Institute of Policy Studies

Online Forum on Healthcare 4.0: Technology Adoption and Innovation

By Shazly Zain

Technology is regarded as an important tool in enhancing the competitiveness of the economy of a country. Even before the onset of the Covid-19 pandemic, most advanced economies and even some developing ones have made strong moves into the digital economy. Technology adoption can come in the form of adopting physical or digital solutions. Meanwhile, innovation examines intangible solutions such as changing business workflows, job redesign and the inclusion of new skillsets. The onset of the Covid-19 pandemic has resulted in global attempts to radically reduce human interaction, through enforced or self-imposed quarantines, increased safe distancing and by many organisations, remote working arrangements. The next normal for many industries, including healthcare, will look nothing like the normal before the pandemic struck.

To examine what this next normal might be, Institute of Policy Studies researchers, Shazly Zain and Dr Faizal Yahya organised an online forum on 5 May 2020 on technology adoption and innovation within the Singapore's healthcare sector. Attended by healthcare professionals from local and community hospitals, telemedicine providers, start-ups, data analysts and human resource experts, this forum aimed to discuss the potential of technology adoption and innovation in healthcare, the challenges and how best to integrate people with technology and innovation.

Sharing Experiences in Healthcare 4.0

Innovation in Organisational Processes: An Ophthalmologist-led Eye Care Team

The Singapore National Eye Centre (SNEC) has recognised the need to innovate its procedures and address the skills gap. Using a needs-based analysis and an ophthalmologist supply model to predict and plan for future demands for eye care services and what healthcare professionals needed, SNEC developed an "ophthalmologist-led eye care team" and task shifting. Task shifting is the rational distribution of tasks among healthcare workforce teams, with specific tasks shifted away from highly qualified individuals to healthcare professionals with shorter training and fewer but adequate qualifications. SNEC would also develop training programmes and accreditation based on this team-based model.

The benefits of adopting a team-based approach to eye care can be seen in SNEC's intravitreal injections (IVT) services. Prior to innovating the new team-based model, IVTs were only done by ophthalmologists. IVT tasks were now shifted to nurses instead and this resulted

in waiting times for patients dropping from an average 35-minute wait for a specialist-led IVT to just a four-minute wait for a nurse-led IVT. Procedure times for nurse-led IVTs were two minutes longer than specialist-led IVTs. However, there was an increased procedure time, which was due to nurses spending time reassuring and explaining the procedure to patients, that in turn drastically improving patient satisfaction.

Pioneering Technology Use in Dental Care and its Challenges

DP Dental focused on the adoption of physical technologies to improve integrated healthcare services. As early as 2007, DP Dental had begun using imaging technologies to eliminate traditional but uncomfortable diagnostic procedures. Technology adoption in the diagnostic stage has affected the treatment stage as well. The digital workflow has visualised precise end goals for patients and allows DP Dental's professionals to use "backwards design" to help patients realise these end goals. Using imaging technologies to scan and create 3D models of patients' teeth and jawline before sending these models to Invisalign factories to produce Invisalign or clear aligners. DP Dental has managed to harness a system that requires fewer visits by patients to the practice to do same day CAD-CAM crown, dental sleep appliance, splints from craniofacial pain or TMD pain,

The company recognised that dental care could not be confined to just teeth as other elements including the tongue and throat were pivotal to oral care. The Linguadontics Clinic (TLC) was set up with an emphasis on the importance of tongue, airway, and sleep, providing treatment to patients of any age with collaborations with paediatricians, ENTs, and other medical professionals. DP Dental clinical director lectures internationally too to form network of collaboration with researchers and practitioners in these fields.

One of the challenges faced by DP Dental in technology adoption is regulation. This is seen in the infant tongue-tie release procedure done in TLC which uses lasers instead of the traditional scissors operated by paediatricians. The use of lasers in this procedure reduces bleeding and is common practice in other countries. DP Dental had conducted 400 instances of this procedure before the company received a notice from authorities to stop this treatment, claiming it was not evidence-based treatment. The matter was settled after two years of lobbying the Singapore Dental Council (SDC) with evidence of the treatment's success in other countries and with professional testimonials from international communities vouching for DP Dental's level of care. While the SDC is now keen to examine the viability of new treatment methods, the psychological costs of bad experiences are evident. Regulations that inhibit innovation can often lead to long-term structural problems as it deters innovators that are willing to invest in new concepts and technologies that could have otherwise improve the quality of service provided.

Technology has also softened the impact of Covid-19. While dental care is an essential service, DP Dental can only see patients in severe pain. Patients seeking other treatments such as orthodontic treatment (braces) are unable to meet with their dentists. DP Dental has avoided this issue as they use imaging technologies from Dental Monitoring which allows patients to scan and have their teeth movement and aligner fit captured and monitored weekly. This has allowed them to continue to attend to patients remotely even during the circuit breaker.

Discussion on Technology and Innovation Concerns in Healthcare

Retaining Employees

As investments into technologies and training are costly, several participants raised concerns over the fear of talent being poached. One key lesson shared during the discussion is the role of leadership. Leadership should meet the interests of employees as well as provide opportunities to grow within the organisation. Constant innovation also creates a dynamic environment which helps motivate and retain employees. Participants also shared that their employees fear being poached as other organisations would only extract information from staff whereas staying in an innovative organisation promises growth.

Wages is also an important incentive to retaining employees. It is far cheaper to raise the wages of existing and trained employees than it is to hire and train new employees.

Patient Empowerment

While healthcare professionals are comfortable with technology, education is necessary to ensure patients are comfortable with technology. Participants shared that in several local community hospitals, patients are being trained to take their own medication with the help of technology. These technologies, which are commonly used in Western countries, sort medicine and monitor medication consumption throughout a period. Patients can also use these technologies to purchase refills when necessary.

Improving Communication with Regulators and Educators

While regulation is necessary, participants shared that there is a need for Singapore to show a tangible commitment to innovation. Some participants noted that while ministries may have ideas on innovation, the middle layer of bureaucracy and regulation are less aware and innovative. This has curtailed some forms of innovation in Singapore. A channel is needed for regulators to gather information on new innovations and constructive feedback from healthcare organisations.

Participants also had varying experiences getting new technologies approved for use in Singapore. A key factor discussed during the forum is the narrow criteria of productivity and efficiency. Regulators often adopt the line, “Compared to the current model of using manpower, how much improvement is there by adopting technology and what is the cost-benefit analysis?” This is problematic as the Southeast Asian region has cheap manpower and it becomes difficult to justify the capital and maintenance costs of new technologies vis-à-vis manpower from the region. Participants felt that viewing technology so narrowly ignores the potential benefits in clinical outcomes, deferred costs, and workforce satisfaction.

Participants also noted that practitioners are often more updated with the latest medical practices. Meanwhile, local institutes of higher learning (IHLs) only provide fundamentals in healthcare but medical knowledge is ever-increasing, making it difficult for educators to create learning programmes for medical students. Practitioners are often forced to develop their own programmes to ensure their employees remain up to date. Thus, it is important to develop

feedback channels between practitioners and IHLs to ensure that graduates entering the healthcare workforce are up to date on the latest practices.

How Can Organisations Start Innovating?

The forum concluded with human resource practitioners sharing a three-pronged approach to encouraging organisations to innovate. First, leaders must practise what they preach. Leaders need to be able to see, holistically, the impact of innovation on the entire organisation. Innovative organisations usually have leaders who themselves, utilise new technologies.

Middle management generally have different incentives compared to leaders. While leaders concern themselves with organisational cost-benefit analysis, middle management are more career-minded and are financially motivated. Competition and performance management are priorities for the middle management and pitching innovation to improve performance is a relevant incentive for them.

There is little incentive for employees to innovate as the rank and file are often more concern about remaining employed. As such, developing a culture of innovation and making technology commonplace is important. Some organisations conduct regular virtual townhalls with employees and such repetitive practices can help create a sense of commonality and technological social norm amongst employees.

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