

Using health-care technology to manage COVID-19 pandemic: a case of Al-Ain city hospital, UAE

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Case synopsis

The case highlighted the predicament the government owned Al-Ain City Hospital, United Arab Emirates (UAE), faced following the surge in the incidences of COVID-19 in the country in March 2020. The hospital management decided to initiate the work-from-home arrangement as a non-pharmaceutical intervention of handling the spread of the disease amongst its employees. Fatima Almur, the Information Technology Director in Al-Ain Hospital, asked the Application Support Manager, Aysha Shahwan, to deploy some information technology (IT) tools significant for remote support to patient care within two weeks. Shahwan faced significant challenges in deploying the IT tools in two weeks given the diverse workforce, with the majority of them having limited knowledge in operating the tools, and hence, their apprehension in the usefulness of the tools. Besides, Shahwan had to deploy some advanced tools for easy and secured access to the electronic health record (EHR), telemedicine and telecommuting using mobile phones, tablets or PCs. The deployment of these advanced tools would be jeopardised by employee acceptance and consequent dwindling productivity. Considering the issue of employee acceptance of the change and their limited knowledge, Shahwan had, therefore, to develop training frameworks to boost the former's perceived usefulness and ease-of-use of the IT tools. Will Shahwan successfully deploy the advanced IT tools to enable the hospital staff, including medical staff and departments, to ensure efficient patient care from a remote location? Will she be able to train the 600 employees across genders, ages and knowledge, use the IT tools and safeguard them from common software threats like email phishing and ransomware? Will the hospital be able to sustain its vision of quality patient care using advanced technologies through this new arrangement of remote support amidst the pandemic when patients are more?

Opening situation

In March 2020, observing the increasing spread of COVID-19 in Al-Ain City in the UAE, Fatima Almur, the Information Technology Director in Al-Ain Hospital, held a meeting on March 25 with the hospital's Application Support Manager Aysha Shahwan to discuss how Al-Ain Hospital can remain afloat amid the pandemic. During the meeting, Almur shared the hospital management's plan to initiate the work-from-home arrangement in two weeks, to safeguard the employees and medical staff from the spread of COVID-19. Shahwan had to help the employees work remotely by adopting some IT tools and their applications in two weeks.

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The hospital considerably relied on the IT system for all its functions from diagnosis to treatment, maintaining patient's health records, rapidly changing medical-evidence base and provider orders. The IT tools also help the medical staff with applications providing two-way voice and video and other telemedicine services. Besides, IT tools helped the institution maintaining important administrative information like the status and availability of supporting resources (hospital beds, personnel and others) and annual financial records. Understanding the IT support's imperativeness, Shahwan had the critical task of adopting a system of tools and applications to enable individual departments to work remotely from home, with smooth coordination with the medical team on site. Besides, Shahwan had to develop a secure virtual private network (VPN) to not only enable the employees to securely connect back to their office using a range of devices but also to access the practise management system, patient records and diagnostic images saved in the hospital's EHR.

A few days after the pilot implementation of the information technology tools, however, Shahwan and her team experienced new challenges in the form of inability to use the tools by some employees working remotely because of their lack of knowledge and experience in using these tools. The challenge implied that workers were unlikely to accept the new technology's implementation as they questioned its perceived usefulness and perceived ease-of-use. This lack of technology acceptance and appropriate knowledge amongst the employees drove Shahwan to develop a training framework, ensuring equipping the employees from threats of ransomware and email phishing. However, considering the circumstances, the questions arise how will Shahwan successfully deploy the IT tools by ensuring well-trained employees and increasing their acceptance of the technology implementation? Will Shahwan positively increase the employees' perceived usefulness and perceived ease-of-use of the new IT tools? Will she maintain employee productivity through the IT implementation and remote work setting to sustain the hospital's vision of quality patient care using advanced technologies, especially during the pandemic crisis?

Al-Ain hospital background

Al-Ain hospital was established in 1975 in Al-Ain, in the eastern region of the Emirate of Abu Dhabi, becoming one of the biggest hospitals in the city. It has a capacity of 400 and two beds with 35 departments comprising of specialised units. These specialised units deal with emergencies and acute diseases along with a separate department handling acute stroke patients. The hospital's core values revolve around its mission and vision, which aims to transform *the health-care system in the region based on international standards, thus using the most cutting-edge technologies*. The hospital holds performance credentials accredited by the global quality regulator, the Joint Commission International (SEHA, 2020) for 10 years now. Amidst the COVID-19 pandemic, the hospital has taken an excellent decision to merge with another hospital for providing superior medical care to its patients, specifically women and children. This initiative reinforces that health and safety is the top priority of the hospital and it is taking suitable measures to ensure the same.

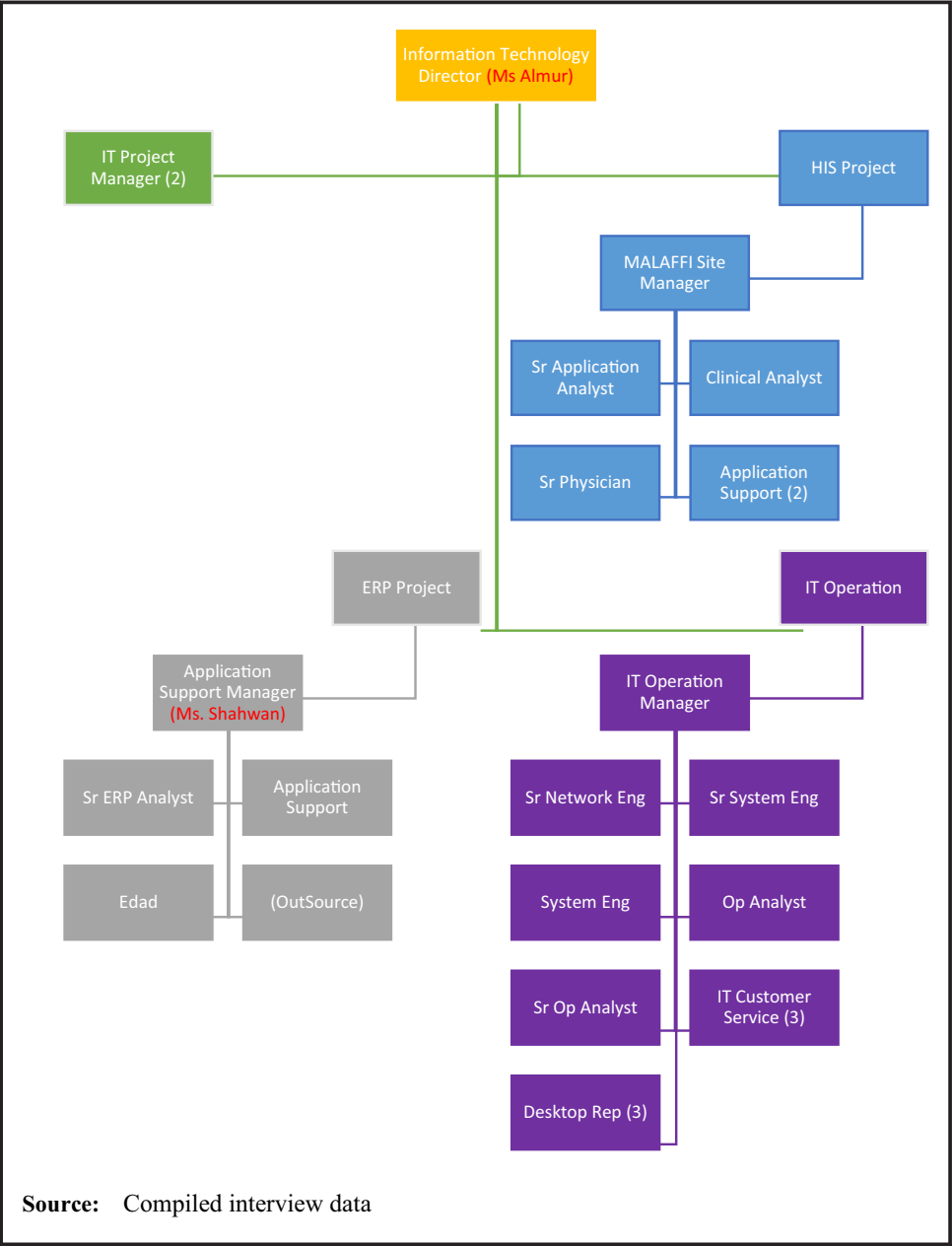
Al-Ain hospital history and the information technology department

Information technology is a crucial part of the hospital, delivering various services every day for time-effective management of different services, systems and projects related to patient care. Under the leadership of Fatima Almur, the department of IT focusses on the best practical and efficient way to support the hospital's mission by providing the best support with advanced and effective information technology-based technologies. The hospital had built a full IT Infrastructure across the hospital buildings, such as extensive local area networks and wireless network access connecting peripherals.

The information technology department is responsible for handling and observing network systems and servers, administrating and supporting diverse business applications and

illustrations through Malaffi the region's first Health Information Exchange platform with a central database of unified patient histories, to improve health-care excellence and patient outcomes. Concerning its structure, the IT department, as shown in Figure 1, is headed by the IT Director, to whom four departmental managers, each heading a particular segment, reports. The IT Project Manager takes care of all the IT projects adopted by the hospital, the Malaffi Site Manager looks after the health information system (HIS) project, the IT operation manager takes the responsibilities of network and operation systems and customer services and the Application Support Manager (Ms Shahwan), heads the enterprise resource planning application support.

Figure 1 Organisational chart of IT department of Al-Ain hospital



Compiled interview data

Shahwan, the application support manager, indicated that the IT department's history is marked with achievements in providing and supporting quality patient care carried out by the hospital setting, which plays a vital role in serving the patients. The core vision and focus of establishing the department have been facilitating advanced technological processes across the 35 departments to ensure consistent employee performance across job roles irrespective of their direct or indirect involvement in the medical care of the city's population. Furthermore, its Director Ms Almur and Application Support Manager, Ms Shahwan, take regular decisions to streamline the IT facility's performance to withhold the institution's values towards care.

The department has always been considered the institution's core responsible unit in addressing any emergent concerns and issues. Hence, its role in the complete computerisation of the hospital processes through IT implementation in the pandemic crisis was imperative. Flexibility in the department's systems has been domineering in establishing the positive frameworks and achievement of significant performance, thereby creating long-term value in line with the hospital vision (SEHA, 2020). Most of the organisation's changes to conform to emerging issues have been determined by the department embracing adjustments in the form of positive alternatives, thereby providing desired success.

Need for the change process

The department's significant role was evident with the outbreak of COVID-19 in the country, with its responsibility in the complete computerisation of the hospital's work processes to ensure effective remote support by the employees. As part of the computerisation initiative, the department worked towards the successful deployment of IT tools of telecommuting, telemedicine, access to EHR, software for conference calls and collaborative document editing and digitalised medical devices like remote patient monitoring devices, implanted medical devices such as pacemakers and telemetry systems used to monitor and report patient information. Departments such as administration, finance, logistics, customer service and information technology were included in the complete remote support plan. Besides, the medical staff like doctors and nurses were asked to support remotely through shift-wise on-site support, implying that only a handful of the medical staff had to be present on-site taking care of the critically ill patients. The rest of the medical staff had to support the patients through the software and IT tools, monitoring their health regularly through mobile applications, data on EHR, remote patient monitoring devices and others. Moreover, the critical support staff working in the Administration, Finance and Customer Care departments were asked for telecommuting to assist the frontline staff in taking care of the patients through patient health history, information on beds, oxygen support and other allied medical instruments and bills. As the Application Support Manager, Shahwan had to spearhead the IT tools deployment and was responsible for the efficient transition of the work setting from on-site presence to remote working.

Besides, the department was responsible for developing the VPN to encourage staff involved in the patient's immediate treatment thereby facilitating their remote access to patients' treatment and medical history. Further, the VPN had to be developed as such that it enabled the employees to securely manage the system and the patient records and diagnostic images stored in the hospital's EHR using a variety of devices such as phones, tablets, laptops and desktops. The framework further involved the introduction of technology-based communication platforms to support work-from-home initiatives through telecommuting with patients and inter-departmental colleagues. Shahwan and her team aimed to minimise contact amongst the workforce and the patients as a precautionary measure. The aim had necessitated them to bring in the organisational change through

complete computerisation of the entire work system to deliver the essential services from a remote location. With the IT implementation initiative, Shahwan and her team also attempted unhampered employee productivity through raising their acceptance of the technology implementation so that assistance provided to the frontline staff, the backbone of the organisation, remains unhindered.

Emerging issues in the programme

Irrespective of the effort Shahwan and her team made to ensure the unhampered productivity of the remote working staff, their lack of experience in operating the new technology frameworks caused the potential derailment of performance goals. Although the technology was adopted in two weeks, the trial period of remote working, initiated within these two weeks, saw the inability of nearly 65% of the employees to use the tools appropriately. The inability was further defined by the employees' low acceptance rate towards the complete computerisation of the work processes, owing to their lower perceived usefulness and ease of use. The inability led to a delay in service provision to the patients and the frontline staff, like resource management, telecommuting issues in customer service, efficient inter-departmental communication through the virtual meeting applications and such others. As the employees belonged to diverse departments and in some of the regular usage of information technology tools were otherwise not the usual norm, so the ability to use them was not equal amongst the 600 workforces. Therefore, whilst implementing the plan, Shahwan faced a new issue with training these 600 employees of different expertise, job level and departments, with their respective shifts, in this short period of 2 weeks. Besides, there were issues of data protection, and hence, a system with a strong defence wall against privacy and data theft had to be developed along with an amendment to existing ethical principles. The ineptness of approximately 65% of the employees to use digital platforms expertly posed a serious challenge to data privacy protection. Therefore, the training module should include imparting knowledge on ethical practices whilst using the information technology tools and protocols of safeguarding data, including patient health information.

Enlisted below are the challenges that threaten to undermine the perceived progress and pre-determined performance expectations as follows:

- Managing the workforce to properly administer training services on different applications for a successful transition to online platforms.
- The workforce's diverse capabilities were a critical impediment in determining the improvement frameworks that need to be made as part of value creation to embrace the positive approaches linked to service delivery. For instance, departments such as Finance, Customer Support, Audit, Administration and Logistics had work processes significantly different. Therefore, the framework had to be such that every employee, irrespective of their extent of knowledge, could operate the information technology tools efficiently.
- Training module must be involving an exhaustive list of protocols, some unique to the departmental needs apart from some common ones, to ensure data protection and maintain behaviour expected whilst using the information technology tools. However, developing such an exhaustive module considering each of the departments' different job requirements and imparting the training to the 600 employees across three working shifts posed a challenge for the information technology team in two weeks.
- Most importantly, employees' resistance to change. Nearly 55% of the employees had more than 10–15 years of working experience in the hospital whose responsibilities did not require of digital platforms. However, the sudden imposition of complete digitalisation through information technology tools and behaviour protocol for data

safety created apprehensions amongst these employees towards the change. These apprehensions were based on the perceived usefulness and ease of using the IT tools in remote support and productive work. Besides, in two weeks, some employees might not be better equipped to handle the change and might be demotivated to continue work in the changed work settings, thereby affecting their productivity.

The way out through the application of the technology-acceptance approach

The IT department's primary focus of the complete computerisation initiative was to establish a system that shows conformity to the standard operations in the health care facility such that its mission, vision and service delivery quality, especially during the pandemic, even though remote support. As the applications support manager, Shahwan had to take charge of system planning to ensure no resistance amongst the workforce by identifying their values and preferences, thereby motivating them to accept the change with a minimal adverse effect on their productivity. Shahwan had a vital role to play in delivering a seamless changeover in service delivery. The responsibility depended on ensuring that there is consistency in the services rendered in the health care setting. Shahwan needed to strike a balance between the change frameworks to be embraced alongside the anticipated positive results, which was the basis for success concerning the hospital's mission and vision.

Consequently, Shahwan applied the technology-acceptance approach to measure the employees' perceived usefulness and ease of use of the IT tools. The information helped her understand the extent of employee acceptance towards the computerisation process and the tools selected for remote support. Besides, the information helped devise the training framework, catering to each of the employees' specific technological requirements ([Table 1](#)).

Approach to the information technology implementation

Upon measuring the "employees" extent of acceptance towards the IT tools to be implemented for successful remote support, Shahwan, with her team's assistance, took specific concrete steps for smooth implementation of the computerisation process in the Al-Ain hospital. These approaches were necessary considering the change in the work setting in the organisation and were implemented after it was acknowledged by Ms Almur and Al-Ain hospital's management authority.

Create urgency

Shahwan's team received direct orders from the hospital management through their Director, Ms Almur, to implement the remote working process through IT as a preventive measure to check the spread of COVID-19. The hospital management's orders created urgency in her department, as they had only two weeks to initiate the remote working process. Shahwan held direct meetings with all 35 departments to acknowledge them about the situation and requested their cooperation to achieve effective IT implementation. During the two weeks, the IT department, under Shahwan, involved the creation of a sense of urgency through effective communication with employees through regular emails and reminders to convey the need for complete computerisation in the short period and make a list of employees who will be supporting from home full-time and the medical staff who will be working on shifts.

Form a powerful coalition

Shahwan formed an inter-departmental coalition to steer the change to remote working. As these departments depend on the other's input for accomplishing their task, the work in one

Table 1 Employees' technology acceptance scenario across core departments of the hospital								
Departments								
Technology acceptance model indicators								
	Medical staff	Finance	Administration	Logistics	Human resource	IT	Customer care	
	Subjective norm associated with the IT tools	Medium	Low	Medium	Low	High	High	High
	Voluntariness to use IT tools	High	Medium	Low	Medium	High	Medium	Medium
	Impact on their image/social status after using the IT tools	Medium	Low	High	Medium	High	High	High
	Job relevance behind using the IT tools	High	Low	Medium	Medium	High	Low	Low
	Output quality or the IT tools' ability to perform specific tasks	Medium	Medium	Low	Medium	High	Low	Low
Result demonstrability or the production of tangible results will directly influence the IT tools' usefulness	High	Low	Low	Medium	Low	High	High	Low
Notes: *High denoted more than 90% positive perception. **Medium denoted more than 55% positive perception. ***Low denoted less than 30% positive perception Source: Compiled by the researcher from interview data								

department has direct implications for the work and progress in the other department (task interdependence). For instance, the medical staff could not function without the administration department's assistance, who are in charge of the patient's health history or hospital resources like beds. Therefore, without an effective coalition, interdependencies can cause mistakes necessitating rework and creating crises. Shahwan identified these departments' interfaces and interdependencies and initiated an appropriate amount of coalition. At the same time, Shahwan maintained a balance in the coalition because too much coalition would lead to inefficiency and too little of it might cause rework or other problems.

Create a vision for change

Determining the "hospital's values of transforming the health-care system in the region based on international standards, thus using the most cutting-edge technologies", Shahwan's created the change vision on implementing effective IT tools to provide efficient patient care from a remote location as well. She intended to implement advanced applications which can be accessed using a range of devices through a strong VPN. Such applications will enable the employees to retain their productivity and secure the data stored in the database and cloud.

Communicate the vision

After developing the vision, Shahwan developed a summary capturing the perceived future goal the hospital intended to achieve, irrespective of their operation from a remote location. In each of the interdepartmental meetings held every week during and after the IT implementation, Shahwan communicated the change vision. Moreover, she applied the vision in all aspects of pre-implementation operations, from training to performance reviews.

Remove obstacles

Shahwan faced employee resistance issues, as is evident from their technology acceptance rate present above, during the plan of implementation of the remote working. Ms Shahwan found a correlation between the lack of adequate knowledge on IT tools' operation and the medium level perception – only 55% perceived the change positively useful. The hospital contained diverse employees across age (18–65 years), experience (<1–>30 years) and cultural backgrounds, including language. However, the lack of knowledge was not a significant obstacle, as many employees were eager to learn the new process. Therefore, Shahwan made a user guide in Arabic and English, as they are most commonly used in the hospital. Further, she provided the employees with different training methods through MS team, screen sharing and regular text messaging communications using WhatsApp. Furthermore, she appointed change managers in each department, responsible for identifying the employees resisting change even after adopting solutions to their initial resistance. The change manager also recognised employees who were actively participating in the change, rewarded them accordingly and addressed the employees' existing problems in coordination with Shahwan and the IT team.

Create short-term wins

Shahwan created the short-term wins through the application of selective IT tools as the pilot project. The pilot project showcased her and the employees their abilities to operate the tools and a taste of short-term wins. Besides, the pilot project enabled the team to understand the existing lacunae concerning increased employee acceptance of the IT implementation and other external obstacles like the inability to monitor patient's progress using telemedicine and telehealth applications.

Build on the change

Sustain the change, i.e. continue using the IT even after remote support is over in a post-pandemic work environment, was the core intent of Shahwan. Consequently, she indulged in continuous analysis of IT tools used by the employees and introducing new, upgrade IT tools with the changing demand in the patient care system. She created short-term goals for each department to meet every month. Once reaching the short-term target, she analysed what went right and what areas still needed improvement. Besides, she followed a rotational appointment of change leaders to enable each of the employees to take a leadership role. Such strategy also ensured employee motivation, avoided biased perception of an individual for the long-term and maintained fresh ideas from each of the new change managers. Besides, continued remote support of some employees in the post-pandemic environment will help lessen organisational liabilities and motivate employees to provide maximum productivity by reducing their travel time, spending more quality time with their families and using additional time to support the organisation.

Anchor the changes in corporate culture

Based on the hospital vision of transforming the health-care system in the region based on international standards, thus using the most cutting-edge technologies, Shahwan made this complete computerisation initiative become part of the organisation's core. She made this change as part of the organisation's culture by transforming every process from human-based to technology-based, using humans only to operate the technologies. She stringently monitored that each of the employees is only using the IT tools to treat patients, monitor patients, maintain their records, communicate with both in- and out-patients and their colleagues. She also held regular meetings with the departmental heads and change managers to monitor the obstacles – both external and from the workforce- and analyse technology usage targets. These meetings also helped her be updated with the change in demand for a particular technology deemed fit for usage for a particular task or department to guarantee patient care and services as per international standards.

Way ahead

Al-Ain Hospital was greatly affected by the surge in the cases of COVID-19 and justified the need to embrace a change from on-site service provision to remote support of the department not involved in direct treatment of patients. Therefore, the focus was to deploy a set of IT tools to work remotely without compromising employee productivity and provide critical support to the frontline staff through telecommuting. However, the implementation had to be carried out in two weeks and its pilot project reflected the inability of 65% of employees to operate the systems efficiently. The IT team developed the remote support framework, which would ensure adequate preparedness by the staff expected to take charge of the activities and included training on the roles to be performed. Shahwan, as the application support manager, had to devise powerful frameworks, based on the change management theory, to ensure productivity and service provision, which fulfilled the hospital's vision and values, exactly as they ensured whilst working on-site. Such approaches helped Shahwan's team to establish an ideal benchmark of remote support by a hospital in the entire Gulf region. Nevertheless, for how long Shahwan can ensure the continuity of the remote support considering the inefficacy rate of 65% in the pilot implementation stage? Are the employees and the IT team well-equipped – regarding training and IT resources – to support remotely for a prolonged period? Considering that the change is in a hospital setting, which plays an important role in patient care, especially during a pandemic, how can the IT implementation approach be enhanced to be effective for a prolonged period?

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