TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING AUTHORITY

Assessment of Information Management Practices in TVET Institutions in Kenya

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The research team hopes that the findings and recommendations presented in this report will make a meaningful contribution to enhancing information management practices in Kenyan TVET institutions.

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ABSTRACT

Data is a critical asset that drives business intelligence and informed decision-making in all sectors. In Technical and Vocational Education and Training (TVET) institutions, effective information management ensures systematic collection, storage, analysis, and distribution of data, supporting institutional efficiency, trend analysis, and opportunity identification. This study explored information management practices in Kenyan TVET institutions, focusing on regulatory frameworks, personnel capacity, infrastructure availability, financial resources, and the adoption of information management systems. It further examined the integration of standard information management processes within institutional quality management systems (QMS), identified challenges affecting TVET institutions and proposed mitigation strategies. A sample of 258 TVET institutions, representing 10.06% of the 2,565 accredited institutions was selected for this study. Data collection was conducted using a structured questionnaire scripted in Kobo Collect software, targeting administrators, information managers, and staff responsible for information management. The questionnaire was pre-tested to ensure reliability using Cronbach's alpha coefficient, and a team of researchers visited the institutions to administer the questionnaire. Quantitative data was cleaned, analysed, and presented using SPSS and Excel for descriptive and inferential statistical analyses, while qualitative data was subjected to content analysis. The findings showed that though traditional methods such as filing were still prevalent especially in Vocational Training Centres (VTCs), most institutions were integrating digital technology in information management. Information was received through various channels, including emails, hand delivery, and social media, with public institutions using more diverse platforms. However, mail registration remained a challenge, particularly for public VTCs and private institutions. Most TVET institutions preferred cabinets and computers for information storage, with online and cloud storage still remaining low. The weak enforcement of security policies, absence of data retention frameworks, and limited use of incident response plans exposed institutions that had integrated digital technology to data vulnerabilities. The study also revealed that 65% of institutions lacked designated personnel for information management, with responsibilities distributed across various administrative offices. The qualifications that were held by the information management personnel included Information Technology (IT)-related fields (59%), unrelated disciplines (27%), and records or library sciences (14%). Further, 67% of institutions lacked a dedicated budget for information management, hindering the implementation of efficient systems. Only a small proportion (25%) of the institutions had established information management systems. To improve information management in TVET institutions, the study recommends increased investment in infrastructure, personnel training, and financial support. Strengthening security frameworks, enforcing policies, and integrating standardized processes within QMS will enhance operational efficiency. Addressing these challenges is crucial for effective decision-making, record-keeping, and overall institutional performance, ultimately improving the quality of education and training in TVET institutions.

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ABBREVIATIONS AND ACRONYMS

DLM	Data Lifecycle Management
EDMS	Electronic Document Management Systems
KNQA	Kenya National Qualifications Authority
LMS	Learning Management System
NACOSTI	National Commission for Science, Technology and Innovation
NP	National Polytechnic
KSTVET	Kenya School of TVET
PWD	Persons with Disability
QMS	Quality Management System
SPSS	Statistical Package for the Social Sciences
TTC	Technical Trainers College
TVC	Technical and Vocational Colleges
TVET	Technical and Vocational Education and Training
TVETA	Technical and Vocational Education and Training Authority
VTC	Vocational Training Centres

CHAPTER ONE

INTRODUCTION

1.1 Background

Technical and Vocational Education and Training (TVET) institutions play a pivotal role in equipping individuals with practical skills essential for Kenya's socio-economic development. Effective information management within these institutions is crucial in ensuring efficient administration, enhancing training quality, and facilitating decision-making processes. However, challenges such as inadequate technological infrastructure, limited staff training, and inconsistent data management practices have been identified as significant barriers to optimal information management in Kenyan TVET institutions. For instance, a study by Mwangi (2016) highlighted that the adoption of Information and Communication Technology (ICT) in the management of TVET institutions is still in its nascent stages, with many institutions lacking the necessary infrastructure and expertise to implement effective ICT solutions. Addressing these challenges requires a comprehensive assessment of current information management practices to identify gaps and develop strategies for improvement.

The TVET Authority's Quality Management System and Assurance Manual emphasizes the importance of establishing robust internal quality management systems, which include effective information management as a core component. Further, the National Polytechnic Requirements and Guidelines provides for library services and facilities including information resources, ICT resources, organization and access to the resources, library services, staffing, budget, and information literacy and competency. In this age of increasing data security challenges, managing digital information and records intelligently is essential. Current trends point to increased recognition of the place of information management, accompanying technological advancement and resultant regulation and legislation. Records management encompasses creating and capturing data to meet requirements for evidence and organizational activities and taking appropriate action to protect their authenticity and useability over time (ISO 15489-1:2016).

Data is the most powerful, yet most underutilized and poorly managed organizational asset. Data provides knowledge and insights that can support effective decisions and actions at both strategic and operational levels in any organization (ILO, 2021). Data is an important asset for managing organizations and enterprises and is now commonly referred to as a “corporate asset” which, like money, personnel, and equipment, can be used to improve the operation of and organization or increase the revenue and profits of an enterprise. However, to derive the benefits of data, it must be properly managed. Whereas some aspects of data management are rather straightforward, security procedures should be in place to protect confidential data from falling into the wrong hands. Backup and recovery procedures must be developed and standardized to permit the re-generation of data that has been lost, and standards should be developed on naming conventions for the programs and data items in the environment (Gillenson, 1990).

Data management is the process of collecting, organizing, analyzing, using, and preserving data for informed decisions making, reaching conclusions, providing a platform for easy retrieval and re-use, and creating new, supporting or modifying existing knowledge based on evidence. It is the process where data is collected, sorted, coded, prepared, analysed, presented,

interpreted, stored, and secured, for the solution of practical problems, and future use (Owan et al., 2019). Data Management refers to the practices, concepts, procedures, processes, and the whole range of systems that allow an organization to control its data resources. It involves the entire lifecycle of a given data asset from its creation to retirement, how it progresses and changes throughout its lifetime through the internal and external data streams of an organization. Data management is an administrative process that includes acquiring, validating, storing, protecting, and processing data to ensure accessibility, reliability, and timeliness for the users (Dagnaw & Tsigie, 2019). Data management plays an important role in carrying out tasks such as staffing, transfer and placement of students. Therefore, all institutions need to treat data as an important asset, which is as vital as physical assets (Nor Hasbiah *et al.*, 2017). The effective management and integration of data in education and training can play a critical role in decision making. Strategic data management can greatly help governments and other stakeholders in injecting vibrancy in all sectors, including training. This will ensure that they respond effectively to diversity, adapt to the changing world and place a greater focus on success of trainees (Ndiku, et al., 2014).

Despite the recognized significance of efficient data management, many TVET institutions in Kenya faces significant challenges. One of the major issues is the lack of adequate technological infrastructure. Many institutions still rely on obsolete systems or manual methods for data collection and management, which could be awash with inefficiencies and inaccuracies (Oluoch, 2018). Constrained financial resources often limit these institutions' investment in modern data management solutions or in providing adequate training for their personnel, (Wanyama, 2020). This situation is exacerbated by the general reluctance to change among staff members accustomed to traditional methods of managing data, thereby hindering the adoption of new methodologies, (Brown & Duguid, 2017).

The Kenyan TVET institutions play a crucial role in equipping individuals with practical competencies needed in the labour market. One key aspect that affects the operational efficiency and effectiveness of TVET institutions pertains to data management practices. The importance of efficient data management in educational institutions has been realized in recent times with rising intensity. Data management practices in TVET institutions enable monitoring student progress, measuring program effectiveness, and making better resource allocations possible (Oktay & Yilmaz, 2020). The rising necessity for proficient workers across multiple industries has made it essential for TVET institutions to not only monitor student performance but also to ensure that their curricula are compatible with labor market requirements. The achievement of this compatibility is supported by robust data management frameworks capable of analysing patterns, monitoring performance indicators, and offering critical insights aimed at fostering ongoing enhancement (Munyiri & Karanja, 2021). The evaluation of existing practices in TVET institutions can help in aligning their information management systems with national standards, thereby enhancing operational efficiency and training outcomes. This study assessed the status of information management practices in Kenyan TVET institutions. The study also identified prevailing challenges, and proposed recommendations to strengthen the systems for improved performance and accountability.

1.2 Problem Statement

Information is a critical resource for any organization, as it plays a vital role in guiding decision-making and shaping business strategy. TVET institutions generate, process, and store vast amounts of information, which can be prone to mismanagement if appropriate systems are not implemented. Such mismanagement can lead to the exposure of sensitive personal information, potentially resulting in legal liabilities. As such, it is essential for TVET institutions to adopt proactive strategies to mitigate these risks. The TVET sector has experienced exponential growth in number of accredited institutions from 430 institutions in 2014 to over 2,600 accredited institutions offering more 820 programmes. Further the enrolment has grown over 600,000 trainees. Despite this enormous growth, there has been little attention on how institutions collect, store, process, and utilize data for decision-making Currently, there is a lack of research on the status of information management in Kenyan TVET institutions. Therefore, it is necessary to assess the current state of information management within these institutions and provide targeted support to ensure the implementation of effective practices that guarantee proper information handling and security. This study examines the current information management practices in Kenyan TVET institutions, identifies key challenges, and provides recommendations for improving data handling, security, and accessibility. Aligning TVET institutions with national data management standards will enhance operational efficiency, improve training quality, and strengthen accountability within the sector.

1.3 Objectives of the Study

The main objective of this study was to assess the information management practices in TVET institutions in Kenya.

1.3.1 Specific Objectives

The specific objectives of the study were to:

i. identify the information management practices adopted by TVET Institutions;
ii. determine availability and implementation of regulatory and policy framework governing information management in the institutions;
iii. establish the capacity of information management personnel engaged by TVET Institutions;
iv. determine the availability of physical resources for information management;
v. establish the availability of financial resources allocated for information management;
vi. determine utilization of information management systems;
vii. determine the integration of standardized information management processes in institutions QMS;
viii. identify the challenges faced by TVET institutions in information management and possible mitigation measures.

1.4 Significance of the Study

The result from this study will provide clear insights on status of information management in the TVET institutions. This will enable stakeholders to put in place mechanisms for improving information management systems and provide opportunity for knowledge sharing on significance of data and best practices for effective information management. It is envisaged

that the results from this study will greatly contribute to improving data management systems in the TVET institutions.

1.5 Scope of the Study

The target for this study was limited to information management in all categories of TVET institutions (KSTVET, NPs, TVCs and VTCs) in Kenya.

CHAPTER TWO

LITERATURE REVIEW

2.1 Empirical Literature

Information management refers to the collection, organization of information from various sources and its distribution to stakeholders. Information management concerns the control over how information is created, acquired, organised, stored, distributed to promote efficient and effective information access, processing, and use by people and organisations. The elements of information management are widely used in various of industries such as social, technology, business and education (Nasir et al., 2020). Information management in computer science and its applications is used as an equivalent for information technology or data management, where the emphasis is on the structures underlying quantitative data and their relationship to the design of databases. In business or management, it has similar implications to technology management, with emphasis on the relationship of information technology to business performance and competitiveness. In library and information science, it is identified with the 'emerging market' for information workers, whose perception of information embraces data, organizational intelligence, competitive intelligence, external information resources of all kinds and the associated technology (Kaur, 2012).

Information is a valuable asset for effective functioning of any organisation and can constitute a constant risk that could affect the capability of an organization if not properly managed. The right use and analysis of information can enhance the productivity and performance of an organisation. Organizations should establish suitable mechanisms for acquisition, processing and utilization of information and identify their strategic directions. Information is a valuable aspect that helps organisations to improve their performance that depends on the availability and practicability of information management (Nasir et al., 2020). Information management is vital to all organizational processes since it fulfils important functions by providing evidence and information about personnel, clients, stakeholders and assets of the organizations (Maseh & Mutula, 2015)

2.2 Data Lifecycle

Data Lifecycle Management (DLM) is a policy-based approach for managing the flow of an information system's data throughout its lifecycle. The DLM products automate the processes involved, typically organizing data into separate tiers according to specified policies and automating data migration from one tier to another based on those criteria. As a rule, newer data, and data that must be accessed more frequently, is stored on faster, but more expensive storage media, while less critical data is stored on cheaper, but slower media (Dagnaw & Tsigie, 2019). The DLM involves: Data collection; processing/conversion; transformation; analysis; synthesis/integration; storage; backup; security/confidentiality; access; retrieval sharing/distribution; re-use; publication and shredding/disposal (Owan et al.,2019). Many organizations and enterprises are currently employing Big Data to inform business decisions and gain deep insights into client behaviour, trends, and establish opportunities for creating exceptional client experiences (Dagnaw & Tsigie, 2019). The data lifecycle can be summarized as shown in Figure 1.

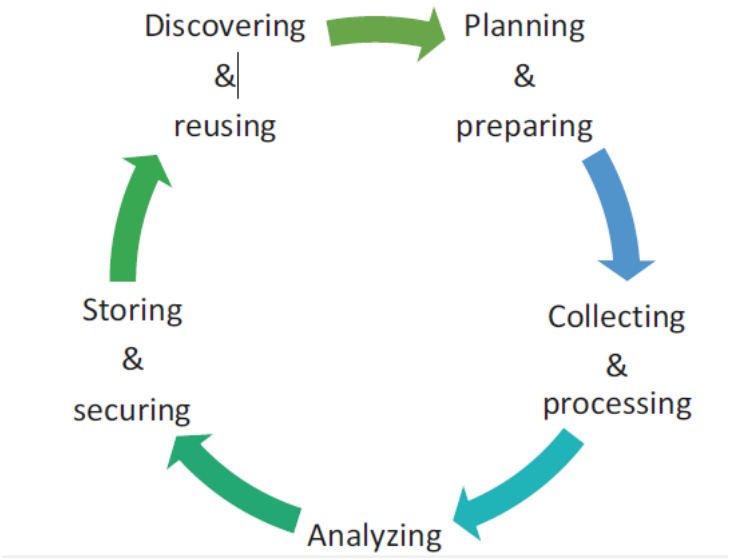

Figure 1: Data Lifecycle

2.3 Information Management Practices in TVET Institutions

Technical and Vocational Education and Training (TVET) is recognized worldwide as an important skills development pathway for accelerating economic growth and development of any nation. It equips trainees with relevant occupational skills, eliminate unemployment, reduce poverty and negative social vices such as crime within communities. Technical training is therefore vital for any economy to compete effectively and grow, especially in the era of economic integration and rapid technological change. The TVET is meant to equip trainees with practical skills, knowledge and entrepreneurial tools needed by the employers or for establishment of private enterprises. The TVET programmes should equip trainees with abilities, skills and knowledge to harness present and future employment opportunities and build a self-sustaining nation (Bello & Muhammad, 2021).

The collection, analysis and use of data on TVET is important for effective planning of skills development. The data on TVET provide essential information on the inputs, processes, outputs, and outcomes of TVET systems and programmes, as well as the characteristics and needs of trainees and graduates. The TVET data can support evidence-based policy formulation and practice by informing the design, implementation, monitoring, and evaluation of policies and interventions as well as the identification of good practices and innovations. TVET data can greatly help in better understanding of the performance of different economic sectors, trainee achievement and learning outcomes, transition from training to work, and gaps between skill supply and demand, among others (UNESCO, 2024). Effective information management practices are essential for TVET institutions to ensure timely access to information enhanced decision-making and improve overall performance.

Information management in TVET institutions encompasses how information is received, created, classified, tracked, stored, secured, accessed, and disposed of to meet governance, identity, research and memory needs. It can be described as the policies and practices by which the institutions collect, protect and uses digital information assets to meet the academic and organizational needs, or the strategic application of methods, tools, and technology intended to make it easier to create, gather, store, retrieve, and share knowledge assets (Hassan, 2023).

2.4 Regulatory and Policy Framework Governing Information Management

Regulations, Policies and procedures provide clear guidelines for addressing various components of information management systems and programs. The policies and procedures give guidance to ensure standardization and uniformity. In Kenya, the primary policy and legal framework governing information management is the "Public Archives and Documentation Service Act" Cap 19, which outlines the management, preservation, and disposal of public records, with the Kenya National Archives responsible for overseeing this process. Additionally, the Data Protection Act of 2024 governs personal data protection, that ensure individuals have rights over their personal information and organizations must obtain consent before collecting or using it while the Access to Information Act of 2016 plays a key role in promoting transparency and allowing citizens to access public information from government bodies.

The TVET institutions are required to develop institutional information management policies that are aligned to the national policies to provide guidelines on the creation, use, maintenance, preservation and disposal of information. Other guidelines and legislations that have been developed to regulate information management include Personnel Letter No.1/2008, Public Procurement and Asset Disposal Act, No. 33 of 2015, Public Finance Management (PFM) Regulations, 2015, ISO 15489-1 2026-Records Management, Data Protection Act No. 24 of 2024, and the TVET Accreditation Handbook.

2.5 Information Management Practices in Educational Institutions

According to Ali (2011), an effective higher education Internal Quality Assurance Systems (IQAS) requires an information system to provide suitable, sufficient, accurate, and trustworthy data. By enforcing better planning, policymaking, and management, the information system significantly improves quality, which eventually leads to higher academic achievement. Rapid developments in information and communication technology have changed the face of higher education, necessitating the adoption of creative approaches by academic institutions to handle their data and decision-making procedures. This has necessitated the TVET institutions to also adopt information management practices such as information management systems, data driven decision-making, performance tracking, learner management systems and quality assurance systems to enhance delivery of quality education processes.

Most TVET institutions in Kenya are embracing digital Student Information Systems (SIS) to oversee student records, admissions, course registration, and performance monitoring. These systems assist in keeping precise and current records, allowing administrators, teachers, and students to easily access information. Based on research conducted by Kiprotich et al. (2018), the implementation of SIS in vocational institutions in Kenya greatly decreases the need for paperwork and manual management of student information, enhancing operational productivity. The Kenya Technical Trainers College (KTTC), Presently known as Kenya School of TVET(KSTVET), has incorporated SIS into its functions for handling vast amounts of student information and facilitating academic management.

Kenya's TVET institutions are increasingly utilizing Learning Management Systems (LMS) to support online and blended learning. Learning management systems such as Moodle offer resources for delivering courses, evaluating student progress, and monitoring performance. The

COVID-19 pandemic sped up the implementation of LMS, leading to the shift to online learning. Mulwa and Kyalo (2020) emphasize the importance of LMS in maintaining education during the pandemic by enabling TVET institutions to provide online classes, share study materials, and evaluate students from a distance. This practice is in line with worldwide education trends, as digital learning environments are increasingly common.

Managing educational resources is a vital element of technical and vocational education and training (TVET). Digital Library Management Systems (LMS) are employed for the purpose of arranging and controlling the availability of books, journals and other educational resources. Ndung'u and Gichoya (2019) noted that many TVET institutions in Kenya were transitioning from conventional to digital libraries, offering students easy access to learning materials remotely. This showed that TVET institutions are continually embracing knowledge management strategies to record and share institutional knowledge effectively by documenting successful methods and curating a database of educational materials for teaching and learning purposes while encouraging the exchange of knowledge, among faculty and staff members alike in order to support ongoing learning, foster creativity and guarantee the long term viability of their educational programs.

Many TVET institutions have integrated Electronic Document Management Systems (EDMS) to manage administrative documents like staff records, financial documents, and institutional reports. EDMS reduces dependence on paper systems, securely storing records for easy retrieval. Mugo and Khaemba (2021) noted that Nairobi Technical Training Institute (NTTI) has effectively implemented EDMS to enhance the handling of administrative duties. EDMS helps to promote transparency and accountability by ensuring thorough documentation and easy auditing of institutional processes. The increased use of digital systems has led to more worries in data security and privacy for TVET institutions. The Data Protection Act (2019) in Kenya requires institutions to safeguard personal information from illegal access or breaches. Oguta (2021) noted that several TVET institutions have put in place secure ICT systems, such as encryption, firewalls, and frequent security audits, to adhere to data protection laws. These actions guarantee that confidential information, like student records and financial data, is safeguarded from cyber dangers and abuse.

Performance monitoring and evaluation are key aspects of effective information management in TVET institutions. TVET institutions are implementing robust quality assurance systems to monitor and evaluate their performance. This includes the collection and analysis of data related to program quality, student outcomes, and compliance with industry standards. They utilize data management systems to monitor the progress of students, staff, and programs within the institution. Mutiso et al. (2022) propose that institutions can use digital performance management systems to collect data on student success rates, employment outcomes, and industry relevance, essential for aligning TVET programs with labor market demands. TVET institutions also seek accreditation from TVETA and regular monitoring by the KNQA to validate the quality and relevance of their programs, which requires effective information management practices.

The present information management techniques used by TVET institutions are intended to boost productivity, facilitate better decision-making, encourage creativity, and guarantee the applicability and quality of TVET courses. By implementing these strategies, TVET

institutions may better meet the needs of the community at large, employers, and students, helping to create a workforce that is both competent and flexible. According to Kumar et al, (2021), Effective information management supports the core mission in education, which promotes institutional accountability and regulatory standards. Thus, robust data and information management systems are needed in the strategic planning and operational efficiency of a TVET institution, thereby directly leading to its capacity to fulfil its educational objectives.

2.6 Resources for Information Management

Information Management infrastructure includes data centres (libraries, records unit), computer labs, and administrative offices. According to Wambua and Ndegwa (2022), TVET institutions that are well equipped with data centres and modern computer laboratories are in a better position in terms of managing information efficiently. Sufficient physical space and facilities are needed to house the servers, storage systems, and office equipment used in the management of information. Majority of the institutions, however, had infrastructure problems characterized by outdated or insufficient infrastructure-especially the institutions that are in rural areas. Kamau and Mwaura (2021) support that an inadequate infrastructure may limit the institution in implementing and maintaining effective information management systems.

Financial resources are crucial for supporting various aspects of information management, including technology acquisition, staff training, and infrastructure development. According to Roberts and Martin (2022), a well-allocated budget enables institutions to invest in advanced information management systems, update hardware, and provide necessary training for staff. In Kenyan TVET institutions, budget constraints are a common challenge. Many institutions struggle with limited financial resources, which can impact their ability to invest in necessary IM resources (Mugambi & Njeri, 2023). Effective budget planning and allocation are essential for ensuring that sufficient funds are directed towards information management activities.

In this respect, the technological infrastructure available to the TVET institution forms an important part of the effectiveness of its information management practice since supports knowledge management, even while specific information technologies and systems are specifically established to pursue knowledge management. The systems and processes that enable data processing, storage, and communication (databases, servers, PCs, information devices, etc.) are collectively referred to as the information technology infrastructure. It includes all information systems used by an organization, such as management information systems and transaction processing systems.

Strong technological systems and capabilities are highly required for the efficient collection, storage, analysis, and usage of data in supporting institutional decision-making and operational performance. A critical element of technological infrastructure is the data management system. Efficient data management systems, such as enterprise resource planning and learning management systems, enable TVET institutions to consolidate and standardize their data for integrity, security, and accessibility (Tsai et al., 2019). Such systems also encourage the integration of data from various sources to allow further analysis and reporting (Gu et al., 2020).

The implementation and maintenance of information management systems (IMS) are crucial for effective data handling. IMS can include databases, learning management systems (LMS), and enterprise resource planning (ERP) systems. According to Wambua and Ndegwa (2022),

these systems help streamline administrative processes, improve data accuracy, and support decision-making. However, the adoption of IMS varies across Kenyan TVET institutions. Some institutions have successfully implemented advanced systems, while others struggle with outdated or inadequate technology (Kamau & Mwaura, 2021). Ensuring that IMS are up-to-date and properly maintained is essential for optimizing information management practices.

The availability of personnel for information management in Kenyan TVETs varies greatly: some have personnel assigned to information management, while others have personnel performing duties related to information management together with other duties. A study by Mwangi and Karanja (2022) indicated that the majority of Kenyan TVETs face issues that relate to inadequate staffing to provide such services. This could lead to increased workload and possible inefficiencies in data management. Besides, information management personnel are not evenly distributed between urban and rural institutions. Generally, urban institutions have a better supply of competent IM personnel and resources in comparison to rural institutions (Kamau & Mwaura, 2021). This inequality might affect the quality of information management practices or generally institutional performance.

Information management is vital for efficiency, accuracy of data, and decision-making in such institutions. Moreover, the availability and capacity of information management (IM) personnel go to the core in realizing these objectives. The personnel in IM in the institutions of TVET are charged with the duty to manage information both in education and administration. In Kenya, IM personnel are tasked with the core functions that revolve around educational and administrative data management in Kenyan TVET institutions. This involves student recordkeeping, academic performance management, and management of information systems. A study conducted by Kimani and Otieno (2021) reveals that in Kenyan TVET institutions, IM staff play a fundamental role in ensuring the accuracy of data, managing enrolment records, and facilitating reporting about institutional performance to regulatory bodies. Information Management personnel also participate in implementing and maintaining information systems such as LMS and SIS. Such systems are very important in managing administrative processes efficiently and informing decisions effectively. According to Wambua & Ndegwa (2022), some of the activities carried out by IM personnel include data entry, system administration, and user support. Such activities require specialized skills.

2.7 Integration of Standardized Information Management Processes in Institutions' Quality Management Systems (QMS)

Standardized information management processes are critical components of QMS, as they facilitate the systematic handling, documentation, and analysis of data essential for maintaining quality. Standardized information management processes are integral to the effective operation of a QMS. They ensure consistency, accuracy, and reliability in data handling, which are crucial for decision-making, performance monitoring, and compliance with quality standards (Harris, 2023). According to Taylor and Adams (2021), standardized processes help institutions establish clear protocols for data collection, storage, retrieval, and analysis, thereby enhancing overall quality management. In the context of TVET institutions, standardized processes support various functions, including academic performance tracking, administrative management, and reporting to regulatory bodies (Smith & Thompson, 2020). Effective information management processes enable institutions to maintain comprehensive records,

assess performance against established benchmarks, and implement continuous improvement initiatives.

In Kenya, some TVET institutions have made significant strides in integrating standardized information management processes into their QMS. For example, the National Industrial Training Authority (NITA) has implemented standardized processes for data management and quality assurance across its affiliated institutions (Kimani & Otieno, 2021). These processes have led to improved data accuracy, streamlined reporting, and enhanced overall quality management. However, other institutions continue to face challenges in achieving full integration. According to Mwangi and Karanja (2022), many Kenyan TVET institutions struggle with limited resources and technical expertise, which can impede the effective implementation of standardized processes. Addressing these challenges requires targeted support and resources to help institutions overcome barriers to integration.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This study aimed at assessing information management in TVET institutions. This chapter outlines the research methodology that was adopted in this study. It specifically highlights the research design, target population, sample size and sampling technique, data collection instruments, pilot, ethical consideration and data analysis.

3.2 Research Design

This study used a descriptive approach. Mixed-method research was used to systematically integrate both qualitative and quantitative data. The method permitted a more complete and synergistic utilization of data from open-ended and close-ended questions.

3.3 Target Population

The target population for this study was all the accredited TVET institutions in Kenya.

3.4 Sampling Techniques

The study employed both stratified and simple random sampling technique to come up with the appropriate sample for the study. The institutions were first divided into various non-overlapping subgroups or strata based on some relevant features that compose institution category (KSTVET, NPs, TVCs, VTCs), type (Public, Private) and geographical location (County) of TVET institutions. Later, the researchers drew a proportionate number of institutions from every stratum to build the final sample. Therefore, a sample of 258 TVET institutions, which represented 10% of the 2,565 accredited TVET institutions was selected for this study. The respondents included administrators and data managers/staff responsible for information management within the sampled TVET institutions.

Table 1: Population and Sample Size

Category	Population	Sample Size
KSTVET	1	1
NPs	24	24
Public TVCs	307	80
Private TVCs	1102	65
Public VTCs	1026	73
Private VTCs	105	15
Total	**2565**	**258**

3.5 Data Collection Instruments and Procedure

A questionnaire that was scripted using Kobo Collect software was used to collect data. The respondents for this study included administrators/information managers/staff responsible for information management within the sampled TVET institutions. A team of TVETA officers visited the sampled institutions to collect the data.

3.6 Validity and Reliability of Research Instruments

The data collection questionnaire was piloted to determine its reliability and validity. The reliability of the questionnaire in relation to the objectives was assessed using Cronbach's alpha coefficient. The reliability tests demonstrated high internal consistency, showing that the instrument effectively measured the desired constructs. The results of the reliability assessment are as shown in Table 2.

Table 2: Reliability Test

Constructs	Cronbach's Alpha	No of Items
Objective 1: Current information management practices	0.836	7
Objective 2: The regulatory and policy framework governing information management	0.780	11
Objective 3: Availability and capacity of information management personnel	0.789	6
Objective 4: Physical resources for information management	0.811	7
Objective 5: Availability of financial resources allocated for information management	0.733	6
Objective 6: Availability of information management systems	0.868	7
Objective 7: Availability and integration of standardized information management processes in institutions QMS	0.932	7

The Cronbach alpha test showed that all the constructs exceeded expectations of baseline reliability, with all the values above the 0.7 criterion. All the objectives had good internal consistency over their respective items, indicating reliable measurement. This showed that the items accurately represented the desired aspects of assessing the information management practices in Kenyan TVET institutions.

3.7 Legal and Ethical Considerations

The Authority obtained a research permit from the National Commission for Science, Technology and Innovation (NACOSTI) in line with the National STI Act. To ensure dignity and respect for the respondents, the researchers conducted themselves with courtesy and respect. In addition, all respondents were led through an opening statement in the questionnaire that informed them of the confidentiality of the information provided and allowed them to feel free in responding to the various items in the questionnaire.

3.8 Data Analysis

The data collected was cleaned, coded and checked for quality, accuracy and completeness. The quantitative data was analyzed using SPSS and Excel to derive descriptive statistics and presented in the form of frequency tables, bar graphs and pie charts. Content analysis was done on textual qualitative data related to the study objectives.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

Introduction

This chapter presents empirical findings and discussions of the study. Specifically, the chapter discusses the response rate, demographic information, the study findings and discussions for the specific objectives.

4.1 Response Rate

A total of 244 out of the sampled 258 TVET institutions, representing 95% responded to the questionnaire. Table 3 shows response rate for the different categories of institutions.

Table 3: Response rate

Category	Sample size	Number Responded	Proportion (%)
NPs	25	25	100
Public TVCs	80	80	100
Private TVCs	65	61	93.8
Public VTCs	73	66	90.4
Private VTCs	15	12	80
TOTAL	**258**	**244**	**94.5**

Response rate for different categories and types of institutions ranged from 80% to 100%. The high response rate of the sampled institutions means the results from the study were representative of the target population.

4.2 Demographic Characteristics of Respondents

The demographic information examined included gender distribution, disability status of the respondents and their training experience.

4.2.1 Gender Distribution of Respondents

Gender consideration is crucial for promoting equality, empowering individuals and fostering a more inclusive TVET ecosystem. The Kenyan constitution has important provisions for gender equality and participation in all sectors of the economy, including education and training. Figure 2 shows the gender distribution of respondents.

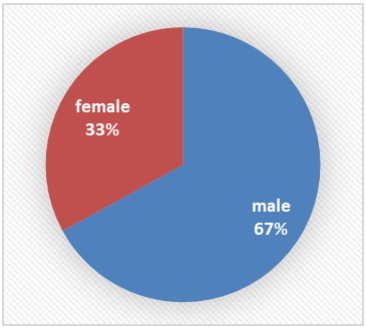

Figure 2: Gender of the respondents

Most respondents (67%) were male, while female respondents were 33%. Although there were more male than female respondents, the gender distribution was aligned with Kenya's constitutional one-third gender rule. However, there is need to continually provide more opportunities for female at management level to attain gender parity.

4.2.2 Disability Status of the Respondent

Data on disability is crucial for understanding representation of Persons with Disability (PWD) within the management of the institutions. The data highlights whether the respondents identified as having a disability or not, providing insights into the inclusiveness of the respondents. Figure 3 illustrates the distribution of respondents based on their disability status.

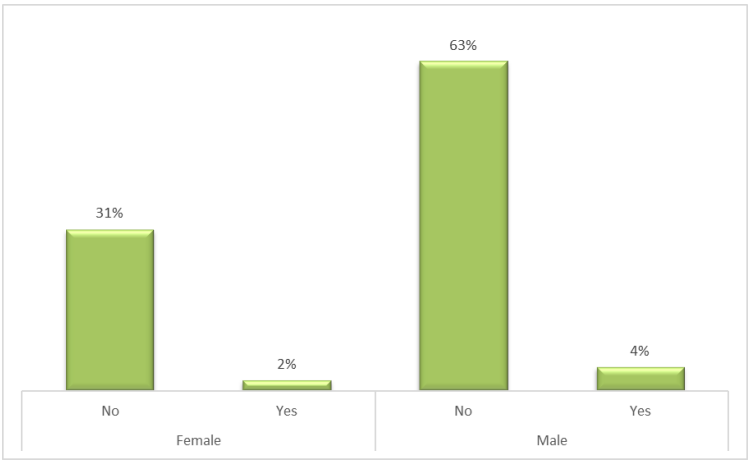

Figure 3: Disability Status of the Respondents

The results showed that 6% (2% female and 4% male) of the respondents were PWDs while 94% of the respondents (31% female and 63% male) reported having no disabilities.

4.2.3 Respondents Training Experience

Respondents were required to state their training experience that were classified into five age groups. Figure 4 shows respondents training experiences aggregated in terms of institution types and age groups.

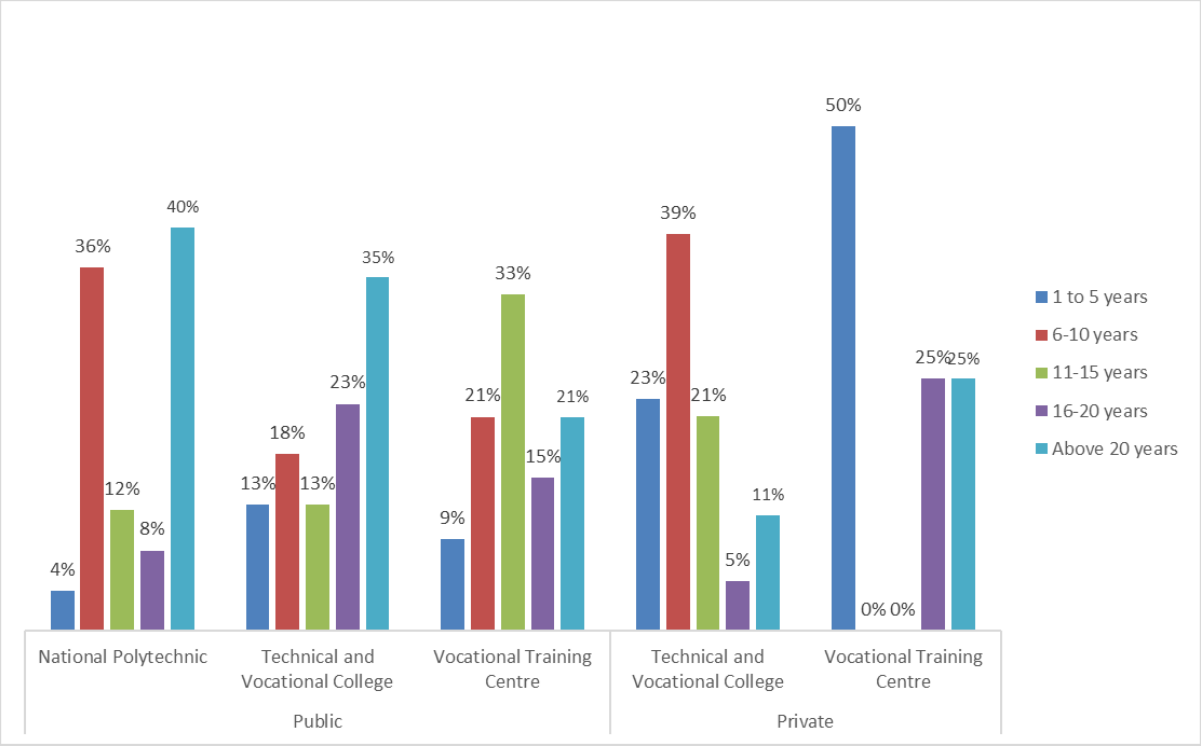

Figure 4: Respondents Training experience in Years

A large proportion of respondents from NPs had training experience of 6 -10 years (36%) and above 20 years (40%). Majority of respondents from public TVCs had training experience of 16 - 20 years (23%) and above 20 years (35%). In private TVCs majority of respondents had training experience of 6 - 10 years (39%) and 1 to 2 years (23%). For public VTCs, most respondents had training experience of 11-15 years (33%), 6 - 10 years (21%) and above 20 years (21%). On the other hand, majority of respondents from private VTCs had training experience of 1-5 years (50%). Generally, respondents from public institutions had more years of training experience than those from private.

4.3 Information Management Practices in TVET Institutions

The study determined information management practices that were employed by TVET institutions. It assessed how information is received, classified, processed and stored within the institutions.

4.3.1 Nature of information Created/Received

The study results indicated that all the institutions created and received information in both hard and soft copy formats. This showed that in addition to the traditional hard copies, all the institutions had embraced Information Communication Technology (ICT) in their information management systems.

4.3.2 Mode of Receipt of Information from External Sources

The study sought to establish how institutions received information. The findings are presented in table 4.

Table 4: Mode of Receipt of Information

Mode of Receipt of Information	Public			Private		Overall
	NP	TVC	VTC	TVC	VTC	%
Collaboration software	24%	18%	2%	11%	17%	12%
Courier Services	92%	73%	23%	39%	33%	51%
Hand delivery	96%	79%	71%	75%	75%	77%
Institutional emails	100%	99%	92%	100%	92%	97%
Social media applications	92%	70%	83%	82%	75%	79%
Through Postage	96%	89%	62%	51%	58%	71%
Any other	12%	16%	3%	13%	17%	11%

The results showed that institutions received information from external sources through various modes. Majority of public and private institutions were using institutional emails, social media applications, courier services and hand delivery as the main modes of receiving information. Postage services remained relevant in all the institutions while the usage of courier services was relatively low in public VTCs and private institutions. The use of collaboration software was minimal across all institution categories. Overall, the widespread use of emails and social media platforms for receipt of information showed that most institutions had embraced use of technology in information management.

Other modes of receiving information include an application for sending anonymous data, phone calls, oral communication, the institutional website, short message service (SMS), walk-in visits, WhatsApp, the student portal, and verbal communication via phone call.

4.3.3 Classification of Information

Information classification is normally undertaken to ensure accuracy, storage, security and easy retrieval of relevant information for administrative purposes. The study sought to establish how institutions were classifying information. The findings are presented in Table 5.

Table 5: Mode of Classifying Information

Classification Mode	Public			Private		Overall
	NP	TVC	VTC	TVC	VTC	%
Classifying/ determining the specific subject	84%	69%	30%	67%	42%	58%
Filing/placing in a specific subject file folder	84%	91%	86%	95%	92%	90%
Registering/ capturing in mail register	64%	44%	11%	31%	25%	33%
Any other	4%	5%	15%	3%	17%	8%

The findings provided insights on how institutions classified information. NPs and public TVCs perform relatively well, with subject classification (84% and 69% respectively) and strong filing compliance at 84% and 91%. In contrast, Public VTC and private institutions exhibited lower compliance, particularly in mail registration. Despite these challenges, the

majority of private institutions (95%) practiced filing information. Generally, filing emerged as the strongest practice in all the institutions (90%), while registering mail remained the weakest at 33%. Additionally, the use of alternative methods was minimal, averaging only 8%, suggesting a preference for conventional approaches in managing information.

4.3.4 Tracking Movement of Information

Tracking information in TVET institutions is essential for efficiency, accountability, and proper record management. The study sought to establish how institutions tracked the movement of information. The findings are presented in Table 6.

Table 6: Mode of tracking movement of information

Forms of Tracking	Public			Private		Overall
	NP	TVC	VTC	TVC	VTC	%
Bring-up diary	20%	10%	2%	7%	0%	8%
File census	4%	3%	2%	9%	0%	4%
File movement register	83%	59%	37%	43%	33%	50%
File transit slip	28%	8%	2%	3%	17%	8%
None	4%	26%	55%	38%	18%	36%
Any other	20%	17%	8%	12%	8%	13%

The findings showed consistent use of the file movement register with 50% of all the institutions using it. This suggested that the file movement register was widely recognized as essential for efficient record tracking across most institutions, particularly in NPs (83%) and public TVC (59%). The higher adoption rates in public institutions could indicate a stronger emphasis on formal documentation processes compared to private ones. The low usage of tracking tools like the bring-up diary and file transit slip could be attributed to limited capacity/lack of personnel in charge of information management. Additionally, the high percentage of institutions that were not using any of the tracking tools (55% public VTCs and 38% private TVCs) showed the existence of potential gaps in tracking the movement of information which could impede their operational efficiency. This further confirmed the lack of effective information management practices in the respective TVET institutions.

The institution employs various other methods to track information and ensure proper document management. Original documents are securely stored in designated files, while copies are distributed to relevant personnel. Document custodians ensure their safety. Tracking tools include a delivery handbook, file tracking system, G-Suite collaborative software, and a developing file movement register. Mails are forwarded via email, with original copies filed and distributed copies recorded. Some emails are downloaded and shared via WhatsApp for faster communication. Additional tracking measures include a register, SAP software for procurement approvals, and written records for reference and trust. However, formal evidence of document distribution is sometimes lacking.

4.3.5 Storage of Information

Efficient information storage in TVET institutions enhances accessibility, security and organization of data, leading to better decision-making and streamlined operations. It also reduces paperwork, minimizes data loss, and ensures compliance with regulatory requirements.

This study established how the TVET institutions were storing their information. The findings are presented in table 7.

Table 7: Storage of information

Types of Storage	Public			Private		Overall
	NP	TVC	VTC	TVC	VTC	%
Boxes	48%	29%	27%	21%	0%	27%
Cabinets	100%	100%	91%	93%	100%	96%
Computers	88%	95%	80%	97%	92%	91%
In trays	52%	48%	27%	36%	33%	39%
Online platforms /cloud	76%	43%	8%	44%	42%	37%
Any other	24%	11%	9%	8%	17%	11%

The findings showed that the use of boxes was less prevalent in both public and private institutions, with overall usage at 27%. Cabinets and computers were the most used methods in both Private and public institutions, indicating a strong preference for both physical and online storage. Generally, 37% of the institutions were using online platforms and cloud storage, with NPs and TVCs using them more extensively compared to VTCs. This disparity suggested that while NPs and TVCs are increasingly adopting emerging digital solutions such as cloud platforms, VTCs relied heavily on cabinets and computers to store information. Some institutions employed other various storage methods to manage and preserve records effectively. Digital storage solutions such as external hard drives, flash disks, and email storage which ensures easy access and backup of important information are used. For physical storage, documents are kept in files and organized on shelves or open shelves, while some records are securely placed in a safe. In certain cases, documents are stored on the floor within a designated storage room. Additionally, important records are transferred to the Nairobi archives for long-term preservation.

4.3.6 Security of Information

The study determined how TVET institutions safeguarded information against unauthorized access, modification, disclosure, disruption, or destruction. It focused on security measures implemented to ensure confidentiality, integrity, and availability throughout the data lifecycle. The results from the respondents are shown in Table 8.

Table 8: Information Security

Information Security	Public			Private		Overall
	NP	TVC	VTC	TVC	VTC	%
Data encryption	84%	53%	27%	61%	25%	49%
Data retention policies	18%	10%	2%	10%	17%	9%
Enforcement of Security policies	39%	13%	73%	13%	17%	12%
File Folders	89%	90%	6%	90%	100%	86%
Incident Response Plan	30%	5%	0%	8%	0%	7%
Network security	64%	33%	11%	28%	75%	26%
Physical Access Controls	97%	85%	14%	75%	33%	79%

Records storage areas/ repository/ store	72%	40%	20%	36%	8%	34%
Regular Audits	55%	26%	3%	30%	33%	25%
Regular backups	84%	73%	17%	56%	8%	53%
Regular updates of software	80%	35%	2%	25%	25%	27%
Surveillance (CCTV, security guard)	80%	45%	27%	51%	25%	41%

Physical access controls and file folders were the most used forms of security measures particularly in NPs and TVCs. In contrast, public VTCs displayed low levels in most of the information security measures. Similarly, data security measures such as data retention policies, Incident Response Plan and Enforcement of Security policies were employed by low proportion of institutions.

While public institutions tend to prioritize information security, private institutions may lag in critical areas, making them more susceptible to security breaches. Usage of incident response plans was very low especially among TVCs and VTCs. For instance, only 5% of public TVC had an incident response plan in place while none of the VTCs had, highlighting a potential vulnerability in their security posture. The overall findings underscore the need for a more robust approach to information security across all TVET institutions, particularly in data retention policies, incident response plans and enforcement of security policies.

4.3.7 Disposal of Non-Current Information

The study assessed how non-current information that was no longer actively used in daily operations was disposed in the TVET institutions. The results from the respondents are shown in Table 9

Table 9: Disposal of Non-current Information

Type/Category	Archiving	Destruction and Archiving	Destruction
Public			
National Polytechnic	40%	60%	0%
Technical and Vocational College	40%	43%	17%
Vocational Training Centre	67%	25%	8%
Private			
Technical and Vocational College	28%	63%	10%
Vocational Training Centre	60%	30%	10%

The findings revealed the disposal methods for non-current information within Technical and Vocational Education and Training (TVET) institutions. Most NPs (60%) adopted both archiving and destruction as methods of disposal. Among public Technical and Vocational Colleges (TVCs), 43% adopted both archiving and destruction, while 40% adopted archiving only. Similarly, in public Vocational Training Centers (VTCs), the majority (67%) opted for archiving only.

Among private institutions, 63% of private TVCs adopted both archiving and destruction, whereas the majority of private VTCs preferred archiving only. A low proportion of TVET institutions adopted destruction alone as a method of information disposal. This indicates a strong emphasis on preserving information for future reference, reflecting the institutions' recognition of the value of historical data in maintaining standards and institutional knowledge.

Overall, the findings suggest a mixed approach to information disposal across TVET institutions, balancing between information preservation and destruction. The variations in disposal practices may be attributed to institutional policies, resource availability, or differing priorities in data management.

4.3.8 Mechanisms put in place by Institutions to Guarantee Data Consistency

Data consistency is crucial for institutions because it ensures that all information is accurate, reliable and uniform across various systems and departments. Inconsistent data can lead to errors, miscommunication and poor decision-making, which can negatively impact operations and overall organizational performance. In TVET institutions, inconsistent trainees' records or programmes data could result in scheduling conflicts, inaccurate assessments or even compliance issues. Maintaining data consistency enhances operational efficiency, supports data-driven decision-making and builds trust with stakeholders by providing a clear and accurate representation of institutions' information at all times. This study sought to establish mechanisms institutions have adopted to guarantee data consistency across platforms. The results are presented in 10

Table 10: Mechanisms put in Place by Institutions to Guarantee Data consistency

Mechanisms	Public			Private		Overall
	NP	TVC	VTC	TVC	VTC	%
API integration for real-time synchronization of systems	29%	5%	5%	10%	8%	9%
Consolidation of data in a common repository/ data warehouse	58%	49%	26%	31%	42%	39%
Maintenance of a virtual real-time database	50%	18%	14%	26%	8%	22%
Maintenance of standardized data formats, units and naming conventions across different sources	54%	40%	17%	38%	42%	34%
Any other(s)	0%	24%	45%	23%	33%	28%

A minimal proportion of institutions (9%) had integrated their systems by use of application programming interfaces (API) for real-time synchronization of systems and therefore data consistency. Some of the systems integrated using APIs included trainee management systems, learning management systems, assessment and other databases which largely reduced the risk of discrepancies and errors in institutional data. Majority of institutions that had not used APIs to integrate their systems reported that they were either operating standalone systems or were yet to automate their systems. A significant proportion of institutions were consolidating institutional data in a common repository/ data warehouse (39%), and 34% maintained standardized data formats across different sources to guarantee data consistency. The results also revealed that on average, 22% of respondent institutions maintained a virtual real-time

database as a way of ensuring data consistency. The greatest proportion of this institutions were national polytechnics (54%). Maintenance of a virtual real-time database is crucial since it allows for real-time updating and synchronization of information across all systems. With a real-time database, changes made to trainee records, training programme schedules or assessment outcomes are instantly reflected across all platforms, reducing the chances of discrepancies and errors. The other mechanisms that were adopted by institutions included decentralised repositories based on departments and administrative offices, nonrealtime databases and social media platforms.

4.4 Regulatory and Policy Frameworks Governing Information Management

Regulatory and policy frameworks provide clear guidelines for information management and structured approach to safeguard sensitive data, ensure legal compliance, maintain data integrity, promote transparency, and reduce risks associated with information handling. This is crucial in sectors with stringent privacy and security regulations, as it establishes procedures for data collection, storage, access, and disposal. All TVET institutions are expected to adhere to various standards, laws and policies relating to information management. The study determined the availability and implementation of the main regulatory and policy frameworks. Table 11 shows the responses from the institutions.

Table 11: Availability and Implementation of regulatory and policy frameworks

Public Institutions

Relevant standards/laws/policies	NP		TVC		VTC	
	Availability	Implementation	Availability	Implementation	Availability	Implementation
Data protection Act No. 24 of 2019	58%	42%	31%	19%	12%	5%
Institutional Records management Policy	50%	50%	23%	21%	17%	15%
Access to Information Act 2016	46%	38%	26%	21%	6%	3%
Public Archives and Documentation Service Act 1990	21%	21%	16%	13%	3%	0%
Copyright Act 2003	58%	50%	20%	14%	6%	3%
Computer misuse and cybercrimes Act 2018	38%	38%	24%	14%	9%	6%
Official Secrecy Act 1968	54%	54%	31%	28%	9%	6%
NP regulatory standard	88%	83%	3%	0%	5%	5%
Accreditation handbook	63%	63%	33%	34%	23%	18%
TVET Regulations 2015	88%	88%	69%	64%	44%	35%
TVET Act, 2013	100%	100%	98%	94%	77%	74%

Private Institution

Relevant standards/laws/policies	TVC		VTC	
	Availability	Implementation	Availability	Implementation
Data protection Act No. 24 of 2019	38%	31%	17%	17%
Institutional Records management Policy	26%	26%	8%	8%
Access to Information Act 2016	20%	18%	0%	0%
Public Archives and Documentation Service Act 1990	8%	7%	0%	0%
Copyright Act 2003	15%	13%	8%	8%
Computer misuse and cybercrimes Act 2018	16%	15%	0%	0%
Official Secrecy Act 1968	13%	13%	0%	0%
NP regulatory standard	8%	7%	0%	0%
Accreditation handbook	46%	46%	25%	25%
TVET Regulations 2015	64%	62%	58%	50%
TVET Act, 2013	82%	79%	92%	92%

A large proportion of the NPs had acquired and were implementing the standards, regulatory and policy frameworks except the Public Archives and Documentation Service Act 1990, Computer misuse and cybercrimes Act 2018, and Access to Information Act 2016. The proportion of TVCs that had acquired the regulatory and policy documents was lower than that of the NPs while the VTCs had the lowest availability and implementation levels of the documents. However, majority of the TVCs and VTCs had acquired the TVET Act Cap 210A and TVET regulations 2015. This observation could be attributed to the fact that these documents form part of the basic requirements for accreditation. Based on this observation, the availability and implementation of the regulatory and policy frameworks for information management could also be improved by incorporating them as part of the basic requirements for accreditation.

In comparison to public TVET institutions, majority of the private TVET institutions had not acquired the regulatory and policy documents except the TVET Act CAP 210A, TVET Regulations 2015. Generally, the level of availability and implementation of the information management regulations and policies among private TVET institutions was low. The private institutions basically had acquired regulatory and policy documents related to accreditation while those relating to other aspects of information management were largely unavailable. The absence of these critical documents is likely to adversely affect information management practice in the institutions.

4.5 Availability and Capacity of Information Management Personnel

This study sought to establish availability, qualifications, experience and upskilling programmes of personnel engaged by TVET institutions as information management officers. It further sought to establish whether institutions had included positions of information management personnel in their approved establishment.

4.5.1 Availability of Information Management Personnel in TVET Institutions

Information management professionals play a crucial role in ensuring efficient handling, storage, retrieval and dissemination of information. Proper management of data related to trainees, trainers, programmes, performance and other administrative aspects is essential for smooth operations and decision-making in TVET institutions. This study sought to determine the availability of personnel in-charge of information management in the TVET institutions. Figure 5 shows the responses from the institutions.

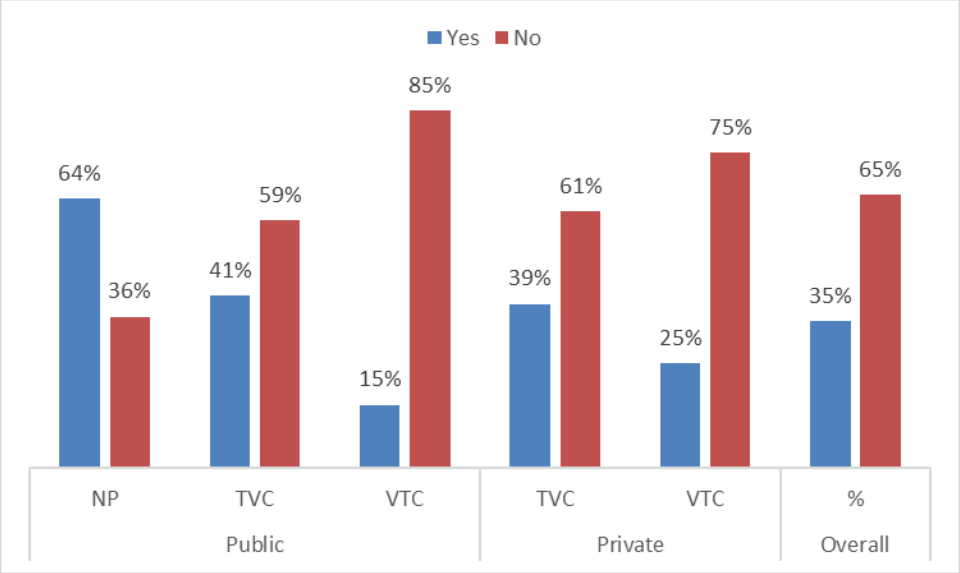

Figure 5: Availability of personnel in charge of information management

A significant proportion of the private institutions (39% of TVCs and 25% of VTCs) reported having designated personnel responsible for information management with clearly defined roles, while the remaining majority in both categories indicated otherwise. In public institutions, the majority of National Polytechnics (67%) had designated personnel responsible for information management, followed by Technical and Vocational Colleges (41%), while Vocational Training Centres had the lowest representation at 15%.

Overall, most institutions (65%) did not have designated personnel responsible for information management. Despite the absence of designated personnel for information management and a central registry, some institutions manage information through various departments, including the registrar's office, the secretary's office, the ICT department, and other key administrative units. This indicated that information is handled at the departmental level rather than through a centralized system in most of the institutions.

4.5.2 Qualification of the Information Management Personnel

Qualified information management personnel possess the technical expertise required to design, implement and maintain effective data management systems, and they play a pivotal role in ensuring the accuracy, security and accessibility of critical data. Well trained personnel are trained to navigate complex regulatory requirements, mitigate risks and safeguard sensitive information from breaches or misuse. This study sought to determine the areas of specialization of personnel deployed by TVET institutions as information managers. Results are presented in Figure 6

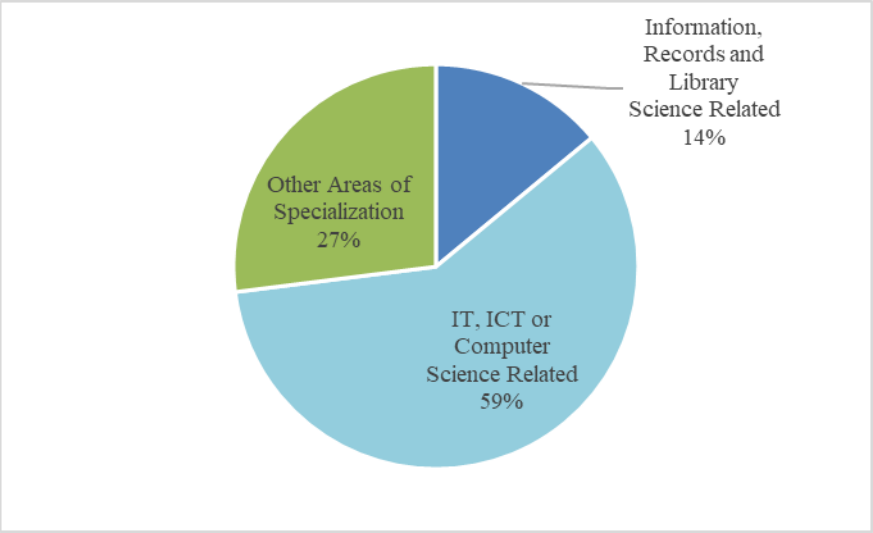

Figure 6: Areas of Specialization of Persons in charge of Information Management

Majority (59%) of the personnel engaged as information managers had qualifications in IT, ICT or computer related areas, 27% had qualifications in other areas of specialization not related to information management. The other qualifications included health sciences, Education and training, communication and food science. A relatively low proportion (14%) had qualifications in information, records and library sciences. It is important for institutions to engage information managers with qualifications that are well aligned and consider regular capacity building of the personnel. Without relevant qualifications, personnel may lack the skills to manage information efficiently, leading to errors, inefficiencies and potential vulnerabilities that could compromise institution's operations and reputation.

4.5.3 Experience of Personnel in Charge of Information Management

Work experience plays a significant role in the competence of personnel, particularly in critical fields like information management. Experience contributes to the development and perfection of key skills, problem-solving abilities and a deeper understanding of complex systems. This study sought to establish the experiences of officers engaged by TVET institutions as information managers. Table 12 provides years of experience of the personnel in charge of information management across different institution categories.

Table 12: Information Management Officers' Experience

Type/Category	Below 5 years	6-10 years	11-15 years	Above 16 years
Public				
National Polytechnic	13.3%	80.0%	6.7%	0.0%
Technical and Vocational College	55.2%	24.1%	13.8%	6.9%
Vocational Training Centre	33.3%	22.2%	11.1%	33.3%
Private				
Technical and Vocational College	54.2%	41.7%	4.2%	0.0%
Vocational Training Centre	66.7%	33.3%	0.0%	0.0%
Overall	**45.0%**	**40.0%**	**8.8%**	**6.3%**

It was noted Most officers deployed by the institutions as information managers had experience of 10 years and below. This situation was more pronounced in private VTCs where all information management officers had less than 10 years of experience. This implied that information management officers in TVET institutions may lack requisite experience for effective data handling, improved systems management and ability to meet both educational and administrative information needs.

4.5.4 Upskilling (CPD) of Personnel(s) in Charge of Information Management

Upskilling involves improving personnels' skills to meet evolving job demands. It is crucial for personnel in charge of information management to stay updated on new tools and practices to remain effective. This study assessed whether personnel in charge of information management undertook upskilling. Table 13 presents the proportion of the personnel in charge of information management upskilled in the TVET institutions.

Table 13: Personnel in charge of information management upskilled

Type/Category	Yes	No
Public		
National Polytechnic	56.3%	43.8%
Technical and Vocational College	36.4%	63.6%
Vocational Training Centre	10.0%	90.0%
Private		
Technical and Vocational College	37.5%	62.5%
Vocational Training Centre	0.0%	100.0%
Overall	**36.0%**	**64.0%**

The study showed disparities in upskilling across the TVET institutions. A majority (56.3%) of information management personnel in the NP had undergone upskilling. In contrast, only a small percentage (0-36.4%) of VTCs and TVCs had undertaken similar initiative.

4.5.5 Inclusion of Information Management Office in Organizational Structure

The respondents were asked to indicate whether the positions of information management personnel were included in the institutions' organizational structure. The inclusion of such positions in the structure could enhance the efficiency of information management within the institutions. Figure 7 illustrates the proportion of institutions that have integrated information management personnel positions into their organizational structure.

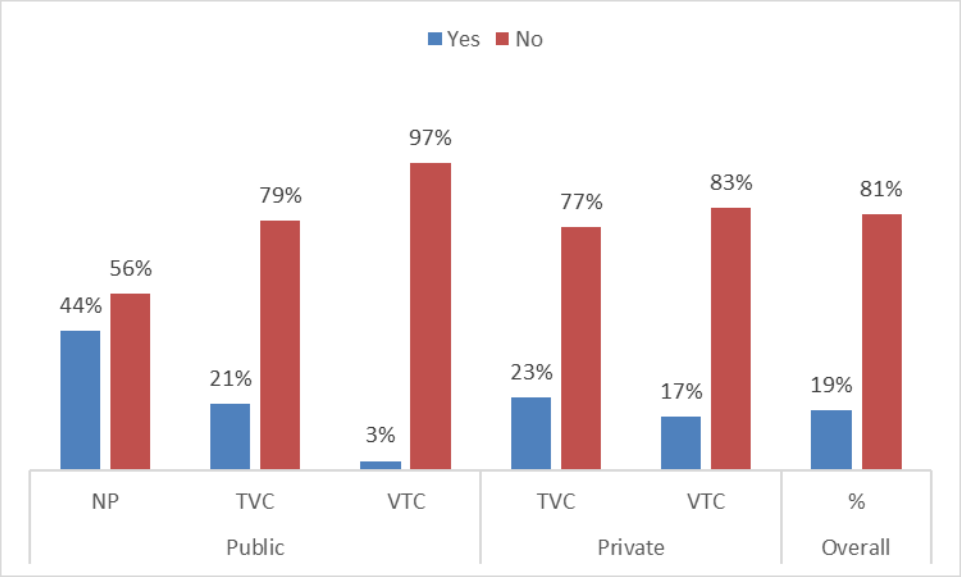

Figure 7: Information management office in organizational structure

Most of the TVET institutions (81%) had not included an information management office in their organizational structure. This suggested that even in cases where institutions had personnel responsible for information management, their roles were not defined in the structure. However, the proportion of NPs that have included information management offices were 46%, indicating a relatively greater recognition of information management officers.

4.6 Availability of Physical Resources for information Management

Infrastructure is a critical requirement for effective information management in TVET institutions. Availability of a robust information management infrastructure, including records management unit/registry and IT systems enables seamless information storage, integration and retrieval. Without adequate infrastructure, TVET institutions risk data fragmentation, inefficiencies and an inability to adapt to evolving educational and industry demands, ultimately hindering their ability to produce skilled and job-ready graduates. This study sought to establish whether training institutions had invested in a well-equipped registry to support information management.

4.6.1 Institutional Records Management Unit/ Registry

Respondents were asked to indicate whether their institutions had established and furnished a records management unit/ registry. The results are presented in Table 14

Table 14: Availability and Furnishing of Records Management Unit/Registry

Type/Category	Availability of Records management Unit	Records management unit equipped/Furnished
Public	**29%**	**74%**
NPs	64%	75%
TVCs	36%	76%
VTCs	8%	60%
Private	**15%**	**73%**
TVCs	18%	73%
VTCs	-	-

Overall	**25%**	**74%**

Results from the study showed 64% of NPs had records management units, the highest among all categories, with 75% of these units being well-equipped. Public VTCs recorded the lowest availability (8%) and were least equipped (60%), indicating a critical gap in records management infrastructure. Public TVCs reported 36% availability with 76% of them well-equipped, while private TVCs indicated 18% availability with 73% equipped. Private VTCs had no designated records management unit. Generally, 25% of institutions had records management unit and 74% of these units were well-equipped. This indicates that while records management infrastructure is limited, existing units are generally well-furnished.

4.7 Availability of Financial Resources for Information Management

4.7.1 Availability of Budget for Information Management

The provision of adequate funding can greatly enhance information management within institutions by enabling the acquisition of necessary technology, skilled personnel, and infrastructure. This will lead to improved data collection, analysis, accessibility, and overall decision-making capabilities. Insufficient funding can result in outdated systems, limited data access, and inefficient information management practices that can hinder operational effectiveness.

The study assessed the availability of financial resources allocated for information management. Figure 8 shows the proportion of the institutions that had allocated financial resources.

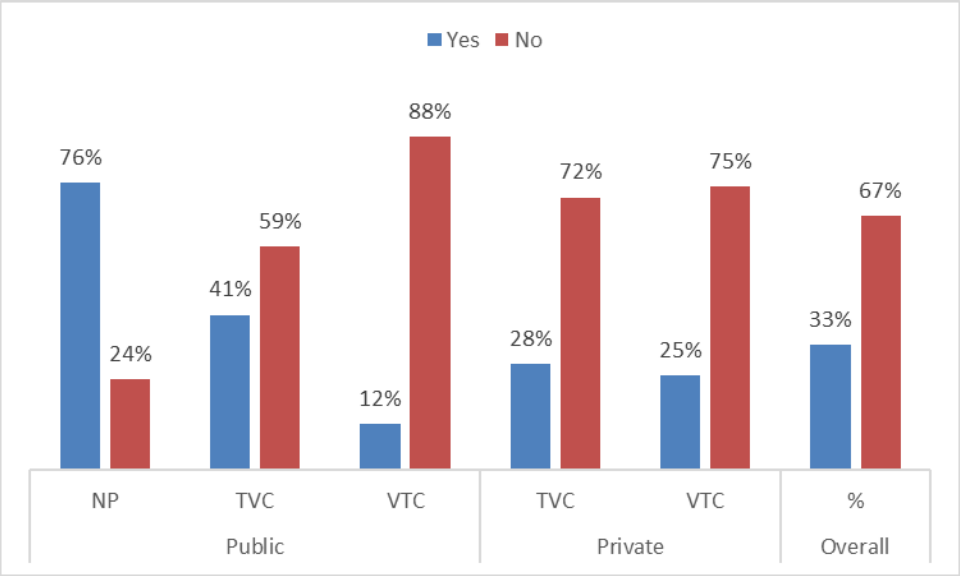

Figure 8: Availability of specific budget for information management

Most TVCs and VTCs had not allocated a specific budget for information management. However, most NPs had designated a vote head for information management. A higher proportion of private TVCs lacked a dedicated budget for information management as compared to the public TVCs. The study also showed that public VTCs lagged in establishing a vote head for information management. Generally, a significant proportion (67%) of

institutions had not allocated a specific budget for information management. The lack of dedicated funding can impede the implementation of effective information management systems and potentially affect the overall operations at the institutions. Institutions that did not have a dedicated vote head indicated that they drew funds for information management from various sources such as administration, ICT, stationery and maintenance and library budgets. Some respondents noted that expenses were covered on a need basis, through petty cash, donations, or county government allocations. Other institutions relied on supplies from the county government or state department, while others incorporated costs into general operational budgets. However, financial constraints, lack of awareness, and absence of a structured financial plan resulted in inadequate funding. Institutions frequently adjusted other budget lines to accommodate information management. Alotaibi, 2021 observed that the lack of financial allocations to get the state-of-the-art information systems greatly affected the implementation of information management systems.

4.7.2 Preparation of Information Management Procurement plans that include Supplies

Annual procurement plans provide structured roadmap for the purchase of goods and products required by an organization or department within a particular year. This results in optimization of costs, enhanced efficiency, mitigation of risks and improved allocation of resources through prior identification of necessary goods, services and appropriate vendors. This study sought to determine whether institutions were preparing annual information management procurement plans that included supplies. Results are presented in Figure 9

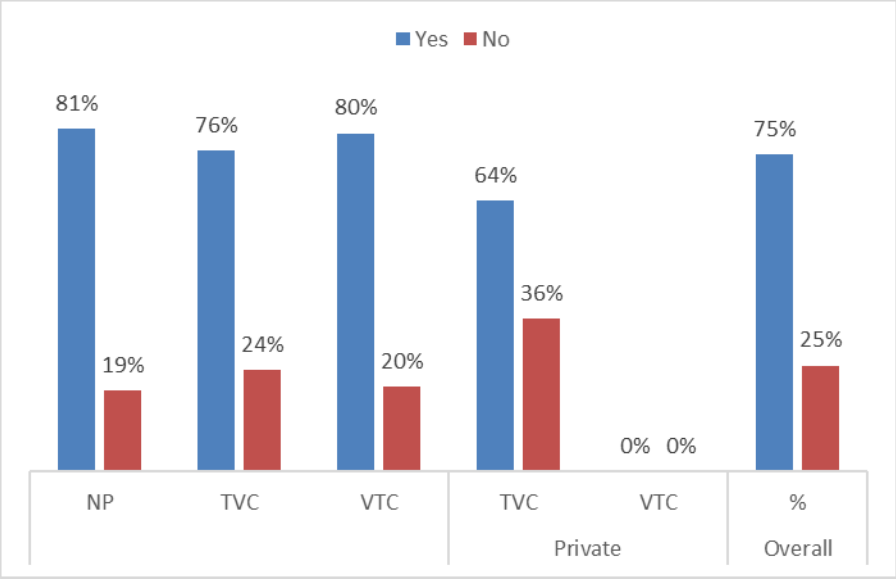

Figure 9: Preparation of annual procurement plans for information management

The NPs had the highest proportion of institutions that prepared procurement plans followed by public VTCs and TVCs respectively. None of the private VTCs prepared annual procurement plans for information management.

4.8 Availability and Utilization of Information Management Systems

Adoption and utilization of a robust information management system enhances efficiency by ensuring accurate, up-to-date and easily accessible information, which is vital for both

academic and administrative purposes. The study sought to establish if TVET institutions had adopted and were utilizing Information Management Systems. It further determined the technology platforms adopted by institutions that reported to having acquired information management systems.

4.8.1 Availability and Level of utilization of Information Management Systems for Record Management

The respondents were asked to indicate whether they had adopted and were utilizing information management system (IMS) for record keeping. The results findings are presented in Table 15.

Table 15: Information Management System

Category/Type	Availability	Utilization
Public		
National Polytechnic	84%	100%
Technical and Vocational College	45%	97%
Vocational Training Centre	6%	100%
Private		
Technical and Vocational College	51%	90%
Vocational Training Centre	25%	100%

Most of the NPs (84%) were implementing information management systems. A significant proportion (45%) of public TVCs had information management systems, 97% of them utilized the systems. The availability and utilization of MIS was lowest (6%) in public VTCs. Among the private TVCs, 51% had an information management system, with 90% utilizing the systems. Private VTCs indicated 25% availability, with full utilization among those that had the system. Institutions that had an information management system but were not utilizing could be due to low staff capacity and/or non-functional IMS modules.

The general low availability of information management systems could be attributed to the challenge of streamlining record management processes in the TVCs and VTCs. Therefore, there is an urgent need for the institution to adopt information management system. Further, there is a clear indication that where the system was available, it was fully utilized.

4.8.2 Information Management System/ Platform adopted by Institutions

The choice of an IMS for a TVET institution is influenced by factors such as the institution's specific needs, ease of use, scalability to accommodate future growth and ease of integration with existing systems. Other important considerations included security features, regulatory standards and cost-effectiveness. This study sought to establish the main information management systems/platforms selected and acquired by the targeted institutions. Table 16 shows the various platforms cited by respondents.

Table 16: Information Management System/ Platform acquired by Institutions

System Adopted				Private		
	NP	TVC	VTC	TVC	VTC	Overall
EDRMS	5%	0%	0%	0%	0%	1%
ERP	81%	64%	0%	42%	0%	57%
LMS	52%	19%	0%	23%	67%	26%
MIS	62%	53%	25%	55%	0%	55%
Other(s)	14%	6%	75%	39%	33%	21%

The ERP (57%) and MIS (55%) were the systems that had been acquired by majority of the institutions. In addition, some institutions had implemented other information management systems to enhance their operations. These included Data Transfer Systems, QuickBooks Accounting System as well as KOHA and CALIBRE for library management.

4.9 Availability and Integration of Standardized Information Management Processes in Institutions' QMS

Standard operating procedures (SOPs) provide instructions that describe processes for tackling specific activities to mitigate errors and maintain consistency. The respondents were asked whether they had developed standard operating procedures for information management. The findings are presented in Table 17.

Table 17: Availability of Standard Operating Procedures for Information Management

Category/Type	Proportion	
	Yes	No
Public	**18%**	**82%**
National Polytechnic	72%	28%
Technical and Vocational College	14%	86%
Vocational Training Centre	2%	98%
Private	**18%**	**82%**
Technical and Vocational College	21%	79%
Vocational Training Centre	0%	100%
Overall	**18%**	**82%**

A large proportion of NPs (72%) had developed standard operating procedures for information management. This could be attributed to the capacity of staff in the institutions and ISO certification requirements. However, very low proportions (0 to 21%) of TVCs and VTCs had developed standard operating procedures. This signifies low integration of quality management practices in information management among TVET institutions. Absence of such procedures could make information management disorderly and open to abuse.

4.10 Challenges faced by TVET institutions in information management and possible mitigation

Information management is essential for the smooth operation of TVET institutions, ensuring efficient record-keeping, decision-making, and service delivery. However, many TVET institutions face significant challenges in managing information, which can hinder their

effectiveness and overall performance. Identifying these challenges and implementing appropriate mitigation measures is crucial to enhancing institutional efficiency and improving the quality of education and training provided. Some of the main challenges that were highlighted by the respondents included:

i. Shortage of skilled personnel
ii. Inadequate capacity building and awareness creation
iii. Information security concerns, such as data breaches and unauthorized access undermine information integrity;
iv. High costs associated with hiring and retaining qualified and experienced staff;
v. Inadequate structural and technology infrastructure
vi. Financial constraints
vii. Lack of a structured framework for information management
viii. Long distances from postal offices and poor security

Mitigation Measures

The following strategies were proposed by the respondents as key mitigation measures for improving information management in the institutions:

i. **Infrastructure and Technology:** Respondents stressed the importance of budget allocations for servers, ERP systems, and improved internet connectivity. The creation of a central registry and automated systems is recommended to enhance data handling, along with storage solutions to improve security and access.
ii. **Capacity Building:** Ongoing staff training in information management practices is vital. Hiring additional personnel like data clerks is suggested to strengthen institutional capacity.
iii. **Policy Development and Compliance:** Institutions should create standard operating procedures (SOPs) for data management and establish clear data access and security policies. Staff should be educated on legal frameworks and institutional policies.
iv. **Collaboration and Support:** The respondents also highlighted the need for government and stakeholders to provide resources, training, and infrastructure support, alongside building partnerships for resource mobilization.
v. **Security Measures:** Cybersecurity assessments, ongoing training, and physical security measures are recommended to protect sensitive information.
vi. **Digital Transformation:** There is a focus on digitalizing records and adopting cloud storage to reduce physical storage requirements and improve data retrieval. A unified data management system is needed for better information sharing across departments.

CHAPTER FIVE

SUMMARY, CONCLUSSION AND RECOMMENDATIONS

5.1 Summary

Most institutions had integrated digital technology in their information management systems. Information was received via emails, hand delivery and social media platforms. Although filing was the most employed method of information management within the institutions, mail registration remained a significant challenge, especially for Public VTCs and private institutions. A significant proportion (50%) of the institutions used file movement registers to track the movement of information. The findings also indicated that most institutions preferred the use of cabinets and computers for information storage as opposed to metal boxes. Although some institutions were adopting online and cloud storage, traditional methods remain dominant, especially among VTCs. There was weak enforcement of security and lack of data retention policies, and minimal use of incident response plans. This exposed the institutional data to significant vulnerabilities, emphasizing the need for stronger security frameworks.

A large proportion of the NPs had acquired and were implementing standards, regulatory and policy frameworks except the Public Archives and Documentation Service Act 1990, Computer misuse and cybercrimes Act 2018, and Access to Information Act 2016 which were acquired and implemented by a few NPs. The proportion of TVCs and VTCs that had acquired the regulatory and policy documents was lower than that of the NPs. Majority of public TVCs and VTCs had acquired the TVET Act Cap 210A and TVET regulations, 2015. In comparison to public TVET institutions, majority of the private TVET institutions had not acquired the regulatory and policy documents except the TVET Act CAP 210A and TVET Regulations 2015. Generally, the level of availability and implementation of the information management regulations and policies among private TVET institutions was relatively low.

Majority (59%) of the information management personnel had computer-related qualifications while 14% had information, library and records management related qualifications. A significant proportion (27%) of the information management officers had qualifications in other areas of specialization, indicating a gap in relevant expertise for effective information management. Most of the officers that were deployed as information management personnel had experience of 10 years or less suggesting a potential gap in expertise for effective data handling, systems management, and meeting both educational and administrative information needs. A majority (56.3%) of NPs had upskilled personnel in information management, while a smaller percentage (0% - 36.4%) of the VTCs and TVCs had taken similar initiative. Most institutions (81%) had not incorporated information management personnel positions in their approved organizational structure.

A small proportion (25%) of institutions had established records management units with 75% of the units well-furnished and equipped. Institutions that did not have Records Management Unit relied on decentralized storage within various departments and administrative offices such as the registrar’s office, principal's secretary office, the ICT department and finance office. The limited availability of record management infrastructure could hinder the effective implementation of information management systems in TVET.

Most institutions (67%) had not allocated a specific budget for information management which could potentially affect their overall operations. The institutions that did not have a dedicated vote head for information management sourced funds from various vote heads such as administration, ICT, stationery and maintenance and library budgets. Some institutions indicated that expenses for information management were covered on a need basis, through petty cash or donations while others relied on supplies from the county or national government. The institutions frequently adjusted other budget lines to accommodate information management.

Most of the NPs (84%) were implementing information management systems. A significant proportion (45%) of public TVCs had information management systems out of which 97% were utilizing the systems. The availability and utilization of information management systems was lowest (6%) in the public VTCs. Among the private TVCs, 51% had an information management system, with 90% utilizing the systems. All the 25% private VTCs that had management information systems were utilizing it.

A large proportion of NPs (72%) had developed standard operating procedures for information management. A lower proportion of TVCs and VTCs had developed standard operating procedures. This signified low integration of quality management practices in information management among the VTCs and TVCs. Absence of such procedures could make information management disorderly and open to abuse.

The main challenges that were faced by institutions in information management included inadequate skilled personnel, insufficient infrastructure, security risks and financial constraints. The proposed mitigation measures included improved investment in infrastructure, capacity building of staff, and adoption of digital solutions. Other mitigation measures proposed were the establishment and implementation of information management policies and fostering collaboration among stakeholders.

5.2 Conclusion

The information management practices across Kenyan TVET institutions varied significantly due to challenges such as a shortage of skilled personnel, inconsistent digital technology adoption, and inadequate resources. While many institutions relied on decentralized approaches, only a few had dedicated information management staff or well-organized record-keeping systems. The key barriers to efficient information management included security concerns, limited financial resources, and insufficient staff training. To improve outcomes, it is crucial to enhance digital adoption, invest in staff development, and strengthen infrastructure. Establishing standardized policies, fostering collaboration, and ensuring compliance will not only improve decision-making and service delivery but also enhance the overall performance and sustainability of TVET institutions.

The findings revealed that while digital technology had been integrated into information management systems, traditional methods still dominated, especially in VTCs. Challenges such as weak security enforcement, inadequate skilled personnel, insufficient infrastructure, and financial constraints hindered effective information management. Regulatory frameworks existed but were inconsistently implemented, particularly in private TVET institutions. Many institutions lacked dedicated budgets and structured policies, leading to inefficiencies.

Although some institutions had adopted information management systems, utilization remained low in VTCs. The information management practices could be improved through increased investment in digital solutions, capacity building, infrastructure development, and stronger policy enforcement.

5.3 Recommendations

Based on the findings from this study, the following recommendations were made to improve information management in the Kenyan TVET institutions;

i. Institutions to integrate systems to guarantee data consistency, ease of tracking and retrieval of information;
ii. Institutions to hire/deploy qualified and experienced officers to coordinate information management;
iii. Institutions should organize periodic capacity building programmes for their personnel to keep abreast with current trends in information management;
iv. Institutions to include provision for information management officers in institutions approved establishment;
v. Institutions to establish information management infrastructure including registry, ICT infrastructure and associated applications;
vi. TVET Authority to include regulatory and policy frameworks guiding information management in quality assurance tool;
vii. Provide a dedicated vote head and budget for information management;
viii. TVET institutions should prioritize adoption and effective utilization of information management systems;
ix. TVET institutions should develop and implement standard operating procedures for information management.

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APPENDICES

Appendix 1: Questionnaire

Technical and Vocational Education and Training Authority (TVETA) is conducting a study on Assessment of Information Management Practices in Kenyan TVET institutions. The findings from this study will help in making informed decision-making and policy formulation to support the institutions in the establishment of effective and secure information management systems. You have been identified as one of the respondents. Your honest response to the items of this questionnaire will remain confidential and the data will be used entirely for the intended purpose.

Preliminary Information

101 Respondent

☐ Administrator

☐ Registrar/ Person in charge of information management

102 Gender of the Respondent

☐ Male

☐ Female

103 Respondent has any disability?

☐ Yes

☐ No

103 Years of experience

☐ 1 to 5 years

☐ 5 to 10 years

☐ 10 to 15 years

☐ 15 to 20 years

☐ Over 20 years

104 Name of TVET provider: ……

105 County (Please select)

106 Type of institution/ provider

☐Private

☐Public

107 Category of institution/ provider

☐ Vocational Training Centre

☐ Technical and Vocational College

☐ National Polytechnic

☐ KSTVET

Part 2: Current Information Management Practices in TVET Institutions (how information is received/created from external sources, classification, tracking of information, storage & security of information, access of information, media, information disposal)

201a What is the nature of information created/received by your institution?

q Hard Copies

- q Soft copies
- q Hard and Soft Copies

201b How is information received from external sources?

- q Hand delivery
- q Institutional Emails
- q Through Postage
- q Courier Services
- q Collaboration software
- q Social Media applications
- q Any other (state)

201c How is created/ received information processed/ classified?

- q Registering/ captured in mail register
- q Classifying/ determining the specific subject
- q Filing/placing in a specific subject file folder
- q Other (State)

201d How does your institution track the movement of information within the institution?

- q File movement register/issuance register
- q File transit slip
- q Bring-up diary
- q File census

201e How is the information received stored?

- q Cabinets
- q Computers
- q Online platforms/ cloud
- q In trays
- q Pigeonholes
- q Any other (state)

201f How is the information secured?

- q Filing
- q Records storage areas/ repository/ records store
- q Surveillance (CCTV, security guard)
- q Physical Access Controls
- q Network security
- q Data encryption
- q Regular backups
- q Regular updates of software
- q Enforcement of Security policies
- q Data retention policies
- q Incident Response Plan

- q Regular Audits
- q Any other (state)

201g To what extend do you agree or disagree with the following statement;

Statement	SD	D	N	A	SA
Information retrieval in the institution is fast and effective					

201h How do you dispose of non-current information?

- q Destruction (recycling, burning, shredding, deleting)
- q Archiving
- q Destruction and Archiving
- q Any other (state)

201i Which of the following mechanism(s) has TVETs put in place to guarantee data consistency across the institution

- q Consolidation of data in a common repository/ data warehouse
- q Maintenance of a virtual real-time database
- q Maintenance of standardized data formats, units and naming conventions across different sources
- q API integration for real-time synchronization of systems
- q Any other (State)

PART 3: Regulatory and policy framework governing information management

(check for availability and implementation of relevant standards, laws, policies, effectiveness of applicable regulatory and policy framework)

301a Indicate availability and implementation of the following standards, laws and policies in your institutions;

Relevant standards/laws/policies	Availability (Yes/No)	Implementation (Yes/No)
Data protection Act No. 24 of 2019		(Check for registration with the Office of the Data Protection Commission)
Institutional Records management Policy		(Monitoring reports)
Access to Information Act 2016		(Check for existence of PC&ATI Committee)
Public Archives and Documentation Service Act The Public Archives Act 1990		(check on procedure for disposal of records, record retention and disposal schedule)
Copyright Act 2003		
Computer misuse and cybercrimes Act 2018		
Official Secrecy Act 1968		

NP regulatory standard		
Accreditation handbook		
TVET Regulations 2015		
TVET Act, 2013		

301b In your view, are the available regulatory and policy framework effective?

[Yes, No]

PART 4: Availability and capacity of information management personnel engaged by TVET Institutions

401a Does your institution have personnel in charge of information management and their roles clearly defined?

[Yes, No]

401b If Yes in 401a, what is the qualification of the officer(s) in charge of information management

401c What is the experience of the officer(s) in charge of information management

401d Has your institution conducted upskilling (CPD) for information management personnel(s) in the last three years (eg from Kenya Association of Records Managers and Archivists -KARMA)?

401e Are information management personnel positions part of the approved organizational structure?

[Yes/No]

PART 5: Availability of physical resources for information management

501a Does your institution have a records management unit/ registry?

☐ Yes

☐ No

501b If Yes **in 501a,** Is the records management unit well equipped and furnished? (check for furniture, cabinets,)

501c Does your information management office prepare annual procurement plans that include supplies?

PART 6: Availability of financial resources allocated for information management

601a Does your institution have a vote head in the current budget for information management?

☐ Yes

☐ No

601b If No, how do you fund information management?

PART 7: Availability of information management systems

701a Has your institution adopted information management systems for records management?

☐ Yes

☐ No

701b If yes in 701a, which information management system/ platform has your institution adopted?

- q EDMRS
- q LMS
- q ERP
- q MIS
- q Others (state)

701c Is the system in 701b above being utilised? (check whether the records in the system are current)

PART 8: Availability and integration of standardized information management processes in institutions QMS

801Does your institution has standard operating procedures for information management?

☐ Yes

☐ No

PART 9: Challenges faced by TVET institutions in information management and possible mitigation

901a What are some of the challenges faced by your institution in information management?

902b What mitigation measures would you propose for the above-mentioned challenges?