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DIGITAL HEALTH IMPLICATIONS IN HEALTH SYSTEMS IN AFRICA

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ABSTRACT

Digital health adoption and implementation holds great promises and opportunities in strengthening and transforming health systems and community across Africa continent. This synopsis climaxes the digitalization health systems opportunities and implications on preventive and curative healthcare and medical services delivery in Africa. Also it aims at galvanizing robust political leadership commitment and investment of government, local public and private stakeholders' partnership and collaboration in maximizing on the digital health benefits and in harnessing the importance of an integrated digital health ecosystems approach, technologies and tools. Authors buttress that digital health contextual inter-operability harmonization and standardization or validation of methods and strategies benchmarks are needed in strengthening and maximizing local, national and regional digital actionable care services delivery (e.g.: dCare, dFitness, dPharmacy, dImmunization) in promoting healthier lifestyles and wellness, attainment of sustainable economy development and global health security.

KEYWORDS: Digital health, digital medicine, re-engineering, empowerment, integration, Africa.

With some of the fastest growing economies of the world, Africa has come to age and ripe in ascending into digital health and medical paradigm shift in health systems re-engineering, innovative transformation and effective care services delivery to its populations in need. Increasingly, Africa is becoming an attractive global investment environment with innumerable industrial opportunities and implications those that drive strategic growth and profits, social cohesion, well-being, regional and global economic prosperity.[1] The digitalization of health database and electronic records provides convenient, affordable and timely medicine, making accessible and effective health care devices against existing health systems challenges and issues in African countries.[1,2] Also integrated digital and mobile networks and relational databases provide and participation from patients, health care provider's best practices, policy makers, governments, industries and regulators in remotes health settings.[2] It also enhances a new dawn in data and information gathering, analysing, reporting, sharing, mobilizing and empowering patient, care providers and other stakeholders on emerging threat and disease trends, patient safety, uniform adoption and implementation of digital healthcare surveillance approach, risk dissemination, management and monitoring systems.[3]

Public healthcare digitization ecosystems integration owns great promise and potential to uplift access to technology, health and education' and opening new frontiers in revamping health systems deficiencies in Africa continent.[2,4] Moreover in bridging the gaps between technology, health, care providers and community altogether through building and maintaining information, communication and care service delivery networks as well as opening new areas of opportunities to all actors.[5] Digital platforms and applications provide a real time catalyst for new healthcare and medical paradigm shift at this time when it has never been needed with various preventable and manageable health systems challenges, health and demographic transition and

globalisation. Increasing accessible and available data sharing and exchange, partnerships with engaging applications and devices have increased the capabilities of integrated patient, health providers and community primary health care mainly in lifestyle adaptations, positive social and behavioural changes.[4] Healthcare digitalization applications such as health technology development and information dissemination automated and integrated patient-care provider's empowerment and tasks, fitness and clinical game-based to problem-based applications and tools, automated sensors and wearable devices provide viable and sustainable opportunities.[3,5] Mainly in increasing access online networks, to affordable, reliable and effective tools, counselling, coaching, tracking and monitoring individual and environmental changes and provide early warning signals thresholds in detecting and equal opportunities to respond to the threat or population needs using the most effective interventions and services delivery.[6] Moreover, power digital health tools to increase early detection and identification of threat and diseases, timely prevent and appropriate new management solutions are enhanced by maximizing and strengthening collective participation and collaboration of patients, care providers, public-private partnerships and community resilience.[4,6,7]

This synopsis highlights the ramifications and future opportunities of digitalization of healthcare and medical services adoption in health systems, primary health care in Africa; harnessing and fostering leadership and investment in the sustainability of digital benefits to the local, national and regional health care, economy development and global health security.

There is urgent need for active leadership in healthcare digitalization process, vital in defining the local and national to regional framework, providing direction and strategic priorities in Africa continent especially in countries. Such efforts must be supported by ethical, legal and policy enablers at all levels (patient, providers, insurers, and regulators) that provide opportunities for both political and financial commitment and investment as well as strategic partnership including public private and community in digital health technologies implementation.[5] Also understanding the various digital health components (Health ICT, mobile and internet health, quantified self-care, gamification, metadata, sensors and wearable healthcare, well and wellness care applications, electronic health records and medical imaging, telemedicine and personal genomics) is essential in setting up the right local and national structures and administration.[2,4,7] Furthermore the establishment of local to regional experts committees those engage the public, providers and support the real time implementation, execution, monitoring and evaluation and coordination of the various task forces and activities in speeding up the requisite in development and pilot operational digital health research needed for

evidence-based guidelines, measures and programming activities.

Fostering digital health systems information and communication technology implementation in local, national and regional letters require adoption in strategic health programming and programs importance and imperative in addressing the current and future health systems challenges and issues. But also in tackling the heavy public burden of infectious diseases such as HIV, TB, malaria and rising trend in chronic diseases can uplift the new trajectory health framework of digital and mobile devices game changers in transforming the African health care systems.[8,9] Hence, digital technology infrastructures and facilities backbone resources development and investment is capital in increasing significantly the power of applications accessibility and availability to the general public, promoting communication and information awareness or information penetration in positive healthcare outcomes and socio-behavioural changes, complete real time accessibility, acceptability, awareness, accelerated deployment and business areas prospects.[10,11]

Maximizing on digital health and medical devices benefits and opportunities are numerous and of great value including but not limited to: (1) digital health and medical policies and regulations formulation and implementation, enhancing integrated threat and disease surveillance and response systems, evidence decision making health programming and priorities; (2) expansion markets business and marketing areas and opportunities to telecommunications, pharmaceutical, biotechnologies and related companies and new long term partnerships and collaboration in promoting robust local, national, regional to global economy growth, sustainable development and prosperity; (3) increasing real time accessibility, scalable, cost effective and availability mobile care integrated into public health in improving early warning signals, accurate and timely detection and investigation coordinated approach in addressing health systems challenges and diseases public health burden. Hence boosting diseases prevention and control performance and effectiveness; (4) cutting edge genomics metadata mining to nano-diagnostic implants forecasting, sensors and wearable devices in disease biomarkers monitoring, risk factors based family planning and care in chronic diseases; in addition to existing serological and molecular assays and technologies in mapping microbiome emergence, distribution and evolution studies; (5) cutting edge information technologies analysis in frontline situations identification, diagnostic, mapping, understanding, reporting, prevention, evidence decision support in effective response logistics and management in remotes; (6) improving and maintaining good practices at all levels and effective participatory approach to health resilience and evidence translation into positive social and behavioural changes, patient-providers informed choices and quality care and outcomes; (7) prediction or

modeling and contextual validation of various application and tools future threat, disease or epidemics before it happen including mapping vaccine and drug pharmacovigilance and quality assurance. Ultimately, paving ways in increasing patient-centered and precision medicine landscape in Africa and beyond; increasing health, wellness and quality healthier lifestyles of African and global population long life expectancy, productivity and sustainable development.

Competing interest
Authors declare no conflict of interest.

Author's contributions
ET conceived the idea, performed the initial search exploration and drafted the manuscript. ET and MG gathered and selected the useful publications. ET wrote the first draft of the manuscript. ET, MG, YM, OAO, CY, AAA provide additional critical insights and inputs. All authors read and approved the final manuscript.

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