



United Republic of Tanzania

Tanzania Health Enterprise Architecture

Request for Architecture Work

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Acronyms

eGA	eGovernment Agency
MoFP	Ministry of Finance and Planning
MOHCDGEC	Ministry of Health, Community Development, Gender, Elderly and Children
MWTC	Ministry of Works, Transport and Communication
PORALG	President's Office Regional Administration and Local Government
TZHEA	Tanzania Health Enterprise Architecture

1 Introduction

1.1 Background

The Government of Tanzania is in a process of developing Tanzania Health Enterprise Architecture (TZHEA) will help to simplify the complexity of Tanzania's health information systems (HIS) by allowing for important interrelationships between different components of its HIS to be identified, including which components need to be aligned to which parts and in so doing reduce the risks and incentives of fragmentation, duplication, and lack of interoperability. Tanzania is embarking on this journey after realizing that that well-developed enterprise architectures reduce the risk of costly mistakes from applying diverse information and communication technologies in an unplanned and unstructured manner which increases costs and the workload of frontline health care workers.

TZHEA involves four components:

- Business process mapping: maps the existing business processes of the health sector ("as-is") and how they can be improved ("to-be").
- Information architecture: maps information flows throughout the health sector and how they can be improved.
- Applications architecture: maps how the different software applications will interact.
- Technology architecture: maps how core common services or registries will facilitate those interactions.

Some initial ideas have been proposed in the area of applications architecture through a draft "conceptual model," through USAID funding to John Snow, Inc. (JSI). This work will build upon this work towards the vision of comprehensive enterprise architecture. Once comprehensive enterprise architecture and standards are established, an enterprise architecture body under the purview of the National eHealth Steering Committee will oversee the adherence of data systems to the standards and integrations set out in the enterprise architecture.

1.2 Scope

This document presents a Request for Architecture Work for the Tanzania Health Enterprise Architecture (TZHEA). The long-term scope of the TZHEA is intended to be all data systems efforts in Tanzania's health sector. TZHEA's duty is to help manage the fundamental organization of the information technology embodied in its components, their relationships to each other and to the environment, and the principles guiding its design and evolution. Within this broad statement, TZHEA scope can be broken down into the following major functions:

- Provide and communicate a technology road map to all interested parties.
- Recommend implementation strategies for specific technologies and products.
- Function as a conduit to move data systems related information between systems and stakeholders

1.3 Document Purpose

A Request for Architecture work describes the business imperatives behind the architecture work, thus driving the requirements and performance metrics for the architecture work. This should be sufficiently clear so that initial work may be undertaken to scope the business outcomes and resource requirements, and define the outline information requirements and associated strategies of the architecture work to be done.

This document that will be handed over to the Enterprise Architecture Team to trigger the start of an architecture development cycle.

2 Request for Architecture Work

2.1 Summary of Request

This document will be a living document which will be updated over the time of development of the Tanzania Health Enterprise Architecture (TZHEA). It will provide an overview of the TZHEA.

2.2 Organization Sponsors

Tanzania Health Enterprise Architecture work is sponsored by:

Permanent Secretary for Health	Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC)
Permanent Secretary	Ministry of Finance and Planning (MoFP)
Permanent Secretary for Communication	Ministry of Works, Transport and Communication (MWTC)
Deputy Permanent Secretary for Health	President's Office Regional Administration and Local Government (PO-RALG)
Chief Executive Officer	eGovernment Agency (eGA)

3 Business Context

3.1 Health Sector Mission Statement

Tanzania health sector mission is *“Committed to facilitate the provision of basic health services that are of good quality, equitable, accessible, affordable, and sustainable and gender sensitive”*.

3.2 Vision Statement

The vision of the health sector is *“to have a healthy society with improved social wellbeing that will contribute effectively to individual and national development.”*

3.3 Health Sector Goals and strategic Plan

National Health Policy (2007) and Health Sector Strategic Plan (HSSP) IV (2015-2020) are the main guiding principle and strategy for the health sector in Tanzania. As Tanzania strives to reach middle income status, the health sector has resolved to give more attention to the quality of health services in tandem with the pursuit of universal access. The overall objective of HSSP IV is to reach all households with essential health and social welfare services, meeting, as much as possible, the expectations of the population, adhering to objective quality standards, and applying evidence-informed interventions through efficient channels of service delivery.

The country has made impressive gains in reducing under-five and infant mortality, through declines in morbidity and mortality from malaria and other childhood diseases. HIV prevalence has also fallen. Some decline in Maternal Mortality has been noted but this was not fast enough to reach the Millennium Development Goal (MDG) targets; Neonatal mortality has also gone down but less than planned.

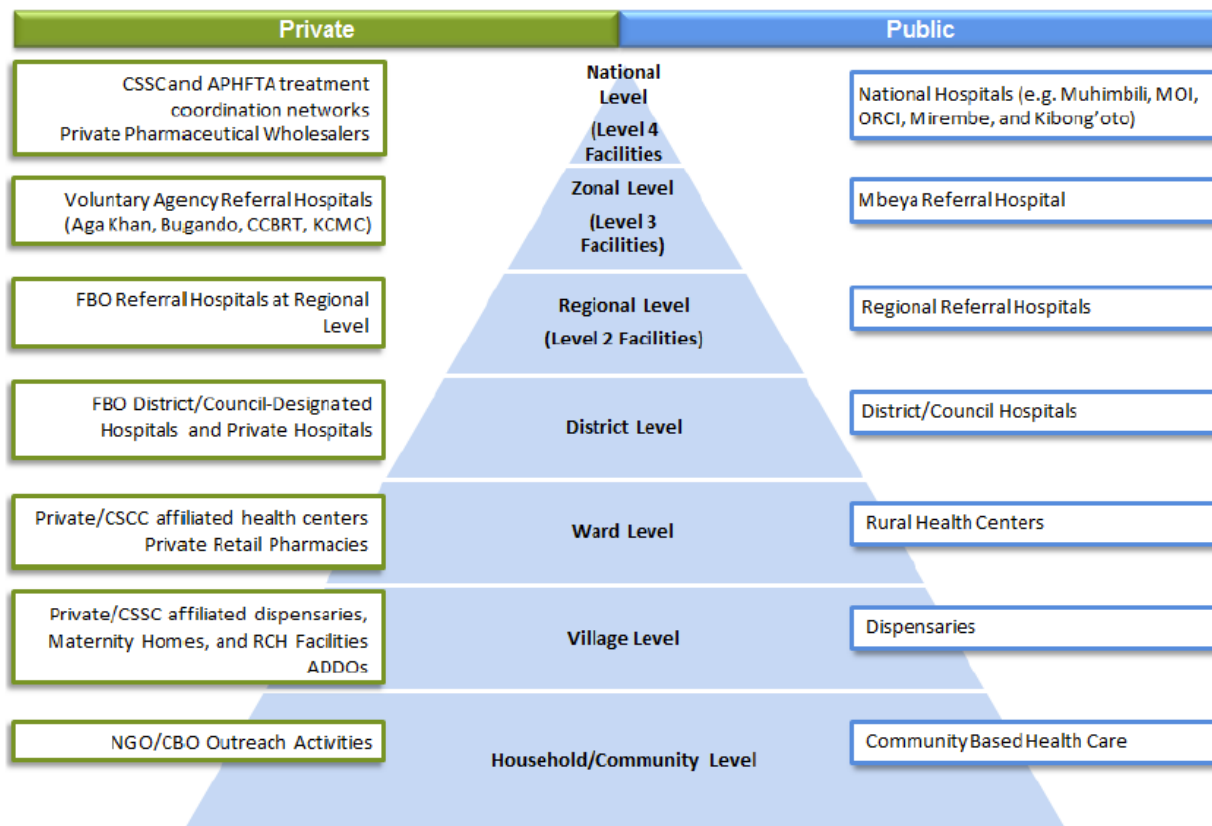
Integrated delivery of a reviewed package of essential healthcare interventions, strengthened Comprehensive Council Health Planning decentralized to the facility level, better management of health facilities at all levels, and health system strengthening in aspects such as Integrated Logistics System, Human Resource, and District Health Information Systems are key features to achieve harmonization and a coordinated approach.

Under National Health Policy, the MOHCDGEC has developed HSSP IV which outlines strategies focused on particular service areas, including strategies on Reproductive, Maternal, Neonatal, Child, and Adolescent Health (RMNCAH) and its various sub-components, malaria, HIV/AIDS, tuberculosis and leprosy, eye care, non-communicable diseases and neglected tropical diseases and health promotion. The MOHCDGEC has also developed strategies focusing on particular levels of the sector such as the Community Based Care Program and the Primary Health Services Development Program Strategy. In addition, the Ministry has developed strategies focused on particular health systems building blocks, including human resources for health, pharmaceutical sector, health financing, health management information system, health commodity supply chain, and health monitoring and evaluation.

The enterprise architecture work is expected to focus on enabling the achievement of the objectives described in these strategies.

3.4 Overview of Tanzania health sector

Health and social welfare services are provided from the grassroots level up through higher levels of care, beginning with community health care, dispensaries and health centers, and proceeding through first level hospitals, regional referral hospitals and zonal and national hospitals, all providing increasingly sophisticated and well-defined services.



Tanzania has decentralized most Government functions through Decentralization by Devolution (D-by-D). The President's Office Regional Administration and Local Government (PORALG) is responsible for the management and administration of public services at Regional and Council level. At the local level the Local Government Authorities (LGAs) are responsible for planning, delivering and overseeing public services. The Council Health Management Teams (CHMTs) manage health care and social welfare services at the Council level.

The Ministry of Health, Community Development, Gender, Elderly and Children (MOHCDGEC) has the overall responsibility over the health and social welfare services and defines priorities for services in the health and social welfare sector. The MOHCDGEC provides technical guidance to organisations involved in service delivery and defines, controls and promotes maintenance of quality standards. The MOHCDGEC mobilizes resources and has the lead in policy and international relations in health and social welfare. The MOHCDGEC delegates some stewardship functions to PO-RALG and other statutory health agencies, e.g., Medical Stores Department, Tanzania Food and Drug Authority, etc.

The President's Office, Public Service Management and Good Governance (PO-PSMGG) assists in matters of human resources management pertaining to Public Service across the entire government system.

3.5 Business Principles

Partnership: The health sector operates according to the principle of partnership under a Sector Wide Approach (SWAp) involving the MOHCDGEC, other Ministries especially PO-RALG, national non-governmental and private partners and the international Development Partners (DPs).

Equity of access: The health sector aims to ensure equitable access to quality health services across household income, gender and rural/urban dimensions.

Value-for-money and efficiency: The health sector aims to ensure that the impact of health sector investments and expenditure is maximized in terms of improved health of Tanzanians.

Social accountability: The health sector aims to provide services in an inclusive, client-focused way which involves and is accountable to the community.

3.6 Purpose of architecture work

The Tanzania eHealth Strategy 2013-2018 states *“To understand more completely and plan a way forward, the Ministry and health sector stakeholders agreed to adopt enterprise architecture (EA) as the framework to guide the development of an integrated national health information system”*. The enterprise architecture is expected to provide a blueprint with the aim of identifying and describing different components of the national health information system, their relationships and how information can be shared between them.

Tanzania’s Digital Health Investment Roadmap mentions the lack of enterprise architecture that outlines how different health information system components communicate and link with each other. It states that without enterprise architecture, standards, and strong governance structures, leaders in the health sector struggle with disparate data systems and digital health projects that collect data in slightly different ways, making it difficult to share and use data. The Investment Roadmap recommends to *“Put in place an enterprise architecture, including governance, guidelines, and standards for interoperability”* which should include a “National eHealth standards framework”.

The health sector in Tanzania is a highly complex network of inter-dependent institutions and systems. The purpose of enterprise architecture work will be:

- To streamline business processes, including those which operate across different institutions to improve efficiency and effectiveness in achieving health sector goals.
- To develop standards that will enable better information sharing and exchange across and within health sector institutions, ensuring the right people have the right information at the right times to inform their work, while accounting for client privacy and confidentiality rights. This is expected to result in better-informed actions decision making.
- To enable information and communications technology (ICT) within the health sector to better support health sector business processes and use of information and data.

3.7 Success criteria

In the short term, this enterprise architecture work is expected to result in:

- Well defined and documented health sector business processes, including recommendations for improvements to those business processes

- Clear mapping of information flows and accessibility within the health sector, including recommendations for how information flows can be improved
- Mapping of electronic information systems used in the health sector and recommendations for how they can better support business processes and information flows and access, through improvements to the systems, integration between systems, and system convergence where appropriate.
- Development of future “to-be” business processes, information flows and technology, including roadmap for moving from “as-is” to “to-be” and success indicators
- Publication of standards, guidelines and governance structures for implementation of “to-be” architecture

The long-term success of this work will comprise implementation of the recommendations, standards and roadmap developed, resulting in more efficient and high quality health services.

3.8 Timescale

Tanzania Health Enterprise Architecture (TZHEA) is expected to be launched by August 2019. Implementation of components of the proposed enterprise architecture can begin as they become available, before August 2019. After August 2019, it is envisioned to have a structured implementation of what is being articulated in TZHEA roadmap under defined governance structures, in order to fully implement, govern and realize the TZHEA.

4 Enterprise Architecture Work

4.1 Enterprise Architecture Vision

The vision of TZHEA is

“To simplify the complexity of Tanzania’s health information system and accelerate the application of innovative interoperable technologies to improve the performance, efficiency and effectiveness of the health system by ensuring the right data is available at the right time to the right person for evidence based decision making”.

4.2 Problem Description

In the recent review of available data systems identified more than 120 distinct health or health related data systems. The MOHCDGEC and its partners identified some key concerns of the health sector about constraints to system interoperability and the exchange of data, which causes inefficient business processes, inconsistencies and burdensome and redundant data management. The following are the challenges that Tanzania health system face when it comes to data systems:

- A fragmented landscape of data systems
- Numerous data and health information systems (HIS) silos
- Duplication of efforts across health sector amidst scanty and un-optimally utilized resources
- Lack of ability to exchange data due to lack of standardization and adoption of open standards
- Lack of common, structured and accessible standards for health terminology such as diagnosis and drugs
- Inability to effectively put in place measures of enforcing national and international laws/regulations on health information management

Enterprise architecture will help to address this concern by identifying interoperability use cases, setting data standards and designing governance structures to ensure they are implemented.

The Enterprise architecture should build on the existing work, such as the work done by eGA to establish the standards of system interoperability across the government. The Tanzania Health Enterprise Architecture will build on this in a way that is specific to the health sector and encompasses both government and non-government health sector service providers.

4.3 Detailed Objectives

The Objective of Enterprise Architecture is to optimize business processes (both manual and automated) across the enterprise into an integrated environment that is responsive to change and supportive of the delivery of the Health Sector Strategic Plan. The Enterprise Architecture work will identify how business processes, particularly those which operate across different institutions, can be improved and better supported by digital systems.

The enterprise architecture will address how the systems within health sector can be made more interoperable, propose standards controlling the way data are exchanged across health sector, and including guidelines and proposed governance structures to ensure implementation.

It will establish interoperability requirements across the health sector and standards for data exchange among the systems in the sector. This will reduce the duplication of effort and inconsistencies and inaccuracies in data for decision making. Enterprise architecture will define use cases for how foundational systems, such as the health facility registry, will interact with other systems.

Enterprise architecture work will define how gaps in governance structures can be filled to facilitate interoperability and monitor compliance in the implementation of the to-be architecture. Governance structures will be monitoring the enterprise architecture roadmap implementation and ensuring new initiative follow the enterprise architecture blue print.

4.4 Enterprise Architecture Drivers

The following are the key drivers that drove the health sector to use enterprise architecture approach to benchmark all decisions.

- **Eliminate duplication of efforts:** Eliminate duplication of effort and functionality, using a unified framework for developing and documenting digital solutions that address mission-specific requirements and adhere to government standards and reporting needs
- **Common frame of reference:** Provide a common frame of reference that the government can use to contract service providers or steer the development of digital health solutions in a cohesive manner
- **Cost savings:** Increased cost savings and redirecting resources to sustainability of integrated digital health initiatives.
- **Need for increased business and IT alignment:** The Enterprise architecture will increase the alignment of the health sector as IT investments will be better aligned to ensure the mission, vision, goals and objectives of the health sector in Tanzania are met.
- **Provide holistic vision:** Provide a holistic vision of the relationship between health sector business operations and digital health investments for enabling integrated e-health services and evidence based decision making in health sector
- **Existence of the siloed systems:** There are many instances of more than one application providing the same functionality and not exchanging data. The TZHEA will identify the case for integration of systems and interoperability use cases and set a road map for its implementation together with the governance, to ensure implementation as per agreed standards.

4.5 Enterprise Architecture Principles

This section describe principles to which the Enterprise architecture will adhere. Architecture principles have been divided into the four domains of the Enterprise Architecture: Business, Application, Data and Technology.

4.5.1 Business Architecture Principles

Name	Primacy of Principles
Principle Reference	TZHEA-P01
Statement	These principles apply to all Health sector
	Rationale
	To ensure adequate and consistent information to decision makers and the realization of the business goals and purpose

Implications

- The principles are followed in order not to undermine a joint management of information
- Initiatives will not begin until they are examined for compliance with the principles
- A conflict with a principle is addressed by exception management or by changing the approach of the initiative
- Principles are amended only in accordance with the prevailing decision making process

Name Align to Health sector

Principle Reference TZHEA-P02

Statement Information management decisions are always made under the business alignment perspective in order to generate maximum benefits of the Health sector.

Rationale

- This principle means "service above all."
- Decisions based on the Health sector perspective have greater long-term value than decisions based on a certain perspective of a group with a specific interest.

Implications

- Information management initiatives must be conducted based on Health sector strategy. Individual areas must follow information management initiatives in accordance with strategy and priorities. Planning is modified whenever necessary.
- As new needs arise, priorities must be adjusted proportionally.

Name Maximum benefits at the lowest costs and risks

Principle Reference TZHEA-P03

Statement Strategic decisions for solutions must always strive to maximize benefits generated for the Health service at the lowest long-term risks and costs.

Rationale

Decisions must not be made based solely on reaching lower solution costs. Every strategic decision must be assessed based on cost, risk, and benefit perspectives. Lower costs often represent greater risks and, perhaps, fewer benefits.

Implications

- A solution must be selected based on a qualitative or quantitative cost, risk, and benefit assessment
- IT infrastructure must also be optimized based on business requirements and technological capacity to generate lower costs and risks, thus benefiting the focus of the Health service

Name: Business continuity

Principle Reference TZHEA-P04

Statement Health Services must be maintained, despite system interruptions.

Rationale

As system operations become more inherent, we become more dependent of them. Therefore, we must consider the reliability of such systems throughout their entire conception and application. Health services must be able to continue conducting their normal activities, regardless of external events. Hardware failures, natural disasters, and lack of data integrity must not interrupt Health services.

Implications

- Dependence on shared applications implies that business interruption risks must be expected and managed in advance. Management includes, but is not limited to, periodic revisions, vulnerability and exposure tests, or designing mission-critical services to ensure continuity through redundancies or alternative resources.
- Recoverability, redundancy, and maintenance must be approached at inception.
- Applications must be assessed regarding criticality and impact on the Health service to determine which continuity level is required and which corresponding recovery plan must be implemented

4.5.2 Application Architecture Principles

Name Usability

Principle Reference TZHEA-P05

Statement Applications are adapted to specific group of users, and should result in good user experiences efficiency and expected results

Rationale

The purpose is to promote the use of the applications. Patient-near application will and should not necessarily be similar to an application at your desk, or application used in the meeting room. The usability of IT-supported processes will depend on the technical user environment and the user's ability to use the application in the given context.

Implications

Increased requirements for standardization of infrastructure and equipment in accordance with the requirement of the Health, safety and environment

Implications

- Interoperability and industry standards must be followed unless there is a mandatory business reason to implement a non-standard solution.
- A process to establish standards, periodic revision, and exceptions must be established.
- Current IT platforms must be identified and documented

4.5.3 Data Architecture Principles

Name Information is an asset

Principle Reference TZHEA-P06

Statement Information is a valuable asset and is managed accordingly

Rationale

The purpose of information is to provide decision support. Correct information at right time and place is critical to make the right decision

Implications

- Information are managed according to internal and external requirement
- The data controller and data processor are responsible for documenting measures or health information management regarding confidentiality, integrity, quality and availability

Name Information is accessible and shared

Principle Reference TZHEA-P07

Statement User have access to necessary information according to professional need, responsibility and authority

Rationale

Access to the correct information at the right time and place is critical for quality and efficiency of decision making in relation to both patient care and management

Implications

- Compliance to a common set of policies procedures and standard governing information management
- All relevant stakeholders participate in decisions on information management necessary to realize Health service goals
- Shared environment for information is defined by standard and data models, elements and other meta-data
- Meta data are stored and made available from a common repository
- Common policies are adhered to when phasing out old system in order to sustain access to necessary information
- Common data models for Health sector are used to ensure the consistency of data
- This principle may in some cases be contrary to the information security requirements, but should under no circumstances lead to unintended disclosure of confidential information

Name Common terminology and data definitions

Principle Reference TZHEA-P08

Statement Data is defined coherently throughout the health sector, and definitions are comprehensible and accessible by all users.

Rationale

The data employed in the development of applications must have a common definition so that the data can be shared. A common terminology facilitates communication and promotes efficient dialogs. Additionally, data and interfaces must be shared among different systems.

Implications

- Health sector must first establish a common terminology for business activities. Such definitions must be uniformly used throughout the sector
- Whenever a new data definition is required, efforts regarding such definition must be coordinated and reconciled with the health sector data description "glossary."
- Ambiguities arising from multiple data definitions must be replaced by a definition that is accepted and understood by the entire sector.

Name Information security

Principle Reference TZHEA-P09

Statement Information sharing and disclosure are made in accordance with relevant legislation and internal policies

Rationale

Protect Information from unauthorized access, use or disclosure

Implications

- Control adherence to the code of conduct for information security in order to prevent unauthenticated and authorized access to sensitive information
- Aggregation or comparison of data may require increased classification
- Public policies and procedure for managing data may require increase classification
- Public policies and procedures for managing data classification are followed
- Access to information based on a policy of professional need requires regular audits
- In order to adequately provide access to open information while maintaining secure information, security needs must be identified and developed at the data level, not the application level
- Security must be designed into data elements from the beginning, it cannot be added later
- System, data and technologies are protected from unauthorized access and manipulation

4.5.4 Technology Architecture Principles

Name Interoperability

Principle Reference TZHEA-P10

Statement Software and hardware must follow established standards that promote data, application, and technology interoperability.

Rationale

- Standards help ensure coherence, thus improving the ability to manage systems, raise user satisfaction, and protect current IT investments, thus maximizing return on investment and reducing costs.
- Interoperability standards also help ensure support from several suppliers to their respective products, thus facilitating integration.

4.6 Benefits of EA Work

There are many benefits expected from the development of the Health Enterprise Architecture. The realization of the benefits of development of Enterprise architecture requires the implementation of the blue print and ensuring the governance board is monitoring the implementation, thereby ensuring IT projects conform to the to-be Enterprise architecture. Below are some of the expected benefits for the EA;

4.6.1 Process Improvement

The re-architecting of business processes will result in better alignment with priorities of the health sector strategic plan. This will result in better efficiency and quality of health sector services.

4.6.2 Cost reduction and standardization

Implementation of target architecture will ensure it improves the quality of the health services provided and results in cost savings over time, though the initial cost of implementation of Enterprise Architecture may be costly. With standards in place the cost of integration of systems will be lowered by reducing additional work for data definitions.

4.6.3 Achieving Strategic plans

The Enterprise Architecture will identify capability that will ensure realization of the vision of the health sector. The alignment of the business with the IT will ensure investments are made to support the vision of the health sector. The development of the EA will ensure alignment to principles outlined in the National Health Policy, strategies like HSSP IV and eHealth strategies.

4.7 Enterprise Architecture Governance

4.7.1 EA Governance

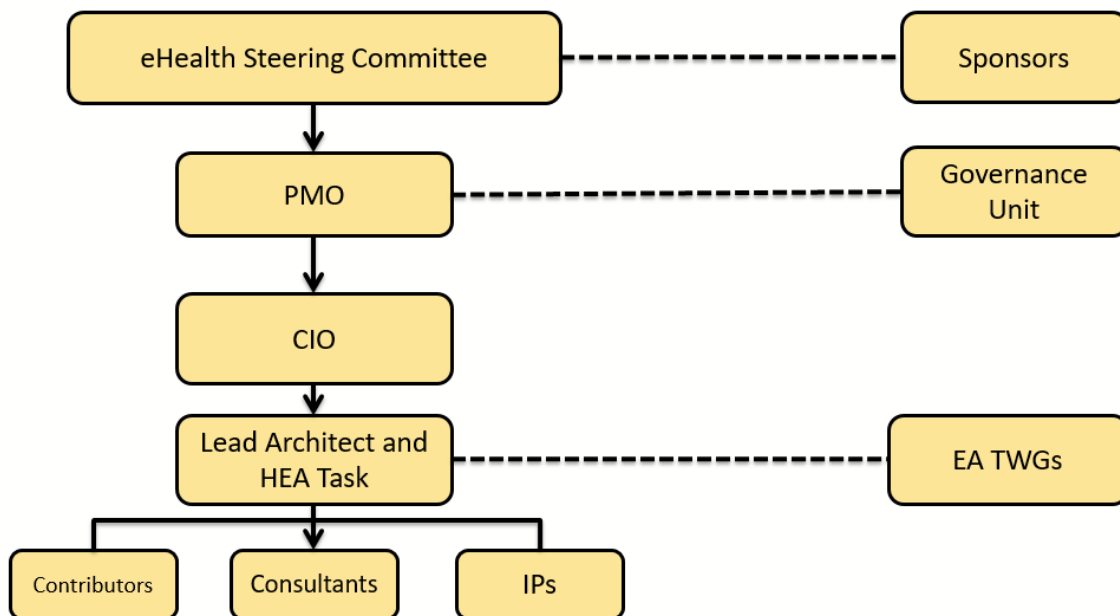


Figure1: EA Governance Structure

4.7.2 TZHEA Team

The TZHEA team will comprise of Lead Architect and the other architects who form the HEA Task team, each domain has been assign with one Architect to lead the development of the specific domain. Below is the responsibility of the Lead Architects and Architects.

Lead Architects

- Provide the link between the architecture team and the business.
- Ensure all IT investments are in alignment with the business.
- Deal with internal and external stakeholders needs and concerns.
- Identify, monitor and manage risks within recognized constraints
- Communicate the enterprise architecture objectives in terms of how they relate to business objectives
- Revise the prioritization and roadmap sequencing required to achieve the desired future state architecture
- Provide pro-active governance in terms of design principles, standards, products and configurations
- Measure and report on compliance to enterprise architecture governance
- Assess progress towards achieving the future state enterprise architecture
- Continually improve the enterprise architecture process
- Ensures project activities are performed on schedule and within budget constraints
- Ensures that established program and project standards and practices are met; ensures quality of end products
- Presents, justifies and communicates to all stakeholders in business and IT

TZHEA Architects

- Work with the consultant to ensure requirements are incorporated and all necessary approvals are obtained from relevant governance structure
- Supervise the work of the Consultant: monitor the work of consultant and provide the required support.
- Support Consultant in development of the Requirements of Architecture
- Act as an EA ambassadors
- Ensure a unified approach in the development of Enterprise Architecture
- Facilitate the Technology, Application, Data, and Security enterprise architecture processes
- Participate in EA surveys to recommend approval or denial of information technology standards, best practices and guidelines
- Communicate enterprise architecture standards to all interested parties
- Analyzes and documents business processes, scenarios, and information flow
- Ensures strategic business goals are documented
- Analyzes and documents business information (logical and physical) and associated relationships
- Recommends data architecture improvements based on information use and requirements
- Ensures data standards are adhered to.
- Definition and communication of the Enterprise Architecture blueprint (including Principles, Standards, Reference Architecture Models, Patterns, Guidelines etc.).

- Facilitating Architecture Decisions on Topics and Gaps.

5 TZHEA Framework

This section provide the methodology which will used to develop Tanzania Enterprise Architecture. It also describe the deliverable which will be produce across each phase of the EA development. TZHEA will be developed using the tailored TOGAF framework. TZHEA framework will follow the ADM cycle to develop and produce all the deliverable described in the deliverable framework. Figure 2 shows all deliverable which are expected to be developed in the TZHEA.

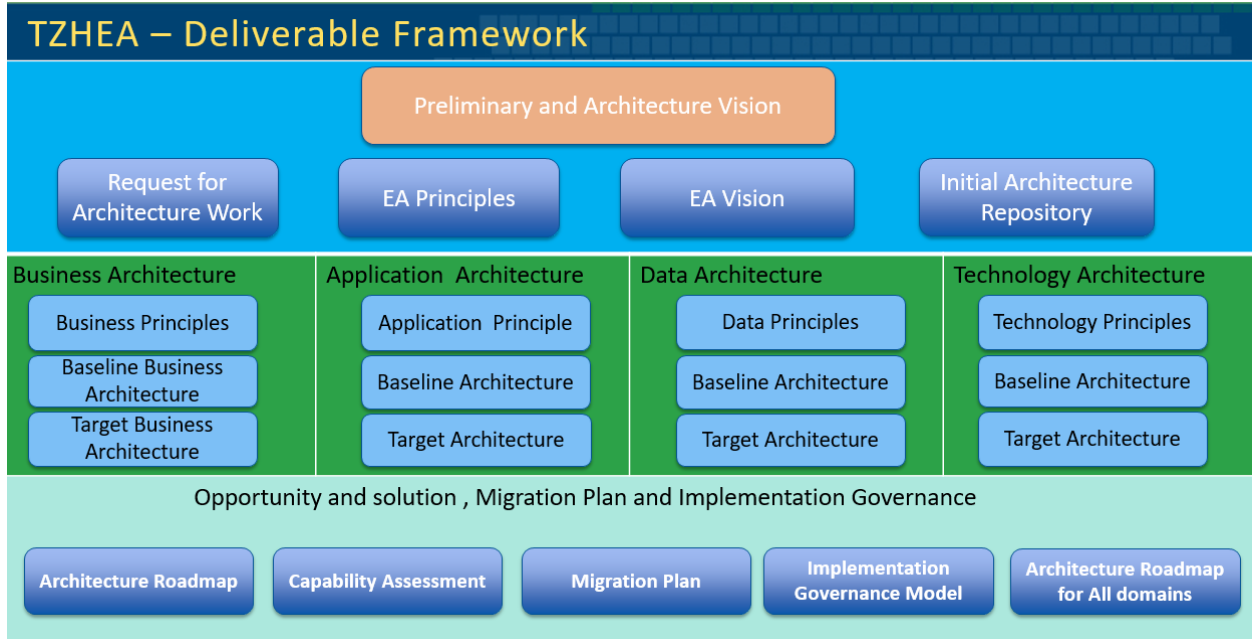


Figure 2: TZHEA Deliverable Framework

6 Risks and Key Constraints

Development of Tanzania Health Enterprise Architecture TZHEA to realize Tanzania digital health vision is a continuous endeavor which requires high level of commitment from Government, partners and other stakeholders. Since architecture benefits will be realized after it has been developed and implemented then it is crucial to ensure we identify and monitor potential risks and constraints associated during development and implementation of the Health enterprise architecture.

6.1 Potential Risks and mitigation

Development of TZHEA is a large project which requires a lot of resources and high level of commitment, this makes the project face several risks. This sub-section is dedicated to uncovering potential risks and their mitigation strategies. The taskforce team will be monitoring risks and applying mitigation strategies where necessary to ensure successful development and implementation of TZHEA.

The following Table lists the risks, probability, impacts and mitigation strategies to be implemented.

SN	Risk	Mitigation strategy
1.	<p>Project size:</p> <p>Project size refers to the number of stakeholders to be involved in the design and development, the number of eventual stakeholders affected by the Health Enterprise Architecture plan, projects to be implemented, and the extent of reach through the organization hierarchy. Currently there are main three stakeholders involved in the design and development namely; MoHCDGEC, PO-RALG, and PATH. Other stakeholders include PO-PSM, MoWTC, eGA, NIDA, NBS, DPs and citizens, etc.</p> <p>Probability: High</p> <p>Impact: High</p> <ul style="list-style-type: none"> • Delay in gathering and agree on Architectural plan and requirements • High development cost due to high overhead caused by high number of stakeholders. 	<p>Early planning and engagement of key stakeholders from the beginning to gather their concerns and requirements</p> <p>Clear definition of scope and vision</p>
2.	<p>Complexity nature of TZHEA:</p> <p>TZHEA development is a complex project in Tanzania which has never been done before. Most countries who have tried to implement Health Enterprise Architecture have failed due to its complexity.</p> <p>Probability: High</p> <p>Impact: High</p> <ul style="list-style-type: none"> • Failure to address Health issues • Misuse of financial resources 	<p>Contract to a reputable organization preferably international organization or consortium which includes excellent skills and proven experience in successful development and implementation of Health Enterprise Architecture.</p>
3.	<p>Inadequate expertise in Enterprise Architecture development:</p>	<p>Use of consulting group and extensive procurement screening process to ensure</p>

	<p>Development and Implementation of Health Enterprise plan requires and relies on the existence skills and expertise within Health sector which are very few.</p> <p>Probability: Medium</p> <p>Impact: Medium</p> <ul style="list-style-type: none"> • Failure to address Health issues 	<p>qualified and skilled organization is selected to undertake the assignment.</p>
4.	<p>Inadequate User/Stakeholder Buy-In:</p> <p>Low stakeholder buy-in may result into low engagement during development and implementation processes.</p> <p>Probability: Medium</p> <p>Impact: High</p> <ul style="list-style-type: none"> • Architecture may not address health concerns • Delay the development of the Architecture • Lack of adherence and advocacy of the architecture once is completed 	<p>Early engagement of users/stakeholders to ensure buy in, shared vision and commitment</p> <p>Ensure the benefit of the TZHEA is known to all stakeholders</p>
5.	<p>Architecture development contractual risk:</p> <p>This a secondary risk which is a result of consulting development of Health Enterprise Architecture</p> <p>Probability: High</p> <p>Impact: High</p> <ul style="list-style-type: none"> • High development cost • Delay in delivery • Difficult to maintain the Architecture over time 	<p>Close supervision and follow-ups to be done to the vendor who will develop the architecture</p> <p>Ensure Health Enterprise taskforce team are engaged fully in the development of the TZHEA.</p>

6.2 Organizational Constraints

The health sector in Tanzania is categorized into three main domains namely social services, health research and health services. Tanzania Health Enterprise architecture development is expected to start with health services followed by the remaining domains. Health Services will initially cover six major building blocks namely governance and leadership, Information Systems, Service delivery, Logistic and supply chain, Health financing and Human resources.

6.3 External and Business Constraints

Financial constraints

There is financial support to develop TZHEA through BMGF funds, however implementation and maintenance of the TZHEA may require additional financial resources beyond what the BMGF funds can support. This can be a constraint in achieving the target architecture, because target architecture can be reached by implementing project and solutions identified by the architecture plan.

Time constraint

Development of TZHEA is planned to be completed by August 2019, however due to its complex nature, the allocated time may not be enough to create a shared vision and necessary buy-in required to successfully implement the TZHEA.

Country maturity level in the enterprise architecture.

Successful implementation of TZHEA depends very much on the maturity level of the country as whole on enterprise architecture. It will be beneficial to build on some of the Government Enterprise architecture standards in the development of health enterprise architecture. This can delay or hinder development of TZHEA due to the inadequacy of Tanzania standards.

6.4 Human Resource Constraints

Health Enterprise Architecture Taskforce team will lead the development and shall work closely with the consultant to develop and implement health enterprise architecture. HEA Taskforce team is composed by government officers who have other assignments which can lead into competing priorities. This is a major human resource constraint to the project and sustainability of the TZHEA.

6.5 Assumptions

Successful development and delivery of Tanzania Health Enterprise Architecture is based on the following assumptions

- Continuous availability of funds to support development of TZHEA from the preliminary phase.
- Support from all stakeholders of the architecture during development and implementation of the architecture.
- Strong leadership and technical expertise to manage and guide development of the TZHEA.