THE IMPACT OF COVID-19 ON THE MENTAL HEALTH OF FRONTLINE HEALTHCARE WORKERS

Muhammad Turki Alshurideh [1], Barween Al Kurdi [2], Hevron Alshurideh [3]

[1] Department of Marketing, School of Business, The University of Jordan, Amman 11942, Jordan, Orcid [0000-0002-7336-381X], m.alshurideh@ju.edu.jo

[2] Department of Marketing, Faculty of Economics and Administrative Sciences, The Hashemite University, P.O. Box 330127, Zarqa 13133, Jordan. Orcid [0000-0002-0825-4617], barween@hu.edu.jo

[3] Department of Foreign Languages, Faculty of English Language and Literature, The University of Jordan, Amman 11942, Jordan. Hevronalshurideh@gmail.com

ABSTRACT

The COVID-19 pandemic, healthcare systems are under a lot of strain as a result of a health emergency. Despite this exceptional pandemic, doctors treating COVID-19 patients come across a number of difficulties. Attention has been called to the mental health of frontline healthcare professionals as studies continue to show high rates of burnout, psychological stress, and suicide. Frontline healthcare workers who had direct contact with Covid-infected patients displayed a higher level of mental illness. Due to their excruciatingly long and stressful work hours, these HCW displayed signs of anxiety, sadness, and insomnia. This research carried out with impacts, benefits and disadvantages occurred for the HCWs during Covid-19 pandemic with the help of online research articles and accordance with word health organization.

Keywords: *Mental Health, Healthcare Workers, Covid-19.*

1. INTRODUCTION

Two years ago, when the new Covid 19 epidemic began in the Chinese province of Hubei and quickly spread both locally and globally over a short period of time, the world was hit by a humanitarian crisis [1], [2]. The virus-caused illness developed into a global public health

emergency, prompting the World Health Organization (WHO) to declare it a pandemic in March 2020 and implement global lockdowns and quarantining measures to halt its spread [3], [4].

The novel corona virus became a challenge specifically for the healthcare system and had a significant impact on the nations frontline workers i.e., the healthcare workers such as the doctors, nurses, physicians etc [5], [6]. who were up and front fighting the pandemic and treating those affected [7]. In our paper we intend to explore the influence of Covid- 19 on the mental health of these frontline healthcare professionals and study the challenges and risks they faced during and post Covid-19 [8]. While the fear of the pandemic has been decreased to some extent, the stress remains both personally and professionally [9], [10].

While the entire nation was under a strict lockdown and were instructed to maintain social distancing, this rule did not apply to the healthcare workers [11]. These HCWs were in direct and close contact with the infected patients [12], [13]. Apart from physiological risks, according to [14] due to lack of personal protective equipment, widespread media coverage, lack of resources for treatment, increasing number of cases, death toll, high workload and social stigma, frontline healthcare workers go through tremendous emotional stress during a pandemic [15]–[17]. COVID-19-related mental health issues are best described as a "slow-motion tragedy," as the psychological consequences are likely to be widespread and long-lasting.

2. LITERATURE REVIEW

2.1. Impact of Covid-19 on the mental health of health care workers (HCW)

The significance of mental health is often overlooked in societies, and this is partly due to the stigma surrounding the entire issue [18]. Individuals are looked down at and are perceived differently when they try to seek help and support for their mental health issues [19], [20]. According to WHO, *"mental health refers to a condition of well-being that enables people to perceive their abilities, cope with daily stress, be productive, and contribute to society."*

While the protection of mental health is mandatory for all members of the society, our report focuses on the mental health of the frontline heroes, especially the health care workers in the face of the pandemic Covid-19 [21], [22].

From reviewing previous literature [23], it has been well established that apart from the direct impact of the pandemic which was death and other physical morbidities, one of the indirect effects of the pandemic was the huge toll it took on the mental health of the health care workers who were in close contact to the infected individuals [24]–[26]. confirmed that the health care workers are at the highest risk of contracting the corona virus due to the nature of their job which requires them to be at the frontline fighting the pandemic [27].

The escalation of the Covid cases resulted in overcrowded hospitals and ICUs. The pandemic has a particularly strong impact on healthcare workers in intensive care units (ICUs) [28], as they witness the daily struggles of patients fighting with the life-threatening disease for which there was no cure readily available, these HCW have long-term interactions with infected patients and were exposed to insufficient protective equipment and the risk of infection [29], [30]. Moreover, these HCW were also not allowed to meet their families and were away from their homes for a long period of time [31]. The disruption in the work life balance of these HCW caused due to long working hours and work overload resulted in disturbed sleep cycle and lack of sleep has already been identified as a stressor on the job [32], [33].

It was highlighted by [34], [35] that healthcare professionals are subjected to high levels of stress, unstable work schedules, and irregular shifts, which can lead to sleep difficulties and psychological issues, increasing the workload of healthcare staff [36]. HCW not only endure stress as a result of their increased duty [37], [38]. Personal circumstances such as the risk of becoming infected and spreading the virus to their homes/families and the disruption of their work life balance was tied to greater mental health burden [6], [39], [40].

Furthermore, with every passing day and the rapid increase in the Covid cases and the lack of adequate medical supplies and other equipment further multiplied the HCW's anxiety [41]. Fear of working in such an environment and lack of rest can indirectly increase the likelihood of being infected with COVID 19 from working in a medical facility [42], [43]. The risk of transmission can adversely affect the willingness of healthcare professionals to aid in the outbreak situation [44], [45].

These healthcare professionals conceal a vulnerability characterized by anxiety, fear of contracting an infectious disease, and expectancy of impending death. Fear of isolation or system failures, such as a lack of PPE and ventilators, worsen this stress [46], [47]. According to research, the causes of these detrimental psychological effects include beliefs connected to the workplace, such as an excessive workload or amount of free time, a lack of personal

protection equipment (PPE), overly enthusiastic media coverage, and a sense of inadequate support [48]. According to research, extreme exhaustion can increase the HCW's propensity to constrict. Covid-19 [49], [50].

To further support the arguments, studies conducted by [51] confirmed that the frontline medical care takers in direct contact with the Covid infected patients has shown higher level of mental problems comparatively to the non-frontline workers [52]–[54]. These HCW showed symptoms of anxiety, depression, PTSD and insomnia due to unbearable and long working hours [55]. According to studies carried out in China, which demonstrated that psychological support or intervention may be required for HCW who showed high levels of depression, anxiety and insomnia due to their long interactions with Covid-19 patients [56], [57].

Moreover, from available literature it was identified that frontline health care workers were in a constant role conflict i.e., which was more significant between their familial role or healthcare personnel role [58]–[60]. Research revealed that HCW having children showed higher percent of mental distress, anxiety and depression due to fear of being a carrier and spreading the virus to the children [61]. confirms that all the aforementioned factors prove to be significant stressors that triggers stress in these health care professionals and severely impacts their performance in the long term if not provided with the proper mental support [62][63], [64]. Addressing the underlying consequences of the COVID-19 pandemic on healthcare workers is essential for designing policies and interventions to assist them maintain their mental health [65].

2.2. Discussing the risk of mental health encountered by front line heroes

One of the main risks of mental health encountered by the front-line heroes includes having a fear of getting infected by the virus [66]–[68]. As this is not just an ordinary virus that a person will fall sick after getting affected by, this is considered to be a deadly virus that can cause death. The mortality of the virus is considered to be very high, and the people getting affected by the virus can cause a lot of harm to society [69], [70]. The frontline workers are required to keep calm and are required to think of the current condition of the parent [71], [72]. The main objective is in making sure that work ethics have been taken into account in overcoming the problem situation [73], [74].

There lies a need for making sure that the mental health impact of the pandemic situation is required to make sure which aims at reducing the risk of getting affected by the virus [75], [76].

In addition to this, it has also been observed that the landlord is forcing the person to lease the property as they are regularly dealing with COVID 19 patients that have a high chance of spreading the virus [77], [78]. All the mentioned work activities are considered to be creating a lot of problems for the frontline personnel [79], [80]. Furthermore, the manner in which people are affected by the virus, along with the problem of not letting the family members see their loved ones before they pass away, is considered very tragic [81]–[83].

2.3. Evaluating the effect of mental health on work performance of frontline heroes

After being affected mentally, the workers suffered from offering a quality of works. They tend to make mistakes or are not mentally present at the place of treating the patient [84]. The problem arises when the healthcare workers are not able to deliver the quality of services they are required to provide [85]. The workers tend to lose confidence in the medical work that they are giving to the patient [86]. In addition to this, the reduction in the quality of offering the required services results in reduced motivation [87], [88]. The workers are also required to have the motivation to be fully functional in the work practices that are being carried out in the medical department [89], [90]. The frontline personals are humans and also require respect that allows in understanding in making them be fully functional during their work activity [91].

In addition to this, the workers also faced the fear of food, shelter, and healthcare as they have the notion that if they are affected, no person will look after their life [92]–[95]. This makes the personals not deliver the quality of service which they are appointed to offer to the patient [96]–[98]. In addition to this, brutal attackers are also being made to the frontline people if they do anything wrong during the treatment of the patient as there is a Situation that coordinates towards unethical practices related to making the people be aware of the mental torture which the health line works are facing [99], [100]. A number of issues in regards to making a number of work practices concerning improvement in the overall mental health of the works [101], [102].

The research shows that the first mental challenge, which the frontline personals faced, includes staying separately from their family members [103], [104]. It can also be said that there is more problem that comes to taking care of oneself as the personal healthcare keeps in mind that they are the only earning member and if they fall sick or lose their life it will be no one looking after their family member [105]. In addition to this, the situation arises when the workers are not being allowed to meet with other personnel to reduce the fear of the virus getting transferred [106].

2.4. The positive side of Covid-19 impact over frontline workers in UAE

Frontline workers recognized and rewarded in the UAE. The biggest heroes of the pandemic are frontline workers [107]. They've worked tirelessly to keep people safe and healthy, as well as to provide a sense of stability through difficult times [108]. Residents across the globe held monthly, even nightly, rituals in which they cheered medical personnel from their balconies every evening during the early days of the pandemic [109]. The novelty of these festivities fell off as Covid-19 outbreaks continued [110]. Despite this, hospital staff and others have continued to fight the health crisis, putting their lives on the line every day for the past nine months [111], [112].

2.5.The mission of the Frontline Heroes

Increasing public understanding of the critical role those frontline workers play during crises and emergencies, recognizing and appreciating their work and sacrifices, and taking care of their requirements and addressing their concerns [113]–[115]. Those operating on the frontlines in healthcare institutions, as well as in prevention and protection, are considered frontline heroes. It includes staff working in healthcare facilities including doctors, nurses, allied healthcare professionals (lab technicians, respiratory therapists, radiographers), as well as housekeeping, cleaning, and trash removal (porters, security, catering, administrative, pharmacists) [116]. It also covers people working in security and prevention, such as those engaged in crisis management, security, and emergency services, as well as frontline humanitarian organizations [117], [118].

2.6. 'HAYYAKUM' is a program that provides free tuition to the offspring of battlefield soldiers

Under the "Hayyakum" program, children of front-line healthcare workers will be given scholarships to attend public schools in the UAE. Scholarships will be offered from the 2020–21 school year through high school graduation [119]. It covers transportation, a laptop, and tuition. "Hayyakum" aims to provide frontline healthcare workers' kids with a top-notch education while simultaneously easing their parents' financial burdens and enticing them to stay in the UAE for a longer period of time [120], [121]. This program is a part of a bigger effort by the Ministry of Education and the Frontline Heroes Office to develop and carry out further education-focused program for the kids of frontline healthcare professionals while also securing long-term funding for the scholarship [122], [123].

2.7. Impact of Emotional Intelligence on HCWs during pandemic

HCWs are faced with difficult and stressful situations during the COVID-19 epidemic such as, the increased daily death rate, separation from their families, and the risk of infection [124], [125]. HCWs reported greater levels of psychological distress as a result, including anxiety, despair, sleeplessness, and emotional vulnerability [126]. Furthermore, it seems impossible to apply new rules and norms due to a lack of time and resources [127]. Even in this unique circumstance, though, using EI skills could only take a little while and have a big impact [128], [129]. As a result, health care CEOs are urged to use their interpersonal and personal abilities to develop positive relationships with their staff members such as:

- *Self-awareness of their own situation:* health-care executives should pay attention to their feelings in order to recognize difficult days and manage well. An accurate self-evaluation of mental and physical well-being could aid in making more informed decisions [130].
- *Paying attention to team emotions:* Health-care leaders should converse with their coworkers and listen to and watch their verbal and nonverbal communication. The HCWs' comments and actions could provide crucial information about their thoughts, emotions, and concerns, as well as their level of emotional exhaustion and discomfort.
- *Self-perception of their own interaction style:* When interacting with HCWs, health care leaders should pay attention to both the content of the messages provided and the communication methods employed (e.g., words and actions). The emotional and psychological conditions of HCWs may be influenced by the quality of leaders' interactions, which could have an impact on the organizational climate [131].
- *Support and knowledge of the team:* Health-care executives should spend time with their teams to learn about the requirements of HCWs and the workloads that are acceptable for them. It's very important to be sensitive to HCWs' perspectives and sentiments, especially in the context of crisis management [132].
- *Collaboration and teamwork:* health-care leaders should emphasize the importance of teamwork and schedule time for briefing and/or debriefing with their HCWs to discuss work difficulties and solutions. Each HCW's involvement is critical in developing a team spirit and performance based on shared values and common goals.
- *Guidance toward a new vision:* health-care executives should act as guides, understanding their HCWs' feelings, strengths, and weaknesses, deciding on a common

aim to pursue, and encouraging them to see the epidemic as a chance to learn and grow [133].

Given the difficult challenges that HCWs face around the world, EI must be implemented, which can only be accomplished by offering personalized training to health care leaders [134], [135]. EI skills can be learnt and developed through programs that combine theory and practice. The complexity of health-care institutions has grown. To cope with larger and longer-term pressures, health-care leaders must develop and deploy EI abilities [136]–[139].

2.8. General Research Model

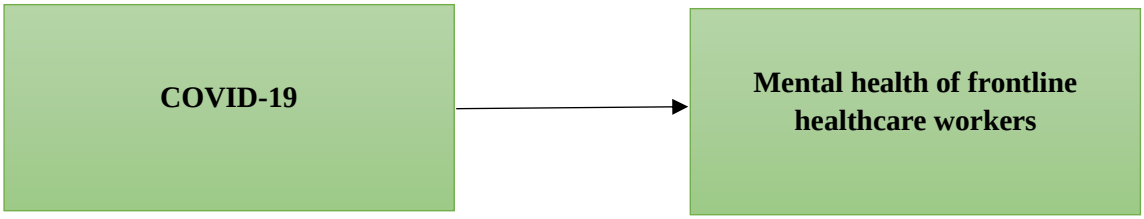

Figure 1: Conceptual Research Model

3. DISCUSSION

Lack of interpersonal communication causes healthcare professionals suffer from burnout and also experience a lack of self-control. Among the various other factors damaging the mental health of these health care givers, isolation and social distancing of front-line healthcare professionals who have to remain in quarantine (if infected) or quarantined (if infected) deprived the HCW from receiving any kind of social or emotional support from friends, colleagues, family etc. This is also linked with the sudden reversal of roles from being the caregiver and treating the ailing patients to becoming one of them creates a sense of loss of power, disappointment and helplessness among these HCWs.

The UAE has engaged over 80,000 important frontline employees in a unique initiative to give them with professional, psychological, and financial support in acknowledgment of their efforts. This includes mental health services, discounts, education, and benefits for the families of critical workers. Some UAE healthcare professionals will also be eligible for long-term visas

under other programs. To acknowledge the hard work and contributions made by frontline HCWs during Corona virus, golden visas were provided as a token of appreciation.

4. CONCLUSION AND RECOMMENDATIONS

After analyzing our topic through connecting provided information's, reasoning, and reflecting on concepts in the course through our understanding of the core issues in the case we need to provide suggestions and recommendation regarding the way of dealing with the impact of covid-19 on the mental health of frontline workers.

As a result of our research, we conducted suggestions for the frontline workers to deal with their mental health issues. During the covid-19 pandemic the frontline workers might experience pressure and stress which will lead to many damages. First of all, raising awareness among employees is important thing to do, for example The world health organization created a program for frontline workers to help them deal with their stress and pressure, they also created a list of important instructions, for example one of the instructions says "Be transparent with your manager, request the assistance you require, and educate yourself on your rights so that you can speak up for yourself." (***World Health Organization***), which is the right thing to do, communication is the most effective resource of having a stable mental health. Having such a program, educational posters that instruct the workers can Increase the awareness and help to the employees to control their mental health and create a healthy work environment. It can become difficult for frontline employees to cope with their daily activities so seeking for professional help can help workers to understand their emotions, what are the causes, and the professionals will suggest ways to deal with these problems.

Supporting each other is a good way to help with stress and pressure, because they have been at the same situation, so talking to someone knows exactly how it feels can create a healthy support system between employees, "Because of stigma or fear, most healthcare workers may face opposition from their families or communities. This could complicate an already difficult situation. Staying in touch with loved ones, particularly through digital means, is a good approach to keep in touch if possible. For social support, go out to your coworkers, manager, or other trusted individuals; your coworkers may be going through similar situations" (***WHO***)

REFERENCES

[1] 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.

[2] 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.

[3] 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.

[4] 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.

[5] 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.

[6] 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.

[7] 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.

[8] 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.

[9] N. Alsharari, "Integrating Blockchain Technology with Internet of things to Efficiency. International Journal of Technology," *Innov. Manag. (IJTIM),* vol. 1, no. 2, pp. 1–13, 2021.

[10] M. Alshurideh, B. A. Kurdi, and S. A. Salloum, "Investigating a theoretical framework for e-learning technology acceptance," *Int. J. Electr. Comput. Eng.*, vol. 10, no. 6, 2020, doi: 10.11591/IJECE.V10I6.PP6484-6496.

[11] 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.

[12] 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.

[13] 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

[14] 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.

[15] 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.

[16] H. M. Alzoubi, M. T. Alshurideh, B. Al 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, doi: 10.5267/j.uscm.2022.8.009.

[17] 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, 2017, doi: 10.1080/13527266.2017.1322126.

[18] 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.

[19] H. M. Alzoubi, N. N. Alnazer, and M. A. Alnuaimi, "Analysing 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, doi: 10.1504/IJBEX.2017.085799.

[20] M. Alshurideh, B. Al 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, pp. 19–41, 2020, doi: 10.3991/ijim.v14i02.11115.

[21] 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.

[22] M. Alshurideh, B. Al Kurdi, and T. Al afaishata, "Employee retention and organizational performance: Evidence from banking industry," *Manag. Sci. Lett.*, vol. 10, no. 16, pp. 3981–3990, 2020.

[23] T. M. Ghazal *et al.*, "Hep-pred: Hepatitis C staging prediction using fine {G}aussian SVM," *Comput. Mater. Contin.*, vol. 69, no. 1, pp. 191–203, Jun. 2021.

[24] 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.

[25] 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.

[26] 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.

[27] 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.

[28] 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.

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

[30] 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

[31] 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.

[32] 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.

[33] 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.

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

[35] 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.

[36] 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.

[37] 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.

[38] 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.

[39] 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.

[40] T. M. Ghazal *et al.*, "Software defect prediction using ensemble learning: A systematic literature review," *IEEE Access*, vol. 9, pp. 98754–98771, Jul. 2021, doi: 10.1109/ACCESS.2021.3095559.

[41] 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.

[42] 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.

[43] 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.

[44] 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.

[45] 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.

[46] H. M. Alzoubi *et al.*, "Empirical linkages between ICT, tourism, and trade towards sustainable environment: evidence from BRICS countries," *Econ. Res. Istraz.*, vol. 37, no. 1, pp. 850–862, 2022, doi: 10.1080/1331677X.2022.2127417.

[47] M. Alshurideh, R. 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. 12, pp. 69–78, 2012.

[48] 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.

[49] 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.

[50] 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.

[51] 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.

[52] 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.

[53] 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.

[54] 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.

[55] H. M. Alzoubi and Y. Ramakrishna, "Empirical Investigation of Mediating Role of Six Sigma Approach in Rationalizing the COQ in Service Organizations," *Oper. Supply Chain Manag.*, vol. 15, no. 1, pp. 122–135, 2022, doi: 10.31387/oscm0480335.

[56] 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.

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

[58] 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.

[59] H. A. Shamout, Rabeb Ben-Abdallah, Muhammad Alshurideh, "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.

[60] 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.

[61] 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.

[62] 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.

[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. 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 *ACM International Conference Proceeding Series*, 2019, vol. Part F1479, pp. 414–418. doi: 10.1145/3316615.3316720.

[65] 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.

[66] 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.

[67] 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.

[68] T. M. Ghazal *et al.*, "An iomt-enabled smart healthcare model to monitor elderly people using machine learning technique," *Comput. Intell. Neurosci.*, vol. 2021, 2021, doi: 10.1155/2021/2487759.

[69] 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.

[70] 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%3D15

1548527%26site%3Dehost-live

[71] 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.

[72] 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.

[73] 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.

[74] T. M. Ghazal *et al.*, "IoMT Cloud-Based Intelligent Prediction of Breast Cancer Stages Empowered with Deep Learning," *IEEE Access*, vol. 9, pp. 146478–146491, Oct. 2021, doi: 10.1109/ACCESS.2021.3123472.

[75] 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.

[76] 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.

[77] 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.

[78] 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.

[79] 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.

[80] 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.

[81] 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.

[82] 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.

[83] 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.

[84] 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.

[85] 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.

[86] 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.

[87] 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.

[88] 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.

[89] 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.

[90] 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

[91] 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.

[92] 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.

[93] 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.

[94] 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.

[95] 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.

[96] H. Alzoubi and A. ALnuaimi, M., Dana Ajelat & Alzoubi, "Toward Intelligent Organizations: An Empirical investigation of Learning Orientation's role in Technical Innovation.," *Int. J. Innov. Learn.*, vol. 29, no. 2, pp. 207–221, 2020.

[97] 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.

[98] 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.

[99] 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.

[100] 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.

[101] 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.

[102] 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

[103] 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.

[104] 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.

[105] 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.

[106] 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.

[107] 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.

[108] H. M. Alzoubi and R. Yanamandra, "Investigating the mediating role of information sharing strategy on agile supply chain," *Uncertain Supply Chain Manag.*, vol. 8, no. 2, pp. 273–284, 2020, doi: 10.5267/j.uscm.2019.12.004.

[109] 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.

[110] 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.

[111] 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.

[112] 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.

[113] 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.

[114] 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.

[115] 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.

[116] 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.

[117] 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.

[118] 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.

[119] 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.

[120] 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.

[121] 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.

[122] 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.

[123] 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.

[124] 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.

[125] 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.

[126] 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.

[127] 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.

[128] 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.

[129] 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.

[130] 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.

[131] 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.

[132] 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.

[133] 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.

[134] 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.

[135] 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.

[136] 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.

[137] 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.

[138] 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.

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