting process nor the transactions are regulated by any central body [59]. A clever combination of a few fundamental cryptographic ideas (specifically, cryptographically functions and digitally signed systems with the adaptability of peer-to-peer networks) makes this all feasible [60].

A decentralized peer-to-peer network built on demand over the Internet connects all Bitcoin nodes: It is a node in the Bitcoin network every time the Bitcoin application is run on different [61]. A flow of data packets is shared with the new node to keep it up to date with the current system status [62]. Nodes get all the information they need to verify the integrity of a packet in every packet they receive from their neighbors [63]. Only if it passes this examination is it forwarded to all other nodes in the network. As a result, each and every node sends a confirmed packet to all of its neighbors in exactly the same way [64]. To do the full operation, it just takes a matter of seconds. Most of the time, the packets transferred inside the Bitcoin network include either a transaction or a block of data. Input and output addresses, digital signatures, and space to ultimately store a

message are the only components need to complete a transaction [65], [66]. It is common practice to assign input addresses to their corresponding output addresses when a transaction occurs. Digital signatures can't be created without the private keys that can only be obtained by entrusting the input addresses with a digital signature [67], [68]. Bitcoin transactions take a few seconds to reach all of the other nodes in the network, which is why it takes so long for a packet to get at its destination [69].

This does not adequate to declare the transaction validated, even if every take on the role the input address from which it was transmitted and may thus detect any transaction originating from the same address as illegitimate [70], [71]. For this reason, a transaction may be confirmed only when a miner adds it to a subsequent block. Some nodes, known as miners, perform extra tasks that set them apart from the rest of the network [72]. There are many other kinds of transactions that may be performed on a ledger; in addition to basic ones, they can also seek to add to it [73]–[75]. Its creation necessitates the use of sophisticated computational equipment [76]. If the miners are successful, they will be well rewarded: Not only do they get the freshly minted bitcoins, but they are also rewarded with the transaction fees associated with any transactions they successfully include in the block [77]–[79]. As long as the block has, I link to previous legitimate blocks; a timestamp, which serves as a digital fingerprint of all transactions contained in the block; and a unique nonce, the block is regarded to be valid and may be included in the blockchain [80]. To locate a nonce, a miner must do a brute-force search, and the likelihood that a particular miner would succeed is directly related to the amount of computer power used [81], [82]. There are nodes on the peer-to-peer network where such a nonce may be found for a miner's block [61]. Each node may independently verify that the block is legitimate, and all miners will begin linking that one as the final valid block. Until the first block was mined by Satoshi Nakamoto in January 2009, the blockchain consisted of a series of connected blocks [83].

2.2. How blockchain will give advantage

Technological innovation is one of the important variables that may assist to overcome the obstacles provided by the COVID-19 pandemic [60], [84]. Technological advances, like the Web of Things (IoT), machine intelligence, deep learning, cryptocurrency, mechatronics, unmanned aircraft, three-dimensional able to print, nanotechnology as well as bioengineering, 5G communication systems, platform as a service and computing capabilities, and data science, can be able to leverage to devise effective urgent management techniques for the COVID-19 pandemic

[85]–[88],[89]. Moreover, it is not bidirectional [90]. Distributed ledger technology enables users to trust the result of a process without believing the individuals, which is a requirement for economic efficiency and success [91], [92]. The novel coronavirus generated special challenges.

Individuals and towns are contributing money and protective gear in significant amounts [93]. However, a widespread fear is that contributions are being not utilized where needed and that resources are being diverted [94], [95]. There are various causes underlying these challenges, but they effect the motivation of individuals to give and hence postpone the purpose of fixing the problem.

2.3. Monetary Donation

As the number of infected persons continues to rise and hospitals in Italy are forced to deal with an unprecedented level of demand, a number of fund-raising events have been organized to help alleviate the strain [96], [97]. This problem is complicated because individuals frequently feel conflicted between their want to give money and their lack of faith in how it will be used. We believe that blockchain technology can be used to solve this issue [98], [99]. Why isn't this technology being utilized for goodness instead of only for profit?

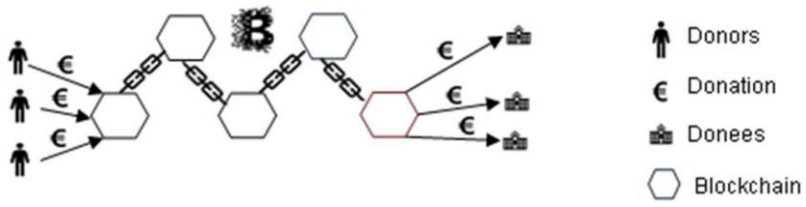


Figure 1: Blockchain Process

All stakeholders, contributors, and recipients can track and verify every monetary transaction thanks to the usage of blockchain, which is additionally bolstered by the inclusion of relevant paperwork [100], [101]. Because of the system's openness, the issue of skepticism previously highlighted would be resolved, allowing for an increase in contributions and faster collection and transmission of cash to hospitals, charities, and other projects [102].

2.4.Technical and Sanitary Material Donations

The global supply chain has been severely disrupted by the continuing COVID-19 outbreak [103], [104]. Factory lockdowns have led to a stop in industrial productivity, as well as a lack of factory design and equipment that can accommodate the new social and physical distance paradigms [105]. Additionally, the worldwide supply chain has been impacted by import and export restrictions [106], [107]. Despite the fact that it is now hard to measure the full extent of the pandemic's impact on global supply chain, it is clear that there have been major supply and demand issues. Strong growth or high supply might be caused by the sort of items needed [108], [109]. Supply chains for hospital devices and medicines have encountered and continue to encounter challenges in maintaining their integrity while also satisfying the increased demand [76].

Manufacturing businesses and certain foreign nations have volunteered to give technological and/or sanitary supplies to hospitals in times of crisis, such as during the SARS-CoV-2 epidemic. Products sold may not be delivered to their intended destinations for a variety of reasons [110], [111]. Think of a manufacturing business that is able to shift its major output into donating face masks and protective suits to a medical facility by air and that the transportation of these items takes place through the air [112].

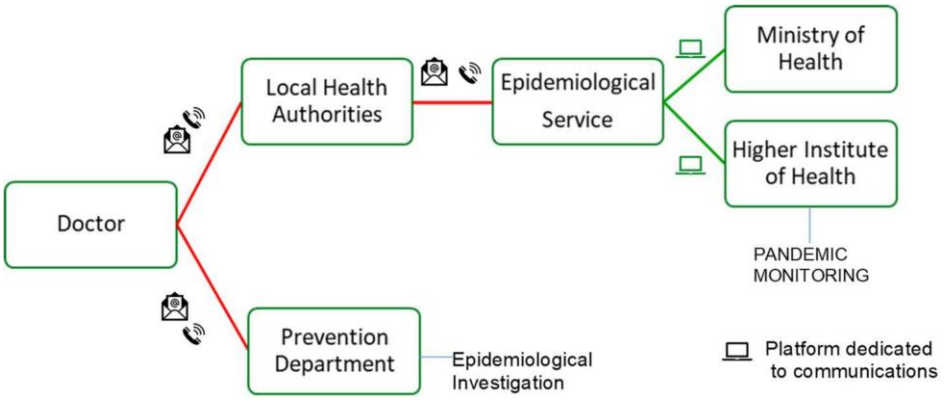
For example, a blockchain may be used to track a product's complete life cycle [113]. The presence of a trustworthy person who can record the transaction on the blockchain should be ensured at all points of access; this person should also bring, where feasible, the de-materialized papers such as the bill of lading or receipt signature [114]–[116]. The manufacturing firm, airport security, transportation companies for each delivery and delivery site, and the hospital are the trusted players [117]. There is an initial transport vehicle from which the items are loaded, and an authorized person adds this transaction to a network [118]. Then, a second man notifies the arrival of these products at an airport and their boarding aboard the aircraft, which completes the transaction. It is done both after the aircraft has landed and when items are moved from an airport to a medical facility [119].

Figure 2: Blockchain Life Cycle [120]

The development of a more robust supply chain may be aided by the use of blockchain technology [121]. Using blockchain, all stakeholders may be brought together in such a stable place without revealing their identities. Auditability, provenance, and transparency are all aided by the immutability of information logs [122].

2.5.Notification Flow of Suspected COVID-19 Cases

There were indicators for each area in Italy as to how COVID-19 instances were being communicated in Italy [123]. On the form for reporting instances of insert from viral pathogens doctor fills up the patient's individual and demographic clinical information, which relates to the locations they've been and how they've gotten there [124], [125]. The Prevention Department and the associated Local Health Authority must be notified of the completed form through email or phone [126]. This information is used to conduct epidemiology studies to discover all of the person's connections, in particular [127], [128]. When the LHA transmits a document to a regional epidemiological service, the data is sent to the Ministry of Health and ISS through an ad-hoc



infrastructure, which in turn provides the information to the LHA [129], [130]. This information is often used by the latter to track the spread of the

Figure 3: Notification Flow of Suspected COVID-19 Cases [131].

epidemic throughout the country [132]. SARS-CoV-2 test samples have been transferred to the regional lab in the meanwhile [133]. The doctor updates and delivers the results following the notification flow as outlined when the test results are available [134], [135].

Therefore, the doctors in the urgent and communicable diseases areas of the hospital, wellbeing staff from different wards, LHA officials, regional etiological provider functionaries, and protection divisional officials all participate in blockchain integration at the regional level [119], [136], [137]. Doctors would be responsible for uploading forms and changes to the blockchain, as well as verifying the information in the applications and changes [138], [139]. A new version of the data would then be included in a block on the blockchain, making it available to any users who have chosen to participate.

2.6.General Research Model

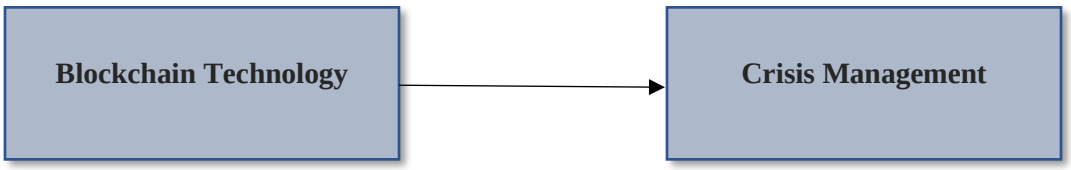


Figure 1: Conceptual Research Model

3. DISCUSSION

The unquestionable promise of blockchain technology has made its use a popular issue in recent years. It can be said that this technology can be deployed instantly and readily would be a mistake, since blockchain is a difficult technology that only a small number of individuals have started to examine. Despite the hype about blockchain, it is not a panacea for all of the world's problems.

However, it does provide new approaches to enhance the administration of current systems, and this is why it is so intriguing and demanding to investigate. There is a wide range of applications for the blockchain, which was originally designed to revolutionize the digital money industry. One of the most appealing aspects of this technology is the distributed system, which maintains the integrity of the data while also protecting users' privacy. A consumer usually, who are emotionally demanding and cognizant, would then request innovative goods / processes from institutions and businesses that are able to take advantage of these new technologies to improve or change the existing processes, create new industries, and create innovative products. While this may have seemed like an idealistic picture of the future only a few years ago, blockchain, a technology that can retain an unalterable record of every transaction, has already become a reality. Using blockchain technology, Gartner predicts that by 2025, the supply chain will be revolutionized, new business models will emerge, and old ones will be disrupted. When this technology is fully tapped into, it results in more efficient operations, real-time transactions, and lower costs in every area of the economy.

Security and confidence can be restored if the method presented in this article is transparent and immutable in crucial emergency scenarios, guaranteeing an efficient system that is also trustworthy. Collaboration and standardization amongst parties that are distinct in nature but have convergent requirements and interests would be necessary to realize the full potential of such a system's capabilities. The introduction of blockchain technology to solve these issues and the significant expenditures they would involve would make one question whether blockchain is not simply another example of an insufficient invention. Testing and analysis will help decide the optimum course of action for introducing this technology gradually, so that significant returns may be achieved step-by-step. That's why the purpose of this research is to build the basis for future research that will include cost-benefit analysis and an assessment of metrics like ROI to evaluate the viability of the project. When it comes to IT deployment, this article presents an architecture that should be studied more.

Blockchain technology has the potential to spur the development of new services for and on behalf of people. When there is an emergency like the COVID-19 crisis, the government must take an active role that appreciates the critical significance of innovation in every area and encourages the digital culture and associated infrastructures. However, when there are several parties engaged, like in the case of providing emergency services, there is an even greater requirement for openness;

quickness; correctness; safety. With the confidence in public institutions at an all-time low, it's critical for governments to meet the needs of people while maintaining high quality standards to generate value for the public and regain the trust of the public. There must be a greater emphasis on the execution of a development and growth plan that includes numerous decision-making levels (businesses, universities, and people), as well as a more participatory form of governance of local systems at the Centre of national governments' attention. To take advantage of emerging technologies like as bitcoin, machine learning, or the Internet - Of - things, a solid digital understanding is required to establish a strong desktop culture that is based on constant and trustworthy engagement with residents, enterprises, and national public authorities.

4. CONCLUSION

The blockchain technology used to manage monetary gifts makes it possible to keep track of the money that has been sent to the recipient. Through the usage of this technique, contributions to hospitals and healthcare infrastructures may rise since donors no longer have to worry about their money being misappropriated. Technical and sanitation items may be tracked on the blockchain in order to find out what went wrong if anything goes wrong, such as a product being lost. This increases the likelihood that donated goods will arrive to institutions when and how they are supposed to. The adoption of blockchain is hampered by the need for vetted individuals at each of the system's entry points. As a result, we're not talking about getting rid of unexpected occurrences altogether, but rather about making it easier to figure out what causes them.

To improve communication amongst healthcare infrastructures, blockchain technology may be used to speed up the flow of information. There is unfortunately a dearth of current digitalization in many national health care systems. In light of the current epidemic, it has become clear that hospitals and healthcare systems need to be digitally transformed. To assist in the management of the pandemic, our study proposes a digital system to detect what is occurring and ensure that the information is accurate and tamper-proof. In our proposal, we want to aid in the administration of enormous amounts of information and the storage of the collected data on a distributed manner, in an official blockchain. Governments and health agencies throughout the globe will need to examine new pandemic strategies to follow South Korea's lead after the epidemic is finished. They can't ignore digital and creative support systems like blockchain in future initiatives since it

represents a viable instrument to help the healthcare system. A new pandemic wave seems unlikely, but if it does occur again, we must be better equipped and utilize all of our technical tools to halt the development of a new epidemic and all of its associated issues.

REFERENCE

[1] H. Alzoubi, M. Alshurideh, B. Kurdi, B. Obeidat, S. Hamadneh, and A. Ahmad, "The influence of supply chain partners' integrations on organizational performance: The moderating role of trust," *Uncertain Supply Chain Manag.*, vol. 10, no. 4, pp. 1191–1202, 2022.

[2] M. T. Alshurideh, B. Al Kurdi, and S. A. Salloum, "The moderation effect of gender on accepting electronic payment technology: a study on United Arab Emirates consumers," *Rev. Int. Bus. Strateg.*, 2021.

[3] D. Miller, "The Best Practice of Teach Computer Science Students to Use Paper Prototyping. International Journal of Technology," *Innov. Manag. (IJTIM)*, vol. 1, no. 2, pp. 42–63, 2021.

[4] O. Gulseven and G. Ahmed, "The State of Life on Land (SDG 15) in the United Arab Emirates," *Int. J. Soc. Ecol. Sustain. Dev.*, vol. 13, no. 1, pp. 1–15, 2022, doi: 10.4018/ijsesd.306264.

[5] H. M. Alzoubi, B. Al Kurdi, M. Alshurideh, I. Akour, E. Tariq, and A. Alhamad, "The effect of social media influencers' characteristics on consumer intention and attitude toward Keto products purchase intention," *Int. J. Data Netw. Sci.*, vol. 6, no. 4, pp. 1135–1146, 2022, doi: 10.5267/j.ijdns.2022.7.006.

[6] M. Alshurideh, B. Al Kurdi, S. A. Salloum, I. Arpaci, and M. Al-Emran, "Predicting the actual use of m-learning systems: a comparative approach using PLS-SEM and machine learning algorithms," *Interact. Learn. Environ.*, pp. 1–15, 2020.

[7] A. Abudaqa, R. A. Alzahmi, H. Almujaini, and G. Ahmed, "Does innovation moderate the relationship between digital facilitators, digital transformation strategies and overall performance of SMEs of UAE?," *Int. J. Entrep. Ventur.*, vol. 14, no. 3, pp. 330–350, 2022, doi: 10.1504/ijev.2022.124964.

[8] H. M. Alzoubi, M. Alshurideh, B. Al Kurdi, I. Akour, B. Obeidat, and A. Alhamad, "The role of digital marketing channels on consumer buying decisions through eWOM in the Jordanian markets," *Int. J. Data Netw. Sci.*, vol. 6, no. 4, pp. 1175–1185, 2022, doi: 10.5267/j.ijdns.2022.7.002.

[9] T. Eli, "Students` Perspectives on the Use of Innovative and Interactive Teaching Methods at the University of Nouakchott Al Aasriya, Mauritania: English Department as a Case Study," *Int. J. Technol. Innov. Manag.*, vol. 1, no. 2, pp. 90–104, 2021, doi: 10.54489/ijtim.v1i2.21.

[10] H. M. Alzoubi, T. M. Ghazal, M. T. Alshurideh, B. Al Kurdi, and K. M. K. Alhyasat, "The effect of e-payment and online shopping on sales growth: Evidence from banking industry," *Int. J. Data Netw. Sci.*, vol. 6, no. 4, pp. 1369–1380, 2022, doi: 10.5267/j.ijdns.2022.5.014.

[11] A. M. Sakkthivel, G. Ahmed, C. T. Amponsah, and G. N. Muuka, "The influence of price and brand on the purchasing intensions of Arab women: an empirical study," *Int. J. Bus. Innov. Res.*, vol. 28, no. 2, pp. 141–161, 2022, doi: 10.1504/IJBIR.2022.123260.

[12] A. Akhtar, S. Akhtar, B. Bakhtawar, A. A. Kashif, N. Aziz, and M. S. Javeid, "COVID-19 Detection from CBC using Machine Learning Techniques," *Int. J. Technol. Innov. Manag.*, vol. 1, no. 2, pp. 65–78, 2021, doi: 10.54489/ijtim.v1i2.22.

[13] M. Alshurideh, B. Al Kurdi, and S. Salloum, "Investigating a theoretical framework for e-learning technology acceptance," *Int. J. Electr. Comput. Eng.*, vol. 10, no. 6, pp. 6484–6496, 2020.

[14] H. M. Alzoubi, B. Al Kurdi, I. Akour, and M. T. Alshurideh, "The effect of blockchain and smart inventory system on supply chain performance: Empirical evidence from retail industry," *Uncertain Supply Chain Manag.*, vol. 10, no. 4, pp. 1111–1116, 2022, doi: 10.5267/j.uscm.2022.9.001.

[15] M. Alshurideh, S. A. Salloum, B. Al Kurdi, A. A. Monem, and K. Shaalan, "Understanding the quality determinants that influence the intention to use the mobile learning platforms: A practical study," *Int. J. Interact. Mob. Technol.*, vol. 13, no. 11, pp. 157–183, 2019, doi: 10.3991/ijim.v13i11.10300.

[16] S. Rana, S. Verma, M. M. Haque, and G. Ahmed, "Conceptualizing international positioning strategies for Indian higher education institutions," *Rev. Int. Bus. Strateg.*, vol. 32, no. 4, pp. 503–519, 2022, doi: 10.1108/RIBS-07-2021-0105.

[17] A. Abudaqa, M. F. Hilmi, H. Almujaini, R. A. Alzahmi, and G. Ahmed, "Students' perception of e-Learning during the Covid Pandemic: a fresh evidence from United Arab Emirates (UAE)," *J. E-Learning Knowl. Soc.*, vol. 17, no. 3, pp. 110–118, 2021, doi: 10.20368/1971-8829/1135556.

[18] A. A. Kashif, B. Bakhtawar, A. Akhtar, S. Akhtar, N. Aziz, and M. S. Javeid, "Treatment Response Prediction in Hepatitis C Patients using Machine Learning Techniques," *Int. J. Technol. Innov. Manag.*, vol. 1, no. 2, pp. 79–89, 2021, doi: 10.54489/ijtim.v1i2.24.

[19] M. Alshurideh, B. Al Kurdi, A. Abu Hussien, and H. Alshaar, "Determining the main factors affecting consumers' acceptance of ethical advertising: A review of the Jordanian market," *J. Mark. Commun.*, vol. 23, no. 5, pp. 513–532, Mar. 2017, doi: 10.1080/13527266.2017.1322126.

[20] N. Alsharari, "Integrating Blockchain Technology with Internet of things to Efficiency," *Int. J. Technol. Innov. Manag.*, vol. 1, no. 2, pp. 01–13, 2021, doi: 10.54489/ijtim.v1i2.25.

[21] M. Alshurideh, B. A. Kurdi, S. A. Salloum, Z. M. Obeidat, and R. M. Al-dweeri, "An empirical investigation into examination of factors influencing university students' behavior towards elearning acceptance using SEM approach," *Int. J. Interact. Mob. Technol.*, vol. 14, no. 2, 2020, doi: 10.3991/ijim.v14i02.11115.

[22] H. Alzoubi *et al.*, "The effect of electronic human resources management on organizational health of telecommunications companies in Jordan," *Int. J. Data Netw. Sci.*, vol. 6, no. 2, pp. 429–438, 2022, doi: 10.5267/j.ijdns.2021.12.011.

[23] T. Mehmood, "Does Information Technology Competencies and Fleet Management Practices lead to Effective Service Delivery? Empirical Evidence from E- Commerce Industry," *Int. J. Technol. Innov. Manag.*, vol. 1, no. 2, pp. 14–41, 2021, doi: 10.54489/ijtim.v1i2.26.

[24] B. Al Kurdi, M. Alshurideh, and T. Al afaishat, "Employee retention and organizational performance: Evidence from banking industry," *Manag. Sci. Lett.*, vol. 10, no. 16, pp. 3981–3990, 2020, doi: 10.5267/j.msl.2020.7.011.

[25] N. Al Amiri, R. E. A. Rahim, and G. Ahmed, "Leadership styles and organizational knowledge management activities: A systematic review," *Gadjah Mada Int. J. Bus.*, vol. 22, no. 3, pp. 250–275, 2020, doi: 10.22146/gamaijb.49903.

[26] J. C. T. Gaytan, A. M. Sakthivel, S. S. Desai, and G. Ahmed, "Impact of Internal and External Promotional Variables on Consumer Buying Behavior in Emerging Economy – An Empirical Study," *Skyline Bus. J.*, vol. 16, no. 1, pp. 45–54, 2020, doi: 10.37383/sbj160104.

[27] H. Alzoubi, M. Alshurideh, B. Al Kurdi, I. Akour, and R. Aziz, "Does BLE technology contribute towards improving marketing strategies, customers' satisfaction and loyalty? The role of open innovation," *Int. J. Data Netw. Sci.*, vol. 6, no. 2, pp. 449–460, 2022, doi: 10.5267/j.ijdns.2021.12.009.

[28] H. M. Alzoubi, G. Ahmed, and M. Alshurideh, "An empirical investigation into the impact of product

quality dimensions on improving the order-winners and customer satisfaction," *Int. J. Product. Qual. Manag.*, vol. 36, no. 2, pp. 169–186, 2022, doi: 10.1504/IJPQM.2021.10037887.

[29] Vorobeva Victoria, "Impact of Process Visibility and Work Stress To Improve Service Quality: Empirical Evidence From Dubai Retail Industry," *Int. J. Technol. Innov. Manag.*, vol. 2, no. 1, p. 1, 2022, doi: 10.54489/ijtim.v2i1.59.

[30] M. Alshurideh, B. Kurdi, and A. Alnaser, "The impact of employee satisfaction on customer satisfaction: Theoretical and empirical underpinning," *Manag. Sci. Lett.*, vol. 10, no. 15, pp. 3561–3570, 2020.

[31] G. Ahmed and C. T. Amponsah, "Gender Differences in Entrepreneurial Attitude and Intentions: A Case of Dubai," *Proc. Ed.*, vol. 11, no. 4, pp. 315–334, 2018, [Online]. Available: https://www.researchgate.net/profile/Rudresh-Pandey-2/publication/349368995_Consumers'_purchase_decision_towards_Private_Label_Brands_An_Empirical_Investigation_for_Select_Indian_Retailers/links/602d103f299bf1cc26cfa009/Consumers-purchase-decision-towards

[32] H. M. Alzoubi, J. R. Hanaysha, M. E. Al-Shaikh, and S. Joghee, "Impact of Innovation Capabilities on Business Sustainability in Small and Medium Enterprises," *FIIB Bus. Rev.*, vol. 11, no. 1, pp. 67–78, 2022, doi: 10.1177/23197145211042232.

[33] B. H. Al Kurdi and M. T. Alshurideh, "Facebook Advertising as a Marketing Tool: Examining the Influence on Female Cosmetic Purchasing Behaviour," *Int. J. Online Mark.*, vol. 11, no. 2, pp. 52–74, 2021.

[34] T. M. Ghazal *et al.*, "Energy-efficiency model for residential buildings using supervised machine learning algorithm," *Intell. Autom. Soft Comput.*, vol. 30, no. 3, pp. 881–888, 2021, doi: 10.32604/iasc.2021.017920.

[35] M. A. Khan, "Challenges Facing the Application of IoT in Medicine and Healthcare," *Int. J. Comput. Inf. Manuf.*, vol. 1, no. 1, pp. 39–55, 2021, doi: 10.54489/ijcim.v1i1.32.

[36] N. Al Amiri, R. A. Rahim, and ..., "The organizational resources and knowledge management capability: A systematic review," *Bus. Econ. …*, vol. 15, no. 5, pp. 636–647, 2019, [Online]. Available: https://www.researchgate.net/profile/Nabeel-Al-Amiri/publication/341824121_The_Organizational_Resources_and_Knowledge_Management_Capability_A_Systematic_Review/links/60840ac9907dcf667bbeae96/The-Organizational-Resources-and-Knowledge-Management-Capability

[37] H. M. Alzoubi *et al.*, "AI-Based Prediction of Capital Structure: Performance Comparison of ANN SVM and LR Models," *Comput. Intell. Neurosci.*, vol. 2022, pp. 1–13, 2022, doi: 10.1155/2022/8334927.

[38] M. Alshurideh, R. M. d.Taisir Masa'deh, and B. Alkurdi, "The effect of customer satisfaction upon customer retention in the Jordanian mobile market: An empirical investigation," *Eur. J. Econ. Financ. Adm. Sci.*, vol. 47, no. 47, pp. 69–78, 2012.

[39] E. P. Mondol, "The Impact of Block Chain and Smart Inventory System on Supply Chain Performance at Retail Industry," *Int. J. Comput. Inf. Manuf.*, vol. 1, no. 1, pp. 56–76, 2021, doi: 10.54489/ijcim.v1i1.30.

[40] G. Ahmed and N. Al Amiri, "An Analysis of Strategic Leadership Effectiveness of Prophet Muhammad (PBUH) Based on Dave Ulrich Leadership Code," *J. Islam. Stud. Cult.*, vol. 7, no. 1, pp. 11–27, 2019, doi: 10.15640/jisc.v7n1a2.

[41] H. Alzoubi, M. Alshurideh, A. Gasaymeh, G. Ahmed, and B. Al Kurd, "Loyalty program effectiveness: Theoretical reviews and practical proofs," *Uncertain Supply Chain Manag.*, vol. 8, no. 3, pp. 599–612, 2020, doi: 10.5267/j.uscm.2020.2.003.

[42] H. M. Alzoubi *et al.*, "Empirical linkages between ICT, tourism, and trade towards sustainable environment: evidence from BRICS countries," 2022, doi: 10.1080/1331677X.2022.2127417.

[43] T. M. Ghazal *et al.*, "Edge AI-Based Automated Detection and Classification of Road Anomalies in VANET Using Deep Learning," *Comput. Intell. Neurosci.*, vol. 2021, pp. 1–19, Sep. 2021, doi:

10.1155/2021/6262194.

[44] H. Alzoubi and M. & Alnazer, N., Alnuaimi, "Analyzing the Appropriate Cognitive Styles and its effect on Strategic Innovation in Jordanian Universities," *Int. J. Bus. Excell.*, vol. 13, no. 1, pp. 127–140, 2017.

[45] M. Farouk, "The Universal Artificial Intelligence Efforts to Face Coronavirus COVID-19," *Int. J. Comput. Inf. Manuf.*, vol. 1, no. 1, pp. 77–93, 2021, doi: 10.54489/ijcim.v1i1.47.

[46] H. M. Alzoubi, M. In'airat, and G. Ahmed, "Investigating the impact of total quality management practices and Six Sigma processes to enhance the quality and reduce the cost of quality: the case of Dubai," *Int. J. Bus. Excell.*, vol. 27, no. 1, pp. 94–109, 2022, doi: 10.1504/IJBEX.2022.123036.

[47] N. Guergov, S., & Radwan, "Blockchain Convergence: Analysis of Issues Affecting IoT, AI and Blockchain," *Inf. Manuf.*, vol. 1, no. 1, pp. 1–17, 2021.

[48] H. M. Alzoubi and R. Yanamandra, "Empirical Investigation of Mediating Role of Six Sigma Approach in Rationalizing the COQ in Service Organizations," *Oper. Supply Chain Manag. An Int. J.*, vol. 15, no. 1, pp. 2579–9363, 2022.

[49] M. Alshurideh, "Pharmaceutical Promotion Tools Effect on Physician's Adoption of Medicine Prescribing: Evidence from Jordan," *Mod. Appl. Sci.*, vol. 12, no. 11, 2018.

[50] G. Ahmed, C. T. Amponsah, and S. S. Deasi, "Exploring the Dynamics of Women Entrepreneurship : A Case Study of UAE," *Int. J. Bus. Appl. Sci.*, vol. 7, no. 3, pp. 13–24, 2018.

[51] A. Alzoubi, "Renewable Green hydrogen energy impact on sustainability performance," *Int. J. Comput. Inf. Manuf.*, vol. 1, no. 1, pp. 94–105, 2021, doi: 10.54489/ijcim.v1i1.46.

[52] H. M. Alzoubi, H. Elrehail, J. R. Hanaysha, A. Al-Gasaymeh, and R. Al-Adaileh, "The Role of Supply Chain Integration and Agile Practices in Improving Lead Time During the COVID-19 Crisis," *Int. J. Serv. Sci. Manag. Eng. Technol.*, vol. 13, no. 1, pp. 1–11, 2022, doi: 10.4018/IJSSMET.290348.

[53] T. M. Ghazal *et al.*, "IOMT cloud-based intelligent prediction of breast cancer stages empowered with Deep Learning," *IEEE Access*, vol. 9, pp. 14649–46478, Oct. 2021.

[54] M. Alshurideh, S. A. Salloum, B. Al Kurdi, and M. Al-Emran, "Factors affecting the Social Networks Acceptance: An Empirical Study using PLS-SEM Approach," in *8th International Conference on Software and Computer Applications*, 2019, pp. 1–5.

[55] H. Alzoubi, M. Shamout, R. Ben-Abdallah, M. Alshurideh, B. Al Kurdi, and S. Hamadneh, "A conceptual model for the adoption of autonomous robots in supply chain and logistics industry," *Uncertain Supply Chain Manag.*, vol. 10, no. 2, pp. 577–592, 2022, doi: 10.5267/j.uscm.2021.11.006.

[56] M. El Khatib, S. Hamidi, I. Al Ameeri, H. Al Zaabi, and R. Al Marqab, "Digital Disruption and Big Data in Healthcare-Opportunities and Challenges," *Clin. Outcomes Res.*, vol. 14, pp. 563–574, 2022, doi: 10.2147/CEOR.S369553.

[57] G. Ahmed and A. Rafiuddin, "Cultural Dimensions of Economic Development: A Case of UAE," *Theor. Econ. Lett.*, vol. 08, no. 11, pp. 2479–2496, 2018, doi: 10.4236/tel.2018.811160.

[58] A. J. Obaid, "Assessment of Smart Home Assistants as an IoT," *Int. J. Comput. Inf. Manuf.*, vol. 1, no. 1, pp. 18–38, 2021, doi: 10.54489/ijcim.v1i1.34.

[59] H. M. Alzoubi, K. L. Lee, P. N. Romzi, J. R. Hanaysha, and M. Alshurideh, "Investigating the impact of benefits and challenges of IOT adoption on supply chain performance and organizational performance: An empirical study in Malaysia," *Uncertain Supply Chain Manag.*, vol. 10, no. 2, pp. 537–550, 2022, doi: 10.5267/j.uscm.2021.11.009.

[60] M. El Khatib, L. Nakand, S. Almarzooqi, and A. Almarzooqi, "E-Governance in Project Management: Impact and Risks of Implementation," *Am. J. Ind. Bus. Manag.*, vol. 10, no. 12, pp. 1785–1811, 2020, doi: 10.4236/ajibm.2020.1012111.

[61] T. M. Ghazal, M. Suleman, T. R. Soomro, and M. Alshurideh, "Combating Against Potentially Harmful Mobile Apps," in *The International Conference on Artificial Intelligence and Computer Vision*, 2021, pp. 154–173. doi: 10.1007/978-3-030-76346-6_15.

[62] M. El Khatib, M. Hammerschmidt, and M. Al Junaibi, "Leveraging innovation input on enhancing smart service quality. Cases from Abu Dhabi Emirate," *Int. J. Manag. Cases*, vol. 23, no. 2, pp. 46–62, 2021, [Online]. Available: http://www.redi-bw.de/db/ebsco.php/search.ebscohost.com/login.aspx%3Fdirect%3Dtrue%26db%3Dbuh%26AN%3D151548527%26site%3Dehost-live

[63] H. M. Alzoubi, K. L. Lee, N. A. N. Azmi, J. R. Hanaysha, and M. T. Alshurideh, "The effect of digital supply chain on organizational performance: An empirical study in Malaysia manufacturing industry," *Uncertain Supply Chain Manag.*, vol. 10, no. 2, pp. 495–510, 2022, doi: 10.5267/j.uscm.2021.12.002.

[64] M. M. El Khatib and G. Ahmed, "Robotic pharmacies potential and limitations of artificial intelligence: A case study," *Int. J. Bus. Innov. Res.*, vol. 23, no. 3, pp. 298–312, 2020, doi: 10.1504/IJBIR.2020.110972.

[65] H. M. Alzoubi *et al.*, "Fuzzy assisted human resource management for supply chain management issues," *Ann. Oper. Res.*, vol. 2, no. 308, pp. 617–629, 2022, doi: 10.1007/s10479-021-04472-8.

[66] M. M. El El Khatib and M. J. C. Opulencia, "The Effects of Cloud Computing (IaaS) on E- Libraries in United Arab Emirates," *Procedia Econ. Financ.*, vol. 23, pp. 1354–1357, 2015, doi: 10.1016/s2212-5671(15)00521-3.

[67] D. M. M. El Khatib, "Integrating Project Risk Management and Value Engineering in Tendering Processes," *Int. J. Eng. Res.*, vol. 4, no. 8, pp. 442–445, 2015, doi: 10.17950/ijer/v4s8/808.

[68] T. M. Ghazal *et al.*, "Multi-Dimensional Trust Quantification by Artificial Agents through Evidential Fuzzy Multi-Criteria Decision Making," *IEEE Access*, vol. 9, pp. 159399–159412, 2021, doi: 10.1109/ACCESS.2021.3131521.

[69] H. M. Alzoubi *et al.*, "Fusion-based supply chain collaboration using machine learning techniques," *Intell. Autom. Soft Comput.*, vol. 31, no. 3, pp. 1671–1687, 2022, doi: 10.32604/IASC.2022.019892.

[70] H. M. Alzoubi, J. Hanaysha, and M. Al-Shaikh, "Importance of Marketing Mix Elements in Determining Consumer Purchase Decision in the Retail Market," *Int. J. Serv. Sci. Manag. Eng. Technol.*, vol. 12, pp. 56–72, 2021, doi: 10.4018/IJSSMET.2021110104.

[71] M. M. El Khatib, A. Al-Nakeeb, and G. Ahmed, "Integration of Cloud Computing with Artificial Intelligence and Its Impact on Telecom Sector—A Case Study," *iBusiness*, vol. 11, no. 01, pp. 1–10, 2019, doi: 10.4236/ib.2019.111001.

[72] S. Akhtar, A., Bakhtawar, B., & Akhtar, "EXTREME PROGRAMMING VS SCRUM: A COMPARISON OF AGILE MODELS Asma Akhtar, Birra Bakhtawar, Samia Akhtar," *Int. J. Technol. Innov. Manag. (IJTIM), 2(2).*, vol. 2, no. 2, pp. 80–96, 2022.

[73] T. Eli and Lalla Aisha Sidi Hamou, "Investigating the Factors That Influence Students` Choice of English Studies As a Major: the Case of University of Nouakchott Al Aasriya, Mauritania," *Int. J. Technol. Innov. Manag.*, vol. 2, no. 1, p. 1, 2022, doi: 10.54489/ijtim.v2i1.62.

[74] T. M. Ghazal, M. K. Hasan, S. N. H. Abdullah, K. A. Abubakkar, and M. A. M. Afifi, "IoMT-enabled fusion-based model to predict posture for smart healthcare systems," *Comput. Mater. Contin.*, vol. 71, no. 2, pp. 2579–2597, 2022, doi: 10.32604/cmc.2022.019706.

[75] C. T. Amponsah, G. Ahmed, M. Kumar, and S. Adams, "The business effects of mega-sporting events on host cities: An empirical view," *Probl. Perspect. Manag.*, vol. 16, no. 3, pp. 324–336, 2018, doi: 10.21511/ppm.16(3).2018.26.

[76] H. Alzoubi and G. Ahmed, "Do TQM practices improve organisational success? A case study of electronics industry in the UAE," *Int. J. Econ. Bus. Res.*, vol. 17, no. 4, pp. 459–472, 2019, doi:

10.1504/IJEBR.2019.099975.

[77] H. M. Alzoubi *et al.*, "IoT for Smart Cities: Machine Learning Approaches in Smart Healthcare-A Review," *Futur. Internet*, vol. 13, no. 8, p. 218, 2021, doi: 10.3390/fi13080218.

[78] M. El Khatib, S. Al Blooshi, and A. Al-habeeb, "The Challenge and Potential Solutions of Reading Voluminous Electronic Medical Records (EMR): A Case Study from UAE," *IOSR J. Bus. Manag. (IOSR-JBM*, vol. 18, no. 12, pp. 38–46, 2016.

[79] T. M. Ghazal, *Positioning of UAV base stations using 5G and beyond networks for IOMT applications*. Arabian Journal for Science and Engineering, 2021.

[80] John Kasem and Anwar Al-Gasaymeh, "a Cointegration Analysis for the Validity of Purchasing Power Parity: Evidence From Middle East Countries," *Int. J. Technol. Innov. Manag.*, vol. 2, no. 1, p. 1, 2022, doi: 10.54489/ijtim.v2i1.60.

[81] H. M. Alzoubi *et al.*, "Modelling supply chain information collaboration empowered with machine learning technique," *Intell. Autom. Soft Comput.*, vol. 30, no. 1, pp. 243–257, 2021, doi: 10.32604/iasc.2021.018983.

[82] M. M. El Khatib and G. Ahmed, "Management of artificial intelligence enabled smart wearable devices for early diagnosis and continuous monitoring of CVDS," *Int. J. Innov. Technol. Explor. Eng.*, vol. 9, no. 1, pp. 1211–1215, 2019, doi: 10.35940/ijitee.L3108.119119.

[83] G. M. Qasaimeh and H. E. Jaradeh, "The Impact of Artificial Intelligence on the effective applying of Cyber Governance in Jordanian Banks," *Int. J. Technol. Innov. Manag.*, vol. 2, no. 1, 2022.

[84] B. Amrani, A. Z., Urquia, I., & Vallespir, "INDUSTRY 4.0 TECHNOLOGIES AND LEAN PRODUCTION COMBINATION: A STRATEGIC METHODOLOGY BASED ON LINKS QUANTIFICATION Anne Zouggar Amrani, Ilse Urquia Ortega, and Bruno Vallespir," *Int. J. Technol. Innov. Manag. (IJTIM), 2(2).*, vol. 2, no. 2, pp. 33–51, 2022.

[85] H. M. Alzoubi, M. Vij, A. Vij, and J. R. Hanaysha, "What leads guests to satisfaction and loyalty in UAE five-star hotels? AHP analysis to service quality dimensions," *Enlightening Tour.*, vol. 11, no. 1, pp. 102–135, 2021.

[86] G. Ahmed and Nabeel Al Amiri, "the Transformational Leadership of the Founding Leaders of the United Arab Emirates: Sheikh Zayed Bin Sultan Al Nahyan and Sheikh Rashid Bin Saeed Al Maktoum," *Int. J. Technol. Innov. Manag.*, vol. 2, no. 1, p. 1, 2022, doi: 10.54489/ijtim.v2i1.58.

[87] T. M. Ghazal, H. M. Alzoubi, R. Naqvi, T. R. Soomro, and M. T. Alshurideh, "The Nexus Between Big Data and Decision-Making: A Study of Big Data Techniques and Technologies," in *The International Conference on Artificial Intelligence and Computer Vision*, 2021, pp. 838–853.

[88] T. M. Ghazal, E. Rehman, M. A. Khan, T. R. Soomro, N. Taleb, and M. A. Afifi, "Using blockchain to ensure trust between donor agencies and ngos in under-developed countries," *Computers*, vol. 10, p. 8, Aug. 2021.

[89] M. El Khatib, F. Beshwari, M. Beshwari, and A. Beshwari, "The impact of blockchain on project management," *ICIC Express Lett.*, vol. 15, no. 5, pp. 467–474, 2021, doi: 10.24507/icicel.15.05.467.

[90] H. M. Alzoubi, M. Alnuaimi, D. Ajelat, and A. A. Alzoubi, "Towards intelligent organisations: An empirical investigation of learning orientation's role in technical innovation," *Int. J. Innov. Learn.*, vol. 29, no. 2, pp. 207–221, 2021.

[91] Asem Alzoubi, "Machine Learning for Intelligent Energy Consumption in Smart Homes," *Int. J. Comput. Inf. Manuf.*, vol. 2, no. 1, p. 1, 2022, doi: 10.54489/ijcim.v2i1.75.

[92] T. M. Ghazal, H. M. Alzoubi, and M. Alshurideh, "Integrating BLE Beacon Technology with Intelligent Information Systems IIS for Operations' Performance: A Managerial Perspective," 2021, pp. 527–538. doi: 10.1007/978-3-030-76346-6_48.

[93] H. M. Alzoubi, S. Joghee, and A. R. Dubey, "Decisions effectiveness of FDI investment biases at real estate industry: Empirical evidence from Dubai smart city projects," *Int. J. Sci. Technol. Res.*, vol. 9, no. 3, pp. 3499–3503, 2020.

[94] M. El Khatib, K. Alabdooli, A. AlKaabi, and S. Al Harmoodi, "Sustainable Project Management: Trends and Alignment," *Theor. Econ. Lett.*, vol. 10, no. 06, pp. 1276–1291, 2020, doi: 10.4236/tel.2020.106078.

[95] T. M. Ghazal *et al.*, "Software defect prediction using ensemble learning: A systematic literature review," *IEEE Access*, vol. 9, no. 1109, pp. 98754–98771, 2021, doi: 10.1109/ACCESS.2021.3095559.

[96] H. M. Alzoubi *et al.*, "Securing Smart Cities Using Blockchain Technology," in *2022 1st International Conference on AI in Cybersecurity (ICAIC*, 2022, pp. 1–4. doi: 10.1109/icaic53980.2022.9896971.

[97] E. Khatib, Z. M., R. A., and A. Al-Nakeeb, "The effect of AI on project and risk management in health care industry projects in the United Arab Emirates (UAE)," *Int. J. Appl. Eng. Res.*, vol. 6, p. 1, 2021.

[98] Nada Ratkovic, "Improving Home Security Using Blockchain," *Int. J. Comput. Inf. Manuf.*, vol. 2, no. 1, p. 1, 2022, doi: 10.54489/ijcim.v2i1.72.

[99] T. M. Ghazal, R. A. Said, and N. Taleb, *Internet of vehicles and autonomous systems with AI for Medical Things*. Soft Computing, 2021.

[100] H. M. Alzoubi, G. Ahmed, A. Al-Gasaymeh, and B. Al Kurdi, "Empirical study on sustainable supply chain strategies and its impact on competitive priorities: The mediating role of supply chain collaboration," *Manag. Sci. Lett.*, vol. 10, no. 3, pp. 703–708, 2020, doi: 10.5267/j.msl.2019.9.008.

[101] Nasim, S. F., M. R. Ali, and U. Kulsoom, "Artificial Intelligence Incidents & Ethics A Narrative Review. International Journal of Technology, Innovation and Management," *Int. J. Technol. Innov. Manag.*, vol. 2, no. 2, pp. 52–64, 2022.

[102] N. Alsharari, "the Implementation of Enterprise Resource Planning (Erp) in the United Arab Emirates: a Case of Musanada Corporation," *Int. J. Technol. Innov. Manag.*, vol. 2, no. 1, p. 1, 2022, doi: 10.54489/ijtim.v2i1.57.

[103] M. M. El Khatib and G. Ahmed, "Improving Efficiency in IBM Asset Management Software System 'Maximo': A Case Study of Dubai Airports and Abu Dhabi National Energy Company," *Theor. Econ. Lett.*, vol. 08, no. 10, pp. 1816–1829, 2018, doi: 10.4236/tel.2018.810119.

[104] Khatib, H. Alzoubi, and M. El, "BIM as a tool to optimize and manage project risk management," *Int. J. Mech. Eng.*, vol. 7, no. 1, pp. 6307–6323, 2022.

[105] H. M. Alzoubi, A. U. Rehman, R. M. Saleem, Z. Shafi, M. Imran, and M. Pradhan, "Analysis of Income on the Basis of Occupation using Data Mining," in *2022 International Conference on Business Analytics for Technology and Security, ICBATS 2022*, 2022, pp. 1–4. doi: 10.1109/ICBATS54253.2022.9759040.

[106] M. El Khatib, A. Kherbash, A. Al Qassimi, and K. Al Mheiri, "How Can Collaborative Work and Collaborative Systems Drive Operational Excellence in Project Management?," *J. Serv. Sci. Manag.*, vol. 15, no. 03, pp. 297–307, 2022, doi: 10.4236/jssm.2022.153017.

[107] T. Ghazal, M. Afifi, and D. Kaira, "Integration of collaboration systems in hospitality management as a comprehensive solution," *Int. J. Adv. Sci. Technol.*, vol. 29, no. 8s, pp. 3155–3173, 2020, [Online]. Available: http://sersc.org/journals/index.php/IJAST/article/view/16386

[108] H. M. Alzoubi *et al.*, "Digital Transformation and SMART-The Analytics factor," in *2022 International Conference on Business Analytics for Technology and Security, ICBATS 2022*, 2022, pp. 1–11. doi: 10.1109/ICBATS54253.2022.9759084.

[109] M. El Khatib and A. Al Falasi, "Effects of Artificial Intelligence on Decision Making in Project Management," *Am. J. Ind. Bus. Manag.*, vol. 11, no. 03, pp. 251–260, 2021, doi: 10.4236/ajibm.2021.113016.

[110] H. M. Alzoubi, A. Ali, A. W. Septyanto, I. Chaudhary, H. A. Hamadi, and Z. F. Khan, "Applied Artificial Intelligence as Event Horizon Of Cyber Security," in *2022 International Conference on Business Analytics for Technology and Security (ICBATS*, 2022, pp. 1–7. doi: 10.1109/ICBATS54253.2022.9759076.

[111] M. El Khatib, M. Almteiri, and S. A. Al Qasemi, "The Correlation between Emotional Intelligence and Project Management Success," *iBusiness*, vol. 13, no. 01, pp. 18–29, 2021, doi: 10.4236/ib.2021.131002.

[112] H. M. Alzoubi and R. Aziz, "Does emotional intelligence contribute to quality of strategic decisions? The mediating role of open innovation," *J. Open Innov. Technol. Mark. Complex.*, vol. 7, no. 2, p. 130, 2021, doi: 10.3390/joitmc7020130.

[113] P. S. Ghosh, S., & Aithal, "BEHAVIOUR OF INVESTMENT RETURNS IN THE DISINVESTMENT," *Int. J. Technol. Innov. Manag. (IJTIM), 2(2).*, vol. 2, no. 2, pp. 65–79, 2022.

[114] H. Alzoubi, M. Alshurideh, B. Al Kurdi, and M. Inairat, "Do perceived service value, quality, price fairness and service recovery shape customer satisfaction and delight? A practical study in the service telecommunication context," *Uncertain Supply Chain Manag.*, vol. 8, no. 3, pp. 579–588, 2020, doi: 10.5267/j.uscm.2020.2.005.

[115] M. El Khatib, A. Al Jaberi, and A. Al Mahri, "Benchmarking Projects' 'Lessons Learned' through Knowledge Management Systems: Case of an Oil Company," *iBusiness*, vol. 13, no. 01, pp. 1–17, 2021, doi: 10.4236/ib.2021.131001.

[116] T. M. Ghazal *et al.*, "Performances of k-means clustering algorithm with different distance metrics," *Intell. Autom. Soft Comput.*, vol. 30, no. 2, pp. 735–742, Aug. 2021, doi: 10.32604/iasc.2021.019067.

[117] Maged Farouk, "Studying Human Robot Interaction and Its Characteristics," *Int. J. Comput. Inf. Manuf.*, vol. 2, no. 1, p. 1, 2022, doi: 10.54489/ijcim.v2i1.73.

[118] M. M.ElKhatib, "Knowledge Management System: Critical Success Factors and Weight Scoring Model of the Technical Dimensions," *Int. J. Appl. Inf. Syst.*, vol. 7, no. 9, pp. 6–12, 2014, doi: 10.5120/ijais14-451213.

[119] H. M. Alzoubi, T. Mehmood, M. Alshurideh, A. Al-Gasaymeh, and G. Ahmed, "Schumpeterian entrepreneurship theory: Evolution and relevance," *Acad. Entrep. J.*, vol. 25, no. 4, pp. 1–10, 2019.

[120] H. M. Alzoubi *et al.*, "Cyber Security Threats on Digital Banking," in *2022 1st International Conference on AI in Cybersecurity (ICAIC*, 2022, pp. 1–4. doi: 10.1109/icaic53980.2022.9896966.

[121] M. El Khatib, A. AlMaeeni, and W. Alkamali, "The Relation between Effective Digital Program Governance and Program Success," *Am. J. Ind. Bus. Manag.*, vol. 12, no. 09, pp. 1402–1418, 2022, doi: 10.4236/ajibm.2022.129078.

[122] T. M. Ghazal, H. M. Alzoubi, R. M. Al Batayneh, N. Taleb, R. A. Said, and M. T. Alshurideh, "IT Governance Framework and Smart Services Integration for Future Development of Dubai Infrastructure Utilizing AI and Big Data, Its Reflection on the Citizens Standard of Living," 2021, pp. 235–247. doi: 10.1007/978-3-030-76346-6_22.

[123] K. Elkhatib, M., Al Hosani, A., Al Hosani, I., & Albuflasa, "Agile Project Management and Project Risks Improvements: Pros and Cons.," *Mod. Econ.*, vol. 13, no. 9, pp. 1157–1176, 2022.

[124] H. Alzoubi *et al.*, "Predicting the intention to use google glass: A comparative approach using machine learning models and PLS-SEM," *Int. J. Data Netw. Sci.*, vol. 5, no. 3, pp. 311–320, 2021, doi: 10.5267/j.ijdns.2021.6.002.

[125] T. M. Ghazal *et al.*, "Hep-pred: Hepatitis C staging prediction using fine gaussian SVM," *Comput. Mater. Contin.*, vol. 69, no. 1, pp. 191–203, 2021, doi: 10.32604/cmc.2021.015436.

[126] H. M. Alzoubi and R. Yanamandra, "Investigating the mediating role of Information Sharing Strategy on Agile Supply Chain in Supply Chain Performance," *Uncertain Supply Chain Manag.*, vol. 8, no. 2, pp. 273–284, 2020.

[127] S. Goria, "A DECK OF CARDS TO HELP TRACK DESIGN TRENDS TO ASSIST THE," *Int. J. Technol. Innov. Manag. (IJTIM), 2(2).*, vol. 2, no. 2, pp. 1–17, 2022.

[128] M. El Khatib, A. Al Hammadi, A. Al Hamar, K. Oraby, and M. Abdulaziz, "How Global Supply Chain Management Is Disrupting Local Supply Chain Management Case of Oil and Gas Industry in UAE," *Am. J. Ind. Bus. Manag.*, vol. 12, no. 05, pp. 1067–1078, 2022, doi: 10.4236/ajibm.2022.125056.

[129] Neyara Radwan, "the Internet'S Role in Undermining the Credibility of the Healthcare Industry," *Int. J. Comput. Inf. Manuf.*, vol. 2, no. 1, p. 1, 2022, doi: 10.54489/ijcim.v2i1.74.

[130] T. Ghazal, T. R. Soomro, and K. Shaalan, "Integration of Project Management Maturity (PMM) Based on Capability Maturity Model Integration (CMMI)," *Eur. J. Sci. Res.*, vol. 99, p. 418{\textendash}428, 2013.

[131] H. M. Alzoubi, S. Hamadneh, O. Pedersen, M. Alshurideh, and B. A. Kurdi, "An Investigation Of The Role Of Supply Chain Visibility Into The Scottish Blood Supply Chain," *J. Leg. Ethical Regul. Issues*, vol. 24, pp. 1–12, 2021.

[132] T. M. Ghazal, M. A. M. Afifi, D. Kalra, and B. Mago, "Information Technology Ethics and Professional Responsibilities," *Int. J. Adv. Sci. Technol.*, vol. 29, no. 4, pp. 11336–11343, 2020, [Online]. Available: https://www.researchgate.net/publication/352159596

[133] M. M. El Khatib, G. Ahmed, and A. Al-Nakeeb, "Enterprise Cloud Computing Project for Connecting Higher Education Institutions: A Case Study of the UAE," *Mod. Econ.*, vol. 10, no. 01, pp. 137–155, 2019, doi: 10.4236/me.2019.101010.

[134] Edward Probir Mondol, "the Role of Vr Games To Minimize the Obesity of Video Gamers," *Int. J. Comput. Inf. Manuf.*, vol. 2, no. 1, p. 1, 2022, doi: 10.54489/ijcim.v2i1.70.

[135] T. M. Ghazal *et al.*, "Modeling habit patterns using conditional reflexes in agency," *Intell. Autom. Soft Comput.*, vol. 30, no. 2, pp. 539–552, Aug. 2021, doi: 10.32604/iasc.2021.018888.

[136] Saad Masood Butt, "Management and Treatment of Type 2 Diabetes," *Int. J. Comput. Inf. Manuf.*, vol. 2, no. 1, p. 1, 2022, doi: 10.54489/ijcim.v2i1.71.

[137] M. El El Khatib, A. Alhosani, I. Alhosani, O. Al Matrooshi, and M. Salami, "Simulation in Project and Program Management: Utilization, Challenges and Opportunities," *Am. J. Ind. Bus. Manag.*, vol. 12, no. 04, pp. 731–749, 2022, doi: 10.4236/ajibm.2022.124037.

[138] S. Federico Del Giorgio, "IMPACTS OF CYBER SECURITY AND SUPPLY CHAIN RISK ON DIGITAL OPERATIONS: EVIDENCE FROM THE UAE PHARMACEUTICAL INDUSTRY Federico Del Giorgio Solfa," *Int. J. Technol. Innov. Manag. (IJTIM), 2(2).*, vol. 2, no. 2, pp. 18–32, 2022.

[139] M. El Khatib, H. M. Alzoubi, A. Al Mulla, and W. Al Ketbi, "The Role of Blockchain in E-Governance and Decision-Making in Project and Program Management," *Adv. Internet Things*, vol. 12, no. 03, pp. 88–109, 2022, doi: 10.4236/ait.2022.123006.