ISSN: 2524-1354 (Online), ISSN: 2519-7851 (Print)
Africa Habitat Review Journal
Volume 15 Issue 1 (September 2021)
http://uonjournals.uonbi.ac.ke/ojs/index.php/ahr

Evaluation of Pre-Tender Documentation of Identified Public Building Projects in the 2009-2010 Economic Stimulus Programme of Kenya

Thomas G. Mundia*, Stephen Diang'a and Githae Wanyona

Received on 13th February, 2021; Received in revised form 13th July, 2021; Accepted on 27th July, 2021.

Abstract

The Government of Kenya, through the Ministry of Finance, proposed the Economic Stimulus Programme (ESP) as a short-term, high intensity, high impact programme, aimed at investing resources in the short-term, in projects with both short- and long-term benefits. ESPs focused on sectors that would generate maximum benefits and revamp the economy, and investment in building of public utility facilities was identified as one of the projects. These projects faced a multitude of problems. This paper is a report on a research that was carried out to investigate the problem of pre-tender documentation of the ESPs. Pre-tender documentation is crucial for monitoring and evaluation of government-initiated programmes and projects. Data was obtained from both secondary and primary sources and analyzed qualitatively. It was observed that documentation of the projects was hardly on schedule, that tender processes were at times flawed, and that poor quality work was delivered by contractors under the supervision of the Ministry of Public Works (MoPW) design teams. Poor performance, process of constituting and composition of design teams, leadership, communication, co-operation between departments and the client experience were noted as contributory factors. Using the ESP as a case study, it can be concluded that the documentation set up at the MoPW is inadequate and there is need for formulation of more robust frameworks. Additionally, there is the need to link the documentation with other current, past, present and future Government of Kenya efforts to institutionalize the knowledge gained. It is recommended that information documentation be done across all the institutional levels with a view to ensure adequate horizontal and vertical communication.

Keywords: Economic Stimulus Programme, Project documentation, Project performance.

INTRODUCTION

Since independence in 1963, Kenya has had a number of development strategies spelt out in the five-year Economic Development Plans. Development of infrastructure and buildings has remained a key concern in all the development plans. Ministry of Public Works (MoPW) has had the mandate of developing these facilities, with its teams of professionals spread out in four departments, namely: Architectural, Quantities, Structural/Civil, and Mechanical & Electrical. However, the task of documenting client ministries' building projects requirements has been quite challenging.

To implement the ESP project within the intended time frame of six months, MoPW reviewed its resource base and capacity. As a result, the ministry outsourced professionals and other technical cadre as the most economical means of implementing the whole programme within the set-out timeline of six months. These groups of professionals were to assist the personnel already available at MoPW to oversee and supervise the programme projects as per their respective disciplines (MoPW, 2010). For ease of supervision, the programmes were clustered into 40 zones with an operation base. 40 supervision teams were consequently formed, comprising 20 from the MoPW design team and 20 outsourced. Each team comprised of 1 Architect (the Lead consultant), 1 Quantity Surveyor, 1 Civil/Structural Engineer, 1 Electrical Engineer, 1 Mechanical Engineer and 2 Clerks of Works (COW). Each team was in charge of projects in 5 geographically compatible constituencies (MoPW, 2010).

*Corresponding author:
***Thomas G. Mundia**, School of Architecture and Building Sciences, Jomo Kenyatta University of Agriculture and Technology, Kenya.
Email: mundiatg@yahoo.com*

This study focused on the approach taken by MoPW in the documentation of ESP projects at the pre-tender stages. The scope of documentation varies just as widely as the different nature and size of projects. MoPW designed and documented prototype designs in response to the ESP 2009/2010. Customization and supervision of the prototype designs were to be carried out by other professionals based at the district/county level. For quality assurance of the projects, the lead line ministry of each component provided technical assistance with information on standards and an integrated project management team. The documentation process took longer than envisaged, mainly due to the fact that the budgetary provision was done without MoPW design team's input. Subsequently, there were a lot of revisions to both the drawings and cost estimates. Since the implementation of the ESP was at the constituency level, members of parliament played a crucial role for the programmes to achieve their objectives.

The problem investigated in this study was the level of the ESP project documentation. Documentation here entails architectural/engineering designs and preparation of tender documents, as well as the expected inputs, including Terms of reference (ToR) for the contractors, among other components. The aim of the study was to investigate the adequacy and relevance of the pre-contract documentation by MoPW design teams, using the ESP infrastructure projects as a case study. The specific objectives of the study were: to examine the adequacy of documentation done by the MoPW design teams; to evaluate the challenges and strengths faced by design teams during the process of documentation; and to devise a better approach to project documentation process.

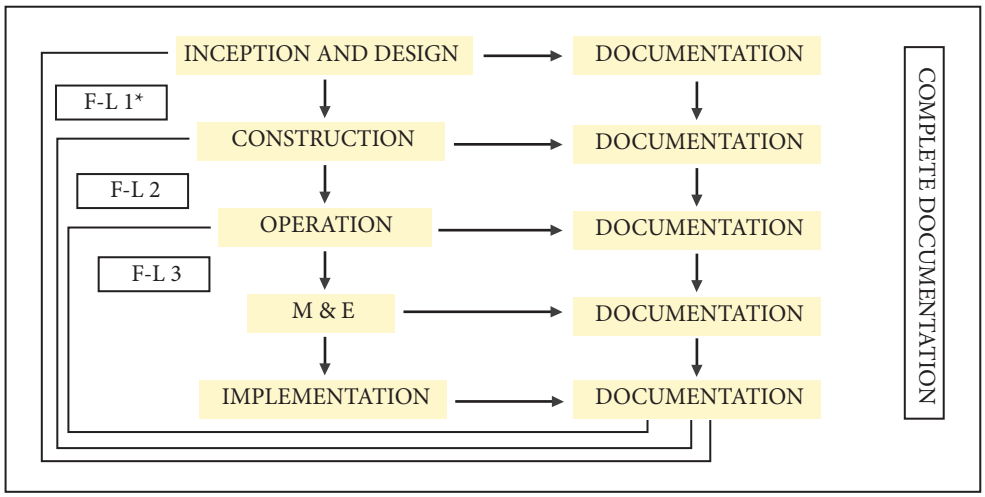
Project documentation is a basis for monitoring and evaluation of the projects and, it is therefore very crucial for government-initiated programmes and projects. It can be viewed in two aspects: intra-project documentation and inter-project documentation. Intra-project documentation refers to the areas in which documentation is intrinsic within a single project cycle – i.e., the period between project inception and design through to implementation and monitoring and implementation. **Figure 1** shows the process-documentation inter-play within the intra project cycle.

On the second part, project documentation is important during the inter-project cycle. Inter-project cycles here are defined as periods between a single project cycle, between design and implementation over a long period of time (**Figure 2**). According to **Figure 2**, the initial Government of Kenya (GOK) construction projects rolled out in the 1970s were relatively smaller because of the relative socio-economic situation of the country. The population was smaller and the country was just rising from long periods of colonialism and the country's development vision was still vague. Nevertheless, the commitment and goodwill was there. Ideally, the projects should have been well documented to inform future such projects. If that were the case, it would have meant that all factors held constant, and the next cycle of projects would have been relatively bigger and more focused, with the hindsight of earlier documentation.

The same was to continue in the subsequent cycles, in this case taken as the epic decades of Kenya's history. Did this happen? Is there something to learn from the past? Will today's efforts inform our tomorrow? Or are we acting in a closed-system where each project cycle is motivated by the current need and the efforts and strategies put in place isolated by the need and the time? These are the questions this study sought to answer.

THEORY

Traditionally, the construction industry uses many different documents for communication among project participants to ensure value and highest quality for money (Bender et al., 2002). Documents are interfaces used to access and navigate through collections of information (Haimes, 1994), and to serve particular business purposes by construction professionals (Zhu et al., 2007). Documents provide a way to show a viewer attributes of the information objects and relationships. Documents are processed through established design processes by a design team (William, 1961). The design team, comprising of architects, engineers and other consultants, produce documents for the owner (Bender et al., 2002).



** **Key:** F-L1, F-L2 and F-L3 show the feedback loops between final implementation documentation with inception and design, and construction and operation phases*

FIGURE 1
Intra-project cycle documentation
Source: Authors 2019

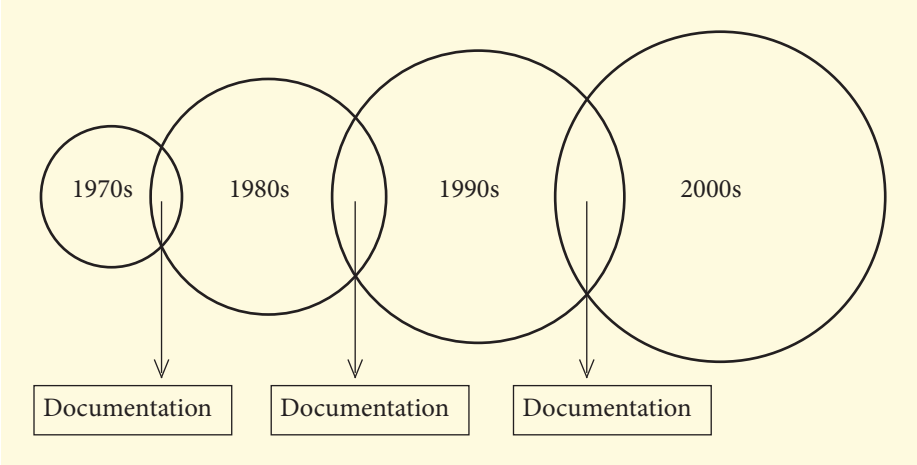


FIGURE 2
Inter-project cycle documentation
Source: Authors 2019

Documents required before implementation of a project provide a backbone for a successful building project. The specifications (or project manual) include; the bidding requirements, contract conditions, and the specifications that define the qualitative requirements for products, materials and workmanship. The construction drawings or working drawings (blueprints) are used during construction. Drawings quantify materials, and illustrate location and relationship (Rydeen, 2011). Poorly drafted, ambiguous or conflicting plans and specifications create problems for all parties- architects, engineers, contractors, sub-contractors and education institutions.

A design team member has to adapt a logical design process to come up with a design solution presented through documents for design problems (Markus et al., 1972). Design is an iterative process (Jennings,

1996), which may be analysed into a linear sequence of events, each with its own recognisable milestones. Several design processes have been identified by different authors. William (1961), has identified the creative process referred to as synectics. In synectics, the imagination is stimulated in a meaningful way by a series of creative analogies – personal, symbolic and direct – in which the design problem is compared with phenomena from other disciplines. The process adapted is fundamental to the success of systematic working of the design team.

Approaches to Design Processes

The design process decisions have important consequences on the ability of the final documents to meet requirements. Design processes can be structured as top-down or bottom-up approaches, as shown in **Figure 3**.

In the top-down design process, a transition is made from abstract levels to detailed levels. Each level of transition involves a greater amount of detail. To transition to the next level, decisions are made on the value of the design parameter. Based on this value of the design parameter, the design problem is decomposed into sub-problems. A top-down design decomposition approach, as shown in **Figure 3**, is characterized through the following: the design parameters in consideration; the requirements that the design parameters are to satisfy; the alternatives for the possible values that the parameters could take; the information or knowledge that is available to make the design decision; and the decided-upon values for the parameters.

From the foregoing, the MoPW mainly employs the top-down approaches to design. This is because the ministry prepares type-drawings at the ministry level and uses them in all areas. As has been mentioned, ESPs specifically employed the top-down approach at 2 levels: one at the Ministry of Finance level and, two at the MoPW pre-contract and intra-contract execution levels. The top-down approaches employed are potentially the reason why the ESPs, while they were able to offer immediate impact in the economy, are now facing various challenges. The main challenge is that a lot of top-down approaches have been criticised for production of unsustainable projects.

Design Stages and Related Tasks in Documentation

Asimov (1962), defines design activity as action aimed at finding solutions to perceived design problems within a resource envelope. A design problem can be defined as the satisfaction of design requirements through the definition of design parameters, the values of which are selected among various alternatives utilizing knowledge resources (Fathianathan and Panchal, 2007).

The activity of design is a purposeful, goal-oriented search (Covey, 1989). Assimilation is systematic build-up of the brief, establishing site conditions, identifying statutory requirements and limitations, economic appraisal, identification of standards, reference to previous solutions, and experience. General study brings order into accumulated data and opinions, exploring relationships and identifying the nature of problems. Development is refinement of one or more possible solutions. Precise planning and design and the working out of details, structure and services is required (Jennings, 1996). Cap 525 of the Laws of Kenya identifies these stages in the design process as inception stage, scheme design, final design, detail design, design and documentation stage (RIBA, 1972). Markus et al. (1972), also identified the following stages in the design process, as shown in **Figure 4**.

RIBA (1972), identifies assimilation, general study, development and communication stages as a flow system in the documentation of a construction project. Assimilation consists of the accumulation and ordering of general information specifically related to the problem at hand. General study consists of the investigation of the nature of the problem. Development consists of the development and refinement of one or more of the tentative solutions isolated during phase two. Phase three consists of the communication of one or more solutions to people inside or outside the design team. Communication entails transferring selected solutions into media by which they can be transmitted to other design team members or stakeholders, and making sure they are understood. Gorti et al. (1998), advance that the key elements of a design process are goals, plans, specifications, decisions and context.

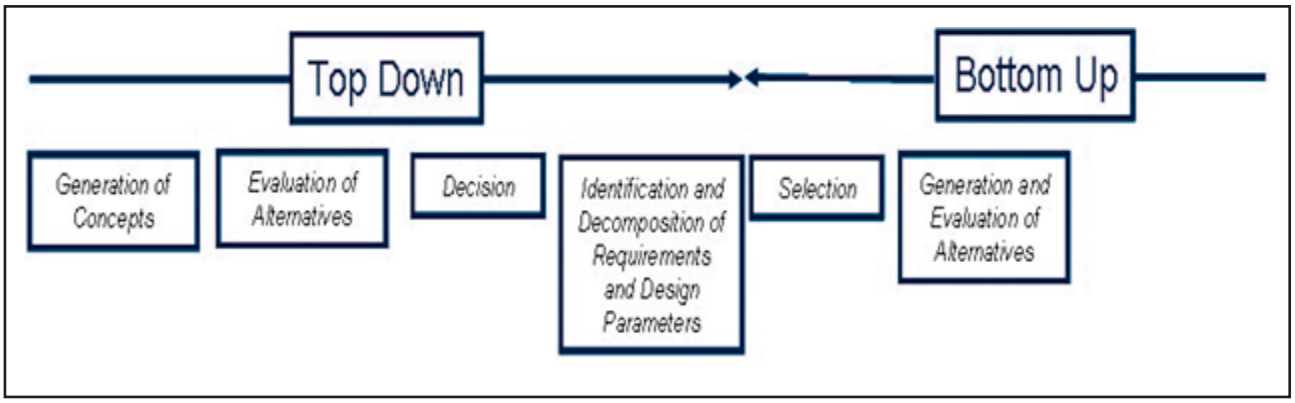


FIGURE 3
Task view of the design process as Top-Down or Bottom-Up approach
Source: Kusiak 2008

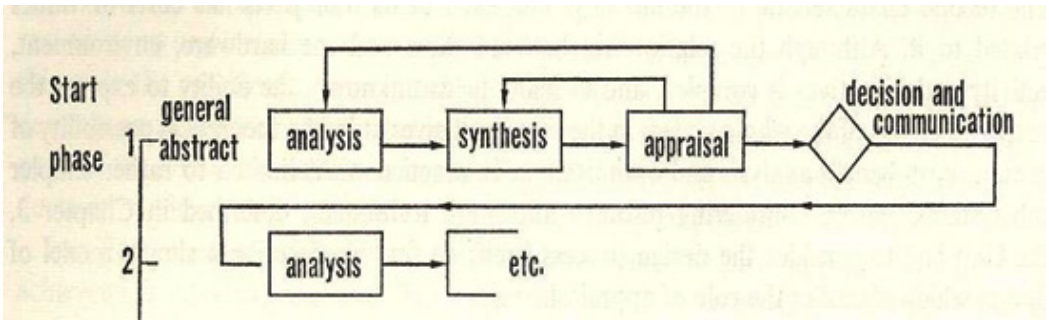


FIGURE 4
Model of design process
Source: Markus 1972

Composition of a Design Team

RIBA (1972), lists the composition of a design team as constituting an architect, quantity surveyor, structural engineer, mechanical engineer and electrical engineer, as professionals to prepare documents to be used in the implementation of a project. Each professional has specific technical expertise, and commonly their roles, duties and obligations in the design and construction process are clearly outlined in Law.

Input Factors in the Documentation Process

Input factors are all factors that can be manipulated in order to change processes (design) and outcomes (Cohen & Bailey, 2007). According to McGrath (1964), input factors can be at the level of the individual (professional consultant), the group (design team) or the environment. In contrast, Gladstein (1984), only distinguishes between factors on the group level and factors on the organizational level, whereas Cohen & Bailey (2007), propose environmental, organizational, group and task factors. Individual factors are, for example, skills of the individual group members, as well as attitudes, for example, preference towards teamwork, and personality characteristics, such as extraversion and conscientiousness (McGrath, 1964). Group size, group structure, and the level of 'cohesiveness' (McGrath, 1964) or group composition (Gladstein, 1984) and tenure (Cohen & Bailey, 2007) are considered as input factors on the group level.

Design Team Performance

Although design team performance is a complicated matter, adherence to scope, timely delivery of projects and effective cost in projects are measurable quantities in successful performance of a team (Badke et al.,

2002). Time, cost and scope are, however, intertwined, and a trade off in one of the parameters affects the quality of a project, and consequently design team performance. Emmitt (2012), highlights that design teams should aim at achieving final building within the cost, on time, and of the appropriate quality.

Inputs such as communication, co-operation, and team composition, influence team performance. Hackman (1987), posits that inputs and team processes combine to influence team performance.

Covey (1989), opines that a design team is indispensable from the design processes and procedures. Design teams at the MoPW are not exempted. There are clearly laid out procedures in MoPW quality manual - MOPW/QM/MR/002, to ensure efficiency and standardize the preparation of tender documents (MoPW, 2010). Implementation and maintenance of this procedure is principally the responsibility of the chief architect.

Coordination of building projects and design development in the MoPW starts with the chief architect receiving a request for the ministry to execute a building project. Upon receipt, the chief architect shall, within two days, direct the respective unit leader to constitute a project implementation team to run the project under the leadership of a project manager, as per the Public Procurement and Disposal Act of 2005 (ROK, 2005). At appropriate stages in the project implementation, the project manager ensures issuance of the applicable certificates to the contractor and the client. The project manager shall continually update the master project file and provide all the logistics required. This procedure shall be deemed complete upon the project manager submitting the final report on a project to the chief architect.

Information Flow in the Design Team

Emmit (2012), highlights that the head of a design team should define what type of information is relevant for each member to establish communication lines, information flows, timetables and format to transfer records and distribute the information. The complexity of a construction project and the unusual number of participants affects the communication process, which could have been facilitated by collaborative system and the adoption of coordination procedure.

From the foregoing, it emerges strongly that documentation is an important undertaking during the pre-contract, intra-contract and inter-contract periods. On the other hand, while some documentation is being done by the MoPW, preliminary information and the literature reviewed shows that there is a disconnect between actual engagement of contractors/professionals in the MoPW design teams and, adequacy of documentation that is done.

RESEARCH METHODS

To establish the performance of the documentation process in public projects, the study adopted a survey research design. The population comprised all the building projects in the ESP programme, in all the 269 districts of Kenya – each of them comprising 7 ESP building projects. This gives a total of 1883 building projects. From this population, a three-stage purposive sampling was done, for practical reasons, in order to get the units of observation - projects and respondents - for the study. Due to financial and time constraints, a random sample of the ESP building projects in all the 269 districts was not practicable. Consequently, the sampling process was done as follows: (i) clustering of the 269 districts into 3 groups of human settlement settings – Urban, Peri-Urban & Rural; (ii) selection of one typical district from each settlement category, because the project documentation processes and challenges amongst districts within a given category of the settlement settings are basically the same; and (iii) selection of 3 projects types from each of the selected districts. Therefore, a total of 9 projects were selected for the study.

The selected districts were: Kasarani (urban), Thika East (peri-urban) and Transmara East (rural). The project types include education, health-care projects, jua kali sheds, market stalls, fish ponds, irrigation agriculture and Information Communication Technology (ICT) development. The study focused on 3 building project types: construction of jua kali sheds, market stalls and health centres. In-depth data were then gathered from each of the 9 sampled projects using a questionnaire. Additionally, the

various post-contract reports on the projects were reviewed to reveal the weaknesses found in the overall project documentation. Respondents to the study questionnaire were the design team members that had been involved in ESP documentation of projects. Collected qualitative data was analyzed by thematic analysis.

RESULTS AND DISCUSSION

The ESP Programme had identified numerous projects per constituency, which were funded with over Kshs 100 million in every constituency. The aim of the ESP projects was to support local development projects in every constituency. The construction of these projects created employment, and the finished projects have provided essential services, jobs and business opportunities, and enough food at the constituency level. The ESP supported projects in education, health and sanitation, food production, environment, local government, industrialization and fisheries sectors.

Sample ESP Designs for Replication

As a rule, the ESP Projects had type-designs that were to be replicated. On the health centres, for example, the following were the main contents: administration blocks, general and maternity wards, kitchens, laundry units, workshops, parking, receptions, covered walkways, electric works, plumbing works, consultation rooms, pharmacy, nutrition rooms, sanitary areas, laboratory and immunization rooms. The proposed housing for the health centres were to include 2 bedrooms, shower, wet core, kitchen and living room.

Adequacy of the ESP Project Documentation

Observations made in this study strongly point to inadequate pre- and post-tender documentation in the ESP building projects. Poor planning, slow pace of implementation and inadequate flow of information were some of the inadequacies inherent in documentation. Already there are structures in place for documentation. The robustness of documentation is a factor of planning, budgeting and adherence to important institutional code of record-keeping and archiving. The tendering process in Kenya has already inbuilt checks and balances that are important for identifying the best contractors. Nevertheless, the receiving ministries (in this case MoPW) have fallen short of the requisite database management systems.

Challenges Experienced in ESP Projects

Nearly all challenges experienced in the ESP implementation had aspects of documentation, directly or indirectly mentioned as a deficiency. **Table 1** highlights the documentation challenges observed, and specifies how the needs may have been tackled by better documentation.

The need to improve documentation for the ESP building projects cannot be overemphasized. According to The Institute of Social Accountability (TISA) (2010), ESP might not achieve its objectives because of the following reasons: ESP projects have been marred with poor planning and a slow pace of implementation; there is low community awareness and involvement in the projects funded by ESP; there is poor flow of information on the progress of the ESP projects; and projects are misplaced and do not meet the priorities of specific regions.

As shown in **Figure 5**, planning and budgeting organizations are able to link up with the technical and implementation agencies through availability of a common pool of documents and information. Whether the centralised documentation for all purposes is top-down or bottom-up, a centralised documentation agency would invariably ensure intra- and inter-level on-demand documentation advantages to the system.

In the Centralized and Institutionalized Documentation Centre (CIDC) set up, MoPW projects should be adequately documented for optimal information availability, information use and information dissemination. Information has been identified as a strong requirement for understanding and learning, and, to effectively ensure its availability, information documentation needs to be handled in a systematic manner. Commissioning documentation is generated throughout the project delivery process, and key documentation, such as Owner's Project Requirements (OPR), Basis of Design (BOD), plans, schedules, inspections and test results, are included in a Commissioning Report. Commissioning

TABLE 1: Documentation needs in tackling problems in an ESP Project

	Challenges	Documentation needs	How better documentation may have helped
1	Site identification	Yes	Previous studies may have established site requirements for such projects and included any possible/feasible sites
2	Bottom-up documentation	Yes	MoPW may have been more aware of the construction needs and feasibility more than the Ministry of Finance (MoF), which ought to have engaged MoPW in the process in the districts from the beginning
3	Statutory requirements: NEMA, VAT and local authorities	Yes	These have previously been done and hence templates are available from previously documented projects
4	Contract management: Capacity of contractors	Yes	Previously used contractors and those whose details are in procurements records have their capacities known hence if well documented may be easy to find and engage
5	Lack of documentation	Yes	To establish systems with proper continuity, documentation in all projects should be considered at all levels during the intra- and inter- project cycles

Source: Adapted from MoF 2012

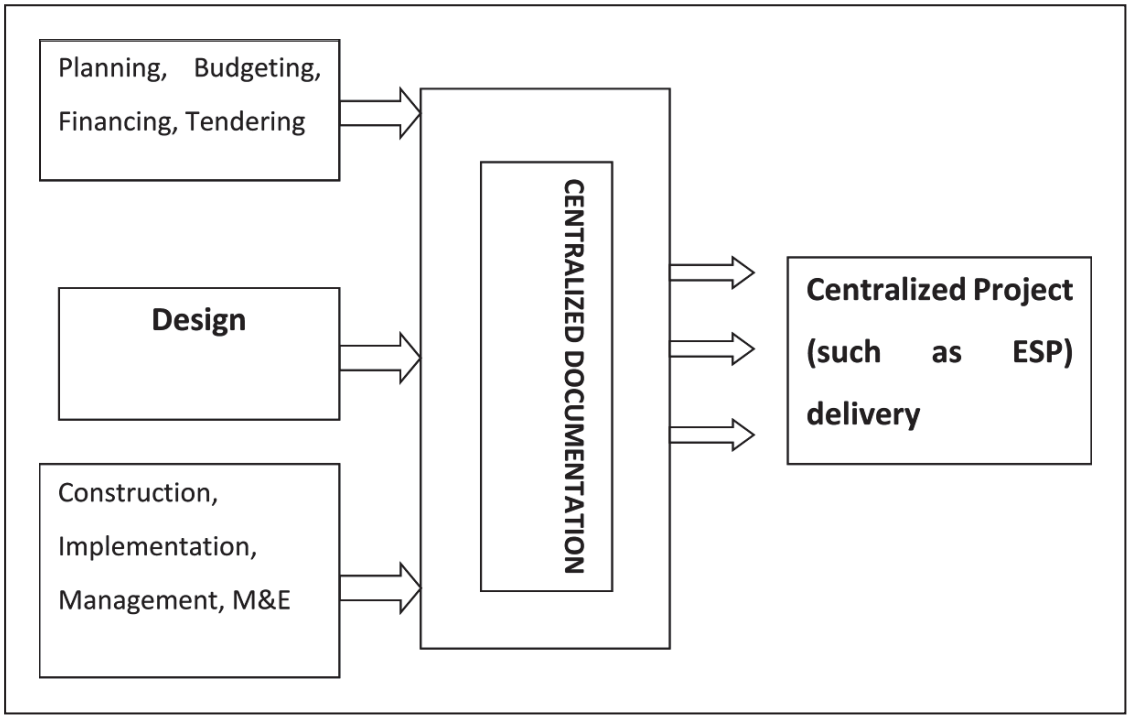


FIGURE 5
Conceptualizing centralized documentation
Source: Author 2019

documentation that will be included in the Commissioning Report. The report is normally shown in a table format with responsibilities of individual team members who will prepare, review and accept the results and documentation. A partial list and descriptions of key commissioning documentation is shown in the **Table 2**.

CONCLUSION AND RECOMMENDATIONS

ESP is an important GOK effort towards wealth creation, jumpstarting the economy and poverty eradication. However, documentation in the ESPs has so far been inadequate. There is, therefore, the need to establish a robust framework for documentation of the ESP projects, whereby the ESP documentation is linked with other current, past, present and future GOK efforts to institutionalize the knowledge gained. A framework towards this action is a centralized institutionalized documentation centre, a model of which was formulated in this study.

This study recommends establishment of a CIDC, which was formulated in the study. It is postulated

TABLE 2: Documentation matrix and implementation

Documentation Matrix Phase	**Document**	**Input by**
Pre-Design	Owner's Project Requirements	O&M, Users, Capital Projects, Design Team
	Commissioning Plan	Owner, Design Team, CA
	Systems Manual Outline	O&M, CA
	Training Requirements Outline	O&M, Users, CA, Design Team
	Issues Log	CA
	Issues Report	CA
	Pre-Design Phase Commissioning Process Report	CA
Design	Owner's Project Requirements Update	O&M, Users, Capital Projects, Design Team
	Basis Of Design	Design Team
	Construction Specifications for Commissioning	Design Team, CA, Owner
	Design Review Comments	CA
	Issues Log	CA
	Issues Report	CA
Construction	Owner's Project Requirements Update	O&M, Users, Capital Projects, Design Team
	Basis of Design Update	Design Team
	Commissioning Plan Update	Design Team, CA, Owner, Contractor
	Submittal Review Comments	CA

Key: *CA - Construction Administrator; O&M - Operations and Maintenance*

Source: Adapted from ASHRAE 2019

that the CIDC enhances all the aspects which project documentation may impact on. When the entire project delivery process is documented in a consistent manner, a historical perspective is created that explains the iterative process of determining the agreed-on project requirements at each step of the development process. Commissioning documentation becomes the road map for the success criteria to be met by facilities that are put in service. At post-occupancy, commissioning documentation becomes the benchmark to ensure that the building can be maintained, retuned, or renovated to meet future needs. It documents the OPR in the beginning of the project and records compliance, acceptance and operations throughout the facility's life.

CITED REFERENCES

ASHRAE. (2019). *The Commissioning Process.*

Asimov, M. (1962). *Introduction to Design*. Prentice-Hall.

Bender J., William, S. and Darlene, M. (2002). *Teambuilding in the Construction Industry*. AACE International Transactions.

Cohen, S.G. and Bailey, D.E. (1997). *What Makes Teams Work: Group Effectiveness*.

Covey, S. (1989). *The Seven Habits of Highly Effective People*. Free Press.

Emmitt, S. and Gorse, C. (2003). *Construction Communication*. Blackwell Publishing Ltd.

Fathianathan, M. and Panchal, J.H. (2007). *Design nodes: An approach for modeling design processes*. Conference Proceedings-4th international conference on digital enterprice technology-Bath,UK.

Gladstein, D.L. (1984). Groups in context - A model of task group effectiveness. *Administrative Science Quarterly*. 29(4), 499-517.

Hackman, J.R. (1987). *The Design of Work Teams*.

Haimes, B.R. (1994). *Document interface*. Industry, AACE International Transactions.

Jennings, G. (1996). *Design team working for the built environment*.

Kusiak, A. and Wang, J. (1993). *Decomposition of the design process*.

Markus T.A, Whyman, P., Morgan, J., Whitton, D., Maver,T., Canter, D. and Fleming, J. (1972). *Building Performance*. London: Applied Science Publishers Ltd.

McGrath, J.E. (1964). *A view of group composition through a group-theoretic lens*. Stamford, Connecticut: JAI Press Inc.

MoPW. (2010). *ISO 2001: 2008 Based Quality Management System, Architectural Department Procedures Manual*. MoPW.

Republic of Kenya (ROK). (2005). *The Public Procurement and Disposal Act*. Nairobi: Government Printers.

RIBA. (1972). *Handbook of Architectural Practise and Management*. London: Architects 66.

Rydeen, J.E. (2011). *Check and recheck: Minimize headaches for construction success with accurate documents*. Penton Media, Inc.

TISA. (2010). *How is the ESP Performing in your Constituency*. TISA.

Zhu, Y., et al. (2007). *Capturing Implicit Structures in Unstructured Content of Construction Documents*.