TECHNOLOGY AND HEALTH SERVICES MARKETING IN AFRICA

ABSTRACT

Service quality improvement is perceived as an approach to achieving better outcomes for consumers, and a means for achieving increased patronage, competitive advantage and long-term profitability; it is currently at the forefront of professional, political, managerial and healthcare concerns.

In this chapter, we explore how technology is impacting developments in the African health care sector; with a keen focus on health service quality, which has become an important corporate strategy for marketing in healthcare organizations. We also highlights some current challenges facing the health sector in Africa, and how entrepreneurs in some of these countries are innovatively overcoming some of these obstacles mainly by low-cost solutions and strategies. However, while health care marketing has been developing significantly recently, measurement challenges still abound in assessing its impact.

From the vantage point that the quality of medical care has customarily been measured by objective criteria; the chapter argues that more subjective valuations are needed. Alongside, in a bid to move quality assessment in the sector beyond the supply side approach, the digitisation and mobilisation of healthcare is discussed through m-health initiatives. Due to the rapid proliferation of mobile devices and online access in the African region, the potential of such technologies from both the demand and supply side encompass healthcare mobile usage.

To address, we recommend that for healthcare marketers to stay competitive, there is a both a need for the integration of immersive technology and the implementation of measurement metrics that involve subjective valuations. Both are critical to improving service quality - which has a significant impact on service satisfaction and behavioural intentions; and further mediates the relationship between the dimensions (interpersonal quality, technical quality, environment quality, and administrative quality) and intentions.

Introduction

The quality of medical care has customarily been measured by objective criteria such as mortality and morbidity; more subjective valuations are repeatedly ignored (Dagger, Sweeney, & Johnson, 2007). The health care sector has been slow to move beyond a supply-side approach to quality assessment. The changing structure of the industry implies that the role patients play in defining what quality means has become a critical competitive deliberation. Consequently, service providers are struggling to device meaningful customer-oriented quality assessment measures (Dagger et al., 2007). The need for effective marketing activities in the health services sector cannot be overemphasised. Over the last two decades emerging information and communications technologies has the potential to improve the quality and delivery of health services in Africa, however, the adoption processes remain slow and complex (Tetteh Ami-Narh, Williams, 2012). Maintaining and delivery of quality is one thing, but another important issue in health services is communication between stakeholders. This means that effective marketing commutation would need to rely extensively on exploiting opportunities presented by the wide range of information and communications technologies. Consequently, the marketing mix would need to shift to digital as the healthcare market evolves. An implication for marketers is that crystallizing customer segments is more important than ever; since they consider educating through content a top priority (Affect, 2018). Today, the proliferation of mobile technologies and the usage of social media provide a low-cost avenue for content dissemination to service users across various sectors of the economy.

Social media has become one of the effective mechanisms used by both the private and public sectors to deliver promotional messages (DePaula et al.,

2017; Narangajavana et al., 2017; Venkatesh, Chan and Thong, 2012). A considerable number of studies have emphasised the increasing use of social media by organisations over the last two decades (Garrido-Moreno et al., 2018; Sigala & Chalkiti, 2015). Through social media, people maintain contact with others; hence it can provide a means of communication between medical institutions and their stakeholders. Additionally, it can be used in advertising and promoting strategies, by posting information about discounts, offers and advantages of accessing the products provided by service providers (Radu et al., 2017). The GSMA (2019) emphasises the growing access and use of mobile phones in the world. These developments have enabled wider personal and organisational uses. As a result, providers and staff members in the medical sector now use mobiles for social networking, continuing education, transferring patient records, and managing physician referral networks with applications (Hammer, 2017).

Healthcare services in Africa: some challenges

There is very limited investment in healthcare services across Africa; the investment shortage is estimated at between $25-$30 billion according to experts (Atieno, 2017). Additionally, there is a shortage of skilled and experienced doctors in Africa (Atieno, 2017; Naicker, Plange-Rhule, Tutt, & Eastwood, 2009). For instance, although Sub-Saharan Africa is inhabited by 13 per cent of the world's population it has 24 per cent of the global disease burden; yet only possesses 2 per cent of doctors worldwide (Atieno, 2017). In addition, the health sector in Africa has been characterised by congestion in hospitals, long distances to health facilities, shortage of health personnel, reliance on paper-based records and inefficient operations. These have given rise to an urgent need for digital innovations in the African healthcare services sector (Volker Hempel, 2018b). Although technology makes it possible for a

single doctor to reach many patients conveniently, there is still need for further investments in augmenting the training of health professionals, especially doctors, whose skills development requires practical exposure. Some of the exposure needs to explore the use of new and emerging technologies (Atieno, 2017).

To a large extent, regulatory and legal challenges also hinder optimal healthcare services in Africa (Hempel, 2018d, 2018c). Given that governments fall short with respect to the needed investment in healthcare provision, service providers must rely on foreign investments and buy-ins. Despite this need, the healthcare industry is immersed in complex regulations that present hurdles for entrepreneurs. Moreover, healthcare start-ups have the challenge of dealing with access to personal data; however, there are limited safeguards towards dealing with data protection issues. An outlier to the issues within the continent appears to be South Africa (SA), indicated by the significant level of health tourism. The country is regarded the centre for the application of modern technologies and innovation in healthcare deliver. It is also the testing ground for entrepreneurship; having the largest life sciences market on the continent; government-sponsored schemes to promote start-ups; a large number of investors entering the market; and huge human capital and talented youth (Hempel, 2018b).

Information Technology and Healthcare services in Africa

Information and communication technology (ICT) has seen an upsurge with wider access to people across both developed and developing countries. The ubiquitous ICT presence is having significant impact on the businesses and other socio-cultural dynamics (Tetteh Ami-Narh & Williams, 2012). Over the last 3 decades African govern initiatives have given much needed attention to

policy initiatives to broaden ICT access to leverage opportunities to urban and rural populations as well as increase productivity and innovation in both the private and public sectors (ITU, 2006). Kwankam (2008) observes that adopting wider use in health services in developing countries can bring about extensive benefits to reducing the problems in the sector. He notes that through ICT practitioners can offer services beyond their physical reach. Which means services could be provided to areas where doctors and other medical staff have no presence but can co-ordinate medical provision from a distance. This can enable less experiences practitioners to remotely access help from experts to improve service delivery. Wider ICT access can also enable healthcare consumers to actively participate in shaping the quality of healthcare services delivery (Kwankam, 2008).

In 2017, the World Health Organization Regional Office for Africa and the International Telecommunication Union (ITU) signed a Cooperation Agreement, on using digital services to save lives and improve people's health in the region. The initiative will establish the platforms in countries to deliver digital health services such as mHealth, e-Learning, Health Information Systems, Telemedicine among others. It is anticipated that all countries in the Africa region will benefit from this initiative over the 2018-2030 period, over a span of four 3-year phases. The partnership focuses on building a capable workforce to effectively use ICT as well as addressing the need for multi-stakeholders partnership models that can bring about the sustainable adoption of Digital Health. Moreover, the new Agreement intends to merge existing efforts and resources towards making available ICT foundations and platforms, that are a requirement for providing and scaling up digital health services in the region (World Health Organization, 2017).

Africa is currently undergoing a digital revolution. For instance, most countries across sub-Saharan Africa have a high level of mobile penetration

(85 per cent), while internet penetration is rising (Atieno, 2017; Poushter, 2016). Already some African countries have come up with innovative ways they can leverage mobile technologies to mitigate shortages in the healthcare service delivery.

Nonetheless, partly influenced by the challenges discussed above, low-cost solutions have been the most viable sort of innovations. For instance, In Malawi, hotline innovations such as 'Chipatala Cha Pa Foni' –facilitates citizens toll free calls regarding pregnancy and paediatric health advice; using a mHealth platform to provide access to hospital information via mobile phones. The wireless heart diagnostic system invented by Sanga Kathema: 'IHMMS', which is built from discarded electronics, represents another low-cost solution - which aids in circumventing the lack of cardiologists, as it can be easily employed by nurses and other health personnel. Similarly, in Togo, innovators like Kodio Afate Gnikou have taken the problem of e-waste created by first world countries and deposited in the third world; and are transforming these leftover parts into a 3D printer which tackles forecasted potential health challenges. In Uganda, Brian Gitta and six student friends developed 'Matibabu' (medical centre in Swahili) - a low-cost, reusable device that can test for Malaria quickly and accurately, without drawing blood. It clips on to the patient's finger and shines a red beam of light on to the skin, detecting changes in the shape, colour, and concentration of red blood cells, all of which are affected by malaria (Hempel, 2018a).

Following, several cases of healthcare innovations across Africa are presented pointing to cases in Rwanda, Malawi, Tanzania, South Africa, Kenya, Uganda, Ghana, and Nigeria. The cases are far from exhaustive; however, they shed light on the diversity of healthcare innovations, expands on the prominence of low-cost solutions, and illuminate the contribution of entrepreneurial efforts on healthcare across the African continent.

Rwanda

The exponential growth of health sector in Rwanda is partly driven by the innovative use of mobile technologies in areas like telemedicine, and drone services for health packages and products movement (Atieno, 2017; Hempel, 2018d). Such initiatives have improved Rwanda's status in reducing child mortality, which is one of the most critical parameters of a country's health care system (Hempel, 2018a).

In conjunction with the Rwandan government ministries of health, youth and ICT; Babylon, a British telemedicine firm, launched a mobile based healthcare scheme in 2016 focusing on quick and easy access to live medical doctors and professionals through mobile devices. In the same year, Zipline, (a Silicon Valley company) kick-started its operations in Rwanda; employing drones in the delivery of health packages and products (e.g. blood needed for transfusions and vaccines) – to mitigate unavailability issues in communities due to logistical challenges such as bad roads. Additionally, they offer benefits such as a decrease in stock-outs and efficient delivery at affordable prices. Over twenty health centres and clinics in Rwanda have access to the drone service, and the initiative serves over two million of its populace which lacks access to primary healthcare (Hempel, 2018d). A similar initiative is evident in Malawi where local start-ups like 'Micromek' are taking advantage of the drone corridor introduced in the country to explore the use of the cutting-edge technology to render quick delivery and transportation options of medical supplies in the hard to reach areas of the country (Hempel, 2018c). Besides drones, other logistical solutions can be seen in other parts of Africa such as Ghana. For instance, 'SnooCODE RED', a logistics app significantly reduces emergency response times of ambulances, through a custom made

mapping system that aid better navigation through dense urban areas (Hempel, 2018a).

Other benefits of technology initiatives in Rwandan healthcare extend to hospitals; particularly nurses. One case in point is IV Drip Alert - a device that enables nurses to more easily manage intravenous fluids through a wireless alert system; hence reduces patients' risks of complications due to empty IV bags. This system is more accurate and efficient than manual systems, due to an automatic monitoring device. The solution circumvents serious problems like air embolisms which can occur if the observer forgets to change the IV at the correct time (Hempel, 2018a).

South Africa

South Africa champions the continent's largest healthcare market valued at approximately USD28.1 billion, and there are 101 mHealth services across the country; of which 83 are live. As South Africa ventures into numerous digital health sectors such as telemedicine, m-health, wearable and medical devices; the Department of Science and Technology in the country notes that there is need to develop its health innovation system using a model that brings together government, academia, industry and civil society which will benefit from manufacturing capability, research and academia, and the regulatory environment (Hempel, 2018b). The country is experiencing the growth of digital health accelerators, aimed at supporting digital health innovation; concurrently the government is fast-tracking the implementation of a National Health Insurance Scheme to cover its citizens. In the interim, on the demand side, digital innovations like 'hello doctor' are available to connect patients with doctors; mHealth implementations like MomConnect have achieved over 460,000 service adopters in the country. Conversely,

innovations like 'EMGuidance' assist health personnel on their work; and novelties such as 'Stock Visibility Solutions (SVS)' by Vodacom, aid to capture drug stock levels daily on the supply side (Hempel, 2018; 2018b).

In addition, the country's manufacturing capabilities and knowledge with highly competitive and innovative firms distinguishes it from other African economies (Hempel, 2018b). In the country, telemedicine start-ups are innovating in healthcare services; particularly individuals' health tracking. While platforms such as 'connectmed' are championing the space, start-ups like 'Vitls' are producing wearable health trackers which allow medical teams to remotely monitor a patient's vital signs. Later start-ups to the game, such as 'HearX' have recently secured funds for hearing-focused digital health initiative. Others such as 'OculusID' have developed biometric solutions with impairment detection through the application of non-invasive, hygienic and cost-effective innovations. 'CapeRay' is another healthcare start-up intending to develop an innovative means for doctors to diagnose breast cancer; through combining X-ray and ultrasound breast screening equipment.

Malawi

There is a clear shortage of doctors in Malawi; quantified at one for every 88,300 people in the country. To mediate such challenges, Malawian entrepreneurs are elevating the healthcare sector through eHealth and mHealth technologies (Hempel, 2018c). Start-ups like 'IMOSYS', which is being funded by the World Bank in its five year project, are implementing national tuberculosis control project to provide care interventions that aim to reduce diagnostic and treatment delays of the ailment (Hempel, 2018c,

2018a). Alongside, major Malawian healthcare players like 'Baobab Health' are developing low-cost power backup systems, touchscreen-based user interfaces designed for users with limited experience, and low-cost information appliances that are significantly more robust in harsh environments than traditional computers - in order to provide low cost diagnostic tools and communication devices for health personnel, especially in the rural areas – where more than 83% of the populace lack access to healthcare tools (Hempel, 2018c).

Tanzania

Tanzanian healthcare entrepreneurs are contributing reasonably to the overall innovation in the country. The 'Be a lady' initiative is a good example which is led by Lulu Said Ameir and focuses on healthcare and hygiene for adolescent girls in secondary schools by installing sanitary pad vending machines. The information from the use of these vending machines is fed back to compare school attendance rates and make recommendations on ways to reduce school absenteeism (Hempel, 2018a). The initiative has also been able to impact low-income earners, by supplying their adolescent girls with access to good quality, affordable sanitary pads.

Another Tanzanian case is that of 'Jamii' - a micro-health insurance start-up using low-end mobile technology (USSD App) to launch insurance policies from as low as USD 1 per month for the low-income populace. Founder and chief executive officer (CEO) of the initiative, Lilian Makoi, projected that it will help impact the lives of 720,000 people by 2018 as the service expands across Africa (Hempel, 2018a). Healthcare entrepreneurial efforts are also impacting Tanzanian hospital networks. 'Okoa', meaning: 'to save', is such; a web-based monitoring software designed to combat the theft of medical

supplies across the networks of hospitals in the country. It achieves this by monitoring medicine inventories at the national medical store and in hospitals, and reporting discrepancies to the Ministry of Health. Resultantly, it aids to cut healthcare costs and ensure medicines are available to those who need them (Hempel, 2018a).

Uganda

In Uganda, inaccurate diagnosis and treatment of ailments has influenced Brian Turyabagye to create 'Mama-Ope' – a biomedical smart jacket that helps doctors identify pneumonia faster and more accurately. It measures temperature and breathing rate and compares it to a database of parameters. The team behind the initiative aim to reduce the margin for human error and help doctors make faster, more accurate diagnoses (Hempel, 2018a). 'Ask without Shame' is another entrepreneurial healthcare initiative in Uganda; it provides emergency sex education via mobile through an android app, Whatsapp, calls, and SMS. Medical experts and counsellors are always available to assist users with the right information regarding sexuality.

Kenya

In Kenya, E-Con wheelchair is a culmination of various solutions proposed by entrepreneurial effort. It is a 4×4 wheelchair that can go-off road, climb stairs, allow the user to stand upright and automatically navigate familiar terrain, all while keeping its passenger perfectly level. The country is also home to Mensa Healthcare; an initiative that enables patients to accurately communicate their prescription history with a tracking tool more efficient than memory; through a personal portable health records system (Hempel, 2018a).

Nigeria

According to the World Health Organisation (WHO), birth asphyxia is one of the three major causes of new-born deaths; accounting for 23 percent of death worldwide. In Nigeria, 'Ubenwa Intelligence Solutions' is developing a machine learning system that can input the cry of a baby, analyse its amplitude and frequency patterns, and give an instant diagnosis of the condition; hence it can now be detected without medical expertise or use of clinical methods (Hempel, 2018a).

Healthcare Marketing

The purpose of healthcare marketing is to study and recognise the requirements and desires of potential patients, in order to meet those necessities at peak standards (Radu et al., 2017). According to the Centres for Disease Control and Prevention (CDC), health marketing involves creating, communicating, and delivering health information and interventions, using customer-centred and science-based strategies to protect and promote the health of diverse populations. The complexity of health marketing can be seen through the diversity of perspectives regarding the term; including (Centers for Disease Control and Prevention, 2011):

- A multidisciplinary practice that promotes the use of marketing research to educate, motivate and inform the public on health messages
- An integration of the traditional marketing field with public health research, theory and practice
- A complex framework that provides guidance for designing health interventions, campaigns, communications, and research projects

- A broad range of strategies and techniques that can be used to create synergy among public health research, communication messages and health behaviours.

In this vein, Health Marketing is a multidisciplinary area of public health practice, which draws from fields such as marketing, communication, and public health promotion; to provide a framework of theories, strategies and techniques that can be used to guide work in public health research, interventions, and communication campaigns (Bernhardt, 2006; Centers for Disease Control and Prevention, 2011). In recent years across Africa there has been a proliferation of private healthcare facilities that are competing and in some instances complement the provision by the public sector. These private healthcare organisations also need to make even more effort at marketing communication to reveal how they stand out from private providers as well as how they can complement public sector healthcare provisions. Therefore the marketing function has assumed a very important role in the health delivery sector.

In meeting the new priorities for healthcare marketing, five essentials are proposed for marketing plans, in order to capitalise on emerging opportunities. These include: advanced social media, targeted content and promotion, creative media relations, emerging tech campaigns, and business-oriented metrics (Affect, 2018). The measurement challenge is highlighted in a subsequent section.

Digitizing and mobilising health: m-health

Globally, there is a growing number of mobile device users; even more so in Africa. Recently, there has been a flood of mobile devices on the market; including smartphones, tablets and wearables. The proliferation of these

personal effect technologies is making it easier for people to adopt their use for health service. Mobile technologies and the internet easily solves the problems of geographical barriers and low resources; thereby taking healthcare services to the millions who would have otherwise lacked medical attention (Atieno, 2017).

Digital Health initiatives help ensure fairness in service delivery and thereby stimulate progress in public health; in addition to making the system work for the whole population. Such initiatives have already demonstrated the significant potential of ICT to empower healthcare workers and the beneficiary population by providing them with the right information at the right time and place (World Health Organization, 2017).

The concept of m-health is one of the key technological domains resulting from the advances in remote healthcare and e-health systems which is bringing together major academic research and industry disciplines worldwide to achieve innovative solutions to healthcare delivery, exploiting the introduction of new wireless standards and network systems with true mobile broadband and fast internet access (Istepanaian & Zhang, 2012).

There is no standard definition for m-health; its complexity is evident in the perspectives taken by scholars, practitioners and even world institutions. Definitions of m-health have focused on either the 'technological' or 'functional' dimension (Nunes & Simões-Marques, 2015) (see Table 1).

Table 1: Dimensions of m-health

Technological dimension	• M-health comprises mobile computing, medical sensor, and communications technologies for healthcare (Istepanian, Jovanov, & Zhang, 2004)

Functional dimension	• M-health involves medical and public health practice supported by mobile devices, such as mobile phones, patient monitoring devices, personal digital assistants (PDAs), and other wireless devices (Volker Hempel, 2017; World Health Organisation, 2012).

M-health services were predicted to be a twenty-six-billion-dollar market globally by 2017; Asia-Pacific is the fastest growing m-health market, only superseded by the USA (Hammer, 2017) – as North America dominates the global digital health market, which is expected to exceed USD 379 billion by 2024 (Volker Hempel, 2017). In Africa, these services are also enjoying growth in countries like South Africa, Rwanda, Nigeria, Kenya and Malawi. Other African countries would need to learn lessons from countries that have implemented to integrate m-health services into healthcare provision.

Healthcare mobile usage

The rise in smartphone ownership in Africa means that people are increasingly going online to find information via the mobile route. For instance, a significant amount of smartphone users gather information about a specific medical problem or procedure, or diet, nutrition, and fitness-related information on their smartphones (cf. Hammer, 2017)

Healthcare providers are also turning to mobiles as professionals in the industry use smartphones and medical apps to facilitate m-health. Compliance and IT security regulations, that made it a challenge for the

healthcare industry to adopt mobile devices in the past are continually being resolved; hence more organisations are finding adoption acceptable (Hammer, 2017). Research also demonstrates the need for digital methods of promoting medical care services in order to expand a business and an important role of social networking sites in marketing communications has been emphasised by many scholars (Radu et al., 2017).

Additionally, there are benefits of mHealth apps for improving patient care. These apps can be broken down into 'wellness' and 'medical' app categories. In app stores, a significant amount (85 per cent) are wellness apps and medical apps make up the remainder – most of these are free to use or get started. The former is typically used by patients, while the latter is designed to be primarily used by physicians (Duffy, 2011; Hammer, 2017). Health apps are becoming more secure as they are being developed with HIPAA-compliance[1] in mind, hence wider adoption in healthcare organisations (Hammer, 2017).

The measurement challenges

Despite all the opportunities provided by the mHealth solutions, challenges lie ahead as well, such as globally accepted policies, guidelines, and standardized metrics (Volker Hempel, 2017).

Though measurement has been continually contemplated by marketing and PR executives, execution still suffers. The evolving health marketing landscape has resulted in linking PR and marketing efforts more closely to

[1] The Health Insurance Portability and Accountability Act (HIPAA) sets the standard for sensitive patient data protection. Companies that deal with protected health information must have physical, network, and process security measures in place and follow them to ensure HIPAA Compliance. Covered entities (anyone providing treatment, payment, and operations in healthcare) and business associates (anyone who has access to patient information and provides support in treatment, payment, or operations) must meet HIPAA Compliance. Other entities, such as subcontractors and any other related business associates must also comply (De Groot, 2018).

business/financial metrics, as a top priority for marketers. The development of metrics aids in measuring the real value of marketing activities on the business; and can aid in strategic decisions (Affect, 2018). Regarding social media, there are communication platforms that can promote certain behaviours thus influencing decision-making (Radu et al., 2017).

Table 2 provides suggested metrics across marketing and overall business metrics.

Table 2: Metrics for measuring healthcare business (adapted from Affect, 2018)

PR/MARKETING METRICS	BUSINESS METRICS
• Share of Voice • Customer / Patient Engagement • Traffic to Website • Downloads • Registrations • Lead Generation	• Market Penetration • Market Leadership • Market Share • Sales/Revenue • Cost Savings • Brand Loyalty

Health service quality

Service quality has become an important corporate strategy for healthcare organizations, like quality in healthcare is currently at the forefront of professional, political, and managerial attention, primarily because it is being seen as a means for achieving increased patronage, competitive advantage, long-term profitability; and as an approach to achieving better health outcomes for consumers (cf. Dagger & Sweeney, 2006; Dagger et al., 2007).

Conceptually, the definition of service quality is mainly specified at an abstract level; either via a 'formative' or 'reflective' approach. In the former, the dimensions of the construct give rise to or cause the overall construct; whereas in the latter, dimensions are viewed as reflective indicators of their higher order construct (Dagger et al., 2007).

Scholarship has also understood service quality in terms of dimensionality. For instance, the SERVQUAL scale which is predominantly employed in understanding service quality encompasses five dimensions: reliability, empathy, tangibles, responsiveness, and assurance (Parasuraman, Zeithaml, & Berry, 1985, 1988). However, researchers have found the scale to be unidimensional (e.g. Brown, Churchill, & Peter, 1993).

The dimensional structure of service quality perceptions has raised replication problems (Dagger et al., 2007). For instance, Buttle's (1996) critique of the widely applied SERVQUAL scale, is partly based on the difficulty to reproduce its dimensions across diverse service contexts.

The construct is also predominantly expressed as a second-order factor (e.g. Grönroos, 1993; Parasuraman, Zeithaml, & Berry, 1988); and more recently, as a third order factor (e.g. Brady & Cronin, 2001). In this regard, Dagger et al. (2007) opine that:

"*This structure suggests that service quality comprises several primary dimensions, which in turn share a common theme represented by the higher order global perceived service quality construct… these dimensions have subdimensions that combine related attributes into subgroups*" (p. 124).

The scholars contend that representing perceptions of overall service quality as third order factors to the subdimensions recognizes that the evaluation of the construct may be more complex than previously conceptualized. Their study findings were drawn from developing and empirically testing a

multidimensional hierarchical scale for measuring health service quality and investigating the scale's ability to predict important service outcomes: service satisfaction and behavioural intentions; suggest that customers evaluate service quality at an overall level, a dimensional level, and at sub-dimensional level and that each level drives perceptions at the level above.

Dagger et al.'s (2007) approach contrasts conceptualisations of Service quality perceptions wherein assessment is based on an expectation (dis)confirmation approach; i.e. the construct is defined as a consumer's judgment of, or impression about, an entity's total excellence or superiority (Parasuraman et al., 1985, 1988). In this context, judgements that shape Perceptions of service quality are often described in terms of the incongruity between consumers' hopes of service and definite service performance (Grönroos, 1993; Parasuraman et al., 1985). Although commonly applied, this approach has been the subject of substantial criticism and debate (see Dagger et al., 2007).

Concluding remarks

An ageing population, mounting competitive pressures, increasing consumerism, and emerging treatments and technologies all partly influence the growth in healthcare; hence it is one of the fastest growing sectors in the service economy (Andaleeb, 2001; Dagger et al., 2007).

Technological developments impact changes in healthcare. The provision of healthcare services can go a long way, via digital technology adoption and mediation; significantly reducing costs. Affect's (2018) recent study indicates that technology enablement is the most crucial concern for healthcare marketers in 2018. In this regard, social media is a key component included in the mix in order to meet the needs of target audiences. the targeting fitness of electronic media has led to its usage by marketing managers in medical

institutions as means of advertisement when they advance the marketing campaigns (Radu et al., 2017). Nonetheless, while emerging technologies (e.g. new drugs and treatments, new devices, new social media support for healthcare) will drive innovation, human factors will remain one of the stable limitations of breakthroughs (Thimbleby, 2013).

In Africa, digital solutions can bolster healthcare access and services across the continent at a fraction of the cost (Atieno, 2017). Rapid improvement in IT infrastructure coupled with growing demand for cost-effective technologies in healthcare such as mHealth (mobile health) will boost the digital health market over the coming years. Already the ubiquitous nature of mobile technologies influences pervasive usage in the healthcare industry, as the nature of the job often requires physicians to be accessible always. These users have perpetual information needs that mobile devices meet.

While access to the internet and proliferation of internet-enabled devices has gone a long way in mitigating the problems faced by the health sector in the region, these systems are only as effective as the quality of health practitioners using them to reach the patients (Atieno, 2017). Therefore the development and use of digital technologies would not improve service quality on their own. However, with good health infrastructure and competent health professionals, digital telecommunications could enhance health service provision significantly.

For healthcare marketers to stay competitive, adopting immersive technology such as artificial intelligence and augmented reality and implementing metrics and measurement becomes critical to improving service quality; as it has a significant impact on service satisfaction and behavioural intentions, and also mediates the relationship between the dimensions and intentions. The nine subdimensions (*interaction, relationship, outcome, expertise, atmosphere, tangibles, timeliness, operation, and support*) drive four primary dimensions

(*interpersonal quality, technical quality, environment quality, and administrative quality*), which in turn drive service quality perceptions.

REFERENCES

Affect. (2018). *HEALTHCARE MARKETING 2018: Guide to Meeting New Priorities in a Shifting Environment*. Retrieved from http://www.affect.com/wp-content/uploads/2017/11/Affect_Healthcare_White_Paper.pdf

Andaleeb, S. S. (2001). Service quality perceptions and patient satisfaction: a study of hospitals in a developing country. *Social Science & Medicine*, *52*, 1359–1370.

Atieno, M. (2017). How technology can improve Healthcare in sub-Saharan Africa. Retrieved November 22, 2018, from http://innov8tiv.com/technology-can-improve-healthcare-sub-saharan-africa/

Bernhardt, J. M. (2006). Improving Health Through Health Marketing. *Preventing Chronic Disease Public Health Research, Practice, and Policy*, *3*(3), 1–3. Retrieved from https://www.cdc.gov/pcd/issues/2006/jul/pdf/05_0238.pdf

Brady, M. K., & Cronin, J. J. (2001). Some New Thoughts on Conceptualizing Perceived Service Quality: A Hierarchical Approach.

Journal of Marketing, *65*(3), 34–49.

Brown, T. J., Churchill, G. A., & Peter, J. P. (1993). Improving the measurement of service quality. *Journal of Retailing*, *69*(1), 127–139.

Buttle, F. (1996). SERVQUAL: review, critique, research agenda. *European Journal of Marketing*, *30*(1), 8–32.

Centers for Disease Control and Prevention. (2011). What is Health Marketing? Retrieved November 20, 2018, from https://www.cdc.gov/healthcommunication/toolstemplates/whatishm.html

Dagger, T. S., & Sweeney, J. C. (2006). The Effect of Service Evaluations on Behavioral Intentions and Quality of Life. *Journal of Service Research*, *9*(1), 3–18.

Dagger, T. S., Sweeney, J. C., & Johnson, L. W. (2007). A Hierarchical Model of Health Service Quality: Scale Development and Investigation of an Integrated Model. *Journal of Service Research*, *10*(2), 123–142.

De Groot, J. (2018). What is HIPAA Compliance? Retrieved November 22, 2018, from https://digitalguardian.com/blog/what-hipaa-compliance

Duffy, M. J. (2011). Smartphones in the Arab Spring. *IPI Report: Media and Money*, 53–56.

Grönroos, C. (1993). A Service Quality Model and Its Marketing Implications. *European Journal of Marketing*, *18*(4), 36–44.

GSMA. (2017). *State of the Industry Report on Mobile Money*.

Hammer, R. (2017). 30 Amazing Mobile Health Technology Statistics for Today's Physician. Retrieved November 21, 2018, from https://getreferralmd.com/2015/08/mobile-healthcare-technology-

statistics/

Hempel, V. (2017). Future possibilities of mobile health in the African context. Retrieved November 22, 2018, from https://www.dr-hempel-network.com/digital-health-technolgy/mobile-health-in-africa-mhealth/

Hempel, V. (2018a). 16 Young digital health, healthcare innovators in Africa who are changing the face of healthcare in sub-saharan region. Retrieved March 11, 2019, from https://www.dr-hempel-network.com/digital-health-startups/16-young-digital-health-healthcare-innovators-in-africa/

Hempel, V. (2018b). 5 Reasons why South Africa is the centre for technology healthcare innovation. Retrieved November 22, 2018, from https://www.dr-hempel-network.com/growth-of-digital-health-market/5-reasons-why-south-africa-is-the-centre-for-technology-healthcare-innovation/

Hempel, V. (2018c). Digital healthcare in Malawi | Challenges faced by the African country. Retrieved November 22, 2018, from https://www.dr-hempel-network.com/health-policies-in-india/digital-healthcare-in-malawi/

Hempel, V. (2018). How to finance your digital health startup in Southern Africa region? Retrieved March 11, 2019, from https://www.dr-hempel-network.com/digital-health-startups/finance-your-digital-health-startup-in-southern-africa/

Hempel, V. (2018d). Is Rwanda the testing market for latest digital health technology? | Digital health sector in Rwanda. Retrieved November 22, 2018, from https://www.dr-hempel-network.com/health-policies-in-india/digital-health-sector-in-rwanda/

Istepanaian, R. S. H., & Zhang, Y. T. (2012). Guest Editorial Introduction to the Special Section: 4G Health—The Long-Term Evolution of m-Health. *IEEE Transactions on Information Technology in Biomedicine*, *16*(1), 1–5. https://doi.org/10.1109/TITB.2012.2183269

Istepanian, R., Jovanov, E., & Zhang, Y. T. (2004). Introduction to the special section on M-Health: beyond seamless mobility and global wireless health-care connectivity. *IEEE Transactions on Information Technology in Biomedicine*, *8*(4), 405–414. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/15615031

Naicker, S., Plange-Rhule, J., Tutt, R. C., & Eastwood, J. B. (2009). Shortage of healthcare workers in developing countries--Africa. *Ethnicity & Disease*, *1*, 60–64.

Nunes, I. L., & Simões-Marques, M. J. (2015). Exploiting the Potential and Facing the Challenges of Mobile Devices: Application Examples. *Procedia Manufacturing*, *3*(AHFE), 807–814.

Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1985). A Conceptual Model of Service Quality and Its Implications for Future Research. *Journal of Marketing*, *49*(4), 41–50.

Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1988). SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality. *Journal of Retailing*, *64*(1), 12–40.

Poushter, J. (2016). *Smartphone Ownership and Internet Usage Continues to Climb in Emerging Economies*. Retrieved from www.pewresearch.org

Radu, G., Solomon, M., Gheorghe, C. M., Hostiuc, M., Bulescu, I. A., & Purcarea, V. L. (2017). The adaptation of health care marketing to the digital era. *Journal of Medicine and Life*, *10*(1), 44–46. Retrieved from

http://www.ncbi.nlm.nih.gov/pubmed/28255375

Thimbleby, H. (2013). Technology and the future of healthcare. *Journal of Public Health Research*, *2*(3), e28.

World Health Organisation. (2012). *mHealth New horizons for health through mobile technologies*. Retrieved from http://www.who.int/about/

World Health Organization. (2017). WHO and ITU to use digital technology to strengthen public health services in Africa. Retrieved November 21, 2018, from https://afro.who.int/news/who-and-itu-use-digital-technology-strengthen-public-health-services-africa