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CHALLENGES FACING IMPLEMENTATION OF HEALTHCARE WASTE MANAGEMENT PROJECTS IN KENYA

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ABSTRACT

The general objective of the study was to determine challenges encountered during the implementation of the healthcare waste management projects in Kenya. A descriptive research design was used for this study. The study adopted purposive sampling technique, of which 30% of the total target population of public health officers and other respondents who participated in the project were used. The number of respondents for this study was 90. The study used SPSS version 21 to establish the descriptive and inferential results regarding the mean, frequencies, standard deviation, regression and correlation. The results were presented in form of charts, graphs and Table. Correlation results revealed that that project resources, project quality management, monitoring and evaluation and availability of technology have a positive and significant effect on project performance during implementation in Kenya. Regression results also indicated that the independent variables had a positive and significant effect on project performance during implementation in Kenya. The study recommended that HCW projects ensured there was sufficient project resources to carry out the project work well and seek additional financial aid form the government and development partners to ensure the projects are sufficiently financed and have a contingency fund as well, in addition resource planning tools should be applied always. Quality requirements set through stakeholder meetings should be clearly followed to the latter, also capacity building in the projects should always be a key objective to ensure that the project personnel are well equipped technically to carry out their activities and improve the efficiency and effectiveness of carrying out their duties. Lastly compliance with requirement provides a guiding system for project tasks and leads to the correct results hence should be ensured. Monitoring and evaluation should be conducted routinely throughout implementation of the HCW projects, by professionals of the field and at the end as well to establish if the product is acceptable. The technology chosen should match the work it is to be used in and be affordable to run in the project. Also it should have technical staff that understands it and that can handle it well under various constraints that may arise from time to time.

Key Words: *Project Resources, Project Quality, Project Monitoring And Evaluation, Technology, Medical Waste*

INTRODUCTION

Healthcare waste refers to hazardous waste materials generated by healthcare activities, including a broad range of materials, from used needles and syringes to soiled dressing, body parts, diagnostic samples, blood, chemicals pharmaceuticals, medical devices and radioactivity materials (WHO, 2015). There are 5.22 million people every year in the world, including 4 million children, who die from the diseases caused by the exposure of the medical waste, so effective waste management becomes more and more important than before (Nie, Qiao & Wu, 2014). An independent study on HCWM financing by PATH found that at the national level, there was no explicit allocation of funds for HCWM and there were no explicit budget lines. At facility level, this study found that the average cost of HCWM per patient was Ksh 12.6.

There is therefore need to address the implementation of the healthcare waste projects in Kenya which is the common denominator in all issues arising out of HCW management. HCW management is the responsibility of public health departments of the ministry of health across all the 47 counties, since the devolution happened. The HCWMP in Kenya, is the first government project of its type specifically targeting HCW in the country, with stakeholders in both the private sector, NGOs and various government institutions in Kenya. Just like all projects constraints of time, cost and quality are used to judge implementation and indicate success or a miss, these parameters apply to this project as well, and with a lot more agency than other projects since the implementation of this type of projects have implications on both human safety at stake and the environment as well. The level of success in carrying out the HCW management activities depends heavily on the quality of the managerial, financial, technical and organizational performance of the respective parties, while taking into consideration the associated risks involved. However a good performance is a challenge in many organizations due to the complexity involved in project implementation. Project success is recorded to have unsatisfying low rates (only 10 to 30 percent) of intended projects (Raps & Kauffman, 2005). Project implementation challenges may include poor monitoring and evaluation, inadequate resources, the lack of fit between strategy and organization structure and culture, unhealthy organization politics, lack of motivation of staff, the lack of involvement and participation of staff, the negative perception and resistance emanating from staff and other stakeholders (Okumus, 2003).

Globally, healthcare waste management is underfunded and poorly implemented. The combined toxic infectious and other hazardous properties of HCW represent a significant environmental and public health threat. A recent literature review came to the conclusion that over 3.5 billion people are at risk from illness caused by healthcare waste and many poor waste treatment practices cause violation of fundamental human rights.

Aseweh and Bouwer (2008) state that in South African facilities do not quantify medical waste and there is no policy and plan in place for managing HCW waste unlike the municipal waste. Manyele and Anicetus (2008) in their research on the main disposal methods for HCW waste in Tanzania indicated use of outdated technology that is not advisable. Very few hospitals (4%) were reported to use autoclave for HCW treatment probably due to the fact that this is an expensive technology. The management of HCW such as sharps waste in health facilities was directly connected to blood-borne disease transmission (HIV, Hepatitis B and C viruses).

Time and cost performance of projects in Kenya are unacceptable with over 70% of initiated projects likely to escalate in time with a magnitude of over 50%. 50% of the projects likely to escalate in cost with a magnitude of over 20%

(Mbatha, 1986; Talukhaba, 1988; Mbeche & Mwandali, 1996). Kenya is among the sub-Saharan countries experiencing high urban population growth rate of 4.3% while rural growth rate stands at 2.1% giving population size of 45.5 million people, in a total of 47 counties (UN data, 2015) which increases the challenges and opportunities in HCW management. Due to poor HCW management can contaminate the soil, air and groundwater hence causing health problems to communities.

Statement of the Problem

As indicated by the global, regional and local perspective on the subject, it is clear that HCW is far from effective and efficient. This is backed by the statistics that indicate that 78.2% of projects fail. In their survey of projects in 34 industries across 38 countries, Price Waterhouse Coopers (PwC) (2012), found that 86% of projects failed to deliver against their budget, schedule, scope, quality and benefits baseline. Secondly like any project, success is more often indicated by its performance in terms of the achievement of project time, cost, quality, safety and environmental sustainability objectives. The underperformance in, HCW means that some or all of these conditions are not met. (Zhou, Zhang & Wang, 2007).

According to Okuwoga (2008) the implementation problem may be related to the following factors poor budgetary and time control, lack of awareness on disposal regulation, use of outdated technology and lack of monitoring and evaluation as well as poor management strategies hence the need for this research. Thirdly, healthcare waste management projects are usually expensive in terms of expertise, technology and capacity building, it is therefore important to justify the expenses by ensuring that the outcome of the projects match the resources injected into them. Locally a project done by David Nyika of the University of Nairobi in 2012 on project implementation in the health, roads and power projects indicated that of all projects performed in three planning regions of Kenya, 20.8% were implemented as per project parameters while the remaining 79.2 % exhibited some degree of failure.(Nyika, 2012). A study was conducted in Bangladesh on patterns of healthcare waste management by Manzurul et al, 2008. This scope of this study was current scenarios of healthcare waste management not the challenges hence a knowledge gap hence the reason for this study. In addition the study was carried out in Bangladesh not Kenya hence geographical scope gap.

A study was conducted in Tanzania of factors affecting Medical waste management in low level facilities by Manyele and Lysenga in 2006. The scope of the study did not include challenges of healthcare waste hence proving a gap that this specific research studies. A study was conducted on solid waste management in Nairobi by Muniafu and Otiato in 2010. The study was based only in Nairobi excluding other counties, also it handled municipal waste not healthcare waste therefore presenting a gap in the research of healthcare waste hence the need for this study.

Research Objectives

The general objective of the study was to explore the challenges facing implementation of Healthcare Waste management projects in Kenya. The specific objectives were:-

- To determine the effect of project resources on implementation of Healthcare Waste management projects in Kenya
- To investigate the effect of project quality management on implementation of Healthcare Waste management projects in Kenya
- To establish the effect of project monitoring and evaluation on implementation of Healthcare Waste management projects in Kenya
- To indicate the influence of availability of technology on implementation of Healthcare Waste management projects in Kenya

LITERATURE REVIEW

Theoretical Review

Resource Based View Theory

Resource based view (RBV) is an approach to achieving competitive advantage that emerged, after the major works published by Barney Werner felt. RBV is a model that sees resources as key to superior firm performance. Resources of the right quality and quantity are important for strategy implementation (Aosa, 2011). Resource based view of the firm starts with the assumption that the desired outcome of managerial effort within the firm is a sustainable competitive advantage (SCA). Achieving a SCA allows the firm to earn economic rents or above-average returns. In turn, this focuses attention on how firms achieve and sustain advantages. The resource-based view contends that the answer to this question lies in the possession of certain key resources, that is, resources that have characteristics such as value, barriers to duplication and relevance. Therefore, the RBV emphasizes strategic choice, charging the firm's management with the important tasks of identifying, developing and deploying key resources to maximize return. Resources comprise three distinct sub-groups, namely tangible assets, intangible assets and capabilities. Tangible assets refer to the fixed and current assets of the organization that have a fixed long run capacity. Intangible assets include intellectual property such as trademarks and patents as well as brand and company reputation, company networks and databases (Williams, 2012). Capabilities encompass the skills of individuals or groups as well as the organizational routines and interactions through which all the firm's resources are coordinated (Grant, 2011). This theory links project resources variable to implementation of HCW projects in Kenya

Waste Management theory

Theory of Waste Management represents a more in-depth account of this area of interest and contains factual analyses of waste, the activity done on waste, and a holistic view of the goals of waste management. It was developed by Eva Pongracz et al. Waste Management Theory is founded on the expectation that waste management is to prevent waste causing harm to human health and the environment. The proper definition of waste is crucial to constructing a sustainable agenda of waste management. This theory also states that sustainable waste management is dependent upon how waste is defined. The waste management theory WMT is an aim towards explanation of waste management it is a conceptual description of waste management, and providing definitions for all waste related concepts and suggesting a waste-related concepts and suggestion a methodology of waste management. This theory links the quality management variable to implementation of HCW.

Theory of change

The theory of change by Carol Weiss is a description and illustration of how and why a desired outcome is to happen in a particular context. It maps out what for instance is done in healthcare waste management for instance and how the goals are to be achieved. It does this by first identifying the desired goals as mentioned above especially the long term goals and then works back by identifying all the conditions that must be in place for the goals to occur.

All these are mapped out in outcomes framework which then identifies what type of activities will lead to outcomes which were the set preconditions for achieving long time goals. It leads to better planning, better evaluation, as it is possible to measure progress towards the achievement of long-term goals that goes beyond the identification of program outputs (Cooperrider et al,

2008).This theory connects monitoring and evaluation variable to healthcare waste projects implementation, which often measured by achievement of specific goals.

Adaptive Structuration Theory

Adaptive structuration theory of Marshall Scott Poole is based on structuration theory coined by Anthony Giddens. The theory states that there is production and reproduction of social systems through members' use of rules and resources in interaction. Further groups and organizations using information technology for their work create perception about role and utility of technology and how it can be applied for their activities and that technological change comes from belief that it is responsible for inducing lasting change socially and especially economically. The perceptions influence how technology is used and meditates its impact.

Conceptual Framework

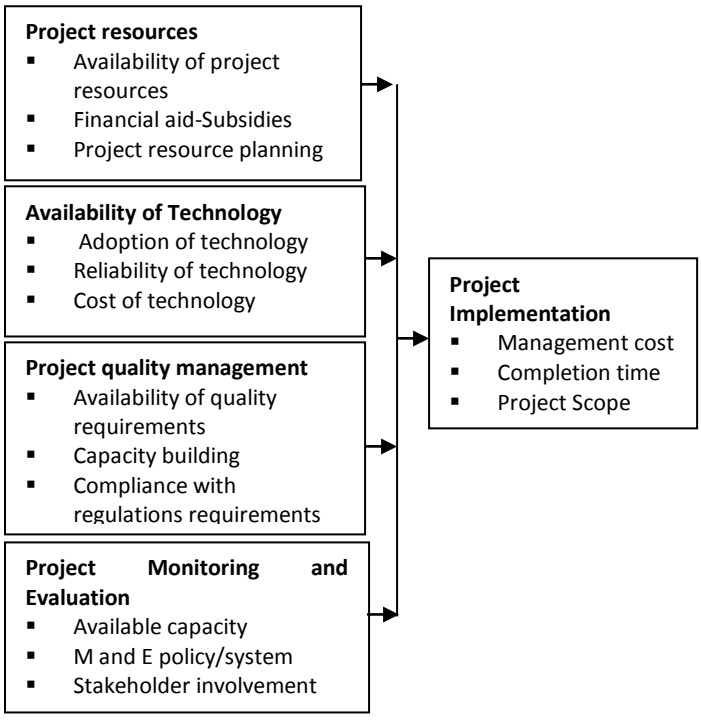

Figure 1: Conceptual Framework

Project resources

The project resources are needed to conduct the project tasks. They include people, equipment, facilities, funding as well. Before undertaking a project secure and sufficient resources are necessary to operate efficiently and sufficiently well to promote success. The following are factors that need addressing in order for the resources to be able to cover the project.

Resource management is one of those facets dedicated to the proper distribution of the people, skills, materials and funds in the project, resource allocation concerns balancing the various needs and priorities of a project (Dayanand & Padman, 2011). Determining the best course of action that will lead to maximizing the effective use of limited resources to offer the best return on investment. This means project managers need to build a proper plan of how, when and why these resources will be allocated and distributed for the entire project lifecycle before, during and after the project. Inadequate resources means that the project may not be completed or in the event of completion, the quality of materials used is poor, corresponding to cheaper lower quality goods and services. This contributes to poor implementation results.

In a field like medical waste management which is very sensitive, poor quality goods due to a smaller budget can be catastrophic because the toxic and infectious waste substances may not be completely destroyed leading to spread of diseases and environmental degradation (Kennickell, 2009). Financial resources are required in sufficient levels to provide the Initial capital investment, effective equipment, operating costs for such elements as labor and consumables, utility requirements and contractual and overhead costs.

Financial aid such as a subsidy is a benefit given to an individual, business or institution, usually by the government to promote economic or social policy. Although usually from the government, it

can relate to any type of support for instance from Non-governmental organizations (NGOs). It is usually direct (cash, grants or interest free loans) or indirect (tax reduction, rent rebates, low interest loans). Generally the cost of proper HCW management is very high. The costs range from the costs of separate collection, appropriate packaging, and on-site handling are internal to the establishment and paid as labor and supplies costs; the costs of off-site transport, treatment, and final disposal are external and paid to the contractors who provide the service (Wibowo, 2004). The costs of construction, operation, and maintenance of systems for managing health-care waste can represent a significant part of the overall budget of a health-care establishment. They should be covered by a specific allotment from the facility budget. Provision of subsidies by the government can greatly help to reduce the cost of healthcare waste management while maintaining the proper standards (Maestle, 2007).

Project resource planning involves determining roles and responsibilities of the project team. The members need to be involved in the process of planning. Resource planning helps manage the people in the project. The place helps in keeping track of those coming into the project and going out of the project during its lifecycle. Various project tools are needed in making the resource plan, such as work breakdown structure (WBS) which identifies activities and assigns resources to them. Also organizational charts are important in identifying project reporting relationships and lastly a staffing management plan that shows when members start with the project, their duration and when they leave (Burke, 2013). Cost escalation is defined as changes in the cost or price of specific goods or services in a given economy over a period. Any project needs to be highly aware of factoring in cost escalation when planning upcoming projects, this is imperative because of the necessity to calculate project budgets as accurately as possible. Cost escalation is a factor applied to a cost estimate to account for the rise in material and labor prices over a given period of time (Kaliba, Muya & Mumba, 2009).Cost escalation contingency provides a more realistic and accurate picture of a project's cost and is generally included when a project's bidding timeline is more than six months from the time the cost estimate is prepared. For large private and public entities, long-term planning is essential for projects and the cost escalation factor must be included. Also, the very presence of an escalation factor within a cost estimate provides a constant reminder to project manager that longer planning timelines increase the possibility of increased costs. For any healthcare waste management project, the cost escalation factor must be calculated for the correct budget to be arrived at to avoid under allocation problems which would stall the project (Shane et al, 2009).

Project quality management

Quality means fit for use or meeting the requirements which often reflect on the stakeholder needs. Project quality management includes all activities needed to determine and achieve project quality (Turner, 2008). Availability of quality requirements/objectives, in all projects stakeholder satisfaction is always the objective. Project quality management is involved with both the end product of the project as well as the processes involved. Quality requirement are formulated based on what the stakeholders want, and by the stakeholders themselves. This means that if the stakeholders feel the product does not meet their needs then the quality of the project will be poor, hence there is need to ensure that quality requirements are carefully noted. (Armijo Olivo et al, 2012)

Capacity improvement in project quality involves activities and effort put into improvement of processes, product and services offered. The improvements can be small, incremental or large changes. It is often based on previous lessons

learned from the project or other similar projects. The goal of the process is avoid repetitive mistakes. Capacity building is a form of continuous improvement in a project. Compliance with requirements is important in quality management in a project. It involves conforming to the set objectives by the stakeholders. This is done through quality assurance and quality control processes. Quality assurance is used to verify that the project processes are sufficient and adherence to these processes lead to the correct quality. Project quality control is used to verify that the end result meets the requirements. (Armijo Olivo et al, 2012)

Recognizing the dangers and the negative impact of HCW waste on the public health and the environment, many countries have developed quality standards it .In Kenya, the Environmental Management and Coordination Act (EMCA) of 1999 does this though more work could be done to make the regulations customized as per the County (Cheng et al, 2009). Furthermore, the Constitution under schedule 4 has devolved the function of waste management to County Governments, and powers and authority for enforcement have been provided for under The Public Health Act Cap 242 and other relevant legal statutes. In discharge of its mandate, the Ministry through Executive Order No. 2 of 2013 is responsible for Management of Public Health and Sanitation policy among other related duties. The Ministry has developed various policies, guidelines and standards on sanitation, health care waste management and general waste.

These policies include the Environmental Sanitation and Hygiene policy, the Healthcare Waste Management Strategy; Healthcare Waste Management Guidelines; Healthcare Waste Management Standard Operating Procedures; the National Healthcare Waste Management Plan; the National Infection Prevention Control Policy and the National Infection Prevention Control Guidelines. There is continuing dissemination of these policies as well as training the Counties in waste management in order to build the capacity of Counties workforce. To this end, the national government has trained over 7500 personnel on waste management in the country (MoH, 2008).

A study conducted in Thika by one Solomon Cheboi in 2015 indicated that full adherence to the HCW quality guidelines was low (16.3%). From this finding, compliance remains a key challenge. A study conducted in Kenya showed that the country was still way below the World Health Organization (WHO) recommended quality standards (Cheng et al 2009). A study done by the Ministry of Health Kenya (2008 revealed that provision of personal protective equipment (PPE) was poor at 37%. In many waste treatment sites where waste handlers had PPE, most of those found handling waste did not have them on but wore them on noticing visitors. This study indicates that quality and quality issues needs addressing in Kenya.

Project Monitoring and Evaluation

Monitoring is the systematic and routine collection of information from projects and programs for four main purposes: to learn from experiences to improve practices and activities in the future, to have internal and external accountability of the resources used and the results obtained; to take informed decisions on the future of the initiative and to promote empowerment of beneficiaries of the initiative. Evaluation is assessing, as systematically and objectively as possible a completed project. Evaluations appraise data and information that inform strategic decisions, thus improving the project or programme in the future (Kusek & Rist, 2004).

According to the official regulation, the Ministry of Health and Environment is responsible for the dispersion of the trainings on waste disposal. To prevent injury to healthcare employees, patients and the environment by medical wastes, persons responsible for waste management ought to have

the requisite knowledge, attitude and behavior. Moreover, it is inevitable to produce an effective management plan in healthcare institutions for the separation of wastes and to have medical wastes controlled and rendered harmless. The realization of these goals primarily necessitates the healthcare managers in hospitals to have sufficient knowledge on the subject and to set up a monitoring plan is to define indicators of achievement or performance, and set up a simple, regular reporting system and also to conduct field visits and inspections. In most cases a monitoring and evaluation **s**ystem refers to all the indicators, tools and processes that you will use to measure if a program has been implemented according to the plan and is having the desired results.

The choice of the monitoring and evaluation system is important in HCW management project since it sets up a framework from which the solidity of the regulations can be measured and from which results changes can be made (Tsakona, Anagnostopoulou & Gidarakos, 2007) Systematic analysis has revealed that to ensure safe management of the HCW waste, all the stakeholders should understand their roles and responsibilities, for instance policy makers must ensure sustainable results commitment (Rossi, Lipsey & Freeman, 2003).Their role does not end with the development of legislations to promote safe handling of the HCW, but even extends to the promotion of cost-effective waste disposal methods depending on the variation in type of waste or season. The public health administrator's role is to develop a customized, yet comprehensive waste management policy depending upon the type of waste generated, identification technical staff or constitution of a waste management committee. Healthcare personnel activities include creating awareness, organizing training, motivating for regular hand washing and to take appropriate measures to ensure that unnecessary hazardous waste is not generated in the first place (Rossi, Lipsey & Freeman, 2003).

Availability of Technology

For some healthcare facilities across sub-Saharan Africa and in many parts of the world, it is often too costly to install and operate any kind of sanitary treatment technology, much less the right type of equipment to manage infectious waste in a socially and environmentally safe manner. Often, facilities dispose of such waste by burying it, throwing it out alongside household waste, openly burning it, or using low-tech incinerators that produce significant pollution and are outdated technology in HCW that can unintentionally create persistent organic pollutants through chemical reactions that occur when the waste is not burnt at the right temperature. This can impact the health of individuals staying or working at the facility, as well as those living both nearby and far away (Rutala & Mayhall, 2012).

Adoption of medical waste management technology may depend on the amount of waste generated, the composition of the waste as well as the budgetary allocation of the health facility for medical waste disposal and size of disposal facility. There are two types of technologies; non-incineration technologies and incineration technologies. A healthcare facility should choose the best available and cost effective technology to handle its waste safely. Non-incineration technology refers to the low temperature heat treatment, chemical processing technology, radiation processing technology, and biological treatment technologies (Swanke & Ventrone, 2007).

Other factors considered are: Environmental desirability which means the adopted waste disposal technique and management ability could insure public health and environmental safety. Administrative diligence which means related management ability could insure adopted policies and measures could be realized and be long term effective, especially for environmental impact.

Economic effectiveness which means the adopted disposal techniques and management measures are cost effective and considering the cost of waste disposal. Social acceptability and equity which means the adopted technology and management measures could be supported and accepted by local society, including the efficiency of waste management measures (Huang &Tang, 2007).

Reliability can be defined as the quality of being trustworthy or of performing consistently well. And as a measure, the degree to which the result of a measurement, calculation, or specification can be depended on to be accurate. The reliability of the technology depends upon the choice of technology made by a healthcare facility based on solid information that is time tried and tested. Other supporting factors also contribute to the reliability of the technology, for instance if the technology chosen depends on the use of electricity to power it, a region with constant blackouts would not benefit much from such a technology. This means than in the choice technology, the 'accessories' of the said technology have to be a deciding factor (Huang & Tang, 2007).

Cost of technology can limit a facility in obtaining the best available technology for medical waste management (Fineberg & Hiatt, 2009**).** Location contributes to cost of technology because of regulations. There are regulations on how long a healthcare facility can store infectious waste on location. Appropriate insurance coverage for transporting and disposing of waste is also a factor (Lee, Ellenbecker & Moure-Ersaso, 2010).

Project implementation

All projects are expected to have specific objectives; that is, an end result, which often costs so much and should be completed within a certain time-frame and in a specific quality specification. Therefore projects which achieve cost, schedule and quality objectives are successful and hence their performance is rated higher than those that do not which are considered to have failed. Success or failure is a simple measure of performance. For small simple projects, this definition might work, but the success-failure measurement is not very practical for most projects. Therefore, in basic terms, project performance can be measured with the help of a monitoring system and key indicators. Like all systems, a project monitoring system must begin with management commitment (Keller, 2006).

Cost of management is concerned with the process of planning and controlling the budget of a project or business. It includes activities such as planning, estimating, budgeting, funding, managing, and controlling costs so that the project can be completed within the approved budget. Management cost covers the full life cycle of a project from the initial planning phase towards measuring the actual cost performance and project completion. Cost planning occurs in the initial phase of a project where the required resources to complete the project activities are defined. Work Breakdown Structures (WBS) and historical information can be used to define physical resources needed (Almuneef & Memish, 2003). Cost estimating can be applied to predict how much it will cost to perform the project activities. Cost budgeting gives an overview of the periodic and total costs of the project. It defines the cost of each work package or activity. A cost baseline is an approved time-phased budget that is used as a starting point to measure actual performance progress (Keller, 2008). Cost control is concerned with measuring variances from the cost baseline and taking effective corrective action to achieve minimum costs. All changes to the cost baseline need to be recorded and the expected final total costs are continuously forecasted. Cost overruns and under runs is the consequences of poor financial resource planning. They can be measured by the deviation from the set budget. These have to be avoided at all costs (Keller, 2008**).**

Project time management refers to the skills, tools, and techniques used to manage time when accomplishing specific tasks, projects and goals. Defining the activities requires one to define the tasks, milestones, and other activities needed to complete the project. A Gantt chart is a simple and quick way to outline the entire project. The focus is on the time it will take to complete each individual task. Sequencing the activities that have been defined, where subtasks are created as needed and the project is organized in a logical manner with dependencies to each task. Estimating activity resources requires assessing the supply and demand of each resource and how it relates to specific project. Everybody should understand their role in the project and should be able to confidently commit to the timeline. One of the most valuable indicators related to the measurement of time is the deviation from the initial estimates of deadlines. This indicator evolves throughout the execution of the project (Almuneef & Memish, 2003). In healthcare waste management projects, time management is vital. As indicated by Nyika (2012), only 20.1% of projects are successful, the success of which one of the parameters is time. Therefore completion on time is an indicator for medical waste management.

Project scope management refers to the set of processes that ensure a project's scope is accurately defined and mapped. Scope Management techniques enable project managers and supervisors to allocate just the right amount of work necessary to successfully complete a project—concerned primarily with controlling what is and what is not part of the project's scope. Scope refers to the detailed set of deliverables or features of a project. These deliverables are derived from a project's requirements. The work that needs to be accomplished to deliver a product, service, or result with the specified features and functions (PMBOK, 2016). There are three processes of Project Scope Management: planning, controlling, and closing. The planning process is when an attempt is made to capture and define the work that needs to be done. The controlling and monitoring processes focus on documenting tracking, scope creep, tracking, and disapproving/approving project changes. The final process, closing includes an audit of the project deliverables and an assessment of the outcomes against the original plan (Askarian, Heidarpoor & Assadian, 2010). Defining the needs of the project is the first step toward the establishment of a project timeline, allocation of project resources and setting project goals. To define the project scope, it is important to first establish the objectives of the project. The resources and work that goes into the creation of a product or service is essentially what defines the scope of the project. The scope outlines the goals that will be met in order to achieve a satisfactory result. The Work Breakdown Structure (WBS) is an important element of the Scope management process and the PMI® places great emphasis on this aspect. The WBS provides the project manager and the team with the opportunity to break down a high level scope statement into smaller, better manageable units of work, called work packages. The resulting WBS provides a complete list of all work packages required to complete the project. Validating the scope is when the project customer formally accepts all the project deliverables. This process occurs at the end of each phase. Controlling the scope process involves monitoring the status of the project and managing changes to the scope. Project scope clearly sets out what is or is not included in the project, and controls what gets added or removed as the project is executed. Scope management establishes control mechanisms to address factors that may result in changes during the project lifecycle. Without defining project scope, the cost or time that the project will take cannot be estimated.

Empirical Review

Project Resources and implementation of Healthcare Waste Management projects

Nabuthia (2015) conducted a study on factors influencing implementation of waste management projects in urban centers in Kenya, based in Bungoma South sub- County. One of the key factors highlighted in his study was the importance of budgetary allocation to the projects in question. The conclusions of his study indicated that 72.5% of the respondents his study was based on were not involved in budgetary decisions and therefore recommended that persons involved in the projects must be involved in the budgeting to allow for holistic understanding of the financial goals of the project and hence work together to achieve the project objectives.

Masogo (2010) conducted a study on factors influencing solid waste management in Kisii municipal council. One of his specific objectives was to investigate effect of financial resources on solid waste management in Kisii County he also mentions effects of physical infrastructure as the other specific objective, since resources can be tangible and intangible, the physical infrastructure may refer to machinery and tools used in waste management as well as the roads and storage and processing facilities for the waste. The findings of this research indicated that financial resources allocated were insufficient and therefore the municipal council of Kisii County needed to increase resources to sufficiently manage the waste capacity.

Quality management and implementation of Healthcare Waste Management Projects

The United Nations Human Settlements Programme, Solid Waste Management in the World's Cities, 2010, reported: "India is a world leader in working on preventing, reducing and managing healthcare waste. Biomedical Waste Management and Handling Rules established in 1998 are in force as part of the Environment Protection Act, 1986. The legislation is still in the process of development and promulgation in another ten countries of the region. Although India has advanced in having legislation, informal sources reveal compliance to the quality may not be more than fifteen percent. A critical area is its quality compliance and enforcement. This is the Indian situation regarding healthcare waste management.

In Ghana, Asase et al (2009) noted that there was a lack of proper quality framework for HCW management in the country which was indicated by Unprotected and uncontrolled dumps, which pose a danger to the public health, environmental health and waste renewable resources and jeopardize residential development in these areas, as is a commonality found in many developing countries unlike developed nations.

Gathuka (2013) conducted factors influencing e-waste disposal in public organizations in Kenya: the case of university of Nairobi. The study design was of descriptive and exploratory techniques, the respondents comprised ICT, Procurement Officers and Disposal Committee members at the University of Nairobi. His findings revealed that there was a limited capacity of relevant government agencies to deal with e-waste and lack of public awareness on the need for safe e-waste disposal as concerning. His recommendation was that proper quality maintenance and management strategies need to be developed for e-waste and other new substances being generated as by products.

Project Monitoring and Evaluation and implementation of Healthcare Waste Management Projects

A study conducted by Morira (2013) on assessment of healthcare waste management at primary health care facilities in Brazil indicated that according to the Brazilian law, implementation of a Medical Waste Management Plan (MWMP) in health-care units is mandatory, but so far evaluation of such implementation had not taken place yet. The purpose of the study was to evaluate the improvements deriving from the

implementation of a MWMP in a Primary Health-care Center (PHC) located in the city of São Paulo, Brazil. The method proposed for evaluation compares the first situation prevailing at this PHC with the situation 1 year after implementation of the MWMP, thus allowing verification of the evolution of the PHC performance.

A study by Sapkota (2014) in Nepal highlighted that in developing countries, HCWM has not gained much momentum. The study was the first in Nepal to evaluate the impact of pre and post-test HCWM interventions and help policy makers devise effective waste management regulations to protect both the people and environment of Nepal. It revealed that improper HCWM practice is alarming in developing countries because resources are inadequate to manage wastes, and waste management is often delegated to poorly educated and untrained laborers, who perform without proper guidance or adequate protection and close to no monitoring or evaluation. Government of Nepal Civil Service Hospital, Minbhawan, Kathmandu, Nepal Janta National Hospital, Damak, Jhapa, Nepal

Availability of Technology and Performance of Healthcare Waste Management Projects

In a study by Yousif and Scott (2007) concerning governing solid waste management, among the challenges often arising in the process, one such constraint is the misuse of technology, which has been documented in numerous cases where sophisticated and expensive technological recycling and composting plants as well as other waste management systems in developing countries have failed Reasons for a breakdown include a failure to adequately and extensively consult the public and relevant stakeholders, adoption of inappropriate technology characterized by imported mechanical and electrical parts which are too expensive to replace or too difficult to maintain.

Failure to conduct economic and financial assessments, limited development of a market for recyclables, financial constraints, and absence of skilled technical personnel to manage these systems have been observed in many developing countries .Techniques that have often proven effective in developed countries prove to be ineffective in many situations in developing countries that do not have the needed infrastructure, need, or know-how to properly implement these technologies. The lack of overall plans for waste management at the local and national levels results in waste management technologies that are often selected without due consideration to their appropriateness (Yousif & Scott, 2007).

A study conducted in 12 Asian countries on risks associated with healthcare waste by Anath, Prashanthini & Visvanathan in 2009 indicated that risks associated with healthcare waste and its management. The study looked at aspects to drive improvements to the existing healthcare waste management situation. The paper placed recommendation based on a 12 country study reflecting the current status. It did not advocate for any complex technology but called for changes in mindset of all concerned stakeholders and identifies some important aspects for serious consideration one of which is technology.

METHODOLOGY

The study adopted an exploratory approach using a descriptive survey design. Descriptive research focuses on what questions (de Vaus, 2011). The unit of analysis was the organizations involved in healthcare waste management in Kenya, specifically MoH at both county and national levels, CDC, PATH, NEMA and WHO. The unit of observation was the public health officers at top management levels in the above organizations operating in Kenya. A multivariate regression model was used to link the independent variables to the dependent variable as follows;

$Y = \beta 0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \mu$

Where;
Y =Project Implementation
X_1 = Project Resources
X_2 = Quality Management
X_3= Availability of Technology
X_4 = Project Monitoring and evaluation
In the model, $\beta 0$ = the constant term while the coefficient βii= 1….4 was used to measure the sensitivity of the dependent variable (Y) to unit change in the predictor variables X_1, X_2, X_3 and X_4. μ is the error term which captures the unexplained variations in the model. Tables were used in presenting the results of the research.

FINDINGS

Project resources

The study sought to determine the extent to which the respondents agree or disagree with the statements on project resources based on a five point Likert scale where 1= strongly disagree; 2 disagree; 3= Neutral; 4= Agree and 5= Strongly Agree. The results of the study were as shown in table 1.

The findings revealed that 3.7% of the respondents strongly agreed that they had sufficient project resources to perform their work, those who indicated agree were 1.9%, while 74.1 of them neither agreed nor disagreed and only 20.3% of them indicated to disagree. The findings of the study also showed that 88.9% of the respondents strongly agreed that healthcare waste management projects are very expensive to undertake, those who neither agreed nor disagreed with the statement were 3.7% while on 7.4% of them indicated to disagree. In addition the findings of the study revealed that 40.7% of the respondents strongly agreed that they had received financial aid to help their project activities, those who agreed were 33.3% while those who neither agreed nor disagreed were 13 % only 13% of them indicated disagree. Moreover, the results of the study showed that 9.3% of the respondents strongly agreed that they had enough technical support to do their work, those who indicated agree were 20.4%, those who neither agreed nor disagreed were 38.9% while those who indicated disagree were 29.6% and only 1.9% of them indicated strongly disagree. Finally, the results of the study did reveal that 22.2% of the respondents agreed funds allocated for implementation of healthcare waste enough, those who agreed nor disagreed were 35.2% those who indicated to disagree were 42.6% .

The implication of the findings is that most of the respondents indicated that they agreed that project resources were indeed a challenge as supported by the data from the respondents hence the data supported the research question on effect of project resources on implementation of HCW by reflecting its importance as indicated by a mean of 3.93. There was a small variation in the responses given by the respondents as indicated by a standard deviation of 0.89 as shown in table 1.

Table 1: Descriptive Analysis for project resources

Statements	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std Dev
We have sufficient resources to perform our work	0.0%	3.7%	74.1%	1.9%	20.3%	4.46	0.95
HWM projects are very expensive to undertake	0.0%	7.4%	3.7%	0.0%	88.9%	4.70	0.86
We have received financial aid to help our project activities	0.0%	13.0%	13.0%	33.3%	40.7%	3.46	0.88

Statements	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std Dev
We have enough technical support to do project work	9.3%	38.9%	29.6%	20.3%	1.9%	3.24	0.95
Funds allocated for HCW project implementation sufficient	0.0%	42.6%	35.2%	22.2%	0.0%	3.80	0.79
Average						**3.93**	**0.89**

Project quality management

The study sought to determine the extent to which the respondents agree or disagree with the statements on project quality management based on a five point Likert scale where 1= strongly disagree; 2 disagree; 3= Neutral; 4= Agree and 5= Strongly Agree. The results of the study were as presented in table 2.

The findings revealed that majority 48.1% of the respondents strongly agreed that they were aware of existing quality requirements for HCW management, 22.2% indicated agree while 24.1 of the respondents neither agreed nor disagreed and 5.6% of them indicated that they disagreed. The findings of the study also revealed that 38.9% of the respondents strongly agreed that there exists a framework for additional training in HCW management, 11.1% indicated agree, 29.6% of the respondents neither agreed nor disagreed while 20.4% of them indicated that they disagreed

The findings of the study further revealed that 26.3% of the respondents strongly agreed that everyone complied with quality requirements for HCW management projects, those who indicated agree were 1.9 %, those who neither agreed nor disagreed were 55.6 %, 14.8% and 1.4% of them indicated disagree and strongly disagree respectively. Moreover, the findings of the study also showed that 14.8% of the respondents strongly agreed that they had tools for project quality managements, those who indicated agree were 24.1%, those who neither agreed nor disagreed were 27.8% while 33.3% of them indicated disagree. Lastly, the findings of the study showed that 14.8% of the respondents strongly agreed that they applied the quality management tools, 29.6% of the respondents indicated agree, 54.4 % of the respondents neither agreed nor disagreed while only 1.2% of them indicated strongly disagree.

The implication of the findings is that majority of the respondents indicated that quality management was indeed a challenge as supported by the data and as shown by a mean of 3.91. There was a small variation in the responses given by the respondents as showed by a standard deviation of 0.98.

Table 2: Descriptive Analysis for project quality management

Statements	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std Dev
The staff is aware of the existing quality requirements	0.0%	5.6%	24.1%	22.2%	48.1%	4.13	0.97
A framework exists for additional training in HCW management	0.0%	20.4%	29.6%	11.1%	38.9%	3.69	1.19

Statements	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std Dev
Everyone complies with the quality requirements in HCWM	1.4%	14.8%	55.6%	1.9%	26.3%	4.31	0.93
There are tools for project quality management	0.0%	33.3%	27.8%	24.1%	14.8%	3.65	1.05
The tools for project quality management are always used	1.2%	0.0%	29.6%	54.4%	14.8%	3.80	0.76
Average						**3.91**	**0.98**

Project monitoring and evaluation

The study sought to determine the extent to which the respondents agree or disagree with the statements on project monitoring and evaluation based on a five point Likert scale where 1= strongly disagree; 2 disagree; 3= Neutral; 4= Agree and 5= Strongly Agree. The results of the study were as presented in table 3. The findings revealed that 32.3% of the respondents strongly agreed that the there is a M & E framework for HCW projects , 27.8% of the respondents indicated agree, 35.2% of the respondents neither agreed nor disagreed while 3.7% of them indicated that they disagree and only 1.1% of them indicated strongly disagree. The findings of the study also showed that 53.7% of the respondents strongly agreed that the M & E was routinely carried out, 31.5% of them agreed, 13% of the respondents neither agreed nor disagreed while 1.9% of them indicated that they disagree.

The findings of the study further revealed that 7.4% of the respondents strongly agreed that all relevant stakeholders were involved, those who indicated agree were 64.8%, those who neither agreed nor disagreed were 14.9 while only 13% of them indicated that they disagree. In addition, the results of the study also revealed that 27.8% of the respondents strongly agreed that M & E is an expensive process in HCWM, those who indicated agree were 35.2%, those who neither agreed nor disagreed were 20.4% while only 16.7% indicated that they disagree.

Finally, the findings of the study indicated that 24.1% of the respondents strongly agreed that there were enough experts in M & E for HCW projects, 29.6% of the respondents indicated agree, 1.9% of the respondents indicated that they neither agree nor disagree while only 42.6% and 1.8% of them both indicated that they disagree and strongly disagree respectively. The implication of the findings is that project M & E in HCW projects is a still a challenge as indicated by the data and shown by a mean of 3.92. There was a small variation in the responses given by the respondents as shown by a standard deviation of 0.94.

Table 3: Descriptive Analysis for M & E for HCW management projects

Statements	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std Dev
There is an M & E framework for HCW projects	1.1%	3.7%	35.2%	27.8%	32.3%	3.83	0.99

Statements	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std Dev
M & E is routinely done	0.0%	1.9%	13.0%	31.5%	53.7%	4.37	0.78
All stakeholders are involved in M & E	0.0%	13.0%	14.9%	64.8%	7.4%	3.63	0.88
M & E is an expensive exercise in HCW projects	0.0%	16.7%	20.4%	35.2%	27.8%	3.74	1.05
There are enough M & E experts in HCW projects	1.8%	42.6%	1.9%	29.6%	24.1%	4.04	0.99
Average						**3.92**	**0.94**

Technology availability

The study sought to determine the extent to which the respondents agree or disagree with the statements on technology availability for HCW projects based on a five point Likert scale where 1= strongly disagree; 2 disagree; 3= Neutral; 4= Agree and 5= Strongly Agree. The results of the study were as presented in table 4. The findings revealed that majority 20.4% of the respondents strongly agreed that HCW projects have a computer refurbishing, those who indicated that they agree were only 3.7% while those who indicated that they neither agree nor disagree were 75.9%. The findings of the study also showed that 22.2% of the respondents strongly agreed that there was a culture of upgrading technology systems, those who indicated agree were 74.1% while those who neither agreed nor disagreed were only 3.7%.

The findings of the study further revealed that 51.9% of the respondents strongly agreed that hiring technology experts is expensive for HCW projects, while those who indicated that they agree were 44.4% while only 3.7% of them indicated that they neither agree nor disagree. Additionally, results of the study also revealed that 20.4% of the respondents strongly agreed technology in use is sufficient for HCW projects, while 20.4% indicated that they agree and 59.2% neither agreed nor disagreed. Finally, the findings of the study indicated that 38.9% of the respondents strongly agreed that technology contributes to a large extent the implementation of HCW projects, while 59.3% indicated that they agree and only 1.9% of them indicated that they neither agree nor disagree. The implication of the findings as shown by the data is that technology is a major challenge indicated by a mean of 4.50. There was a small variation in the responses given by the respondents as indicated by a standard deviation of 0.65.

Table 4: Descriptive Analysis for availability of technology

Statements	Neutral	Agree	Strongly Agree	Mean	Std Dev
HCW projects have a computer refurbishing system	75.9%	3.7%	20.4%	4.56	0.82
HCW projects have a culture of upgrading technology	3.7%	74.1%	22.2%	4.70	0.54

Statements	Neutral	Agree	Strongly Agree	Mean	Std Dev
Hiring technical experts on HCW projects is expensive	3.7%	44.4%	51.9%	4.48	0.57
The technology in use is sufficient for HCW projects	20.4%	20.4%	59.3%	4.39	0.81
Technology contributes to a large extent in implementation performance of HCW projects	1.9%	59.3%	38.9%	4.37	0.52
Average				**4.50**	**0.65**

HCW Projects Implementation

This study sought to determine challenges faced by HCW management projects in Kenya. The study sought to determine the extent to which the respondents agree or disagree with the statements on HCW projects implementation based on a five point Likert scale where 1= strongly disagree; 2 disagree; 3= Neutral; 4= Agree and 5= Strongly Agree. The results of the study were as presented in table 5.

The findings revealed that majority 18.5 % of the respondents strongly agree that HCW management projects are done within cost while 81.51% of them indicated that they neither agree nor disagree. The findings of the study also showed that the respondents wholly (100%) indicated that they strongly agree that HCW projects cost is directly proportional to the implementation success. Moreover, the findings of the study revealed that 3.7% of the respondents strongly agreed that HCW projects are completed within specified time, those who indicated that they agree were 27.8% while those who neither agreed nor disagreed were only 68.5%. Further, results of the study also revealed that 29.6% of the respondents strongly agreed that HCW projects execution conforms to quality specifications, those who indicated that they agree were 7.4% while 44.4% of them neither agreed nor disagreed with the statement and only 18.5% indicated strongly disagree. Lastly, the findings of the study indicated that 9.3% of the respondents strongly agreed that the end result after implementation is usually acceptable, those who indicated that they agree with the statement were 87% while 3.7% of them neither agreed nor disagreed.

The findings of the study were as above shown by a mean of 4.39. There was a small variation in the responses given by the respondents as indicated by a standard deviation of 0.64.

Table 5: Descriptive Analysis for HCW Project Implementation

Statements	Strongly disagree	Neutral	Agree	Strongly Agree	Mean	Std Dev
HCW projects are implemented within approved cost	0.0%	81.5%	0.0%	18.5%	4.63	0.78
HCW project implementation is proportional to cost	0.0%	0.0%	0.0%	100%	5.00	0.00

HCW projects are implemented within contract duration	0.0%	3.7%	27.8%	68.5%	4.65	0.55
HCW projects usually conform to quality specification	0.0%	44.4%	7.4%	29.6%	3.59	1.51
HCW end result is usually acceptable	0.0%	3.7%	87.0%	9.3%	4.06	0.36
Average					**4.39**	**0.64**

Inferential Analysis Results

Correlation Results

Table 6: Correlation Results

Items	Correlations	Project resources	Project quality management	M&E	Availability of technology	Project implementation
Project resources	Pearson Correlation	1				
	Sig. (2-tailed)					
Project quality management	Pearson Correlation	0.065	1			
	Sig.(2 tailed)	0.617				
M&E	Pearson Correlation	0.073	-0.038	1		
	Sig.(2 tailed)	0.577	0.761			
Availability of technology	Pearson Correlation	0.094	0.103	.378*	1	
	Sig.(2 tailed)	0.440	0.439	0.003		
HCW implementation	Pearson Correlation	.690*	.466**	.567*	.517**	1
	Sig.(2 tailed)	0.033	0.007	0.004	0.0027	
	N	90	90	90	90	90

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Regression Results

The study used a multiple linear regression model to establish the challenges facing implementation of HCW projects in Kenya. The overall regression model of the study was $Y= \beta 0+ \beta_1X_1+ \beta_2X_2+ \beta_3X_3+ \beta_4X_4+ \varepsilon$ Where; Y= HCW implementation, X_1 = project resources, X_2= project quality management, X_3= project M & E, X_4= Availability of technology, and ε = Error term. The results for model summary are presented in Table 7.

The study findings showed that project resources, project quality management, project M & E and Availability of technology, had a combined effect of 65% of the variation in implementation of HCW projects in Kenya. This is indicated by an R-square value of 0.65. The regression results show that R was 0.809 which shows that the relationship between the independent variables and the dependent variable was positive.

Table 7: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.809	0.65	0.596	0.297276

Predictors: (Constant), project resources, quality management, M & E, availability of technology

The results of the study also indicated that the overall regression model linking project resources, project quality management, project M & E, availability of technology and HCW implementation in Kenya was significant as indicated by F statistic at (0.000) significance level which was less than 0.05 at 5% level of significance. F calculated was 16.788 while F critical was 2.672. F calculated is greater than the F critical (16.788 > 2. 672); this indicated that the overall model was statistically significant at 5% significance level. The results of the study are as presented in table 8 below.

Table 8: Analysis of Variance (ANOVA)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.90	4	1.453	16.78	.000
	Residual	3.647	85	0.087		
	Total	10.547	89			

Dependent Variable: implementation of HCW projects

Predictors: (Constant), project resources, quality management, M & E, availability of technology

Results of the study revealed that project resources had a positive and significant influence on implementation of HCW projects in Kenya (β= 0.167, Sig = 0.032). This implies that provision of sufficient project resources, making financial aid easily available and doing project resource planning for HCW projects leads to 0.167 unit effect on implementation of HCW projects in Kenya.

Moreover, the results of the study revealed that project quality management had a positive and significant impact on implementation of HCW projects (β= 0.341, Sig = 0.001). Setting clearly understood quality requirements, increasing capacity building and complying with requirements leads to 0.341 unit effect on implementation of HCW projects in Kenya, as shown by 76.8% of respondents.

Furthermore, the findings of the study revealed that project M & E had a positive and significant effect on implementation of HCW projects in Kenya (β= 0.323, Sig = 0.000). This implies that an increase in number of M & E professionals in HCW projects, creating an M & E policy that is appropriate for the HCW projects and relevant stakeholder involvement leads to 0.323 unit effect on implementation of HCW projects in Kenya.

Lastly, the results of the study indicated that availability of technology had a positive and significant influence on implementation of HCW projects in Kenya (β= 0.338, Sig = 0.006). This implies that adoption of appropriate technology, testing for reliability of the technology and ensuring that the technology is cost effective leads to 0.338 unit effect on implementation of HCW projects in Kenya.

Table 9: Regression coefficients

Coefficients	Beta	Std. Error	t-Statistic	Sig.
(Constant)	0.433	0.54	0.878	0.389
Project resources	0.167	0.075	2.409	0.032
Project quality management	0.341	0.076	3.772	0.001
M & E	0.323	0.078	4.667	0.000
Availability of technology	0.338	0.093	2.969	0.006
Dependent Variable: Project implementation				

The optimal Multiple Linear Regression Model for the study therefore is as indicated below

Project implementation ***= 0.443 + 0.341 project quality +0.338 technology +0.323 M & E +0.167 project resources.***

CONCLUSION AND RECOMMENDATION

The study showed that project resources had a positive and significant effect on implementation of HCW projects in Kenya through provision of sufficient project resources, making financial aid easily available and doing project resource planning for HCW projects. The regression results revealed that project resources affect performance during implementation of HCW projects in Kenya positively and significantly.

The study revealed that Project quality management had a positive and significant effect on performance during implementation of HCW projects in Kenya. Setting clearly understood quality requirements, increasing capacity building and complying with requirements positively affects performance during implementation of HCW projects in Kenya .The regression results revealed that Project quality management affects implementation of HCW projects in Kenya positively and significantly.

The study indicated that availability of technology had a positive and significant association with performance during implementation of HCW projects in Kenya. Adoption of appropriate technology, testing for reliability of the technology and ensuring that the technology is cost effective positively affects implementation of HCW projects in Kenya positively and significantly.

The study indicated that project M & E had a positive and significant effect on performance during implementation of HCW projects in Kenya. Increasing number of M & E professionals in HCW projects, creating an M & E policy that is appropriate for the HCW projects and relevant stakeholder involvement positively affects performance during implementation of HCW projects in Kenya significantly**.**

Conclusion

Provision of sufficient project resources, making financial aid easily available and doing project resource planning for HCW projects improves performance during implementation of HCW

projects in Kenya. Setting clearly understood quality requirements, increasing capacity building and complying with requirements improves performance during implementation of HCW projects in Kenya.Increasing number of M & E professionals in HCW projects, creating a M & E policy that is appropriate for the HCW projects and relevant stakeholder involvement improves performance during implementation of HCW projects in Kenya.Adoption of appropriate technology, testing for reliability of the technology and ensuring that the technology is cost effective improves performance during implementation of HCW projects in Kenya.

Recommendations of the Study

For HCW projects the study recommends ensuring there is sufficient project resources to carry out the project work well. Also that HCW projects seek additional financial aid form the government and development partners to ensure the projects are sufficiently financed and have a contingency fund as well, in addition, resource planning tools should be applied always to keep track of the staff and use of other resources in the project to allow for smooth operations.

In resource management, there should be a very clear organizational chart that is visible to everyone to avoid confusion in reference to responsibilities and accountability. Creating and establishing communication structures for the project team that introduces clear instructions to be followed in case of discovery of new risks or developments is very important and hence highly recommended. The best way to reduce the risk of not having enough resources to finish the project, is by making sure that the resource management plan is as thorough as possible, through listing the resources needed, estimating how much of each is needed and scheduling them to meet the project deadline. Most financial aid for projects come from NGOs and development partners especially in developing nations such as Kenya. They require developing a project proposal for these potential donors that must be well written, fact based and as believable as possible in terms of the problem they intend to address. This is another recommendation for acquiring more resources particularly the monetary type for project use.

Quality requirements set through stakeholder meetings should be clearly followed to the latter, also capacity building in the projects should always be a key objective to ensure that the project personnel are well equipped technically to carry out their activities and improve the efficiency and effectiveness of carrying out their duties. Lastly compliance with requirement provides a guiding system for project tasks and leads to the correct results hence should be ensured. Project quality should be about preventing and avoiding rather than measuring and fixing poor quality outputs in projects. It should be part of every project management processes from the moment the project is initiated to the final steps in the project closure phase. Project quality management should focus on improving stakeholder's satisfaction through continuous and incremental improvements to processes, including removing unnecessary activities. It should also achieve continuous improvement of the quality of material and services provided to the beneficiaries.

The project team should and must develop a good relationship with key stakeholders, specially the donor and the beneficiaries of the project, to understand what quality means to them. It should focus not only in meeting the written requirements for the main outputs but also on other stakeholder needs and expectations for the project. Quality characteristics must be included in all material, equipment and services the project will purchase, the procurement officers must have a complete description of what is required by the project, otherwise a procurement office may purchase the goods or services based on her or

his information of the product. Developing a quality plan and a quality checklist for project implementation phase is always recommended. The quality plan developed must describe the conditions that the services and materials must possess in order to satisfy the needs and expectations of the project stakeholders. Quality audits should be routinely conducted. Their purpose is to review how the project is using its internal processes to produce the products and services it will deliver to the beneficiaries. Its goal is to find ways to improve the tools, techniques and processes that create the products and services. Quality problems should be taken as an opportunity for improvement; problems can help identify more fundamental or systemic root causes and help develop ways to improve the process.

Specifically, technology plays a major role in helping the project manager develop and formalize project processes and establish channels of open communication hence should be used in healthcare waste projects. In addition technology should be embraced through using technological tools by the project team to access organizational and tacit knowledge of past projects and historical data with information that can help project teams improve their project performance. Project managers should use technology to not only capture data and information, but also to facilitate knowledge development and transfer. Project performance data stemming from various project segments can feed back into data repositories and database systems; the result is a fluid knowledge flow between project management and technology systems that facilitates learning. Project managers can also achieve a level of continuous improvement in project performance by applying numerous technology tools throughout the project management life cycle hence technology should be used throughout the project**.**

Technology should be applied in healthcare waste projects to do the following; selecting projects by using knowledge-based decision systems consisting of quantitative and qualitative criteria, in developing a resource breakdown structure (RBS) for the project environment and keeping it current by using resource cost information from historical project data and resource database systems. In developing project plans and scope with the help of historical data from knowledge repositories related to project plans and scope definitions and estimating accurately and realistically project costs by using historical cost and effort estimation and earned value data of past projects. In addition to developing a work breakdown structure (WBS) by using standardized WBS packages maintained in database systems, developing a project schedule by using historical schedule data and information from knowledge repositories as well as managing resources by using actual resource usage data from similar projects and reducing risk.

Monitoring and evaluation is important part of the HCW projects. It breeds a culture of accountability in the project and the audits conducted lead to improvement from current situation to better or replacement of failing processes to better hence should be conducted routinely throughout implementation of the HCW projects, by professionals of the field and at the end as well to establish if the product is acceptable. Technology is an important part of every HCW project hence should be embraced. The technology chosen should match the work it is to be used in and be affordable to run in the project. Also it should have technical staff that understands it and that can handle it well under various constraints that may arise from time to time. Sufficient attention should be paid to monitoring and evaluation issues and feedback loops in healthcare waste projects. The lack of monitoring and evaluation tools and methodologies should be tackled by choosing the best and appropriate for specific projects taking

into account only factors relevant to the projects. Monitoring of progress against defined goals should be conducted by project managers so as to assess what is working and what is not and from there can determine what changes should be made to a project. This in turn makes it possible to improve the way things are being done in the project organization by establishing a monitoring and evaluation policy for the project. M & E should be used to demonstrate progress to external stakeholders to justify continued funding and clarify the return on investment of community development efforts to managers and shareholders. M & E should be allocated enough technical support to conduct its processes including to demonstrate commitment to and competence in community development especially in healthcare waste projects. M & E is a powerful accountability mechanism and hence should be conducted to include all relevant stakeholders.

Areas for Further Study

The study recommends future researches to investigate on other challenges of HCW projects. Other recommendations for further research in healthcare waste management include the occupational risks and project risks of healthcare waste management. Research of the performance of healthcare waste in Kenya and in relation to other countries in the region. A study of solutions to various specific healthcare waste problems.

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