



MINISTRY OF HEALTH

# Zanzibar Digital Health Strategy

2020/21 - 2024/25



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## *List of Abbreviations*

CHMT	Council Health Management Team
CMS	Central Medical Stores
CTC	HIV Care and Treatment Clinic
DANIDA	Danish International Development Agency
DHIS2	District Health Information System version 2
eGAZ	e-Government Agency, Zanzibar
eIDSR	Electronic Integrated Diseases Surveillance and Response
EMR	Electronic Medical Record
HCR	Health Client Registry
HFR	Health Facility Registry
HIS	Health Information System
HL7	Health Level Seven
HMIS	Health Management Information System
HMT	Hospital Management Team
HSSP IV	Health Sector Strategic Plan IV
HWR	Health Worker Registry
ICD	International Classification of Diseases
ICT	Information and Communication Technology
IDWE	Infectious Diseases Week Ending
iHRIS	Integrated Human Resource Information System
ITU	International Telecommunication Union
LAN	Local Area Network
LIS	Laboratory Information System
LMU	Logistic Management Unit
M&E	Monitoring and Evaluation
MDAs	Ministries, Departments and Agencies
MMH	Mnazi Mmoja Hospital
MOH	Ministry of Health, Zanzibar
MUHAS	Muhimbili University of Health and Allied Sciences
NHIF	National Health Insurance Fund
PACS	Picture Archiving and Communication System
PIMS	Procurement Information Management System
PORALGSD	President's Office, Regional Administration, Local Government and Special Departments
REACH	Digital Regional East Africa Community Health
RGoZ	The Revolutionary Government of Zanzibar
SDG	Sustainable Development Goals
SMS	Short Messaging Service
USSD	Unstructured Supplementary Service Data
WHO	World Health Organization
ZFDA	Zanzibar Food and Drugs Agency
ZICTIA	Zanzibar ICT Infrastructure Agency

## *Definition of Terms*

1. **Continuity of care** is the degree to which a series of discrete health care events experienced by people as coherent and interconnected over time and consistent with their health needs and preferences.
2. **Digital health** (used interchangeably **eHealth**) is an umbrella term that refers to the use of information and communication technologies (ICT) in medicine and other health professions to manage illnesses, mitigate health risks and promote client wellbeing.
3. **Digital health solution** is an individual digital product or service (or a combination of multiple products or services) created to serve a specific health system objective. It often encompasses a set of ICT infrastructure and services required to improve effectiveness and efficiency of the health system.
4. **Digital health system** is the interrelated set of technologies, processes, and structures within a digital health ecosystem, typically encompassing numerous solutions and organisations.
5. **Electronic medical record (EMR)** is an electronic record of medical information of an individual client which can be created, gathered, managed, and consulted by authorized clinicians and other staff within a health care organisation.
6. **Enterprise architecture** is a blueprint for organisational change defined in models that describe (in both business and technology terms) how the entity operates currently and how it intends to operate in the future. It also includes a plan for transitioning to this future state.
7. **Health client registry (HCR)** is a central database that manages the unique identity of clients receiving health services in a country.
8. **Health system** consists of all organisations, people, and actions whose primary intent is to promote, restore, or maintain health. This also encompasses the people, institutions, resources, and policies that governments put in place to improve public health.
9. **Health worker registry (HWR)** is the central database for maintaining the unique identities of health providers within a country.
10. **System integration** is the process of aggregating the components of a system or sub-systems into one, so that the resulting system can deliver the overarching functions.
11. **System interoperability** is the ability of different information technology systems to communicate with each other to exchange data.
12. **mHealth** is the delivery of health care services through the use mobile devices and networks.
13. **Telehealth** refers to the use of telecommunications and virtual technology to deliver health care within and outside of traditional health-care facilities. It also includes the use of teleconferencing and eLearning systems for remote non-clinical services such as provider training, administrative meetings, and continuing medical education, in addition to clinical services.
14. **Telemedicine** is a subset of telehealth that refers solely to the provision of health care services and education over a distance using telecommunication technologies.
15. **Terminology service** is a service that allows health care applications to use codes and value sets without having to become experts in the fine details of the code system, value set and concept map resources, as well as the underlying coding and terminological principles. The terminology service stores data standards and data quality protocols, and ensures that all transactions are meeting the defined standards and quality protocols.

## Preface



I am delighted to present the Zanzibar Digital Health Strategy 2020/21-2024/25 which aims at improving the provision of safer, equitable, accessible, efficient, and effective health services at all levels through proper use of affordable digital health technologies. The Revolutionary Government of Zanzibar recognizes the potential role of digital technologies in improving the health system performance and delivery of quality health care services to all Zanzibaris; thus, contributing towards sustainable social and economic development.

As an essential step towards laying a strong foundation to harness the benefits of digital technologies, the Government has implemented a number of interventions including: the countrywide installation of fibre optic network backbone, high coverage of electrical power supply, high penetration and remarkable use of mobile network across Zanzibar. Some of the digital health solutions which are currently in place include: the District Health Information System (DHIS2), the electronic Logistics Management Information System (eLMIS) and the Malaria

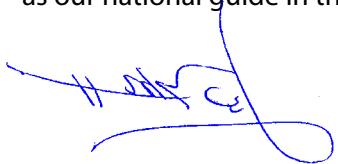
surveillance systems have been successfully rolled out countrywide. These government initiatives provide great opportunities to leverage digital technologies as potential solutions to overcome bottlenecks in key health systems covering: provision of quality health care services, management of health commodities, health workforce management, health financing, effective governance and leadership, and the availability and use of quality health information as well as community engagement and empowerment.

The Ministry of Health Zanzibar, with support from partners, has recently assessed the use of digital health technologies across the health sector. This assessment found challenges and areas for improvement in digital health infrastructure, solutions, governance and leadership, standards and guidelines, digital literacy among users, data quality and use, and digital health adoption and change management. The assessment formed a strong base for the development of the Zanzibar Digital Health Strategy 2020/21-2024/25 which provides strategic directions in addressing the documented and emerging challenges and guides effective implementation, and use of digital technologies to promote universal access to quality health services to all Zanzibaris.

The strategy emphasizes a holistic approach for implementing appropriate and interoperable digital health solutions across the health sector as a pragmatic intervention to enable the health system to function as an integrated ecosystem. Consequently, the implementation of the Digital Health Strategy is guided by the following key principles: designing with users for improved experience; data-driven decision making; harness open standards, open data, open source, and open innovation; build for scale-up and sustainability; build for local ownership of solutions and data; protecting data, patient privacy, and confidentiality; and compliance to national policies, legal and regulatory frameworks.

The implementation of the strategy requires consolidated efforts and resources for the realization of the envisaged benefits of digital health in improving provision of quality health services for better health outcomes and empowerment of citizens for healthy lifestyles. Thus, effective collaboration and coordination among stakeholders is crucial for cost effective implementation and successful achievement of the Government vision on digital health.

Therefore, I would like to call upon all stakeholders in the health sector to make effective use of this strategy as our national guide in the coming five years for better health outcomes to all Zanzibaris.

A handwritten signature in blue ink, appearing to read "Hon. Hamad Rashid Mohamed".

**Hon. Hamad Rashid Mohamed**  
**Minister of Health Zanzibar**

## Acknowledgment



The Zanzibar Digital Health Strategy 2020/21-2024/25 resulted from consultative process with contributions from various health sector stakeholders. The Ministry of Health Zanzibar would like to extend sincere gratitude to all the stakeholders for their invaluable contributions during the process of developing this Strategy. It is not possible to mention all stakeholders, but indeed this task could not have been accomplished without the contributions from Ministries, Departments, Agencies, national/specialized hospitals, health training institutions, associations and professional bodies, regional hospital, district hospitals, council health management teams, primary health care units, private facilities (hospitals, medical centres, and dispensaries), and development and implementing partners.

The Ministry expresses special appreciation to the Danish International Development Agency (DANIDA) for the technical and financial support to assess the Zanzibar digital health implementation

landscape, as well as the development of the Zanzibar Digital Health Strategy 2020/21-2024/25. The Ministry highly appreciates the financial and technical support from the USAID, PATH and D-Tree International that facilitated important activities related to the development of the Strategy.

The Ministry would also like to express special gratitude to the Zanzibar Digital Health Strategy development Steering Committee and the Technical Working Team for their leadership, guidance, commitment and technical inputs to every milestone of this Strategy development process. Moreover, the Ministry is grateful to all government officers involved in the process of the strategy development for their inputs, guidance, and coordination throughout the process. The Ministry also appreciates the vital role played by the ICT unit to the realization of this strategy.

Furthermore, the Ministry would like to specially recognize the consultant from Muhimbili University of Health and Allied Sciences (MUHAS) and his team for assessing the Zanzibar digital health implementation landscape, as well as leading and facilitating development of the Zanzibar Digital Health Strategy 2020/21-2024/25.

Last but not least, I would like to graciously acknowledge the support of all individuals and institutions that are not explicitly mentioned but have in one way or another contributed to the fulfilment of this work. Your valuable inputs and contributions are highly appreciated.

A handwritten signature in blue ink, appearing to read "Asha Ali Abdulla".

**Ms. Asha Ali Abdulla**  
**Principal Secretary, Ministry of Health Zanzibar**

## *Executive Summary*

The launch of the Sustainable Development Goals (SDGs) represents the world's determination to leave no one behind by ending extreme poverty, minimise preventable deaths, and calling for integrated action across sectors, including health to tackle complex development challenges. The application of digital technologies is hailed as an important enabler for the realization of the SDGs. The Revolutionary Government of Zanzibar through various policies such as the Zanzibar Development Vision 2050, Zanzibar e-Governance Policy 2015, Zanzibar ICT Policy 2013, Zanzibar Health Policy 2011, and other government policies, envisions to utilize digital technologies for social economic development and transformations. Additionally, the Zanzibar Health Sector Strategic Plan IV 2020/21-2024/25 recognizes digital health as an important enabler for health system strengthening in improving health care services delivery and achievement of better health outcomes.

Therefore, in the efforts to harness the potential of digital technologies, a number of digital health interventions have been implemented at different scale within the health sector. These, include those used for: routine data management, management of health commodities, provision of quality health services, human resource management, efficient disease surveillance and evidence-based health promotion in Zanzibar.

However, the existing digital health initiatives face a number of challenges. These challenges include inadequate ICT expertise and computing infrastructure; limited financial resources, poorly designed digital solutions, suboptimal data quality and limited data use culture throughout the health system, inadequate digital health capacity and reluctance of some users to adopt digital health solutions in their day to day operations. Additional key challenges include: existence of fragmented digital health systems that are not interoperable, presence of digital systems that do

not meet actual user requirements, lack of policy and standard guidelines; and lack of ICT change management plan. Furthermore, there is lack of digital health governance structure to oversee the implementation of digital health in the Zanzibar as well as limited engagement of key stakeholders in digital health implementation at all levels of the health system.

To address these digital health challenges in a holistic manner, the Ministry of Health Zanzibar prioritized the need for a Digital Health Strategy with a vision for appropriate application of digital health solutions for better health to all Zanzibaris. Thus, the main goal of the strategy is to improve provision of safer, equitable, accessible, efficient, and effective health services at all levels through proper use of digital health technologies.

Furthermore, the Strategy intends to ensure that digital health interventions are properly introduced and implemented to support efforts towards improving the provision of quality health services through digital technologies.

Therefore, the Strategy describes the Zanzibar five year digital health strategic direction 2020/21-2024/25 for the transformation of the entire health system with the goal to achieve the following eight strategic objectives:

1. To increase use of client level systems that facilitate delivery of safe and quality health care
2. To enhance the use of digital solutions for quality improvement, health promotion, and disease surveillance and response
3. To facilitate effective data use for evidence-based actions
4. To facilitate interoperability of systems for effective and secure sharing of health information across the health sector

5. To improve health planning and resources management
6. To improve logistics and supply chain management of health commodities
7. To improve ICT infrastructure and technical support services for sustainable utilisation of digital health at all levels of the health system
8. To strengthen digital health governance and leadership across the health sector

For smooth implementation of digital health initiatives, the strategy prioritizes the need to strengthen the digital health governance structure by establishing the digital health steering committee chaired by the Director General (DG) to provide strategic guidance, and better coordination of digital health initiatives and plans. Furthermore, the governance structure establishes a digital health technical working group (DHTWG) and strongly advocates the use of the existing governance structures for better coordination as well as providing technical support to digital health initiatives and activities at all levels of the health system. Moreover, effective implementation of the strategy is very much dependent on the ability of the ICT Unit to take up a leading role in the daily operationalization of the strategy across the entire health sector. Hence, the strategy advocates the need for the ICT Unit to be upgraded to a

Department of Digital Health to be able to execute that fundamental role.

Successful implementation of the Digital Health Strategy further entails sufficient and sustainable computing, financial and human resources to support the prioritized digital health initiatives and activities. The Strategy suggests different approaches for strengthening computing infrastructure, financial resources mobilization, and ensuring availability of adequate skilled human resources to facilitate effective implementation of different digital health initiatives.

Often, implementation and use of digital health solutions introduces new ways of working. Thus, the Strategy puts forth various changes and adoption of activities that should be done to enable stakeholders to smoothly change their work vision, practices and attitudes to effectively adopt digital health solutions.

Finally, the strategy provides estimated costs for the digital health initiatives implementation to guide financial resource planning and mobilization. The Strategy concludes with the monitoring and evaluation roadmap to ensure digital health implementers, managers, decision- and policy-makers are able to systematically monitor and evaluate the implementation progress of the digital health initiatives.

# **1.0 Introduction**

## **1.1 Background**

The advances in the information and communication technology (ICT) have transformed almost all aspects of social service delivery. It is widely recognized that application of digital health technologies has a great potential to transform health systems for improved population health, fair financing and financial risk protection for households and enhanced responsiveness of the health system [1]. Ultimately, the health system transformation significantly contributes towards the achievement of the universal health coverage (UHC) and the Sustainable Development Goals (SDG), particularly SDG 3 on good health and wellbeing [2].

The Revolutionary Government of Zanzibar (RGoZ), through the Ministry of Health (MOH), strives to promote the appropriate adoption, integration and use of cost-effective digital health technologies for improving the health system performance and delivery of quality health care services to all Zanzibaris. The MOH gives a high priority to relevant digital health technologies that would greatly improve service delivery operations in the health sector; including provision of quality health services, management of health resources, and evidence-based decision making across all levels of the health system.

## **1.2 The Importance of the Digital Health Strategy**

The overall objective of the Zanzibar Digital Health Strategy 2020/21-2024/25 is to promote the use of digital health technologies in a streamlined, cost-effective and cost-efficient manner for improved delivery of quality health services at all levels of the health system in Zanzibar. The Digital Health Strategy seeks to accelerate digitally-enabled transformation of the health system to provide high quality health services and improved population health outcomes through strengthened governance and leadership, efficient management of human resources for health, enhanced health information systems, improved financial management, and efficient supply chain management of health commodities in line with strengthening health system agenda.

The Zanzibar Digital Health Strategy 2020/21-2024/25 is informed by the broader national socio-economic development goals and health sector priorities such as the Zanzibar Vision 2050 [3], the Zanzibar ICT Policy 2013 [4], the Zanzibar eGovernment Policy 2015 [5], the Zanzibar Health Policy 2011 [6], the Zanzibar Health Sector Strategic Plan (HSSP) IV 2020-2025 [7] and Zanzibar Community Health Strategy 2019-2024 [8]. In addition, the Digital Health Strategy is informed by the regional and global digital health initiatives such as the Digital Regional East Africa Community (REACH) Initiative Strategic Plan 2019-2028 [9], the World Health Organisation (WHO) Global Strategy on Digital Health 2020-2024 [10], the WHO and the International Telecommunication Union National eHealth Strategy Toolkit [11], and the WHO Guideline Recommendations on Digital Interventions for Health System Strengthening [12].

Furthermore, the Zanzibar Digital Health Strategy 2020/21-2024/25 is informed by the findings from a comprehensive assessment of the current digital health landscape in Zanzibar. Therefore, this Strategy provides a focused guidance for planning, implementing, and coordinating as well as monitoring and evaluating digital health initiatives to enhance the health system performance, improved population health outcomes and empowerment of clients for healthy life styles.

## **1.3 Alignment of the Digital Health Strategy with National Policies and Strategies**

The Zanzibar Digital Health Strategy 2020/21-2024/25 is aligned with key national policies, strategies, and priorities. The Zanzibar Development Vision 2050 [3] health policy emphasizes the need for building a healthy society by 2050 through the provision of reliable, high quality, affordable and sustainable health

services as well as creating an equal opportunity of access to essential quality health services for all the people without discrimination. The Vision's health policy prioritises preventive services, combating epidemics, special maternal and child health services and the dissemination of health education for all. Moreover, one of the key goals of the Zanzibar Strategy for Growth and Reduction of Poverty (ZSGRP III) 2016-2020 [13] aims to "*improved access to quality health and sanitation services, safe and clean water, and a mitigated burden of communicable and non-communicable diseases*".

The Zanzibar ICT Policy 2013 [4] explicitly emphasises the optimisation of the utilization of ICT in the health sector to improve planning, management, accessibility, and affordability of health care services to the public. Specifically, the ICT Policy underscores ICT as an important strategic means for transforming health care operations, management and administration, public health education on both communicable and non-communicable diseases, sharing of health data, and the use telemedicine to increase access to quality health services for rural and remote communities as well as introducing health informatics courses in tertiary education.

The Zanzibar e-Government Policy 2015 [5] underscores that "the Revolutionary Government of Zanzibar (RGoZ) shall make comprehensive legislation to facilitate effective application of ICT in the governance process, delivery of public services to citizens and prevention of cybercrime". It also emphasizes that "a nationwide awareness program shall be undertaken to sensitize the use and importance of e-government". Similarly, the e-Government Policy emphasizes that "all government organizations shall be connected to the common government communication infrastructure".

The RGoZ has made remarkable achievements in the provision of free-of-charge health services in all government health facilities. The Zanzibar Health Policy 2011 [6] envisions "a healthy population with reliable and accessible preventive and curative health services" and its mission is to "ensure that all Zanzibaris secure their right to quality and equitable health services rendered through Primary Health Care approach" [6]. In addition, the Zanzibar Health Policy 2011 [6] clearly articulates lack of an integrated health information system (HIS) to enable information sharing from various sub-systems; and thus, recommending development and implementation of a comprehensive ICT strategy across the health sector to support such functions as general office management, data sharing among health systems, telehealth, and e-learning.

The Health Sector Strategic Plan (HSSP) IV [7] strives towards universal health coverage that ensures that all Zanzibaris have access to cost-effective promotive and preventive, quality care, and rehabilitative health services addressing vast majority of causes of illness and accompanying disabilities. Furthermore, the HSSP IV outlines several challenges in the health system which need to be addressed and articulates the significant role which digital health technologies can play in both addressing such identified challenges and gaps and facilitating achievements of the health sector goals. Therefore, the HSSP IV points out the need for a clear organizational structure of ICT/digital health and mechanisms for improving coordination and harmonization in the implementation, monitoring and evaluation of digital health solutions. The HSSP IV strategic initiatives such as "*d) Develop and implement ICT Strategy and ICT Policy Guidelines*", "*e) Equip all levels with software and hardware needed to implement ICT Strategy*", "*f) Introduce a dashboard for the programmes, units and facilities within DHIS2 for better visualization of performance*", "*c) Strengthen data use for decision making at all levels*", and "*q) national referral hospital to offer outreach services, telemedicine and technical assistance to districts*" – further emphasizes the need for the development and implementation of the digital health strategy.

In addition, the Zanzibar Community Health Strategy 2019-2024 [8] seeks to improve community health information system through effective use of a digital platform for integrated service delivery, data collection and supervision as well as by integrating community health data into DHIS2.

Moreover, the process of developing the Zanzibar Digital Health Strategy 2020/21-2024/25 was informed by the current use of digital health technologies and best practices in the regional and global contexts including the WHO framework on health system building blocks namely, service delivery, health workforce, health information systems, access to essential medicines, financing, and leadership and governance [14]; the Digital Regional East African Community Health (Digital REACH) Strategic Plan 2019-2028 [9]; the WHO Global Strategy on Digital Health 2020-2024 [10] and the WHO Guideline Recommendations on Digital Interventions for Health System Strengthening [12] as well as the National eHealth Strategy Toolkit recommendations by the WHO and the International Telecommunication Union [11].

#### **1.4 Formulation of the Zanzibar Digital Health Strategy**

The Zanzibar Digital Health Strategy 2020/21-2024/25 was developed using participatory approaches that involved different stakeholders across all levels of the health system and beyond the health sector in Zanzibar. Various stakeholders were also involved in the assessment of the digital health landscape in Zanzibar and the development of the Zanzibar Digital Health Strategy (Appendix I). The engaged stakeholders were from different Ministries, Departments and Agencies (MDAs); tertiary hospitals; health training institutions; associations and professional bodies; a regional hospital; district hospitals; council health management teams; primary health care units (PHCU and PHCU+); private health facilities (hospitals, medical centres, and dispensaries); and development and implementing partners.

The multi-disciplinary stakeholders were actively engaged to contribute to the development of the Zanzibar Digital Health Strategy through participatory consultative meetings, key informant interviews and semi-structured questionnaires. National-level decision and policy makers chaired the consultative meetings. Thus, not only did this participatory approach enhance effective and efficient collection of views, inputs, and recommendations from key stakeholders so that the Strategy is aligned with the national priorities and shared goals of different stakeholders; but it also facilitated ownership of the process and the resulting Digital Health Strategy.



*Stakeholders in one of the consultative meetings. The meeting was chaired by Ms. Halima M. Salum, Deputy Principal Secretary, MOH (third sitting from left)*

## **2.0 *Situational Analysis***

This section presents an overview of the health systems in Zanzibar and a situational analysis of digital health implementation and use within the health sector. The Strategy presents a number of issues found in the assessment and also encompassed findings described in the Zanzibar HSSP IV. Furthermore, identified issues have been categorized based on the WHO health system building blocks [14] where challenges and gaps marked in each block are outlined and their corresponding potential digital health interventions for addressing the documented challenges as well as the expected and/or appropriate improvement proposed to ensure effective delivery of quality health services. The strengths, weaknesses, opportunities, and challenges (SWOC) analysis for the implementation of the Zanzibar Digital Health Strategy 2020 – 2025 is also presented in this chapter.

### **2.1 Overview of the Zanzibar Health System**

#### **2.1.1 Organization of the Zanzibar Health System**

The health system in Zanzibar is organized as a pyramidal structure spanning from the community to the tertiary health service delivery levels including both public and private health facilities (Figure 1). For the public, the structure comprises community-based health services, primary health care units (PHCU), primary health care units plus (PHCU+), district, regional and tertiary hospitals. On the other hand, the private sector complements the public health system by having functional registered hospitals, medical health centres, dispensaries, clinics, pharmacies, laboratories, and other diagnostic service centres as well as alternative medicine practitioners.

At the community level, community-based health services focus on health promotion, disease surveillance, and prevention. The PHCU and PHCU+ provide basic preventive and curative outpatient services, and basic emergency care services. However, the PHCU+ facilities provide additional services such as dental, pharmacy, labour and delivery services. Conversely, private primary health care facilities including clinics, dispensaries, and medical health centres provide different services as stipulated during their registration.

At the district and regional level, hospitals provide comprehensive medical and surgical services to the referred and self-referral patients. Tertiary hospitals provide specialised health care services for the referred and self-referral patients while some of these hospitals are also serving as teaching hospitals.

The Ministry of Health has overall responsibility of overseeing health and social service delivery in Zanzibar including policy analysis, formulation and translation; strategic planning and setting standards including monitoring procedures for quality assurance; and defining Zanzibar health sector priorities in line with disease burden, epidemics and emerging diseases. Additional responsibilities include: resource mapping, mobilization and equitable allocation based on identified needs and disease dynamics; advising other ministries, departments and agencies on conditions of diseases of public health importance; capacity development and technical support provision at all service delivery points; provision of nationally coordinated services including health emergency preparedness, response inclusive of disease epidemics; monitoring and evaluation of the overall health sector performance; promote designing, executing and translating scientific and operational health researches for better planning process; and promote public health best practices including health promotion and disease prevention.

In line with the decentralization by devolution, the President's Office Regional Administration, Local Government, and Specialised Departments (PORALGSD) is responsible for coordinating, supervising, capacity building and monitoring the provision of health and social welfare services at council levels through the Council Health Management Team (CHMT). Additionally, the CHMT is responsible for developing comprehensive council health plans (CCHP), and supervision of health services in their respective councils. There are 302 health facilities across the sector as represented in Figure 1.

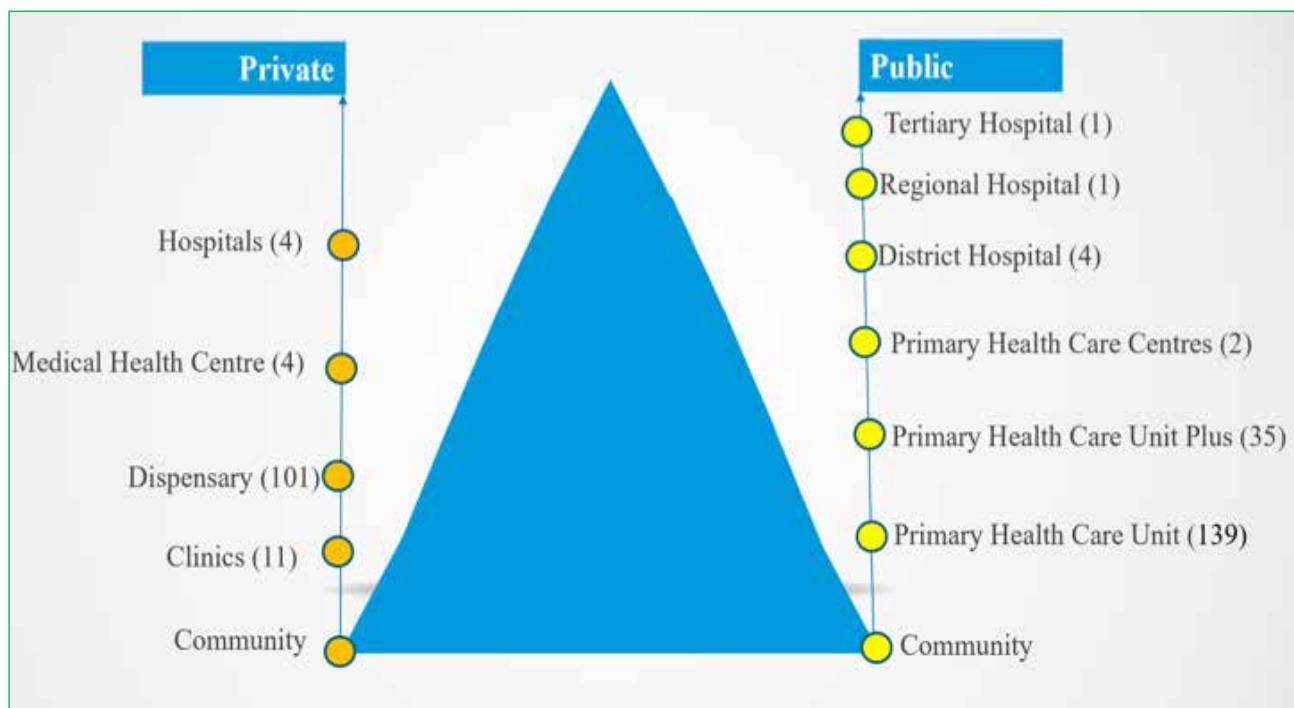


Figure 1: The health care delivery levels in Zanzibar

### 2.1.1 Health system challenges and proposed digital solutions

The health system in Zanzibar is facing a number of challenges which affects the provision of quality health care services as described in the Ministry of Health Zanzibar HSSP IV 2020-2025 [7]. The application of digital health technologies can contribute immensely in the efforts to address and mitigate the identified challenges. Table 1 presents some of the health system issues and corresponding potential digital health interventions.

**Table 1: Recommended digital health interventions to address challenges in the Zanzibar health system**

Identified Issues as per HSSP IV	Potential digital health interventions
<p><b><u>Service delivery</u></b></p> <ul style="list-style-type: none"> <li>i. Limited harmonization and coordination of client-level systems</li> <li>ii. Lack of proper shared health/medical records especially in the health facilities for continuity of care</li> <li>iii. Inequity in resource allocation and service utilization in the health facilities</li> <li>iv. Limited access to specialised health services due to several factors including inadequate qualified HRH, or equipment or infrastructure</li> <li>v. Suboptimal awareness among communities on promoting healthy behaviour, prevention, self-management, access to health care</li> <li>vi. Increased burden of communicable and non-communicable diseases (NCDs)</li> </ul>	<ul style="list-style-type: none"> <li>i. Develop standards and guidelines for implementing client-level systems to facilitate information sharing across all levels</li> <li>ii. Strengthen the use of digital health solutions to support health service delivery at the community and health facility levels.</li> <li>iii. Improve use of telehealth to enhance access to quality health services including specialized care</li> <li>iv. Use digital health solutions to promote health education, information, and communication to enable the communities to adopt healthier behaviours and increasing health literacy in communities</li> <li>v. Implement an electronic referral system to facilitate management of referrals for patient and specimen and feedback</li> </ul>
<p><b><u>Health workforce</u></b></p> <ul style="list-style-type: none"> <li>i. Staffing shortages and skills mix imbalance between supply and demand;</li> <li>ii. Lack of a comprehensive workforce registry</li> <li>iii. Maldistribution of staff, with higher shortages of staff in remote and rural areas;</li> <li>iv. Poor staff performance including low/declining productivity and quality;</li> <li>v. Fragmented approaches to HR planning, management, and development</li> </ul>	<ul style="list-style-type: none"> <li>i. Reinforce the use of digital solutions such as Human Resource for Health information system (iHRIS) to enhance planning and informed decision making during recruitment, allocation, management as well as productivity of health workforce. Such digital solution can be scaled-up to be a comprehensive health workforce registry.</li> <li>ii. Enhance the use of eLearning platforms for provision of pre-service and in-service training including continuing professional development programs</li> </ul>
<p><b><u>Medicines and Health Commodities</u></b></p> <ul style="list-style-type: none"> <li>i. Inadequate health commodities</li> <li>ii. Health facilities experiencing frequent stock-outs of health commodities thus affecting service delivery</li> <li>iii. Inefficient supply chain management including forecasting and utilization monitoring based on needs</li> </ul>	<ul style="list-style-type: none"> <li>i. Strengthen digital solutions for logistics and supply chain management and tracking of health commodities.</li> </ul>

<p><b>Health care financing</b></p> <ul style="list-style-type: none"> <li>i. Limited mechanisms for tracking of financial resources utilization across the health sector</li> <li>ii. Ineffective health care service financial management information systems; limited financial resources</li> </ul>	<ul style="list-style-type: none"> <li>i. Use digital solutions to improve health financial management systems including planning, allocation, expenditures, and reporting at all levels of the health system.</li> </ul>
<p><b>Health information system</b></p> <ul style="list-style-type: none"> <li>i. Limited data use culture across the health sector</li> <li>ii. Shortage of experienced staffs with capacity of analysing and managing advance or complex data</li> <li>iii. Existence of fragmented and uncoordinated digital solutions that are not interoperable</li> <li>iv. Low data quality across the health sector</li> <li>v. Limited ICT infrastructure and inadequate supply of internet bandwidths at all levels within the health system</li> <li>vi. Lack of standards and guidelines on health information systems including data collection procedures and sector direction on data, which translate the HSSP into action</li> </ul>	<ul style="list-style-type: none"> <li>i. Improvements and integration of various health information systems for improved data availability and use at all levels;</li> <li>ii. Strengthen capacity on developing and using digital health systems</li> <li>iii. Promote data use culture for policy and planning purposes and evidenced based actions</li> <li>iv. Improve ICT infrastructure and facilities at all levels of health system</li> <li>v. Develop standards and guidelines on health information systems development and management</li> </ul>
<p><b>Governance and Leadership</b></p> <ul style="list-style-type: none"> <li>i. Weak digital health governance and leadership</li> <li>ii. Limited coordination of stakeholders in digital health initiatives resulting into fragmented digital health solutions across the health sector</li> <li>iii. The current ICT unit is not equipped to provide proper technical support and coordination of digital health initiatives. Furthermore, there is no governance structure that indicates linkages between the ICT unit and other units from different programs and departments.</li> <li>iv. Inefficient allocation of appropriate resources</li> <li>v. Inadequate accountability and transparency in digital health initiatives</li> <li>vi. Limited availability and use of data for evidence-based decision making</li> </ul>	<ul style="list-style-type: none"> <li>i. Strengthen digital health governance and leadership across the health sector, including establishing a Department of Digital Health at MOH</li> <li>ii. Develop digital health solutions embedded with business intelligence and decision support tools to facilitate leadership and governance including planning and monitoring performance of the health system.</li> </ul>

## 2.2 Digital Health Implementation in Zanzibar

The RGoZ has made an incremental progress in using digital health technologies to transform the health system. Recently, the Ministry of Health Zanzibar conducted assessment of the implementation of digital health initiatives in Zanzibar aiming at identifying the achievements, challenges, needs and areas of improvement to inform the development of the Zanzibar Digital Health Strategy. The assessment was

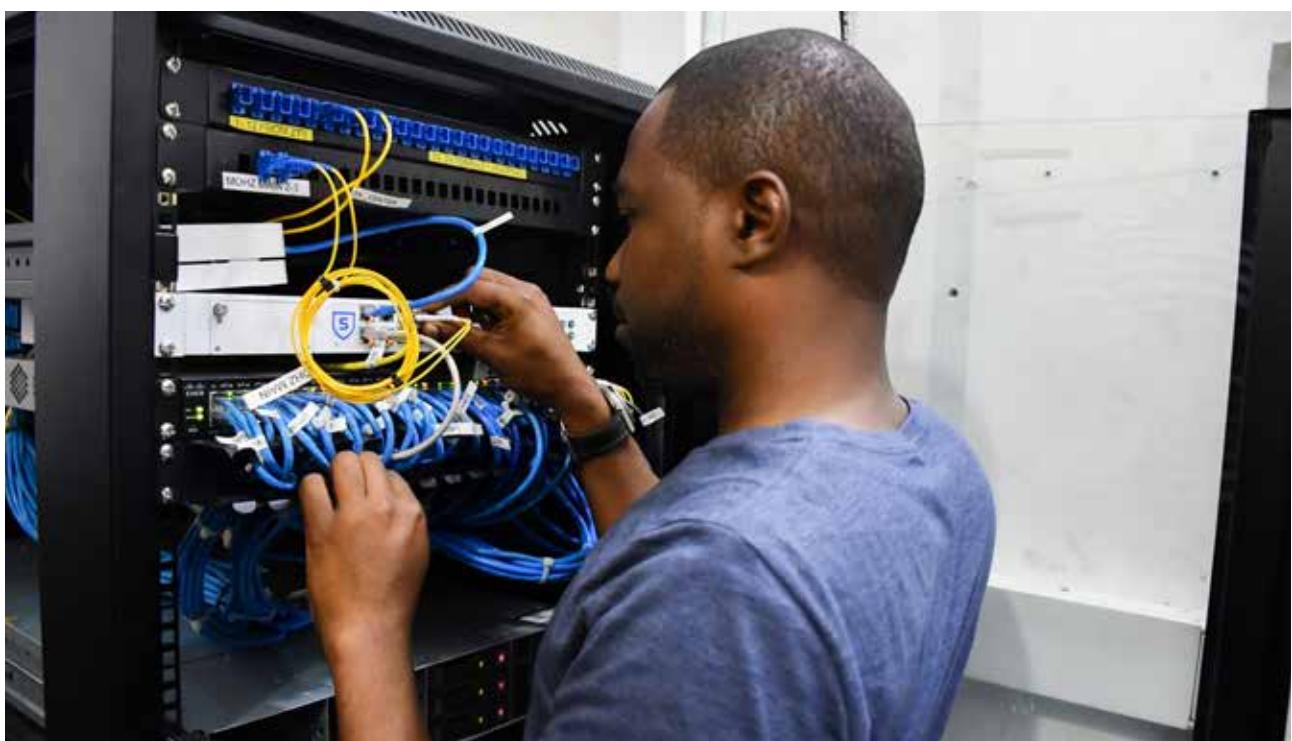
structured based on the WHO health system building blocks [14] and WHO-ITU National eHealth Strategy Toolkit 2012 [11] components which are; governance and leadership, ICT infrastructure, health service delivery, health information system, health workforce, health financing, health commodities, digital health strategy and investment, legal and regulatory framework, standards and interoperability for information exchange, and change and adoption.

### **2.2.1 Governance and leadership in support of digital health**

The assessment found existence of good political will and buy-in from policy and decision makers to support implementation and adoption of digital health solutions to transform provision of health services. Leadership and governance initiatives and instruments that facilitate digital health include: existence of ICT units at the Ministry and its agencies, draft HSSP IV 2020-2025 [8], Zanzibar ICT Policy 2013 [4], Zanzibar eGovernment Policy 2015 [5], Zanzibar eGovernment Agency (eGAZ), and Zanzibar ICT Infrastructure Agency (ZICTIA). However, the assessment report emphasised the need to establish formal governance and leadership structure across the health sector to guide and coordinate the implementation of the digital health strategy.

### **2.2.2 Computing infrastructure**

There are various digital health initiatives implemented by the Government in collaboration with partners and the private sector to improve computing infrastructure. Such initiatives include: ongoing scaling up of the national fibre optic backbone which currently covers all districts and some health facilities; installation of local area network (LAN), distribution of computers and other electronic gadgets to health facilities; distribution of mobile phones and solar chargers to community health workers; countrywide coverage of mobile network connectivity including in remote areas; and availability of electricity to almost all health facilities.



*IT personnel demonstrating a local area network (LAN) at one of health facilities.*

### **2.2.3 Health services delivery**

Development and implementation of digital solutions to support health care service delivery is an ongoing intervention at different health facilities, especially higher-level public and private facilities. Some health facilities are implementing and using electronic medical record (EMR) systems to improve clinical, diagnostic, and administrative services. However, the EMR systems are at different stages of maturity in terms of the number of services and health care service points covered. Additionally, facilities have some digital solutions that are not integrated leading to fragmentation of the patient information. Such applications include: different EMR systems in the same facility, HIV care and treatment clinic (CTC2) database, picture archival and communication system (PACS) for radiology services, laboratory information systems (e.g. Daisa), and electronic blood and transfusion services system (e-Delphin).



*Health care workers attending an infant in a highly specialised unit at Mnazi Mmoja Hospital.*

Furthermore, there are efforts to improve telemedicine services including implementation of telemedicine centre at Mnazi Mmoja Hospital (MMH) intended to extend specialised health care services to remote facilities; and implementation of ECHO project (Extension for Community Health Care Outcomes), an e-Learning platform aiming to build capacity and knowledge sharing among health workers.

Moreover, the assessment found that a number of digital health solutions using short messaging service (SMS), unstructured supplementary service data (USSD), and mobile applications have also been implemented to support health promotion, and surveillance and response services. For instance, malaria surveillance systems and *Jamii ni Afya* mobile app are some of the digital health solutions that have been implemented at the community level.

### **2.2.4 Logistics and supply management of health commodities**

A number of digital health initiatives have been implemented to improve efficiency and effectiveness of health commodities supply chain management. These initiatives include implementation of an electronic logistics management information system (eLMIS); Zanzibar Food Drug Agency (ZFDA) e-portal for online registration of pharmacies, products and premises; m-Supply which is an enterprise resource planning

(ERP) system for registering and management of health commodities at the Central Medical Store (CMS); and integration of eLMIS and m-Supply. In addition, efforts are underway to integrate various health commodities supply chain management systems with other systems such as eLMIS and DHIS2.

### **2.2.5 Health financial resources management**

The health sector in Zanzibar is currently making use of various digital solutions for financial resource management particularly at the ministry level, and in a few public and private health facilities. Some of the electronic financial management systems used at health facilities, which includes Tally and QuickBooks accounting systems, are integrated with the EMR and health insurance e-claim systems to facilitate electronic verification and claim management.

### **2.2.6 Health workforce**

The Ministry of Health Zanzibar has implemented a number of digital initiatives to improve human resource for health (HRH) management. These initiatives include: implementation of an integrated human resource information system (iHRIS), biometric attendance monitoring systems in some institutions to improve HRH attendance and the use of an electronic payroll system for all public employees. Furthermore, efforts are underway to integrate iHRIS and the payroll system to improve exchange of HRH information between the Ministry of Health and the Ministries responsible for finance and public service management.

### **2.2.7 Health information**

Timely availability of quality data provides an opportunity for evidence-based decision making primarily aiming at improving the overall health system performance.

Several digital health initiatives have been implemented to strengthen health information management systems such as the rollout of DHIS2 to all health facilities for routine data management; strengthening of the disease surveillance and response systems by incorporating the Integrated Disease Week Ending



*A healthcare expert reviewing medical images at Mnazi Mmoja Hospital.*

(IDWE) reporting; and neglected tropical diseases data into DHIS2. Other initiatives include, the use of digital applications for malaria early epidemic detection system (MEEDS), malaria case notification (MCN), and malaria service data quality improvement (MSDQI-EDS), and the use of *Jamii ni Afya App* for tracking reproductive, maternal, newborn and child health services (RMNCH) clients. These digital health solutions have improved the availability of health information, efficiency in reporting and decision making. Furthermore, there are ongoing efforts to extend the functionalities of the existing systems and integrate them in order to improve data quality, information sharing and use across the health sector.

### **2.3 SWOC Analysis**

Table 2 shows strengths, weaknesses, opportunities, and challenges (SWOC) for the implementation of the Zanzibar Digital Health Strategy 2020/21-2024/25. The Digital Health Strategy aims to leverage on the strengths and opportunities, and address weaknesses and challenges by providing a strategic direction for the adoption, implementation and use of digital health in Zanzibar. The ultimate goal of the Strategy is to transform health care service delivery for improved health outcomes.

**Table 2: SWOC Analysis of the implementation of digital health initiatives in Zanzibar**

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> <li>i. Existence of political will and leadership commitment at the MOH and its agencies on the use of digital technologies to transform the health system</li> <li>ii. Existence of national instruments supporting digital health e.g. HSSP IV 2020-2025 (draft)</li> <li>iii. Existence of ICT Unit at MOH</li> <li>iv. Availability of electricity in almost all health facilities and institutions</li> <li>v. High penetration of network infrastructure including national fibre backbone and mobile network</li> <li>vi. Existence and use of various digital technologies e.g. DHIS2, eLMIS, EMR, community health digital platforms, etc. at all levels of the health system</li> <li>vii. Availability of ICT officers at the Ministry, agencies, some districts, and Health Facilities.</li> <li>viii. Availability of telemedicine infrastructure in tertiary hospitals.</li> <li>ix. Existence of computing infrastructure at the Ministry, its agencies, and some health facilities</li> <li>x. Availability of laptop computers in public health facilities</li> <li>xi. Lessons learnt from the digital health assessment report</li> <li>xii. Increasing funding of digital health activities at all levels of the health system</li> </ul>	<ul style="list-style-type: none"> <li>i. Lack of digital health governance structures at all levels of the health system</li> <li>ii. Existence of overlapping digital health related responsibilities among various MOH units</li> <li>iii. Inadequate harmonization and coordination of digital health initiatives at all levels</li> <li>iv. Existence of multiple and fragmented digital health solutions</li> <li>v. Limited integration and interoperability among digital health solutions</li> <li>vi. Some digital solutions are not user friendly and do not meet requirements</li> <li>vii. Shortage of ICT personnel to support implementation of digital health initiatives</li> <li>viii. Inadequate digital health skills among health workers and decision makers</li> <li>ix. Insufficient government funding to implement digital health activities</li> <li>x. Dependency on development partners in funding digital health initiatives</li> <li>xi. Unwillingness to use digital health solutions</li> <li>xii. Poor data quality in the health sector</li> <li>xiii. Low data use culture and capacity</li> <li>xiv. Limited digital health legal and regulatory framework</li> </ul>

<b>STRENGTHS</b>	<b>WEAKNESSES</b>
xiii. Existence of partners to support digital health activities	xv. Inadequate ICT equipment to support digital health solutions xvi. Inadequate structured user-support and user-feedback mechanisms for many digital health systems xvii. Limited engagement of key stakeholders in digital health initiatives
<b>OPPORTUNITIES</b>	<b>CHALLENGES</b>
i. Existence of ICT supporting policies and plans e.g. Zanzibar ICT Policy 2013, eGovernment Policy 2015 ii. Existence of Joint Annual Health Sector Review meetings which can be used to mobilize resources to support digital health and data use iii. Existence of training institutions that produce health and ICT professionals iv. Existence of partners who are willing to fund and support digital health v. Advancements in digital technologies that can be adopted in the health sector vi. Increased use of mobile technologies in the community including social media vii. Existence of health governance structures at low levels e.g. Shehia Health Custodian Committees that can be used as a platform to promote use of digital health solutions in the community viii. Existence of the data centre infrastructure at ZICTIA to support hosting of various digital solutions ix. Existence of ICT centres that can be used for health workers' digital health training x. Emerging digital health technologies	i. Lack of eGovernment standards and guidelines for the implementation of digital solutions ii. Limited budget to meet the competing needs and priorities in the health sector iii. Shortage of skilled health and digital health workforce at all levels of the health system iv. Low digital literacy among citizens v. Lack of backup electricity power supply in some facilities vi. Lack of or unreliable and slow internet connectivity in some facilities vii. The donor-driven priorities in funding health sector activities including digital health viii. Limited public private partnership to support digital health initiatives ix. Insufficient monitoring, evaluation and learning of digital health initiatives x. Lack of digital platform to enable citizens to share feedback xi. There is no shared health records system to support continuity of care xii. Lack of health sector enterprise architecture (EA) framework xiii. Lack of sustainability and business continuity plan to maintain digital health initiatives

## **3.0 Strategic Direction**

### **3.1 Vision**

Appropriate digital health solutions for better health to all Zanzibaris.

### **3.2 Mission**

To strengthen digital health enabling environment to support the implementation of interoperable systems for better health outcomes.

### **3.3 Overall Goal**

To improve the provision of safer, equitable, accessible, efficient, and effective health services at all levels through proper use of digital health technologies.

### **3.4 Strategic Objectives**

The Digital Health Strategy strives to attain the following strategic objectives:

1. To increase use of client level systems that facilitate delivery of safe and quality health care
2. To enhance the use of digital solutions for quality improvement, health promotion, disease surveillance and response
3. To facilitate effective data use for evidence-based actions
4. To facilitate interoperability of systems for effective and secure sharing of health information across the health sector
5. To improve health planning and resources management
6. To improve logistics and supply chain management of health commodities
7. To improve ICT infrastructure and technical support services for sustainable utilisation of digital health at all levels of the health system
8. To strengthen digital health governance and leadership across the health sector

### **3.5 Guiding Principles**

The implementation of the Digital Health Strategy will be guided by the following key principles:

1. Design with users for improved experience
2. Be data-driven
3. Harness open standards, open data, open source, and open innovation
4. Build for scale-up and sustainability
5. Build for local ownership of solutions and data
6. Implement appropriate, interoperable, and cost-efficient digital health solutions
7. Protect data, patient privacy, and confidentiality
8. Compliance to national policy, legal and regulatory frameworks

### **3.6 Strategic Objectives and Initiatives**

The Digital Health Strategy defines strategic objectives to be achieved by 2025. The strategic objectives and initiatives indicated below were developed through rigorous consultation process with key stakeholders in the health sector and guided by the WHO health system building blocks and the Zanzibar HSSP IV. Specifically,

these strategic objectives and initiatives articulate shared goals for the health sector stakeholders and build on the existing investment in digital health initiatives. The implementation of the strategic initiatives will result into measurable benefits to clients, health care service providers, health managers, policy- and decision-makers and other broader beneficiaries; and hence the overall health system strengthening.

### **Strategic Objective 1: To increase use of client level systems that facilitates delivery of safe and quality health care**

Digital health solutions have the potential to transform quality of health services delivery at the point of care by streamlining medical and administration work flows, provide seamless integration between functions for smooth patient movement within various services, improve management of health commodities and other resources, and provide real-time report to support decision making processes at different levels of the health system. Moreover, telemedicine services which involves use of telecommunications infrastructure to support delivery of health services such as teleconsultations, teleradiology, and tele-education to remote communities or facilities, provides an alternative approach to address some health system challenges related to reaching rural, remote, and underserved areas with specialized care.

Efforts to implement electronic medical record (EMR) systems to digitize health facility functions are ongoing in some high-level public and private health facilities; and use of telemedicine is still at infancy stage. This strategic objective, seeks to improve provision of healthcare services at the facility and ensure availability of quality client information at all levels through implementation of an integrated EMR system that caters for all clinical and administrative services within a facility and a comprehensive digital solution for community level health services. Furthermore, to ensure linkages and information sharing between the community, health facility, and other levels of the health system, the EMR system is expected to be integrated with the community client level system, and other systems such as DHIS2, eLMIS, and the civil registration and vital statistics (CRVS) system for birth and death registration. Thus, this strategic objective intends to implement the following digital health initiatives:

#### **Strategic Initiatives**

1. Implement electronic medical records (EMR) systems in a holistic and harmonized manner in order to improve clinical and administration services in health facilities.
2. Implement a comprehensive community based digital system.
3. Strengthen telemedicine services for improved equitable access to specialized health services.

### **Strategic Objective 2: To enhance the use of digital solutions for quality improvement, health promotion, disease surveillance and response**

Digital health platforms have the potential to transform and improve provision of health promotion services, quality improvement including supportive supervision, client engagement and disease surveillance and response interventions.

The MOH in collaboration with partners has implemented some digital health interventions for health promotion, and disease surveillance and response such as the use of mobile technologies for IDWE reporting, and malaria surveillance; use of mobile applications and social media for health promotion services. However, the existing digital health solutions for disease surveillance and response are not integrated and do not cover different essential components such as water, sanitation, hygiene, and environmental health as well as port health.

Furthermore, there is no unified digital platform for provision of health promotion services while quality improvement activities including provision of supportive supervision across the health sector are not harmonized. There is also no digital solution for managing supportive supervision visits. Additionally, there is no digital platform for clients to provide feedback on the quality of health services received (client or customer satisfaction feedback).

The Strategy therefore prioritizes implementation of a comprehensive electronic Integrated Disease Surveillance and Response (eIDSR) system. Moreover, initiatives to implement digital solutions for client feedback and for a harmonized supportive supervision are prioritized to ensure effective quality improvement interventions. Thus, the following strategic initiatives are addressed under this strategic objective:

### **Strategic Initiatives**

1. Implement a digital solution for client feedback management.
2. Implement a digital solution for harmonized facility supportive supervision.
3. Strengthen digital solutions for health promotion.
4. Implement an electronic integrated disease surveillance and response (eIDSR) system.

### **Strategic Objective 3: To facilitate effective data use for evidence-based actions**

Evidence-based decisions for effective health care services require use of timely, accurate, and relevant information. Health information is required for strategic planning and for setting of health sector priorities, quality assurance and quality improvement for health services; detection and control of emerging and endemic diseases. Thus, a well-functioning health information management system that provides access and visibility of quality data from different sources in the health sector is paramount for improved health care services and health outcomes.

In order to facilitate effective data use for evidence-based decision in the health sector, this strategic objective aims to strengthen the current efforts on health information management system, which include countrywide use of DHIS2 for routine data management. The focus is to address some prevailing challenges such as parallel reporting of the same data, lack of some required indicators, lack of mechanisms for sharing feedback with health facilities, lack of centralized dashboards for visualization to support decision making processes. Furthermore, the initiative necessary for building capacity on data analysis, interpretation, dissemination, and instilling data use culture across the health system, is prioritized under this strategic objective.

### **Strategic Initiatives**

1. Improve DHIS2 to accommodate new requirements including indicators, reporting and data analytics and visualizations.
2. Develop and implement a health data warehouse.
3. Strengthen data use capacity across the health sector.

### **Strategic Objective 4: To facilitate interoperability of systems for effective and secure sharing of health information across the health sector**

Effective and efficient health system is highly dependent on consistent and accurate collection, exchange and use of health information across the health sector, for improved health care service delivery and health

outcomes. For instance, improved patients' health care services, in terms of accessibility, coordination and continuity of care requires better exchange and management of information flow, and cooperation between different stakeholders involved. This requires functional standardized and interoperable digital health solutions across the continuum of care and across health service provision points.

However, the implementation of digital health solutions in Zanzibar is currently facing several challenges including lack of the health sector enterprise architecture (EA) framework to streamline digital health implementations, use of peer to peer integration for a growing number of digital health solutions which increases complexity to manage and expand such integration, lack of an interoperability layer (health information mediator), and limited adoption and use of standards such as ICD-11, HL7, and DICOM.

Moreover, there is a need to improve registries for health facilities, health workers, health clients, health products, and terminology services. These registries are key components of the health information exchange (HIE) which allows information systems and devices to seamlessly and securely share information. Health facility registry (HFR) acts as a master facility list (MFL), a health worker registry (HWR) serves as a central database for maintaining unique identities of health workers, while a health client registry (HCR) uniquely identifies patients. The HCR and HWR enable identities from disparate point of service applications to be linked to a unique HIE for each patient and health care worker respectively. Thus, this strategic objective intends to implement the following strategic initiatives to facilitate interoperability of systems:

### **Strategic Initiatives**

1. Develop Zanzibar health enterprise architecture (ZHEA).
2. Develop health information mediator as an interoperability layer for health information exchange.
3. Implement health product registry.
4. Implement health facility registry (HFR).
5. Implement health worker registry (HWR).
6. Implement health client registry (HCR).
7. Implement terminology services.

### **Strategic Objective 5: To improve health planning and resources management**

Proper management of health planning and resources management is one of the key determinants of health system performance in terms of equity, efficiency, and health outcomes. The use of digital technologies is widely recognized as significant to improve health planning, budgeting, reporting and management of resources. The health sector in Zanzibar is currently using an integrated human resource information system (iHRIS) to improve HRH management, and other digital solutions and tools for financial resources management.

This strategic objective intends to strengthen the current efforts in health planning, and resources management systems and address some of the prevailing challenges. Such challenges include: inconsistencies in the existing planning and budgeting tools i.e. plan of action (POA) and medium term expenditure framework (MTEF); lack of digital solution for assets and contract register, and for health planning, budgeting and reporting; lack of centralized e-learning platform for continuing professional development (CPD); and lack of a digital solution for health professional's registration and licensing. Thus, to address the shortcomings and improve effectiveness and efficiency of health planning and resources

management the following initiatives will be implemented:

1. Implement a digital solution for planning, budgeting, accounting, and reporting in the health sector.
2. Improve use of digital solutions for human resource planning, management, and development.
3. Implement an e-learning platform for continuous professional development.
4. Implement the procurement information management system (PIMS) including asset register.

#### **Strategic Objective 6: To improve logistics and supply chain management of health commodities**

The use of digital technologies is widely recognized by health care professionals and practitioners as significant to improve logistics and supply chain management of health commodities. The health sector in Zanzibar is currently using various digital solutions for logistics and supply chain management. These include the use of an electronic logistics management information system (eLMIS) to enhance efficiency and effectiveness of health commodities supply chain management, e-portal for online registration of pharmacies, pharmaceutical products and premises; and an Enterprise Resource Planning (ERP) called m-Supply for registering and management of health commodities at the Central Medical Store (CMS).

This strategic area seeks to improve effectiveness and efficiency of the supply chain management of health commodities by implementing a number of initiatives aimed to enhance the existing systems through addressing challenges including: lack of digital solutions for facility level health commodities inventory and dispensing management; data inconsistencies; irregular data updates; and lack of vaccine and immunization management information system. The following strategic initiatives will be implemented:

#### **Strategic Initiatives**

1. Review, and harmonise requirements for improving logistics and supply chain management systems.
2. Improve the electronic logistic management information system (eLMIS) including upgrading the system and accommodating new requirements e.g. vaccines and cold chain management.
3. Improve the enterprise resource planning (ERP) system at the Central Medical Store.

#### **Strategic Objective 7: To improve ICT infrastructure and technical support services for sustainable utilisation of digital health at all levels of the health system**

ICT infrastructure serves as the foundation and significant component which highly determines the success of any digital health intervention at any level of the health system. The ICT infrastructure involves computing, communication, and electric power supply infrastructure. The Revolutionary Government of Zanzibar, in collaboration with partners, implemented various initiatives to improve ICT infrastructure. These efforts include: installation of fibre optic infrastructure covering all the districts, connecting some health facilities and institutions in the health sector; mobile phone network connectivity across Zanzibar; distribution of some computing devices; and electricity power supply availability in both urban and rural areas, where over 95% of health facilities have electrical power supply.

For smooth implementation of digital health interventions, this strategic objective intends to build on the ongoing efforts to strengthen ICT infrastructure by implementing a number of initiatives in order to address the noted challenges. These challenges include: inadequate computing infrastructure such as local area network (LAN), computers, and internet connectivity at most health facilities and some CHMT offices; lack of power backup facilities; ICT security policy; and business continuity plan. Thus, the following strategic initiatives will be carried out under this strategic objective:

## **Strategic Initiatives**

1. Develop standards and guidelines for computing infrastructure for all levels of the health system.
2. Enhance network infrastructure and availability of computing devices and gadgets across the health sector.
3. Improve electrical power supply backup systems.
4. Enhance ICT security and business continuity management.

## **Strategic Objective 8: To strengthen digital health governance and leadership at all levels of the health system**

Strong digital health governance structure is a necessity for successful digital health strategy implementation. Digital health governance structure facilitates implementation of the digital health strategy vision in a coordinated and harmonized manner at all levels of the health system, and thereby minimize or eliminate duplication of efforts and wastage of the available meagre resources. For cost effective and efficient operation, the Zanzibar Digital Health governance structure is aligned and built on the existing health system governance instruments and structure. Moreover, successful implementation of the strategy is also very much dependent on the ability of the ICT Unit to take up a leading role in the daily operationalization of the strategy across the entire health sector. Hence, the critical need for the MOH to upgrade the ICT Unit to a Department of Digital Health to take up that fundamental role.

Under this strategic objective, various initiatives will be implemented to strengthen digital health governance and leadership at all levels of the health system, including developing and enforcing compliance to agreed standards, guidelines, and best practices (e.g. Principles for Digital Development) in all digital health interventions. Furthermore, capacity building on digital health governance and leadership through short courses, mentorship, coaching, and supportive supervision are prioritized. The following strategic initiatives will be implemented:

## **Strategic Initiatives**

1. Establish a Department of Digital Health with adequate and mix skilled human resources to support effective implementation of digital health activities.
2. Establish and operationalize digital health governance committees to oversee the implementation of digital health initiatives across the health sector.
3. Develop a Digital Health Investment Roadmap.
4. Strengthen capacity of digital health across the health sector.
5. Review policy, legal and regulatory frameworks for digital health.
6. Develop and implement a digital library and solutions inventory to strengthen coordination of data systems and use initiatives.

## *4.0 Digital Health Governance Framework*

The Ministry of Health Zanzibar has formulated the Digital Health Strategy 2020/21-2024/25 to guide the transformation of health care services provision. The key area targeted for transformation is the use of digital technologies to enhance operational efficiency in the delivery of quality health services. Fundamentally, achieving the envisaged digitally-enabled health system transformation requires putting in place and well-functioning strong leadership and governance structure across the health sector.

Based on best practices, this Strategy propose a slight revision of the Ministry governance structure to elevate the ICT Unit to become a Department of Digital Health at the Ministry level to facilitate effective coordination, implementation and adoption of digital health initiatives, including harmonization of efforts and resources while improving performance by eliminating overlaps in responsibilities. Additionally, to facilitate better coordination and provide technical support in the implementation of digital health initiatives and activities at all levels of the health system, the establishment of a digital health steering committee and a digital health technical working group and utilization of existing governance structures is paramount.

Thus, in order to strengthen digital health leadership and governance in Zanzibar, the Strategy aims to: -

1. Establish digital health leadership and governance structure at all levels of the health systems (Figure 2) as follows:
  - a. Zanzibar Digital Health Steering Committee (ZDHSC)
  - b. Digital Health Technical Working Group (DHTWG)
2. Strengthen and align the existing governance by incorporating digital health agenda in their roles and responsibilities. These structures are: -
  - a. MOH Zanzibar Management (MOHZM)
  - b. Council Health Management Teams (CHMT)
  - c. Institutional Management Teams
  - d. Health facilities Management Teams
  - e. Shehia Health Custodian Committees
3. Establish the Department of Digital Health at MOH.

### **4.1 Establish Digital Health Leadership and Governance Structure at all levels**

For successful implementation of the digital health strategy, leadership and governance shall follow best practices such as digital health initiatives prioritization, periodic monitoring and evaluation, frequent communication between stakeholders, regular review and update of regulations, guidelines, and policies to cope and accommodate technological changes. Generally, the digital health leadership and governance will be guided by the following principles:

- Digital health initiatives are aligned with the overarching health sector strategic plans.
- Digital health related policies, regulations, guidelines, and standards are regularly reviewed and updated to accommodate changes in technologies or requirements.
- Digital health investments on digital health are directed to the right projects at the right time according national priorities.

- Relevant stakeholders are actively involved in digital health initiatives.
- Adequate resources are allocated for the implementation of the Strategy.
- Compliance to standards and guidelines in the implementation and use of digital health solutions.
- Provision of adequate and timely supportive supervision, preventive maintenance, and appropriate repair of all digital equipment.
- Rigorous monitoring and evaluation of the implementation of digital health initiatives.

Therefore, the following structure will lead and govern the implementation of the Digital Health Strategy at different levels of the health system.

1. MOH Zanzibar Management (MOHZM)
2. Zanzibar Digital Health Steering Committee (ZDHSC)
3. Digital Health Technical Working Groups (TWGs)
4. Council Health Management Teams (CHMT)
5. Institutional Management Teams (IMT)
6. Health Facility Management Teams (HFMT)
7. Shehia Health Custodian Committees (SHCC)

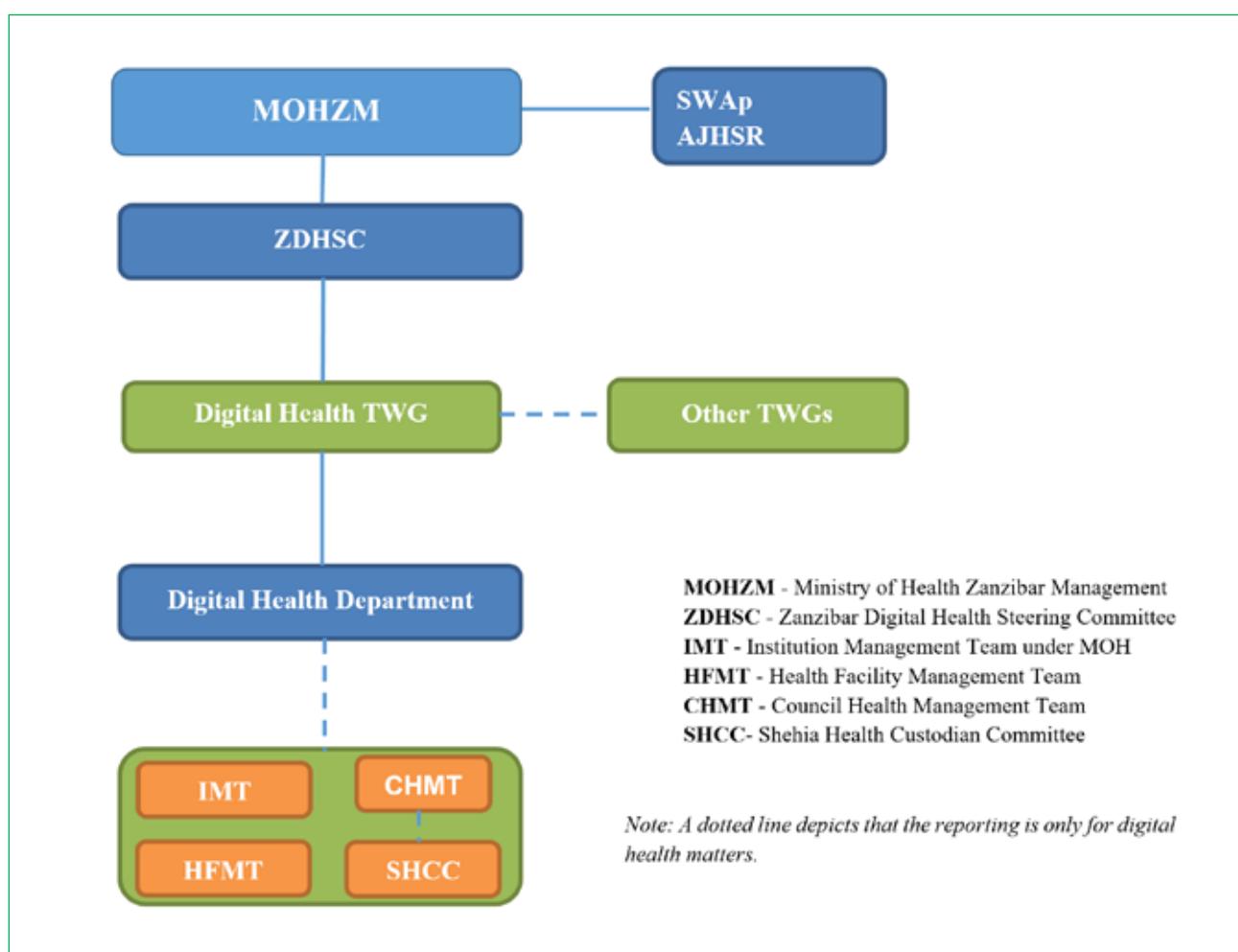


Figure 2: Zanzibar Digital Health Governance Structure

## **4.2 Utilization and Alignment of the Existing MOH Technical Working Groups**

The MOH Zanzibar has different Technical Working Groups (TWGs) which are fundamental for different health related interventions covering the following areas: maternal, newborn, child health and nutrition; human resources for health; quality assurance; health care financing and public financial management; and sector performance monitoring.

The Digital Health TWG and Department of Digital Health in collaboration with existing TWGs will coordinate and align all digital health initiatives.

## **4.3 Responsibilities of each Committee**

### **4.3.1 Zanzibar Ministry of Health Management**

The management of the Ministry of Health Zanzibar plays an important role for digital health leadership and governance to ensure the digital health is one of the main agenda at the ministerial level and other pillar of Government authorities.

The responsibilities of the MOH Zanzibar Management (MOHZM) include the following

- i. Provide leadership on the changes required on policies and regulations required to enforce the implementation of the Digital Health Strategy.
- ii. Make strategic decisions on digital health investments and alignment to the health sector priorities.
- iii. Mobilize and allocate appropriate resources for implementation of digital health initiatives.
- iv. Provide strategic directions on digital health to the Ministerial level and other health sector meetings such as the sector wide approach (SWAp) and annual joint health sector review (AJHSR) meetings.
- v. Review and approve digital health implementation priorities submitted by ZDHSC.

### **4.3.2 Zanzibar Digital Health Steering Committee**

The ZDHSC is an important organ that shall ensure implementation of the Digital Health Strategy through provision of strategic leadership, governance, oversight, and better coordination of digital health initiatives and plans

The responsibilities of the ZDHSC shall include the following:

- i. Oversee the implementation of the Digital Health Strategy in Zanzibar.
- ii. Provide strategic guidance on digital health investments, coordination, and alignment of digital health initiative across multiple stakeholders.
- iii. Mobilize resources for strategic investment in digital health initiatives across the health sector.
- iv. Strengthen Public Private Partnership (PPP) on digital health.
- v. Review and approve digital health related standards and guidelines.
- vi. Ensure development and implementation of digital health change management plan to increase awareness and adoption of digital health solutions.
- vii. Review and approve digital health initiatives and corresponding plan of action
- viii. Monitor and evaluate the implementation of digital health initiatives.
- ix. Present digital health strategic guidance at the Ministerial level to other health sector meetings such as SWAp and AJHSR meetings.

#### **4.3.2.1 Composition of the Zanzibar Digital Health Steering Committee**

The Committee shall be composed of not more than 20 appointed voting members with the representation from MOH departments and agencies (MDAs) including Pemba, Ministry of Finance, PORALGSD, Ministry of Infrastructure and Communication, Mnazi Mmoja Hospital, eGA, ZICTIA, development and implementing partners, civil societies, and private sector. Furthermore, the Committee may co-opt other members based on the agenda to provide technical advice. Appendix II below indicates a list of members of the Zanzibar Digital Health Steering Committee.

#### **4.3.2.2 Leadership**

The Director General shall be the chairperson of the ZDHSC. The Director of Department of Digital Health at MOH shall serve as the Secretary of the ZDHSC.

#### **4.3.2.3 Accountability and Reporting**

- i. The ZDHSC shall meet on quarterly basis. The committee may also meet on demand basis.
- ii. The ZDHSC shall submit reports to the MOH Management and other Annual Health Sector Review meeting.
- iii. The quorum: Simple majority (50% plus one) of the voting members is required for the meeting to be conducted and resolutions to be valid.
- iv. Proxies: Members of the Committee shall not send proxies to a meeting.

#### **4.3.3 Digital Health Technical Working Group**

The Digital Health TWG will play the role of reviewing any new or on-going digital health initiatives and will recommend appropriately to the ZDHSC for approval.

The responsibilities of the Digital Health TWG shall include:

- i. To coordinate the implementation of the Digital Health Strategy to promote collaboration and elimination of duplication of efforts and resources from different TWGs.
- ii. To review and provide recommendation on the developed costed action plans for digital health activities from different interventions.
- iii. To ensure proper use of allocated resources for implementing digital health initiatives under each within their respective departments.
- iv. To develop and enforce compliance to digital health standards and guidelines.
- v. To conduct digital health capacity building initiatives.
- vi. To provide technical support, mentorship, and supportive supervision of digital health activities.
- vii. To collaborate, coordinate and engage stakeholders in the Digital Health Strategy implementation.
- viii. To promote the use of digital health technologies by all stakeholders.
- ix. To provide technical guidance to institutional and health facility management teams on the implementation of the Digital Health Strategy.
- x. May establish task teams to implement specific digital health tasks.
- xi. To conduct monitoring and evaluation of the implementation of the Strategy.

#### **4.3.3.1 Membership**

The Digital Health TWG will be composed of the Director of Digital Health MOH; Head of Monitoring and Evaluation (M&E) at MOH; representatives from eGA, ZICTIA and PORALGSD; representatives from other TWGs; a representative from the Human Resources and Administration Department, representatives from

MOH agencies, health training and research institutions, development and implementing partners, and national agencies responsible for statistics, birth and death registration. Furthermore, the TWG may co-opt other members based on the agenda to provide technical advice.

#### **4.3.3.2 Leadership**

The Digital Health TWG will be chaired by the Director of Digital Health Department. The Director of Digital Health is the one responsible for daily operationalization of the Strategy thus will be well equipped in terms of implementation progress, requirements, and the needs.

#### **4.3.3.3 Accountability and Reporting**

- The Digital Health TWG shall meet on quarterly basis
- The Digital Health TWG shall submit reports to the ZDHSC.

#### **4.3.4 Council Health Management Team**

The ZDHSC shall cascade the implementation of the Digital Health Strategy to Council Health Management Teams through PORALGSD. CHMTs will be responsible for overall coordination of digital health initiatives at the council level.

The responsibilities of CHMTs shall include: -

- i. To ensure activities stipulated in the Digital Health Strategy are incorporated in the Comprehensive Council Health Plan (CCHP).
- ii. To ensure digital health issues are mainstreamed in the council meetings as a key agenda.
- iii. To mobilize resources for the implementation of digital health including human resources and funds.
- iv. To create awareness on digital health in health facilities and communities.
- v. To identify and coordinate various stakeholders for the implementation of digital health action plan at all levels in the council.
- vi. To conduct supportive supervision, mentorship, and coaching on digital health activities at health facilities and community levels.
- vii. To enforce compliance of digital health standard and guidelines and ensure disseminated and effectively implementation among health stakeholders in the council.
- viii. To provide technical advices to district stakeholders on matters stipulated in the digital health strategy and action plan.
- ix. To conduct monitoring and evaluation of the Digital Health Strategy implementation in the district.
- x. To submit quarterly digital health implementation reports to the District Executive Director and the MOH Digital Health Department.

#### **4.3.5 Institutional Management Teams**

The Management Teams at the Ministerial Agencies, research and training institutions in the health sector shall be responsible for overall coordination of digital health activities at institutional level.

The responsibilities of the Management Teams shall include:

- i. To develop annual action plans for digital health activities, in-line with the ZDHS.
- ii. To implement digital health initiatives.
- iii. To mobilize resources for implementing digital health initiatives.
- iv. To enforce compliance to digital health standards and guidelines issued by MOH and eGAZ.

- v. To develop and implements digital health capacity building plan.
- vi. To provide technical support and supportive supervision of digital health activities.
- vii. To conduct monitoring and evaluation of the Digital Health Strategy implementation at their respective institutions.
- viii. To create awareness on digital health in their respective health facilities.
- ix. To submit quarterly digital health implementation progress reports to the ZDHSC via the Department of Digital Health at MOH.

#### **4.3.6 Health Facility Management Teams**

Health facilities management teams shall be responsible for overall coordination of digital health activities at the facility level.

The responsibilities of the Management Teams shall include:

- i. To create awareness on digital health in health facilities and communities.
- ii. To incorporate digital health activities in the health facility comprehensive plan.
- iii. To coordinate the deployment of digital health infrastructure and solutions while adhering to the national standard and guidelines.
- iv. To mobilize resources for implementing digital health initiatives.
- v. To enforce compliance to digital health standards and guidelines.
- vi. To conduct mentorship and supportive supervision of digital health activities within the facilities and communities.
- vii. To support community health volunteers to implement digital health initiatives in their respective communities.
- viii. To conduct monitoring of the digital health activities.
- ix. To submit progress reports on the implementation of the Digital Health Strategy to the Council Health Management Teams and/or Department of Digital Health at MOH on quarterly basis.

#### **4.3.7 Shehia Health Custodian Committees**

Shehia Health Custodian Committees shall be responsible for the overall coordination of digital health activities at the community level to facilitate inclusion of digital priorities in community initiatives and activities.

The responsibilities of the Committee shall include:

- i. To mobilize resources for effective implementation of the digital health in the respective community.
- ii. To supervise the implementation of digital health activities within community.
- iii. To create awareness on the use of digital health solutions among communities.
- iv. To support community health volunteers to implement digital health initiatives in their respective communities.
- v. To identify and address challenges affecting digital health initiatives in the community.
- vi. To submit digital health implementation progress reports to the CHMTs on quarterly basis.

#### **4.4 Establish a Department of Digital Health**

An effective implementation of the Zanzibar Digital Health Strategy depends strongly on the ability of the existing governance structure to actively take a strategic and transformational leadership role in the daily operationalization of the strategy across the entire health sector. Thus, based on digital health leadership and governance best practices, a slight revision of the Ministry governance structure is proposed in which the ICT Unit (currently under the Department of Human Resources and Administration) will be elevated to become one of the Departments, at the Ministry level. The proposed department will have two sections: Digital Health Infrastructure Section and the Information Systems Development Section. However, other sections may be added to increase efficiency and performance of the department in providing technical guidance and support across different levels of the health system. The structure of the proposed Digital Health Department is indicated in Figure 3. The Department of Digital Health at the MOH will be headed by the director, appointed by the relevant authority, and shall report to the Principal Secretary of MOH Zanzibar.

Following the establishment of the Department of Digital Health at the MOH, the head of ICT Unit Pemba becomes the Coordinator of Digital Health in Pemba and will report to the Director of the Department of Digital Health at the Ministry in order to facilitate effective coordination and harmonization of digital health initiatives/activities in Pemba and Unguja.

The Department will be composed of mixed skills workforce and will be a technical arm to provide technical expertise in the area of identification of the digital platforms, conduct technical evaluation and develop best approach and mechanism to harmonize resources to facilitate countrywide implementation of digital health activities.

The responsibilities of the Department of Digital Health will include:

- i. To develop digital health investment and annual action plans.
- ii. To coordinate digital health initiatives across the health sector.
- iii. To manage digital health initiatives dependencies, risks, and mitigations.
- iv. To develop guidelines and tools for reviewing digital health initiatives and solutions.
- v. To develop and maintain an inventory of digital health initiatives.
- vi. To enforce compliance to standards and guidelines for the implementation of digital solutions.
- vii. To monitor and evaluate the implementation of the digital health strategy.
- viii. To submit implementation reports to the Digital Health TWG and ZDHSC on quarterly basis.
- ix. To carry out activities as directed by the Zanzibar Digital Health Steering Committee.

Figure 3 below indicates the proposed Department of Digital Health organizational structure that should be incorporated in MOH Zanzibar organizational structure.

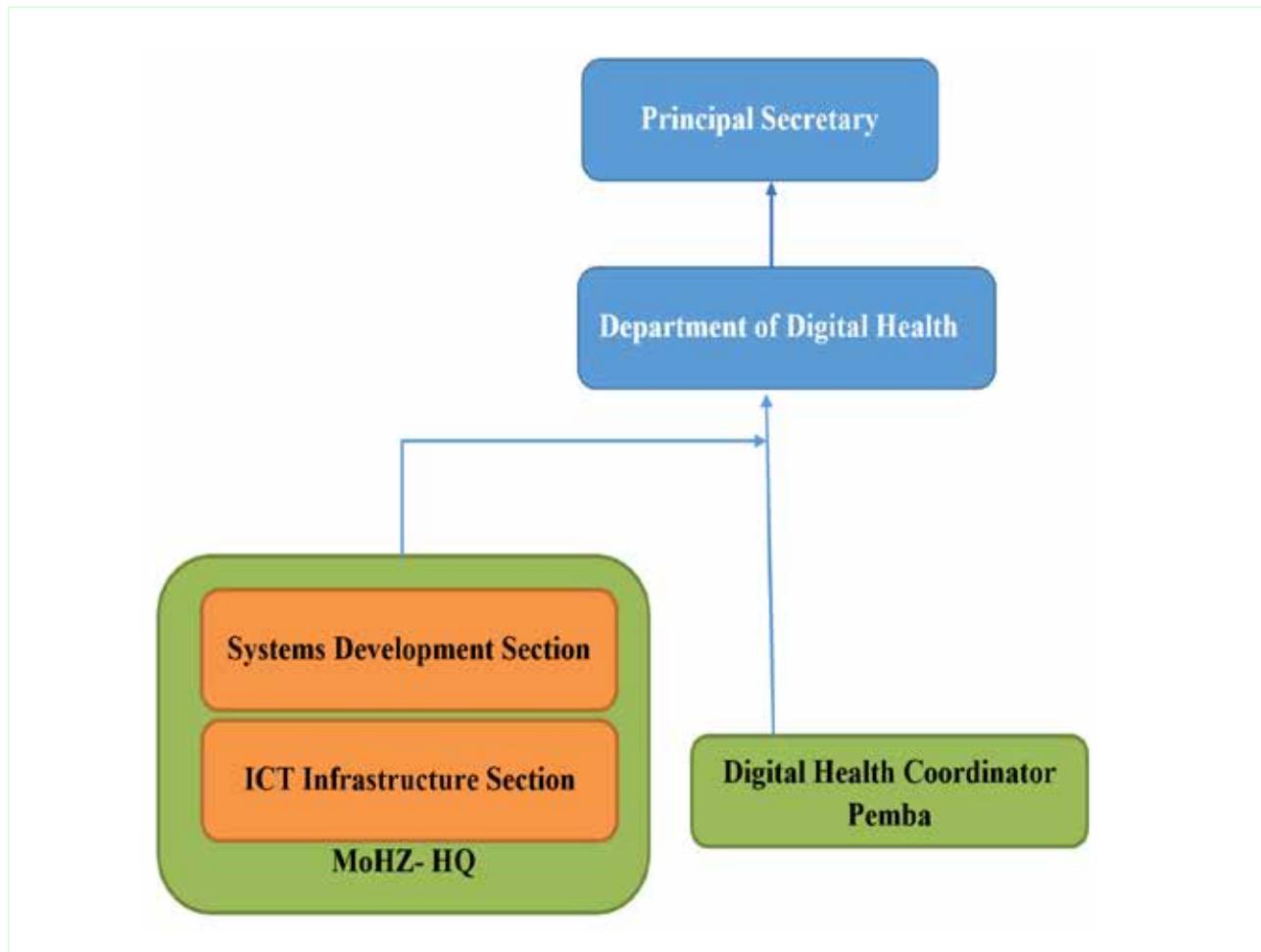


Figure 3: The proposed Department of Digital Health organizational structure

## *5.0 Implementation of the Digital Health Strategy*

### **5.1 Resource Mobilization**

The implementation of the Digital Health Strategy entails sufficient funding, sustainable resources mobilization and accountability mechanisms to support prioritized digital health initiatives and activities. The resources required include financial and human resources, and computing facilities at all levels of the health system.

Adequate skilled workforce is among the critical resources for a successful implementation of the Digital Health Strategy at all levels of the health system. The required human resources include health workers who are digitally literate to effectively use the digital solutions and data for evidenced based practice, planning and decision making. Additionally, ICT personnel are required for planning, design, development, implementation, management, and maintenance of digital health solutions.

Approaches to ensure adequate and skilled human resources include:

- i. Build capacity of personnel to get abreast with the changing digital health applications.
- ii. Recruitment and equitable allocation of skilled ICT personnel.
- iii. Collaboration with development and implementing partners for technical assistance to support the implementation of digital health initiatives.
- iv. Staff collaboration between ministries, departments, and agencies.

Moreover, availability of adequate and reliable computing infrastructure including ICT facilities is the cornerstone in implementing this strategy. For instance, it is critical to ensure procurement, distribution, and efficient use of computing facilities such as network devices, desktop computers, laptops, tablets, and mobile phones depending on the needs of the facility level.

Approaches for strengthening computing infrastructure include:

- i. Improving availability and distribution of electricity from the national grid and other sources.
- ii. Improving availability of electrical power backup to ensure business continuity.
- iii. Improving local area network and internet connectivity in health facilities and institutions.
- iv. Strengthening the use of existing Government ICT resources e.g. national data centre.
- v. Strengthening collaboration with telecommunication companies and mobile network operators (MNOs) to improve network connectivity coverage, speed, and reliability.

The Ministry of Health in collaboration with different partners will devise different mechanisms for mobilizing financial resources required for the implementation of this Strategy. A Digital Health Investment Roadmap will be developed in order to provide detailed implementation approaches for each initiative, map funding sources including who is supporting which initiatives and the coverage of the support. It will also, establish clear gaps, and strategies for funding mobilization.

Some of the approaches for mobilizing financial resources include:

- i. Developing and reviewing digital health investment roadmap.

- ii. Developing and reviewing digital health annual action plans.
- iii. Budgeting and allocation of funds for implementation of digital health initiatives e.g. through the Health Basket Fund.
- iv. Incorporating budgets for digital health activities in Council health plans.
- v. Collaboration with development and implementing partners for financial support to support the implementation of digital health initiatives.
- vi. Development of funding proposals for grants and soft loans.
- vii. Engagement of private sector through strengthening public private partnerships (PPP).
- viii. Building capacity on resource mobilisation and leveraging support from stakeholders.

## 5.2 Change and Adoption

The use of digital health solutions in provision of health care services often introduces new ways of working. Thus, the change and adoption focus on the initiatives that should be carried out to enable stakeholders in the health sector (including clients, health workers, managers, decision makers as well as all Zanzibaris) easily and spontaneously change their work practices, attitudes, and organisational culture to adopt digital health solutions effectively.

A number of issues hinder effective change and adoption of digital health technologies across the health system in Zanzibar. Some of the issues include resistance to use digital solutions; fear of change among health care providers; inadequate basic ICT training and support; limited stakeholders' involvement during planning; design and implementation of digital solutions; and limited platforms for shared learning to enable stakeholders' access and provide feedbacks.



*A health care worker providing care to a client at Mnazi Mmoja Hospital.*

Moreover, there is an exponential increase in advancements and application of digital and emerging technologies such as big data analytics, artificial intelligence (AI), machine learning, wearables, sensors, blockchains, virtual reality and Internet of Things (IoT). The MOH in collaboration with training and research institutions and other stakeholders will continuously explore opportunities for adopting emerging technologies in order to facilitate achievement of UHC, data quality, and effectiveness and efficiency in health services delivery.

Thus, the following initiatives facilitate change management in the implementation and utilization of digital health solutions at all levels for improved quality of health services provision.

- i. Develop and implement a change management plan for the Digital Health Strategy.
- ii. Build capacity of ICT personnel on planning, design, development, implementation and maintenance of digital health infrastructure and solutions.
- iii. Mobilize resources required for the implementation of the Strategy through different mechanisms including government funding, financial and technical support from partners, and public private public partnerships.
- iv. Develop capacity of health workforce to use digital health systems.
- v. Establish and operationalize digital health communities of practice (COPs).
- vi. Develop and implement digital health awareness programs among stakeholders.
- vii. Strengthen short and long digital health courses in training curricula in collaboration with the training institutions and other stakeholders.
- viii. Conduct research and innovative activities for improving application of digital health and adoption of emerging technologies in the health sector.

### **5.3 Risks and Mitigations in the Implementation of the Strategy**

The implementation of the Digital Health Strategy is a complex and costly undertaking. Thus, it is essential to identify and manage potential risks. Some of the risks and their mitigations are indicated in Table 3.

**Table 3: Potential risks and mitigations in the implementation of the Strategy**

<b>Potential risks</b>	<b>Mitigation</b>
<b>Resistance to adopt digital health solutions</b>	Numerous approaches will be employed to overcome resistance among stakeholders to implement and use digital health solutions. <ol style="list-style-type: none"> <li>i. Creating awareness among stakeholders</li> <li>ii. Implementing change management plan</li> <li>iii. Conducting adequate training</li> <li>iv. Conducting mentorship, coaching, and supportive supervision</li> <li>v. Employing user-centred design in order to create value/benefits and improve user experience</li> <li>vi. Operationalizing the digital health governance and leadership structures</li> </ol>
<b>Insufficient resources</b>	The Ministry of Health in collaboration with other government institutions and development partners will mobilize resources required as per the digital health investment roadmap and emerging needs.

<b>Security and privacy threats</b>	Develop and enforce policy and regulatory framework to ensure data security, privacy, and confidentiality in the digital health ecosystem
<b>Weak digital health governance structure</b>	Expedite the establishment and operationalization of the proposed digital health governance structure
<b>Competing interests and siloed implementation of health programs and digital health initiatives</b>	<ul style="list-style-type: none"> <li>i. Comprehensive review and prioritisation of digital health initiatives before implementation</li> <li>ii. Results-Based M&amp;E that focuses on key performance indicators and achievement of outputs, outcomes and impacts of the implemented digital health initiatives and activities</li> </ul>

#### **5.4 Estimated Costs for Implementing the Strategy**

A successful implementation of the Strategy requires adequate funds. An activity-based costing method was used to estimate the costs for activities outlined in the Zanzibar Digital Health Strategy 2020/21-2024/25. Table 4 below summarizes the estimated costs for implementing activities for the eight strategic objectives set out in the Zanzibar Digital Health Strategy 2020/21-2024/25. The cost estimates were derived by estimating unit costs for carrying out each activity under each strategic initiative.

##### **5.4.1 Cost assumptions**

The cost assumptions are based on inputs from the MOH ICT Unit, the expert experiences, best practices, Government standing orders and current market costs. Some of the assumptions considered towards the development of the estimated costs are as listed below: -

1. Consultancy fee assumes the cost that will be offered / paid to an individual or company to undertake digital health work/service that may not be feasibly done by a technical person or team within the Ministry of Health. In this strategy consultancy fee is estimated to 400USD per person-day.
2. Cost estimates in dollars (US\$) were converted to TZS at the exchange rate of 2230 TZS per 1 USD.
3. System development and deployment costs include the costs for acquisition to commissioning of the assignment (system).
4. Annual maintenance cost ranges from 10% to 30% of the system development and deployment cost. This has been set based on the complexity of system and the demands needed to support technical team within the Ministry of Health.
5. Labour charge has been set as 35% of the material costs (based on best practices).
6. It is assumed that the Department of Digital Health will conduct regular preventive maintenance internally based on the preventive maintenance plan. However, in the absence of internal experts to execute preventive maintenance, then 1600 USD per facility has been estimated for the purpose.
7. It is assumed that digital health systems will be hosted in the data centre at Zanzibar ICT Infrastructure Agency at the cost of 5000 USD per year per system.
8. The conference package cost is estimated to 25 USD, including venue, refreshment, and stationeries.
9. Workshop and meeting cost estimates include ground travel, relevant per diems and air travels.
10. Internal procurement process has been assumed to be accommodated in the normal procurement procedures at the Ministry. Hence, the assumption is that there is no associated costs with logistics during procurement processes.
11. Contingency cost is 5% of the total estimated budget.

**Table 4: Estimated costs for the implementation of the Digital Health Strategy**

S/N	Strategic Objectives and Initiatives	Estimated Costs (TZS)
<b>1</b>	<b>Strategic Objective 1: To increase use of client level systems that facilitate delivery of safe and quality health care</b>	
1.1	Implement electronic medical records (EMR) systems in a holistic and harmonized manner in order to improve clinical and administration services in 10 Hospitals and 20 PHC facilities by 2025	1,503,720,000
1.2	Implement a comprehensive community based digital system by 2022	581,300,000
1.3	Strengthen telemedicine services to 10 public hospitals for improved equitable access to specialized health services by 2025	843,330,000
		<b>Sub Total</b> <b>2,928,350,000</b>
<b>2</b>	<b>Strategic Objective 2: To enhance the use of digital solutions for quality improvement, health promotion, and disease surveillance and response</b>	
2.1	Implement an electronic integrated disease surveillance response (eIDSR) system by 2023	598,220,000
2.2	Implement a digital solution for health promotion by 2025	173,880,000
2.3	Implement a digital solution for client feedback management by 2023	119,220,000
2.4	Implement a digital solution for harmonized facility supportive supervision by 2023	227,550,000
		<b>Sub Total</b> <b>1,118,870,000</b>
<b>3</b>	<b>Strategic Objective 3: To facilitate effective data use for evidence-based actions</b>	
3.1	Improve DHIS2 to accommodate new requirements including indicators, reporting, data analytics and visualizations by 2022	119,960,000
3.2	Develop a health data warehouse by 2024	568,170,000
3.3	Strengthen data use capacity across the health sector by 2025	308,180,000
		<b>Sub Total</b> <b>996,310,000</b>
<b>4</b>	<b>Strategic Objective 4: To facilitate interoperability of systems for effective and secure sharing of health information across health sector</b>	
4.1	Develop Zanzibar health enterprise architecture (ZHEA) by 2021	123,100,000
4.2	Develop health information mediator as an interoperability layer for health information exchange by 2022	507,600,000
4.3	Strengthen health product registry by 2021	56,496,000
4.4	Implement health facility registry (HFR) by 2022	294,660,000
4.5	Implement health worker registry (HWR) by 2022	258,780,000
4.6	Implement health client registry (HCR) by 2024	333,300,000
4.7	Implement terminology services by 2024	256,760,000
		<b>Sub Total</b> <b>1,830,696,000</b>
<b>5</b>	<b>Strategic Objective 5: To improve health planning and resources management</b>	
5.1	Develop a digital solution for planning, budgeting, accounting, and reporting in the health sector	152,690,000
5.2	Improve use of digital solutions for human resource planning, management, and development	190,820,000
5.3	Finalize implementation of the procurement information management system (PIMS) by 2021	73,820,000
5.4	Implement an e-learning platform for continuous professional development	92,440,000
		<b>Sub Total</b> <b>509,770,000</b>

<b>6</b>	<b>Strategic Objective 6: To improve logistics and supply chain management of health commodities</b>	
6.1	Review, harmonise, and develop requirements for improving the logistics and supply chain systems	61,100,000/=
6.2	Improve the electronic logistic management information system (eLMIS) including accommodating new requirements e.g. vaccines and cold chain management	170,620,000
6.3	Improve the enterprise resource planning (ERP) system at the Central Medical Store	53,160,000
	<b>Sub Total</b>	
	<b>284,880,000</b>	
<b>7</b>	<b>Strategic Objective 7: To improve ICT infrastructure and technical support services for sustainable utilisation of digital technologies at all levels of the health system</b>	
7.1	Develop standards and guidelines for computing infrastructure for all levels of the health system by 2021	45,600,000
7.2	Enhance network infrastructure and availability of computing devices in 10 hospitals by 2025	1,316,269,300
7.3	Improve electrical power supply backup systems to 10 public hospitals and 20 PHC facilities by 2025	846,733,500
7.4	Enhance ICT security and business continuity management by 2022	115,720,000
7.5	Facilitate hosting of systems at the national data centre and client-based systems at the facilities	115,480,000
7.6	Procure tablets /gadgets and Wireless Access Point to support installation of light weight version of EMR to 20 PHC facilities	228,000,000
	<b>Sub Total</b>	
	<b>2,667,802,800</b>	
<b>8</b>	<b>Strategic Objective 8: To strengthen digital health governance and leadership at all levels of the health system</b>	
8.1	Establish Department of Digital Health with mix skilled human resources to support effective implementation of digital health activities by 2021	10,350,000
8.2	Establish and operationalize digital health governance committees to oversee the implementation of digital health initiatives across all levels by 2020	491,700,000
8.3	Develop a Digital Health Investment Roadmap by 2021	82,300,000
8.4	Strengthen capacity on digital health across the health sector by 2025	295,650,000
8.5	Develop guidelines, legal and regulatory frameworks for digital health by 2025	41,600,000
8.6	Develop and implement a digital library and solutions inventory of digital health initiatives by 2022	165,580,000
	<b>Sub Total</b>	
	<b>1,087,180,000</b>	
<b>9</b>	<b>Monitoring and Evaluation</b>	
9.1	Conduct monitoring, evaluation, and supportive supervision of the implementation of the Strategy	<b>378,800,000</b>
	<b>Total Cost Estimates in TZS</b>	
	<b>11,802,658,800</b>	
	<b>Contingency (5% of the total Cost estimates (TZS)</b>	
	<b>590,132,940</b>	
	<b>Grand Total Cost Estimates in TZS</b>	
	<b>12,392,971,740</b>	

## *6.0 Monitoring, Evaluation and Learning*

Monitoring, evaluation, and learning (MEL) of the implementation of the Digital Health Strategy is essential in ensuring that digital health initiatives are properly implemented to attain the expected outcomes and impacts according to the national health priorities. There is a need for robust MEL mechanisms to strategically monitor progress according to the key performance indicators, assess outcomes and inform appropriate measures for continuous improvement of the implementation of the Strategy. During MEL, there will be a regular reporting of status of implementation of the Strategy to ensure delivery of required outputs and attainment of expected outcomes. Furthermore, challenges affecting the implementation of the Strategy will be identified, assessed, and appropriately addressed.

Monitoring will involve the routine collection, review, and analysis of data, either generated by digital systems or purposely collected, in order to measure the implementation fidelity and progress towards achieving objectives of the digital health strategy [15].

The evaluation will focus on determining achievements of desired outputs, outcomes and impacts of the implemented digital health initiatives and activities [15]. The evaluation will be divided into two main phases. The first phase (mid-term evaluation) will be conducted at the middle of the implementation of the Strategy while the second phase (end-line evaluation) will be conducted at the end of the fifth year.

Learning will focus on using information generated from monitoring and evaluation to continuously improve effectiveness, efficiency, and relevance in the implementation of the digital health activities. Furthermore, the Ministry of Health in collaboration with research institutions and other partners may also design and conduct research activities in order to assess feasibility, usability, effectiveness, and efficiency of digital health initiatives. However, it is recommended that evaluation plans for digital health interventions should focus on generating data that can be used as a basis for assessing whether observed changes in behaviour, processes or health outcomes can be attributed to the digital health intervention [16].

The MEL will employ participatory approaches engaging different stakeholders at all levels of the health system. Table 5 shows the M&E Roadmap for the implementation of the Digital Health Strategy.

The monitoring and evaluation of the implementation of this Strategy shall include:-

- a. Develop and implement MEL capacity initiatives to ensure high quality outcomes.
- b. Review digital health annual action plans in line with the strategic initiatives of this Strategy.
- c. Develop MEL tools with relevant indicators for inputs, process, outputs, outcomes and impacts for effective monitoring and evaluation of the implementation of the strategic initiatives.
- d. Gather baseline data before implementing any strategic initiative.
- e. Conduct MEL on structural, process and outcome indicators.
- f. Engage an external evaluator for the mid-term and end-line evaluation of the implementation of the Strategy.
- g. Disseminate the MEL reports to different stakeholders to all levels of the health system.
- h. Improve MEL tools and techniques based on the feedback from stakeholders.

**Table 5: The M&E Roadmap for the Implementation of the Digital Health Strategy**

Strategic Initiatives	Activities	Indicators	Time-line	Responsible
<b>Strategic Objective 1: To increase use of client level systems that facilitate delivery of safe and quality health care</b>				
1.1 Implement electronic medical records (EMR) systems in a holistic and harmonized manner to improve clinical and administration services in 10 hospitals and 20 PHC facilities by 2025	Develop requirements, standards, and guidelines for health facility digitalization Develop/customize an EMR system	A comprehensive EMR system covering for integrated services developed	Y1	Department of Digital Health (DDH), Mnazi Mmoja Hospital
	Deploy the EMR system in 10 hospitals and 20 PHC facilities	Percentage of health facilities using the	Y1	(MMH),
	Conduct trainings on the use of the EMR system	EMR system compliant to the standards and guidelines	Y2-Y5	Department of Curative Services
	Maintain the EMR system	Percentage of health workers using	Y2-Y3	Department of Planning,
		EMR system for each patient encounter	Y2-Y5	Policy and Research (DPPR), PORALGSD
</				

Strategic Initiatives	Activities	Indicators	Time-line	Responsible
<b>Strategic Objective 2: To enhance the use of digital solutions for quality improvement, health promotion, and disease surveillance and response</b>	Develop requirements for eIDSR system Develop eIDSR system based on the requirement specifications Deploy the eIDSR system in all districts Conduct training on eIDSR system Maintain the eIDSR system	eIDSR system deployed Percentage of % health facilities reporting weekly on time to eIDSR system Percentage of diseases surveillance interventions using eIDSR system	Y1 Y1-Y2 Y2-Y5 Y2-Y5 Y2-Y5 Y2-Y5 DDH, Curative Services Department, PORALGSD, Department of Preventive Services and Health Education, DPPR	
2.1 Implement an electronic integrated disease surveillance response (eIDSR) system by 2023	Develop requirements for digital solutions for health promotion capable to integrated with different communication channels/platforms Develop digital solutions for health promotion Implement digital solutions for health promotion Conduct training on digital solutions for health promotion Maintain the digital solution for health promotion	Functional digital solution for health promotion Percentage of health promotion services offered through digital solutions for health promotion Percentage of clients accessing health promotion services using the digital solution	Y3-Y4 Y3 Y3-Y5 Y3-Y5 Y3-Y5 DDH, Department of Preventive Services and Health Education PORALGSD	
2.2 Implement a digital solution for health promotion by 2025	Develop requirements for a digital solution for client feedback management by 2023 Develop a digital solution for client feedback management Deploy the digital solution for client feedback management Conduct training on the digital solution for client feedback management Maintain the digital solution for client feedback management	Functional digital client feedback system in place Percentage of users trained on the use of client feedback management system Percentage of clients providing feedback through the digital solution	Y3-Y4 Y4 Y4-Y5 Y4-Y5 Y3-Y5 DDH, Department of Curative Services, MMH, PORALGSD	
2.3 Implement a digital solution for client feedback management by 2023				

Strategic Initiatives	Activities	Indicators	Time-line	Responsible
2.4 Implement a digital solution for quality improvement and facility supportive supervision by 2023	Review and harmonize quality improvement and facility supportive supervision guidelines and tools	Functional digital system for quality improvement and supportive supervision	Y1	DDH,
	Develop requirements for developing a digital solution for the harmonized quality improvement and facility supportive supervision	Percentage of users using the digital solution for the quality improvement and facility supportive supervision across different levels of the health system	Y2	Department of Curative Services, MMH,
	Develop and deploy a digital solution for the harmonized quality improvement and facility supportive supervision	Y2-Y3	Department of Preventive Services and Health Education,	
	Conduct trainings on the digital solution for the quality improvement and facility supportive supervision in line with the requirements	Y2-Y5	PORALGSD,	
	Maintain the digital solution for the quality improvement and facility supportive supervision	Y2-Y5	Quality Assurance Unit	
	<b>Strategic Objective 3: To facilitate effective data use for evidence-based actions</b>			
3.1 Improve DHIS2 to accommodate new requirements including indicators, reporting, data analytics and visualizations by 2022	Review and harmonize HMIS data collection tools, indicators, and reporting	DHIS2 improved as per the requirements	Y1	DDH, DPPR, HMIS Unit
	Develop business requirements for improving DHIS2 including incorporating new indicators, data visualization features to support data use	Percentage of health facilities with improved reporting rates into DHIS2	Y1	
	Customize DHIS2 as per the business requirements	Percentage of health facilities with improved reporting timeliness into DHIS2	Y1-Y2	
	Deploy the improved DHIS2 in all health facilities		Y2	
	Conduct training on the improved DHIS2		Y2-Y5	
	Maintain the improved DHIS2		Y1-Y5	
3.2 Develop a health data warehouse by 2024	Develop requirements for a health data warehouse	Functional health data warehouse	Y3	DDH,
	Develop the health data warehouse		Y3	
	Deploy the health data warehouse		Y3-Y4	DPPR
	Conduct training on the health data warehouse		Y3-Y5	
	Maintain the health data warehouse		Y3-Y5	
3.3 Strengthen data use capacity across the health sector by 2025	Develop data use guidelines	Percentage of health workers and managers trained on data use	Y1	DDH,
	Conduct trainings on data management, analysis, and use	Presence of evidence-based plans at all levels	Y1-Y5	DPPR

Strategic Initiatives	Activities	Indicators	Time-line	Responsible
<b>Strategic Objective 4: To facilitate interoperability of systems for effective and secure sharing of health information across health sector</b>				
4.1 Develop Zanzibar health enterprise architecture (ZHEA) by 2021	Develop standards and guidelines for information sharing Develop ZHEA	Health information mediator in place Percentage of digital solutions adhering to the established standards	Y1 Y2	DDH
4.2 Develop health information mediator as an interoperability layer for health information exchange by 2022	Develop requirements for the health information mediator Develop the health information mediator Deploy the health information mediator Conduct training on the health information mediator	Percentage of digital solutions exchanging information through the mediator	Y2-Y3 Y3 Y3-Y5	DPPR
4.3 Strengthen health product registry by 2021	Maintain the health information mediator Review requirements for finalizing the ZFDA e-portal Customize ZFDA e-portal Conduct training on the ZFDA e-portal	ZFDA e-portal customized Percentage of health facilities accessing the e-portal services	Y1 Y1 Y1-Y5	ZDFA DDH
4.4 Implement health facility registry (HFR) by 2022	Maintain the HFR Develop requirements for HFR Develop and deploy HFR Conduct training on the HFR Maintain the HFR	HFR system in place Percentage of health facilities registered in the HFR Percentage of the health workers/ managers using the HFR	Y1 Y1-Y2 Y1-Y5 Y1-Y5	DDH, Department of Curative Services, DPPR, PORALGSD
4.5 Implement health worker registry (HWR) by 2022	Develop requirements for HWR Develop and deploy HWR Conduct training on the HWR Maintain the HWR	HWR developed Percentage of the users using the HWR Percentage of health workers/ managers registered in the HWR	Y2 Y2-Y5 Y1-Y5	DDH, Department of Administration and Human Resources, Professional councils
4.6 Implement health client registry (HCR) by 2024	Develop requirements for HCR Develop and deploy the HCR Conduct training on the HCR Maintain the HCR	HCR system in place Percentage of the users using the HCR Percentage of health clients registered in the HCR	Y1 Y1-Y2 Y1-Y5	DDH, DPPR Y1-Y5

Strategic Initiatives	Activities	Indicators	Time-line	Responsible
4.7 Implement terminology services by 2024	Develop, adopt, and harmonise standards and coding systems for referencing drugs and medical supplies, diagnosis, and procedures	Terminology registry developed	Y1	DDH, MMH, Department of Curative Services
	Develop business requirements for terminology registry	Percentage of health facilities using harmonized medical standards and service codes	Y3	DPPR
	Develop a digital solution for managing the terminology registry		Y4-Y5	
	Conduct training on the terminology registry		Y4-Y5	
	Maintain the digital solution for managing the terminology registry		Y4-Y5	
<b>Strategic Objective 5: To improve health planning and resources management</b>				
5.1 Develop a digital solution for planning, budgeting, accounting, and reporting in the health sector by 2023	Develop requirements for a health planning, budgeting, accounting, and reporting information system	The health planning, budgeting, accounting, and reporting information system developed	Y1	DDH, DPPR
	Develop the health planning, budgeting, accounting, and reporting information system		Y1	
	Deploy the health planning, budgeting, accounting, and reporting information system		Y1-Y2	
	Conduct training on the health planning, budgeting, accounting, and reporting information system		Y1-Y5	
	Maintain the health planning, budgeting, accounting, and reporting information system		Y1-Y5	
5.2 Improve use of digital solutions for human resource planning, management, and development by 2023	Review requirements for the integrated human resource information system (iHRIS)	iHRIS improved	Y1	DDH,
	Customize and deploy the iHRIS	Percentage of the health managers trained on the use of iHRIS	Y1	Department of Administration and Human Resources
	Conduct training on the iHRIS		Y1-Y5	
	Maintain the iHRIS		Y1-Y5	

<b>Strategic Initiatives</b>	<b>Activities</b>	<b>Indicators</b>	<b>Time-line</b>	<b>Responsible</b>
5.3 Implement an e-learning platform for continuous professional development by 2025	Develop business requirements for an e-learning platform Develop/Customize an e-learning platform Deploy the e-learning platform Conduct training on the use of the e-learning platform Maintain the e-learning platform Review requirements for revising the PIMS Customize and deploy the PIMS based on the requirements Conduct training on the PIMS Maintain the PIMS	Functional e-learning platform deployed Percentage of continuous professional development courses offered through the e-learning platform Percentage of the health workers using the e-learning platform PIMS operationalized Number of MOH units using the PIMS Percentage of the users using the PIMS	Y3 Y3 Y3 Y3-Y5 Y3-Y5 Y1 Y1-Y2 Y2-Y5 Y2-Y5	DDH, Department of Administration and Human Resources, Professional councils
5.4 Finalize implementation of the procurement information management system (PIMS) by 2021	Review and mapping requirements for improving the logistics and supply chain management systems across the health sector Conduct workshops for validating the requirements document Finalize the business requirements specification document	Percentage of systems developed/ customized based the requirements Percentage of the health facilities using the eLMIS Percentage of the users using the ERP system	Y1 Y1 Y1	DDH, Central Medical Store, Chief Pharmacist Office
<b>Strategic Objective 6: To improve logistics and supply chain management of health commodities</b>				
6.1 Review, harmonise and develop requirements for improving the logistics and supply chain management systems. by 2021	Review and mapping requirements for improving the logistics and supply chain management systems across the health sector Conduct workshops for validating the requirements document Finalize the business requirements specification document	Customise the eLMIS Deploy the improved eLMIS Maintain the improved eLMIS Provide technical support and maintenance of the eLMIS	Y1-Y2 Y2-Y5 Y2-Y5 Y1-Y5	DDH, Chief Pharmacist Office
6.2 Improve the electronic logistic management information system (eLMIS) including accommodating new requirements e.g. vaccines and cold chain management by 2024				
6.3 Improve the enterprise resource planning (ERP) system at the Central Medical Store (CMS) by 2022	Customize the enterprise resource planning (ERP) system Deploy the improved ERP system Conduct trainings on the improved ERP system Maintain the ERP system		Y1-Y2 Y2-Y5 Y2-Y5 Y1-Y5	DDH, Central Medical Store

Strategic Initiatives	Activities	Indicators	Time-line	Responsible
<b>Strategic Objective 7: To improve ICT infrastructure and technical support services for sustainable utilisation of digital health at all levels of the health system</b>				
7.1 Develop standards and guidelines for computing infrastructure for all levels of the health system by 2021	Prepare standards, guidelines, and requirement specifications for deploying and managing computing infrastructure and digital medical equipment	Percentage of health facilities installed with computing infrastructure adhering to standards and guidelines	Y1	DDH
	Conduct validation workshops for standards guidelines and requirement specifications	Percentage of users satisfied with ICT technical support services	Y1	
	Finalize the standards guidelines and requirement specifications document	Percentage of users satisfied with ICT technical support services	Y1-Y2	DDH
	Install or upgrade LAN		Y1-Y5	
	Establish server rooms in health institutions and hospitals		Y1-Y5	
	Supply computing devices and gadgets		Y1-Y5	
	Develop requirements for electrical power supply backup systems	Percentage of health facilities installed with the power backup system	Y1	
	Install power back systems such as generators/solar systems in 10 public hospitals		Y1-Y5	
	Develop and implement ICT security policy and guidelines	Percentage of staff trained on ICT security and business continuity management	Y1	
	Develop and implement ICT and business continuity management (disaster preparedness and recovery) plan	Percentage of health facilities with operationalized ICT business continuity management plan	Y1-Y5	
	Conduct trainings on ICT security and business continuity management		Y1-Y5	
	Conduct preventive and corrective maintenance of digital equipment and infrastructure		Y1-Y5	
<b>Strategic Objective 8: To strengthen digital health governance and leadership at all levels of the health system</b>				
8.1 Establish Department of Digital Health with mix skilled human resources to support effective implementation of digital health activities by 2021	Prepare and submit for approval a proposal (indicating rationale, responsibilities, and sections for establishing the Digital Health Department	Department of Digital Health established, Number of ICT staff recruited/deployed,	Y1	Principal Secretary
	Recruit/deploy ICT staff	Percentage of users satisfied with ICT technical support services	Y1-Y5	

Strategic Initiatives	Activities	Indicators	Time-line	Responsible
8.2 Establish and operationalize digital health governance committees to oversee the implementation of digital health initiatives across all levels by 2020	Constitute the digital health committees Conduct trainings on digital health governance and leadership across the health sector Operationalize the digital health committees	Percentage of staff trained on the use of digital health governance and leadership Percentage of meetings held Percentage of digital health initiatives and solutions adhering to standards and guidelines	Y1 Y1-Y5 Y1-Y5	
8.3 Develop a Digital Health Investment Roadmap by 2021	Conduct assessment including analysis of existing systems, requirements, and mapping of the funding sources Conduct consultative meetings Develop and disseminate the Digital Health Investment Roadmap	The Investment Roadmap available Percentage of resources mobilized	Y1 DPPR DDH Y1 Y1	
8.4 Strengthen capacity on digital health across the health sector by 2025	Develop digital health awareness programs Implement awareness programs on the digital health Investment Roadmap Conduct trainings on digital health across the health sector Attend digital health national, regional, and international meetings, conferences, and exchange programs	Level of digital health awareness among targeted users across the health sector Level of knowledge and skills in digital health among targeted staff across the health sector Percentage of users satisfied with digital health solutions	Y1-Y5 Y1-Y5 Y1-Y5 Y1-Y5 Y1-Y5	Department of Administration and Human Resources
8.5 Review digital health legal and regulatory frameworks by 2025	Develop guidelines and standard operating procedures to implement the health data security, confidentiality, and privacy Review and incorporate digital health aspects in the existing health policies, laws, and regulations	Percentage of digital health solutions adhering to health data security, confidentiality, and privacy standards	Y1 Y1-Y3	
8.6 Develop and implement a digital library and solutions inventory of digital health initiatives by 2022	Develop business requirements for a digital library and solutions inventory Develop and deployed the digital library and solutions inventory Deploy the digital library and solutions inventory Conduct training on the digital library and solutions inventory Maintain the digital library and solutions inventory	Percentage of staff trained on the use of digital library and solutions inventory Percentage of digital health initiatives and documents available in the inventory system	Y1 Y1 Y1 Y1 Y1-Y5	DDH DDH DDH DDH

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## Appendices

### **Appendix I: List of Key Stakeholders Engaged in the Development of the Strategy**

The development of this Strategy employed consultative approaches in which contributions from a wide range of stakeholders, including individuals and institutions and multi-disciplinary experts, were gathered to ensure it is aligned to the national priorities and shared goals of different stakeholders. The Ministry acknowledges in a special way the contributions from different stakeholders who were engaged throughout the process of developing this Strategy. The following is a list of key individuals and organisations that contributed to this work as the technical working team and the Steering Committee which had roles to oversee the development of the Strategy.

S/N	NAME	TITLE	INSTITUTION
<b>Members of the Steering Committee</b>			
1.	Ms. Asha A. Abdulla	Principal Secretary	MOH
2.	Ms. Halima M. Salum	Deputy Principal Secretary	MOH
3.	Dr. Jamala A. Taib	Director General	MOH
4.	Mr. Ramadhan K. Juma	Director, Administration and Human Resources	MOH
5.	Ms. Attye J. Shaame	Director, Planning Policy and Research	MOH
6.	Dr. Fadhil Abdalla Mohammed	Director, Preventive and Health Promotion	MOH
7.	Dr. Ali Salum Ali	Executive Director	MMH
8.	Ms. Shadya S. Seif	Health Coordinator	MOH Pemba
9.	Eng. Shukuru A. Suleiman	Executive Director	ZICTIA
10.	Mr. Shaaban Haji Chum	Executive Director	eGAZ
11.	Dr. Mzee Suleiman	Director, Communication	Ministry of Infrastructure, Communication and Transportation
12.	Dr. Haji S. Khamis	Director, Coordination Regional Administration and Local Government Authority	PORALGSD
13.	Dr. Mwita H. Mwita	Principal Director	Zanzibar Planning Commission
14.	Ms. Saumu Khatib Haji	Director, Planning Policy and Research	Ministry of Finance and Planning
<b>Members of the Technical Working Team</b>			
1.	Mr. Mohamed H. Al-Mafazy	Head, ICT Unit	MOH
2.	Ms. Subira S. Khatib	Coordinator, Health Sector Reform Secretariat	MOH
3.	Mr. Issa A. Mussa	Deputy Programme Manager	ZITHHLP
4.	Mr. Abdullatif H. Daud	Head, Health Financing Technical Working Group	MOH
5.	Mr. Mwinyi I. Msellel	Director, Training and Research	MMH
6.	Mr. Omar M. Omar	Coordinator Universal Health Coverage- UHC	MOH

7.	Mr. Abdulkadir M. Abdulkadir	Head, ICT Unit	MMH
8.	Mr. Abdulrahman A. Taha	ICT Officer	MOH
9.	Mr. Frank Kagoma	Chief Technical Officer	ZICTIA
10.	Mr. Ramadhan K. Juma	Director, Administration and Human Resources	MOH
11.	Mr. Ali B. Ali	ICT Officer	MOH
12.	Ms. Awena R. Mohd	Head, system Development	eGAZ
13.	Ms. Aisha A. Mohammed	Head, M & E Division	MOH
14.	Ms. Asha M. Seha	Administrator	Integrated Reproductive and Child Health Program
15.	Ms. Khadija S. Simai	Head, Planning and Budgeting Division	MOH
16.	Ms. Husna K. Said	Information Officer	ZITHHLP
17.	Ms. Fatma K. Khamis	Strategic Information Officer	MOH
18.	Ms. Faiza B. Abass	Deputy Programme Manager	Zanzibar Malaria Elimination Program
19.	Dr. Ummul-kulthum Omar Hamad	Head, Obstetrics and Gynaecology department	MMH
20.	Dr. Felix Sukums	ICT Consultant	MUHAS
21.	Mr. Hermes Rulagirwa	Health Informatician	CVL-COICT/TCDC
22.	Mr. Edwin Nyella	Health Informatician	EnterSoft Systems Limited
23.	Dr. John Kaswija	Physician, Tutor Healthcare Management Specialist	Mwanza College of Health and Allied Sciences

#### Appendix II: Members of the Zanzibar Digital Health Steering Committee

S/N	Designation	Institution	Role
1.	Director General	MOH	Chairperson
2.	Director, Digital Health	MOH	Secretary
3.	Director, Planning, Policy and Research	MOH	Member
4.	Director, Curative Services	MOH	Member
5.	Director, Preventive Services and Health Education	MOH	Member
6.	Director, Administration and Human Resources	MOH	Member
7.	Chief Pharmacist	MOH	Member
8.	Chief Executive Officer	eGA	Member
9.	Chief Executive Officer	ZICTIA	Member
10	Executive Director	MMH	Member
11.	Representative	Ministry of Finance and Planning	Member
12.	Representative	PORALGSD	Member
13.	Representative	Ministry of Infrastructure, Communication and Transportation	Member
14.	Representative, development and implementing partners		Member
15.	Representative, civil societies		Member
16.	Representative, private sector		Member



