

Digital Transformation in Healthcare – South Africa Context

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Abstract: Digital transformation is growing at a slow rate in medical schemes or healthcare compared to other industries such as banking and insurance. The healthcare sector needs to embrace the digital transformation and adopt and optimize on use of technology, otherwise, the sector will be left behind. Other sectors have taken advantage of technology, for example in the retail sector, nowadays people shop online, bank, and do travel bookings online. The logistic business has also embraced digital transformation in that most activities are now done through devices at the convenience of one's office or home. The recent HPCSA¹ conference included topics such as Telemedicine's where several digital transformation and innovations in the health sector were also presented. What was evident in the discussions was that progress in accelerating digital transformation is pounded by a slow pace of regulation and other relevant guidelines. The topics discussed clearly revealed that the health sector is still far behind compared to other countries. For example, there is a gap in the adoption of digitally enabled tools for diagnosing, providing treatment, and better management of chronic conditions and other conditions. Electronic medical records are still not a part of routine care both from the supply and the funders side except a handful of players.

On the funders side, you do find several medical schemes² that invest in technology, for example, there are schemes that are already implementing digital application forms for smooth onboarding of new members. This is with the aim of going digital and reduces paper application forms. Similarly, with the submission of claims of which more than 98% are submitted in electronic form has transformed significantly. Strategies such as digital marketing are typically used to reach the target market and communicate more effectively with members. Several schemes have invested a lot in product development such as mobile apps, developing communication channels through online and social media platforms. Social media platforms provide an opportunity for brand repositioning, it also provides an opportunity to reach a new target market and access to a larger pool potential client base. Social media platforms could also be used as a tool to improve service to clients, create convenience, provide instant interaction with clients. However, very few medical schemes optimize on these platforms, particularly small to medium schemes. There is still a need to measure value add of digital transformation to members, chiefly where the quality of care is concerned.

A recent study conducted by Willie (2019) which was an unstructured survey on the use of medical scheme mobile app by members. The survey revealed that more than 75% of the respondents did not have the app installed. Some of the sentiments for not using the app were:

- Lack of awareness about the app
- The app is complex
- No reason to use the app
- Does not meet my needs

Digital disruption has great potential in healthcare, the main areas of investments are certainly Big Data analytics and AI (Artificial Intelligence). Some of the big data analytics tools are useful for improving efficiencies where some of the tools can be automated, this potentially could yield better utilization of human resources and could potentially have huge cost savings. In the main, Big data and AI tools are used to profile clients, medical service providers and look at healthcare utilization patterns and trends. Some of the techniques such as predictive analytics are important in that they can be used not only to profile member but create a strategy to combat attrition. Insights from the data could be useful for data drive decision-making process that potentially save huge downstream cost for medical schemes. There is also great potential in investing in digital marketing and the optimal use of mobile apps.

DIGITAL TRANSFORMATION INITIATIVES IN THE PUBLIC SECTOR - SOUTH AFRICA HEALTHCARE

There are several innovations that must take place in the public sector in South Africa as far as digital

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¹The Health Professions Council of South Africa is a statutory regulator of healthcare professions in South Africa.

²Medical schemes are non-profit organisation which are registered with the Registrar of Medical Schemes. Members belonging to a scheme make contributions and in return receive medical cover according to the rules of the scheme.

transformation is concerned, chiefly these are still at beta phases and their overall impact and outcomes are still to be realized. Furthermore, there are pockets of digital innovations in the public sector dating back to 2014, some are initiatives employed at provincial level while others are deployed at the national level. An integrated holistic approach at the national level could ascertain value add and impact in the sector. Box 1 below depicts the Department of Health's (DoH) digital and eHealth developments and implementation from 2014.

USE OF ARTIFICIAL INTELLIGENCE IN HEALTHCARE

Artificial Intelligence (AI), Machine Learning (ML) and Big Data Analytics are some of the most talked-about technologies in recent years. According to Bali,

Garg, and Bali (2019), AI aims to mimic human cognitive functions, such as the ability to reason, discover meaning, generalize, or learn from experience. Popular AI techniques include machine learning methods for structured data, such as the classical support vector machine and neural network, and the modern deep learning, as well as natural language processing for unstructured data (Jiang, 2017). Machine learning is the foundation of modern AI and is essentially an algorithm that allows computers to learn independently without following any explicit programming (Uzialko, 2019).

The use of AI is already at advanced stages in other industries, the adoption in healthcare is growing at a steady rate, however, there is no doubt AI is certainly going to change the face of healthcare delivery. AI is being employed in a numerous setting, for example,

Year	Digital developments
2014	Aviro launched their innovative eHealth app. North West department of health outlines eHealth plans (RHIS) Cell – Life's iDART hits the target. Tier. Net, the software application that monitors patients on HIV and TB treatment. The NDoH has issued a tender for a service provider to conduct an evaluation of the use of the Tier.Net NDoH sets out eHealth standards evaluation process
2015	The Mpumalanga DoH issues eHealth tender eHealth rollout high on Gauteng's agenda Mobenzi has partnered with the Anova Health Institute to support the Limpopo (DoH) with the deployment of the Mobenzi mHealth technology emocha launches TB mHealth platform in South Africa NDoH is working with the CSIR to develop an eHealth system to accompany the rollout of NHI North West DoH announce eHealth pilot
2016	emocha Boosting MDR-TB linkage to care in South Africa emocha's miLINC for MDR-TB mHealth platform was designed after the NDoH approached John Hopkins University The Human Research Science Council (HSRC) has announced the development of a new mHealth app aimed specifically at pregnant teens NDoH using eHealth to improve health facilities South Africa adopts WHO's HIV 'Test and Treat' guidelines
2017	mHealth aiding in the diagnoses of burn injuries Generic and Biosimilar Medicine of Southern Africa has asked the South African government to accelerate the evaluation and registration of more affordable biosimilar medicines in South Africa. South African medical information-exchange company, Healthbridge, has announced their acquisition of Infosys software solutions' healthcare division WHO and ITU to use eHealth to strengthen health services in Africa South Africa digital health accelerator attracts top eHealth startups
2018	The National Department of Health (NDoH) has identified IT and health information systems (HIS). The South African Medical Research Council (SAMRC) has partnered with Jembi Health systems NPC Philips and UJ renew MoU to empower healthcare professionals Digital health Cape Town have announced the commencement of their second accelerator programme A new mobile app, called ViaOpta Hello, has been unveiled to help hundreds of thousands of South African living with blindness and severe visual impairment
2019	a subsidiary of CompuGroup Medical SE has developed an e-scripting solution that is helping over 1,000 South African doctors ensure medication adherence among their patients. Aviro Health launches whatsapp channel to support HIV self-testing

Box 1: Digital developments in the public sector.

fundes, as well as administrators, use it to adjudicate and process of claims, hospital facilities for assessing bed occupancy. AI is also used to analyses unstructured data such as images, videos, physician notes to enable clinical decision making and information sharing. Other commentators such as Reddy (2018) argues that AI is more prevent in the area of medical diagnosis. AI systems can analyze huge volumes of data faster far more than humans, this improves efficiencies in identifying medical diagnoses than doctors. It should be noted that AI cannot completely replace the medical profession but could be used as a tool to optimize currently process and reach medical conclusions and decision-making factor, thus saving costs and improving quality of life.

APPLICATIONS OF ARTIFICIAL INTELLIGENCE

Artificial has the potential to change the healthcare industry in South Africa for the better, this is subject to optimal use in both the supply and demand side of the health care ecosystem. AI is delivering high value including the following areas:

Medical Diagnosis
AI systems can analyze far more data far faster than humans, which may make them more adept at identifying medical diagnoses than doctors.
Neurology
Neurological healthcare deals with nervous systems disorders such as Parkinson’s disease, Alzheimer’s disease, epilepsy, stroke, and multiple sclerosis. AI can also predict strokes and monitor seizure frequency.
Pathology Images
Most diagnoses depend on a pathology result, so a pathology report’s accuracy can make the difference between diagnosis and misdiagnosis.
Radiology Tools
Various forms of radiology, such as CT scans, MRIs and X-rays provide healthcare providers with an inside view of a patient’s body. However, different radiology experts and doctors tend to interpret such images differently.
Smart Devices
Hospitals are big purchasers of smart devices. The devices, which take the form of tablets and hospital equipment, exist in intensive care units (ICUs), emergency rooms, surgery and regular hospital rooms.

Box 2: Applications of AI- select list.

Source: Morgan (2019).

Overutilization, Waste and Abuse of Medical Services

The South African private health sector expenditure is viewed as one of the most expensive models compared to other similar countries, South Africa

spends 9% of its GDP on healthcare, which is 4% higher than the WHO³’s recommended spending for a country of its socioeconomic status (Bidzha, Greyling Mahabir, 2017). Furthermore, South African private healthcare patients’ stay in hospital costs more than in some developed countries and some of these costs cannot be explained (HMI, 2018). The over-utilization of healthcare services is also cited as one of the cost drivers in the health sector and ultimately impacts on the premiums paid by the members. Providing lower levels of or right care to patients also results in wasteful expenditure from the funders side, other examples of possible waste include medically unnecessary caesarean sections (C-section) or imaging.

The c-section rate in South Africa is higher than the WHO’s recommendation at about 26% (WHO, 2009). In the private sector, the C-section rate is three times higher compared to the national at more than 77%, which significantly high to the recommended rate (CMS, 2019). The recommended rate of Cesarean sections is around 10% -15 % of all births. A study by Manyeh *et al.* (2018) argues that the increase in C-section rate in developing countries has not been clinically justified and these increasing trends have become a major health issue due to potential maternal and perinatal risks, inequality of access and cost involved.

Waste and inefficiency occur at every level in health care system; waste also includes unnecessary procedures done on the patients, other examples include instances where repeat tests on the same patients are done by several providers but billed separately. This could be avoided where if various medical providers in the value chain could access the same patient records for clinical decision making. Thus, there is value in investing in the healthcare delivery model that is not fragmented and encourages care coordination.

According to Albejaidi and Nair (2017), failures of care coordination typically occurs when patients experience care that is fragmented. Other examples include poorly managed care coordination that may result in a patient being referred from one health care setting to another health care setting. Figure 2 below depict various categories of waste as defined by Albejaidi and Nair (2017). One of the highlighted ones

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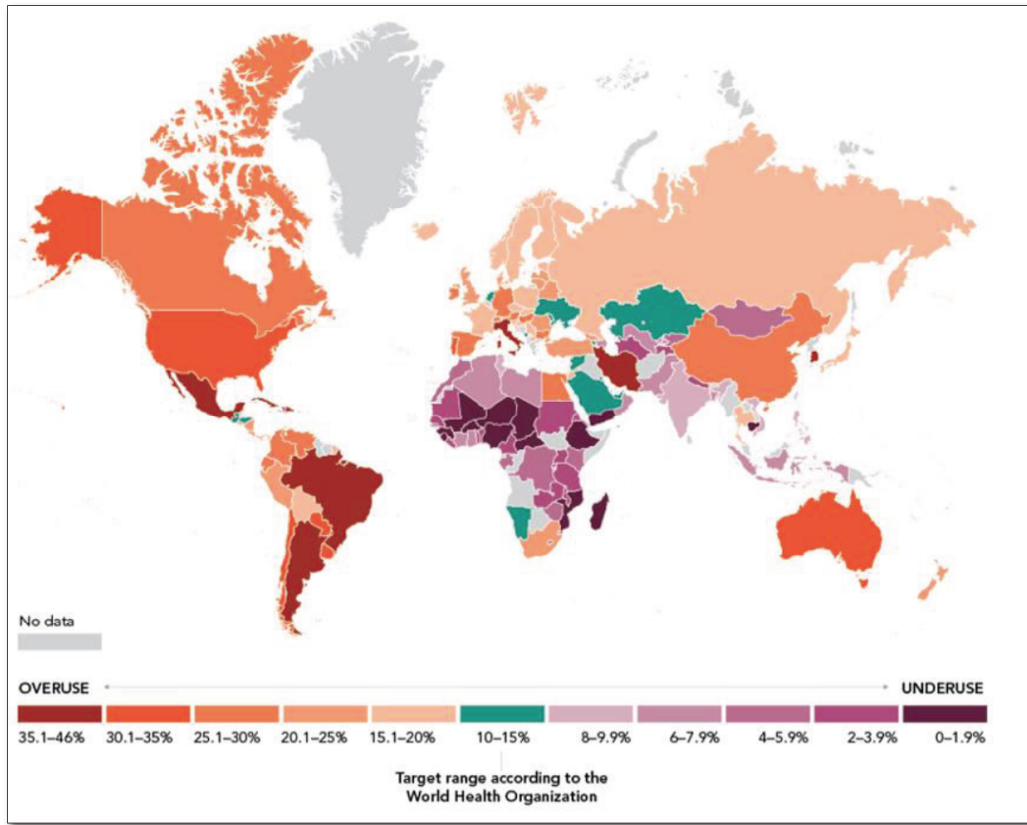


Figure 1: Caesarean sections by country.

Source: WHO.

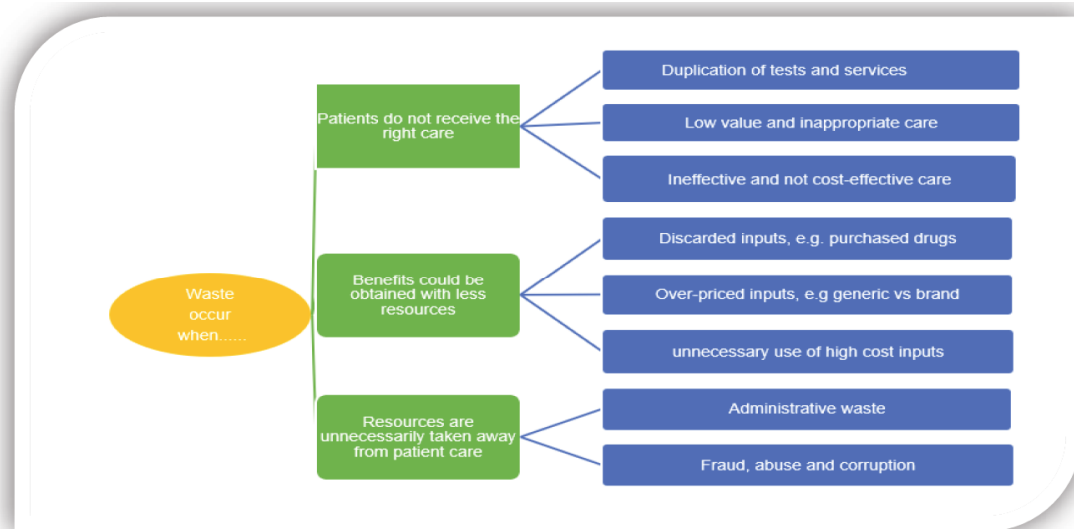


Figure 2: Various categories of waste in health care.

Source: Albejaidi and Nair (2017).

which are frequently prevalent in an uncoordinated health system is typically where patients' records are not stored in a central secure data repository. As a result, duplication of services- tests or procedures are done frequently than clinically necessary.

THE USE OF BLOCKCHAIN AS A RISK MITIGATION MECHANISM

The problem with healthcare insurance is that it has a lot of information asymmetry, and one needs to spend a lot on what is called "transaction costs", to

make the trading environment transparent with some assurance of holding market agents accountable if something goes wrong. If one is not convinced, one only must read the provisional findings of the Health Market Inquiry (HMI) on private healthcare. This type of decision environment isn't just endemic to the demand side of medical insurance, but a monopolistic competition on the supply side also means information isn't freely accessible.

This has meant that people are not sharing information or collaborating as effectively as they should. Well, this is hardly optimal for innovative solutions that bring down the cost of healthcare or mitigate fraud, waste and abuse. Sadly, regulators and governments will be held responsible for the inefficiencies and fraud arising from trading environments with minimal accountability. Once again, one only needs to read the provisional findings of the HMI. Blockchain technology provides free distribution of information across information networks, without the middleman (banks/brokers/administrators). Thus; with lower transaction costs, access to cost-effective quality healthcare increases. The state of the policy conundrum in South Africa means that blockchain technology could be the solution for information black-holes.

Systematic reviews on the impact of blockchain technology (information sharing of patient records, or decision support), finds that it improves patient treatment outcomes and safety, and reduced healthcare utilisation. All these are policy issues that are tussled-out in the National Health Insurance White paper and the HMI provisional report. Although blockchain technology has been found effective within internal corporate systems, better systemic outcomes are achieved on the interoperability of systems. Naturally, this brings on concerns about data protection. Well if blockchain was good enough to establish the Bitcoin money market, hopefully, consumers will trust it to secure their health.

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