Audit of TVET Infrastructure project and establishment of a TVET Infrastructure Management Information System in South Africa

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Contents

Executive Summary

DHET with EU support is conducting audit of TVET Infrastructure and developing TVET Infrastructure Management Information System (IMIS).   The initial process was to conduct environmental assessment.   This involved looking on the available information systems performing within government domain, which are for similar activities and are compliance with National Immovable Assets Maintenance Management Standard (NIAMMS) and National Infrastructure Management Strategy (NIMS), Government Immovable Assets Management Act (GIAMA), and Generally Recognised Accounting Practice (GRAP17) – Property Plant and Equipment. The assessment also covered available IT infrastructure that can be used to host and disseminate data from TVET IMIS to different stakeholders. Furthermore, it involved looking on the available human resource and their capacity.

The process started with a meeting with the director of TVET infrastructure development programme. He presented DHET expectations and the scope of TVET IMIS. The scope of TVET IMIS is expected to capture data from TVET colleges' central offices where the infrastructure are managed. IMIS will also provide access to DHET (especially reports view) for the purpose of Monitoring and evaluation. The regional offices will also have access for reporting purposes.

The main activities that have to be done during the implementation of this project are audit/ data collection, development/customization of infrastructure management information system (IMIS), and sustainability/ human capacity – training. In relation to data collection, the environmental analysis has revealed the need to use three different approaches. One is the current TVET assets register which is up to date and audited by the Accountant General. In case of gaps from the first approach, the assets data collected in 2005 will be used (this is the second approach). Where the first and second approaches do not close the gaps, the third option is to collect data from TVET central offices and from campuses. The data collection provider will work with the IMIS provider to ensure data alignment.   This approach will allow the data collection provider to use tools such as software from IMIS provider and data will be submitted to the database right away. This will limit data recollection as the IMIS and data collection provider will harmonize data requirements before the data collection.   The data collection team from DHET and from TVET will be appointed to work with data collection provider for skills transfer. This will be done after this team has been trained on infrastructure management.

The assessment has revealed the existence of similar infrastructure management that are ongoing in other governments departments. This finding provides an opportunity of transverse tender process which helps to save time and money.   For example, Archibus Solution Centres is currently implementing a project of asset register, asset management, and other modules for National Department Public Works which implementing National Infrastructure Maintenance Strategy (NIMS). During the assessment, consultation was done with DPW about available resources for their current infrastructure management project. They informed that the following resources are available; software licence, data centre, reliable networks infrastructure for data dissemination, technical support team, data collection team, training teams. DPW have shown willingness to share

available resources in design and development of TVET infrastructure management project. This approach if implemented will cut cost and time for the design and implementation of TVET IMIS, data collection and training. On the hand, sharing available resources within government will maximization utilization of government resources and therefore achieve value for money.

The Assessment covered different management information systems such as PREMIS which is developed by Build Environment Department at CSIR, MIPMIS which used by MISA in different municipals within South Africa, Archibus which is used by National DPW. The environmental assessment also covered management information systems such ITS, Pastel Accounting, Pastel Evolution, BAUD, and COLTECH which are used at two visited TVET colleges.

Sustainability is another important component for TVET Infrastructure management project. This component is divided into two. One is training of IMIS application which will be done by the provider. The other component of sustainability is training TVET college personnel on infrastructure management skills. This will be done by the provider. Other sustainability issue is the development of and installation of four environments of IMIS (Development, Testing, Training, and production). In case DPW will have these environments and there will be sharing agreement, it is recommended to use them for TVET IMIS design and implementation.

Different project committees will be appointment by DHET to ensure effective supervision and change management. The project steering committee is already in palace. There will be project management team which will be comprised of project manager, DHET, DPW, appointed TVET principals, and TA. Various technical team are also needed for TVET project; Infrastructure management technical team (DHET, DPW, TVET Colleges), and IMIS technical team (DHET, DPW, TVET, and TA). These teams will discuss technical issues which will arise from design and implementation to advice the project management team.

Based on this assessment which looked on performance, system structure, support availability, and cost of the available systems, it is recommended to use one of the government's existing IMIS in othe departments to implement TVET IMIS. This will require communication between DHET DG's office and the respective department DG's office about the sharing resources that are already available within the Government for TVET infrastructure project. The ToR for TVET IMIS will be developed to be compared with the ToR for existing IMIS. Another ToR will be developed for audit/data collection from TVET colleges which will be compared with existing similar projects in organizations such as CSIR and DPW. The third ToR will be developed for training TVET colleges' personnel on infrastructure management and will be compared with existing projects such as CSIR, MISA, and DPW. The purpose of these ToRs is to review the ongoing infrastructure projects and determine the possibility of transverse tender procedure. The discussion of sharing available resources needs to cover all modules, but it is recommended to start TVET IMIS design and implementation with two modules (asset register and asset management).

The original DHET business plan recommended using shareware/freeware used in other government departments to implement TVET IMIS. This approach requires in-house competent personnel who can be retained. The assessment has shown that this competency is currently not available at DHET. Sustainability of shareware/freeware depends much on the availability of the developer and the source code. On the other hand, the sustainability of Commercial off the Shelf (COTS) Software depends on the availability of the company and maintenance contract. These are among the reasons

we recommend using the existing similar projects in the design and implementation of TVET IMIS and not necessary the shareware/freeware.   The proposed approach will produce more results and will be compliance with national mandate of a single asset register for the state (NIMS compliance)

Background

Department of Higher Education and Training (DHET) was established in 2009 as a result of a Presidential Proclamation, to take oversight of all post-school institutions, including Technical and Vocational Education and Training (TVET) Colleges.

The TVET College sector has a historical institutional record of under-funding of physical infrastructure maintenance and a lack of life cycle planning. This is compromising current efforts to expand access and improve teaching and learning.

At the systemic level the TVET College Sector has not had a planned expansion programme since the Recapitalisation Programme which ended in 2008. Since then, most work of a capital nature at college level has largely focused on refurbishing buildings or constructing a few extra buildings on existing campuses. These are at present not being coordinated or managed from the Department.

Effective asset management requires appropriate planning within a structured framework, underpinned by a comprehensive need for up to date information on built environment services and their condition.

With the shift of the TVET College Sector from a provincial to a national competency under the auspices of the Department of Higher Education and Training, it is now critical that the physical assets of the sector be audited and brought into a single management framework.

 The need for a central planning, assessment and charge of the infrastructure database is critical to keeping the TVET colleges' infrastructure in a functional condition over their life cycles, to deliver modern teaching and learning in quality infrastructure and driving up utilisation efficiencies.

Overview of the Environmental Assessment

The environment assessment involved identifying ongoing projects related infrastructure management within the government departments, identifying management Information Systems (MIS) available at TVET colleges, asset register at TVET colleges, human resource and competency at DHET and at TVET colleges, networks availability and reliability at DHET and TVET (time allowed to visit only two TVET colleges). The assessment also involved discussion with government departments that are currently running similar projects to understand how infrastructure management project were implemented.   Furthermore, we discussed with various providers about their systems and their current projects. During this assessment, indicative costs for implementation of TVET IMIS were requested from requested key role-players.   This environment assessment was conducted by the TA and supported by the project manager.

Available documents for the project
1. Project Business Plan
2. National Immovable Asset Maintenance Management Standards (NIAMMS)
3. National Immovable Asset Maintenance Management – Competency Framework

4. National Immovable Asset Maintenance Management Monitoring and Evaluation Protocol
5. National Immovable Asset Management Maintenance – Planning Guidelines
6. National Infrastructure Maintenance Strategy (NIMS),
7. National Immovable Assets Maintenance Management Standard (NIAMMS,
8. Government Immovable Assets Management Act (GIAMA), and
9. Generally Recognised Accounting Practice (GRAP17) – Property Plant and Equipment
10. Other relevant GRAP policies

The above documents are very important as new documents that will be developed for this project will be aligned with the above documents to ensure conformity with required standards. The documents are also good enough be used in the quality audit of IMIS. For Example, the NIAMMS defines asset management as "the process of decision-making, planning and control over the acquisition, use, safeguarding and disposal of assets to maximise their service delivery potential and benefits, and to minimize their related risks and costs over their entire life." The design of asset management module in TVET IMIS will be guided by this definition.

Required Project Documents
The following project documents are yet to be developed to ensure effective implementation of TVET infrastructure management project.

1. A Business Process Analysis, supposed to capture the workflows of the infrastructure management at TVET. It is recommended to be developed by the provider to approved by DHET
2. A Functional Requirement Document (FRD), supposed to capture what a system shall do at each level of workflow, what reports shall the system produce, what approvals shall be set in the system, data life cycle. It is also recommended to be developed by EU technical support and approved by DHET.
3. Project Charter, this document defines the authority of the project manager, steering committee, project management team, it also state responsibilities of different teams and committees, communication plan and change management. The project manager and the TA will review project charter documents used in similar projects within government and develop TVET IMIS project charter.

Project Objectives
The objective of this project is to establish a basic sustainable single centralized/coordinated TVET infrastructure database which will serve as an infrastructure Management Information System. This in turn will support an infrastructure planning framework with regards to the funding, maintenance and expansion of physical infrastructure.

Anticipated Project Outcomes
The business plan described the need for a sustainable TVET Infrastructure management Information System based on shareware or freeware which provides comprehensive database on all elements of infrastructure. This option was found to be unviable for TVET IMIS. As described above, shareware and freeware are cheap but the development part of it is expensive, employing and retaining internal capacity to develop and upgrade shareware/freeware is expensive. Sustainability of shareware and freeware also depend on the availability of the developer which is normally not guaranteed. The main objective for going for shareware and freeware is to minimize costs of licenses. In this case the same objective can be achieved through sharing resources of ongoing infrastructure management projects. Specific outcomes for this project are:-
1. Database on all elements of infrastructure management
2. College level skills for conducting audits

3. Maintaining infrastructure database
4. Generating infrastructure management reports

TVET Infrastructure Management Project Components
The business plan described two components of the project
1. Establish the basic hardware and software of the TIMIS
   a. Select suitable freeware/shareware system from the current institutions which best fits the DHET requirements
   b. Integrate the TIMIS with relevant government databases i.e. DPW PREMIS
   c. Relevant information standards and definitions
   d. Set up for report writing functionality

2. Establish the institutional and departmental and Institutional Capacity to sustain the TIMIS. This includes training and high level of physical verification and remediation by the service provider. It includes the training for report writing for the departmental staff on the same basis as for the data gathering processes.

Current Infrastructure Management Projects in Government

1 National Department Public Works
This department has purchased and installed Archibus for infrastructure management with modules such as asset register, property management, facility management, project management, lease and billing, capital budget, and other NIMS compliance modules. It seems these modules cover more than what is required for TVET IMIS. The experience shared by the Deputy Director of Information Services suggests that Archibus has met the requirements of DPW in infrastructure management. The discussion with DPW informed that IT infrastructure is hosted at SITA data centre and is accessed national wise by regional offices through reliable networks. It was further reported that DPW has invested in redundant networks to ensure systems availability on the clients' side.

The environmental assessment has shown that Archibus has ongoing projects in government departments, provinces, and agencies. The following are among projects currently implemented in government sectors by Archibus Solution Centre:-
i. Limpopo Department of Health (Hospitals) – Infrastructure Maintenance
ii. Gautrain Management Agency – Assets Management
iii. KZN Department of Public Works – Fixed Asset Register & OPS & Others
iv. National Department Public Works – Billing and Auditing, Lease/IAR & Others

2 Council for Scientific and Industrial Research (CSIR)
The department of Built Environment at this council has developed a system known as Professional Real Estate Management Information System (PREMIS). The system has been installed Limpopo Department of Education - 4530 Facilities, Department of Defence (DOD) 2520 Facilities, Mpumalanga Province. The consultation with PREMIS personnel has shown that the system requires the client to have own IT infrastructure such as data centre and networks. The consultation also confirmed that PREMIS is not for day to day asset management as Archibus, but developed for strategic planning purposes. The environmental assessment revealed that in some provinces, the database from PREMIS was uploaded to Archibus and is up and running. This information is useful as TVET infrastructure data

collected in 2005 is stored in PREMIS at CSIR. This data is one of the sources of data during data collection.

3. Municipal Infrastructure Support Agency (MISA)
    The organization has developed a system called Municipal Infrastructure Performance Management Information System (MIPMIS) that is used by Municipalities. This is a performance management framework and system that will enable MISA and Municipalities to systematically monitor municipal planning, development, maintenance and management as well as the provision of municipal services. The presentation done by MISA and system developers during environmental assessment has shown that the system has two main modules (Asset Register and project management). The developers showed the possibility and capacity of building more modules if required. The shared experience revealed interface challenges which were reported to be on human side than systems. The objectives of MIPMIS are very good, but the assessment revealed challenges in achieving them. For example lack of resources from municipalities and lack of collaboration of vendors who are implementing different systems at municipalities' level. Here below are MIPMIS objectives
    - Identify major or systemic blockages in the development and management of municipal infrastructure throughout the country
    - Monitor the development of infrastructure projects funded through the Municipal Infrastructure Grant (MIG)
    - Monitor the maintenance and management of municipal infrastructure assets
    - Monitor the delivery of municipal services and promptly report on interruptions in the provision of services

4. Systems in TVET Colleges
    Two TVET Colleges located in Pretoria were visited to find out systems available for assets and infrastructure management. The visited colleges were Tshwane South College and Tswane North College. First college has three information systems as part of their management information system. They have Pastel Accounting for financial management, Coltech management information system for student enrolment, BAUD for asset management. They also have the asset register but they cannot say that it is accurate based on lack of personnel and skills. The systems are not integrated which complicates data management at the TVET level. They are currently planning to move to Pastel Evolution with asset management module as a way to solve the integration problem. This version of pastel will provide modules for finance management and asset management. Boland College is reported being using Pastel Evolution. Apart from Chief Finance Officer, Tshwane South College has one of their personnel dealing infrastructure management. The environmental assessment was also conducted at Tshwane North College where the asset register was captured in excel spreadsheets, the infrastructure management is still manual, they have two personnel dealing the infrastructure management. The Tshwane North College is using ITS system as their management information system. Currently, the only module which is used is student enrolment. The Assessment of these two colleges revealed lack of robust management information systems for infrastructure management at TVET college level.

Capacity at DHET

DHET has units such as procurement, risk management, asset management, budget planning, IT infrastructure, IMIS data standards. The structure of DHET does not link these units with TVET colleges. The TVET have their own councils responsible with budget approvals for different issues such as plans and budgets. The reporting such as financial and others are also done reported to the

TVET councils and to the college management. The environmental assessment has shown that the only DHET unit linked to TVET colleges is TVET Infrastructure and Development. This programme has one personnel who is the project manager (Mr. S. Mommen). DHET has units such as IT infrastructure, asset management, risk assessment, IMIS data standards, but their services are limited within DHET. It is recommended to include these units in project management team and technical committees of TVET infrastructure management project.

Data Centre and Networks

During environmental assessment, it was reported that there is only one network connection at DHET (this means one provider). TVET IMIS will be a network intensive system, the database and application programs will be installed and hosted in the data centre. Users from DHET, Regional offices, and from TVET colleges will access TVET IMIS through networks. This approach requires strong and reliable networks from both ends (data centre and client sides). DPW reported that they have a network backup (two providers) for reliability. On the other hand, the visited TVET colleges are facing slow networks. Based on the environmental assessment DPW has better networks to host TVET IMIS, but will require network reliability on the client side. There is a need to conduct an assessment of internet connection at TVET colleges in order to provide recommendations for improvement.

TVET Awareness on the Project

The environmental assessment has revealed that TVET are not aware of the project which necessitates the need for change management and maximum involvement of users in design and development of IMIS and the audit. There shall be awareness programs which must be conducted at TVET colleges. It is recommended to include TVET college principals and chief finance officers in the steering committees. The personnel responsible for infrastructure management at TVET college level will be included in the technical committees. Providers will train DHET and TVET colleges' personnel in advance for fully involvement in design and implementation of TVET infrastructure management project. This approach will bring awareness and ownership at TVET college level.

Summary of Environmental Assessment Findings
- There are ongoing infrastructure management projects in government departments and other government agencies such as DPW, CSIR, and MISA
- There is a possibility of using transversal services to secure these resources without having to go out on public tender
- TVET colleges have assets register which is one source of data
- TVET Colleges infrastructure data was collected in 2005 and is stored in PREMIS at CSIR. This is another source of data.
- There are projects documents but other documents such as business analysis, functional requirements are yet to be developed. This includes the list of reports required from IMIS.
- DHET has only one officer (Mr. S. Mommen) responsible for TVET infrastructure management project.
- TVET Colleges are unaware of this TVET infrastructure Management project
- Steering committee for TVET Infrastructure management has established, but other committees such as project management team and technical committee are yet to be established.
- The Archibus license which is purchased by DPW for infrastructure management is capable of accommodating more infrastructure management projects such as TVET IMIS

- Archibus based infrastructure management information system installed at DPW is NIMS compliance. TVET infrastructure management project is planning on implementing the same strategy.
- PREMIS and MIPMIS are in-house developed management information systems by government agencies.
- PREMIS and Archibus systems can transfer data to each other.
- DPW has network back up (two network service provider) for availability.
- TVET IMIS Users at DHET and TVET are not yet identified
- Three ToRs will be needed for TVET infrastructure management project (IMIS, Auditor, and Training ToR).
- Using the transverse tender procedure will cut costs of design and implementation of TVET infrastructure management project.
- DPW has data collection team and training team established during the   design and infrastructure management project.
- DPW has shown willingness to share the available resources for design and implementation of TVET infrastructure management project. This will require negotiations and agreement between DHET and DPW.
- There is a need to evaluate computer networks at TVET colleges in order to offer recommendations for improvement. This is needed to ensure IMIS availability.

The Project

DHET with EU support want to install infrastructure management information system (IMIS) for TVET colleges. The IMIS will capture data about infrastructure management from TVET central offices. The set up will allow DHET and regional offices to access TVET IMIS reports for monitoring and evaluation.   As discussed above, one of the major anticipated outcomes of this project is to have a system that can produce required reports.

Project Categories

1. Infrastructure Management Information System (IMIS) which includes the Database for assets/Asset register.   This is one of the main components of this project. The environment assessment has shown that the existing systems in other government departments have modules more than those required by TVET IMIS. The design and implementation of this category involves the following:-
    a. Development of user requirements from users. This will produce a document called functional requirements document (FRD), which is the base for developing the tender document, contract, User acceptance test, quality audit, and final acceptance certificate.   FRD is normally developed from business process reengineering which is done through users' workshops. These documents are normally developed by the owner (in this case DHET). The EU TA will conduct TVET users workshops in the second mission (July 2016) for business process analysis and develop the functional requirements document to be approved by the owner.
    b. Develop IMIS ToR and match with the ongoing IMIS projects and develop recommendations for transverse tender.
    c. Procurement department engage the vendor based on the IMIS ToR and recommendations.
    d. Development of the TVET IMIS contract between DHET and the Provider.

  e. Sign the contract and engage the provider

  f. Conduct implementation processes

2. Sustainability (Human capacity). This is divided into two: Training for system users on how to use the system and training on infrastructure management skills. Starting with first one; the following activities will be done.

  a. Identifying people to be training. As mentioned above, this will be done early to allow fully involvement of DHET and TVET colleges personnel in design and implementation of IMIS:-

   i. Support teams. This will involve identifying personnel from DHET and TVET colleges' personnel who will be trained to support TVET IMIS. This will be done by the project manager, TVET Colleges Principals and CoFs, and the TA. This is the IT technical team. The set up shall allow at least one IT personnel in each college.

   ii. Application team. This will involve identifying personnel from DHET and TVET colleges who will be trained for application support. This will be done by project manager, TVET Colleges' Principals and CoF, and the TA.

   iii. Help Desk. This will involve identifying personnel from DHET and TVET colleges who will be trained to work as the first line of support for TVET IMIS users. This will be done by project manager, TVET Colleges' principals and CoFs, and the TA.

  b. Quality audit for training material. This will be done by project manager and the TA.

  c. Quality audit for training delivering. This will be done by project manager and the TA.

  d. Users using the systems. The project manager and TA will ensure support teams are available to support users after the launch of TVET IMIS.

Sustainability also includes the following:-

a. Building four environments for the systems:

 i. Testing environment – to be used during development of new requirements such as new reports, new data capture fields, approvals levels, etc. This is to avoid using the production/live environment

 ii. Training environment – to be used in training new users and/or existing users on new programs/upgrades and avoid using the production/live environment

 iii. Development Environment – to be used in development of new data fields and new tables and avoid using the production/live environment

 iv. Production environment – to be used for data capturing and production of reports

The above environments will be hosted in one of the existing data centres within the government departments and/or agencies such as DPW, SITA, DHET data centre, etc. In case DPW has these environments for its IMIS, it is recommended to use them for TVET IMI design and implementation.

b. Software Maintenance Plan

This is about maintenance contract which is done after installation and set up. Some providers normally provide one year support as part of the original contract. Proper design of maintenance will deal to less maintenance costs. Software maintenance plan involves the following:-

   i. Develop a risk register of the IMIS. This will help to know what can be done internally by IMIS support teams and what is supposed to be done by the provider
   ii. Assign risks to risks owners – which risks shall be managed internally and which shall be managed by the provider
   iii. Assign/identify resources required by each IMIS risk. l
   iv. Develop the maintenance contract and get it signed.

As mentioned above, maintenance plan will reduce costs for the maintenance contracts as some tasks will be done by government support teams.

2b. Training for Infrastructure Management – ensure users have required skills in their area of expertise. This will involve the following:-
   a. Identify the provider (Match the TVET infrastructure Management ToR for training and those which are ongoing in other government departments/agencies).
   b. Conduct training needs assessment
   c. Identifying people to be training
   d. Identify courses to be taught
   e. Quality audit the training material
   f. Conduct training
   g. Quality audit the training methods
   h. Trainees using skills to capture TVET colleges' infrastructure data and update the asset register.

3. Audit/Data collection from the TVET Sites
   This is another main component of IMIS that need to be done early and in collaboration with IMIS provider. The environmental assessment has shown that there three possible sources of data:-
   i. Data from TVET asset registers kept at TVET central offices. The environmental assessment has shown that some of TVET asset registers are up to date and audited by the Auditor General. In case this data will have some gaps, the second approach will be adopted.
   ii. There is TVET infrastructure data collected during 2005 Audit and is stored in CSIR PREMIS. In case data option one and two above do not meet the requirement, the third option will be adopted.
   iii. Collect data from all TVET fields (Central offices and campuses). This approach will be adopted if data from option one and two above will not meet the requirements.

Major Immovable Assets at TVET
Based on this assessment the major immovable assets at TVET are land and building. Based on the business plan, the IMIS shall be able to report per campus per building per room. It has also covered land where it stated the system shall have capability to identify ownership of land.

Proposed Initial Modules for TVET IMIS

As stated above, it is recommended to start TVET IMIS with two modules as described below.

1. Asset Register
   The National Immovable Assets Maintenance Management Standards define asset register as a record of asset information considered worthy of separate identification for asset accounting and strategic management purposes including inventory, historical, condition and construction, technical and financial information about each. The ToR for IMIS provider will ensure asset register module is implemented according/compliance to NIAMMS.

2. Asset Management
   The National Immovable Assets Maintenance Management Standards define asset management as the process of decision-making, planning and control over the acquisition, use, safeguard, and disposal of assets to maximize their service delivery potential and benefits, and to minimize their related risks and costs over their entire life. The ToR for IMIS provider will ensure the implementation of this module is according/compliance to NIAMMS

The assessment has shown that the system IMIS installed at DPW using Archibus has more modules than those required by TVET IMIS. In this case, the assessment revealed the need to negotiate taking all modules to TVET IMIS. The initial setting will consider recommended two modules. More modules can be installed in the future on demand basis.

Indicative Cost for TVET IMIS

The assessment has collected indicative costs for TVET IMIS software from the provider who is current implementing infrastructure management project at DPW. Other systems such as MIPMIS which under MISA and PREMIS which is under CSIR were unable to provide indicative costs. MISA and CSIR said the software is for free for government departments and agencies, the involved costs will be implementation/consultants that will customize the system to meet the requirements, the training, and auditing. They also informed the need for MoU between them and DHET. The indicative costs shown here are from Archibus Solution Centres. Their system is off-the-shelf (COTS) while MISA and SCIR systems are tailor made and in-house development (BESPOKE). Archibus are implementing different projects the government departments and sectors such as DPW, provinces and universities. The prices are only indicative and does not include hardware and other required software such operating systems and application software. The table below show their indicative prices.

Table 1. Indicative Prices (VAT not included)

Item	Quantity	Price (Rand)
Software licenses	50 Concurrent users (Once off)	750,000
Subscription (yearly payable)	1 Year	900,000
Implementation	N/A	900,000
Training	N/A	120,000
Support	Monthly	10,000

Source: Archibus Solution Center.

Project Governance

The following are project committees which will govern the project to ensure intended outputs are achieved:-
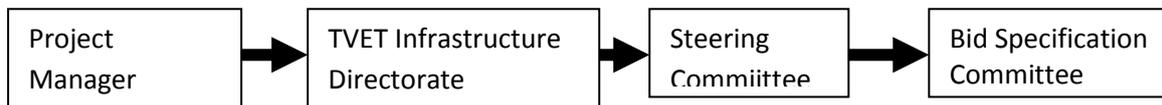
Governance of the Project

There are three main categories of TVET infrastructure project governance. One is the project operational decisions, Joint Steering Committee, Bid Specification Committee.
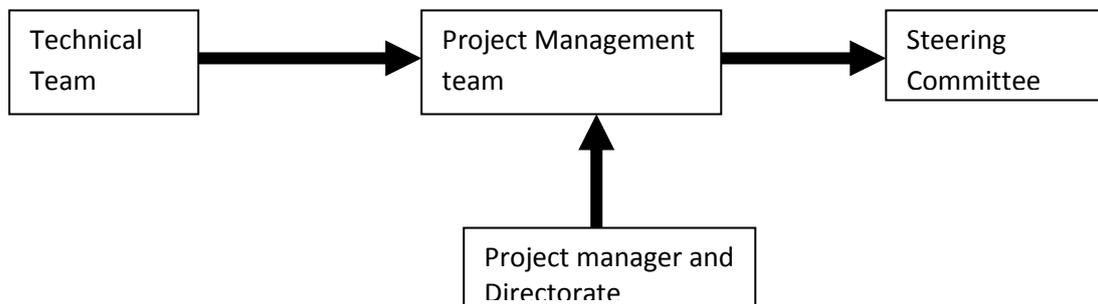
Project Operational Decisions

This level of management will ensure that all activities are undertaken within the approved project schedule and the approved budget. The current governance structure as show in business plan is described by the figure below.

Figure 1. Current Governance Structure

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┌──────────┐      ┌──────────────────┐      ┌─────────────┐      ┌─────────────────┐
│ Project  │ ───▶ │ TVET Infrastructure│ ──▶ │ Steering    │ ──▶ │ Bid Specification│
│ Manager  │      │ Directorate       │      │ Commiittee  │      │ Committee        │
└──────────┘      └──────────────────┘      └─────────────┘      └─────────────────┘
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The following structure is recommended.

Figure 2. Proposed Structure

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┌──────────┐      ┌──────────────────┐      ┌─────────────┐
│ Technical│ ───▶ │ Project Management│ ──▶ │ Steering    │
│ Team     │      │ team             │      │ Committee   │
└──────────┘      └──────────────────┘      └─────────────┘
                           ▲
                           │
                  ┌──────────────────┐
                  │ Project manager and│
                  │ Directorate       │
                  └──────────────────┘
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It is important to have a technical team which reports to the project management team. The technical team is recommended to have representatives from DHET, TVET, DPW, MISA, and CSIR. This team will bring all technical issues and recommendations to the project management team. The project manager and directorate can remain with their role of operational decisions and ensure that all activities are undertaken within the approved project schedule and approved budget. The project manager and directorate will be part of the project management team, which is recommended to have representatives of from DHET directorates, TVET colleges, and project managers from DPW, MISA, and SCIR. The main task of project management team will be to receive implementation reports from technical and vendors, discuss, and escalate to the joint steering committee for decision making. It is recommended to add approval of major project changes as the other function of steering committee. Other specifications remain as stated in the business plan.

Set Project Management Committee

The project management team will be responsible for contract management and escalating proposed changes to the technical committee for discussions and to the steering committee for approvals. This committee will be comprised of:-

1. Project Manager
2. TA
3. DPW Infrastructure Project Manager
4. MISA MIPMIS project manager
5. CSIR PREMIS Project Manager
6. Two TVET Principals
7. Two TVET Chief Finance Officer

Set Steering Committee

The steering committee is already set in the business plan and the following are members with possibility to add more.
  i. Joint Chair: A/DDG:V and DDG:H
  ii. Representative of each branch involved in data information system (GITO etc)
  iii. Director responsible for TVET to coordinate meetings and provide secretarial support
  iv. Representative from SITA
  v. Representative from partner departments (DPW/DRDLR)

Functions of the Steering Committee will be:
  i. Ensuring the project scope is maintained
  ii. Provide oversight on expenditure and budgetary matters
  iii. Ensure the inclusion of partner entities
  iv. Provide oversight and strategic steer to the project
  v. Ensure conditions of relevant entities

Schedule for project meetings
1. The Project Management team will meet once per week
2. Technical team will meet once per month before the steering committee
3. Steering Committee will meet once per month.

The Business Processes Reengineering
This is very important process towards system development
During the first mission discussions were conducted with different government departments that are using assets management systems such as Department of Public Works which using Archibus for infrastructure management. The following functions are among those installed at DPW
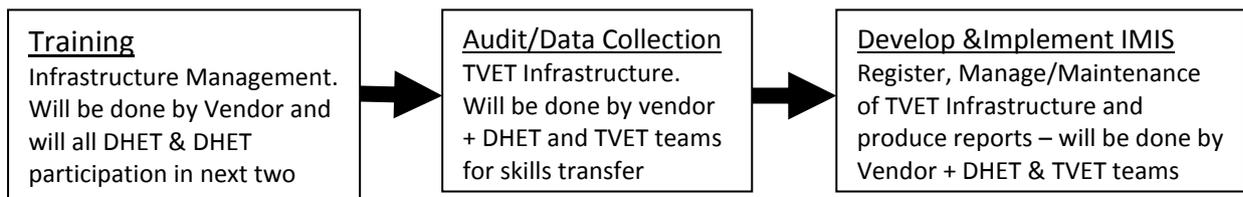1. Assets Register
2. Assets Management (Movable and immovable)
3. Facility Management
4. Projects management
5. Portfolio Analysis
6. Capital Budgeting

It was reported that DPW has the data center and networks, currently their system is hosted at SITA, but finalizing their data centre. They have technical personnel who are maintaining the system. Furthermore the DPW has a network redundant to ensure system availability to the third users. One is SITA network and the other voda com. Furthermore, it was reported that DPW IMIS sites are also installed with sub-domains to ensure system availability during the network breakdown. The user/training manuals are already within the government system. The system is built within government standards such as National Infrastructure Management Strategy (NIMS), Property Plant and Equipment (GRAP 17). The discussion with the Archibus provider revealed that the system is also installed in 23 universities within the country for infrastructure management. The software is commercial off the shelf (COTS).

Sequence of TVET Infrastructure Management Project

The following sequence will be adopted in TVET Infrastructure Management project. The first activity will be training of DHET and TVET personnel on infrastructure management. This will enable them to participate in data collection. The second activity will be audit/data collection from TVET infrastructure. The second activity will be development and implementation of TVET infrastructure management IMIS.

Figure 2. Project Sequence

Training
Infrastructure Management. Will be done by Vendor and will all DHET & DHET participation in next two

Audit/Data Collection
TVET Infrastructure. Will be done by vendor + DHET and TVET teams for skills transfer

Develop &Implement IMIS
Register, Manage/Maintenance of TVET Infrastructure and produce reports – will be done by Vendor + DHET & TVET teams

Proposed IMIS structure

The proposed structure is the one described in project documents where data is captured at TVET central colleges, hosted at DPW data center, reports are viewed at DHET, DPW, and regional offices as described by he figure below.

Figure 3. TVET IMIS Structure
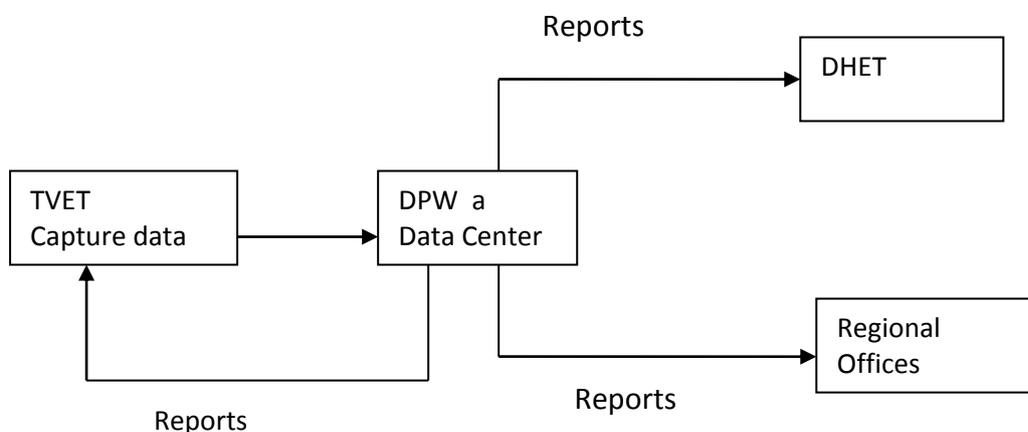
Recommendations

Based on this environmental assessment, the following are recommended.

1. Based on the environmental assessment, it is recommended to use one of the existing systems for TVET Infrastructure Management Information System (IMIS). It is further recommended for DHET to communicate/negotiate with respective government departments and agencies for sharing the available resources. The TVET IMIS ToR will be developed and compared with existing IMIS ToR for transverse tender procedure.
2. The environmental assessment has shown that DPW has reliable networks, therefore it is recommended to host TVET IMIS in DPW networks. This will ensure availability to the TVET IMIS users.
3. TVET Colleges' networks need to be reviewed to develop recommendations for improvement. This will ensure TVET IMIS availability to the TVET colleges' users. It is not enough to have reliable networks at DPW, the client side also need reliable networks.
4. Use the existing Training Providers to train DHET and TVET colleges on infrastructure management. This will need development of TVET infrastructure management training ToR to match with DPW and PREMIS ToRs to see the one which reflects well TVET training requirements.
5. Use the existing Audit/data collection providers to provide data collection services for TVET infrastructure. This also will require a development of ToR for TVET infrastructure data collection/audit to match with those of existing projects such as DPW and CSIR (PREMIS) to identify one that fits well the TVET infrastructure data collection.
6. Engage IMIS provider and audit/data collection provider at the same time that they can harmonize data collection and system requirements
7. The contract shall require the IMIS provider to conduct business process analysis and develop functional requirements document to be approved by DHET
8. DHET and TVET personnel need to be identified early for training to allow maximum involvement in design and implementation of TVET infrastructure management project.
9. The following implementation schedule is proposed.

Project Proposed Schedule

Table 2. Project Schedule

Activity	Responsible Persons	Time
Appoint Project Committees: Project Management Team, and Technical committee. Steering committee is already in place,	DHET	June 2016
Review ToRs and other documents for training, data collection, and IMIS	TA	June 2016

from DPW, MISA, SCIR to set a baseline for TVET personnel training, audit, and IMIS.		
Conduct business processes analysis workshops at TVET colleges' levels capture workflows and develop functional requirements document.	TA	July 2016
Conduct a comparative analysis between TVET functional requirements for IMIS and PREMIS, and MIPMIS. The analysis will cover training, audit, and IMIS and provided procurement recommendations to DHET	TA	August 2016
DHET DG's office Communicate with other government Department DG's office about sharing identified resources	Project Manager & TVET Directorate	September 2016
MoU developed between DHET and other government departments about sharing available resources. In case no resources to be shared, the process will go for public tender using the FRD	Project Manager, TVET Directorate and DHET Procurement	October 2016
Evaluate tenders/submissions	Bids Specification Committee	November 2016
Contract between DHET and Providers of TVET project programs (Training, Audit, and IMIS)	Project manager, Procurement, DHET Legal, and TA	December 2016
Evaluate TVET IT infrastructure and do replacement	Provider, DPW &DHET technical team, project manager and TA	Jan– February 2016
Conduct Training	Provider, Project Manager, DPW, TA	Dec 2016 - Jan 2017
Conduct Audit/Data Collection. Data collection and Sorting - From TVET asset register - From TVET asset data collected 2005 - From TVET central offices and campuses	Provider, DHET &TVET trained personnel, Manager, DPW, and TA	February – April 2016
Develop/Customize and install TVET IMIS	Provider, DHET, TVET, DPW, and TA.	March - April 2017
Train DHET, TVET users, regional users how to capture data and process reports in IMIS	IMIS Provider, TA, project manager, and technical team	May – June 2017
Upload and set collected data from TVET infrastructure into the IMIS	Provider, DHET, TVET, DPW, Project manager and TA	July 2017
Produce required reports	IMIS Provider, TVET, technical team, and TA	July 2017

Set IMIS environment at DPW (Development, testing, training, and production).	IMIS provider, DPW technical teams, project manager and TA.	August 2017
User Acceptance test	IMIS Provider, project management team, technical team, and TA	September 2017
IMIS quality audit	Project manager, TA, and IMIS provider	October 2017
Final acceptance Certificate	DHET, TVET, Project Manager, IMIS provider	December 2017
Maintenance Plan/Contract	Project Manager, technical team, TA, and IMIS provider	January – February 2018

Conclusion

The TVET Infrastructure management Project will include three major programs. One is training of DHET and TVET personnel on Infrastructure management and will be done by the provider based on the ToR. The second is audit/data collection from TVET infrastructure which will be done by the provider in collaboration with IMIS provider, DHET and TVET trained personnel. This will also be done according the ToR. The third program under this project is development and implementation of TVET infrastructure management IMIS. This will also be done by the provider in collaboration with DHET, DPW, and TVET personnel. The implementation of the project will adopt national infrastructure maintenance strategy (NIMS), National Immovable Assets Maintenance Management Standard (NIAMMS, Government Immovable Assets Management Act (GIAMA), and Generally Recognised Accounting Practice (GRAP17) – Property Plant and Equipment.

The implementation of this project will require three providers of which those who are currently implementing similar programs in the government will be evaluated. The evaluation will be done thorough matching the TVET Infrastructure Management project ToRs (Training ToR, Audit/data collection ToR, and IMIS ToR). Those ToRs for ongoing projects which will reflect similar services to TVET Infrastructure Management project ToRs will facilitate transversal tender process. In case one or more ToRs for TVET project will not match the on going project within government departments and agencies, the new tender will be processes to obtain the provider.

The first program will be training DHET and TEVET personnel on infrastructure management to allow them participate in audit/data collection process. Thereafter the audit/data collection will be the second program, which will be done by the provider in collaboration with DHET and TVET trained personnel. The IMIS provider will be involved in the data collection by providing the data requirements and software which will allow data being stored in IMIS database. This will ensure harmonization of data and will serve time of implementation.

The governance of the project will be done by steering committee, project management team, and technical team. These teams will be established from DHET, TVET, DPW, CSIR, and MISA to ensure ownership by DHET and TVET, and to bring experience from government department and agencies that have implemented similar projects.

The project is intending to utilize available resources in other government departments such as software licenses, data centres, networks and technical support teams. This will reduce implementation costs of TVET infrastructure management project, and will maximize utilization of available government resources.