

**INTERNATIONAL JOURNAL OF
INNOVATIVE RESEARCH AND KNOWLEDGE**

ISSN-2213-1356

www.ijirk.com

**PARTICIPATORY PROJECT DESIGN AND
SUSTAINABILITY OF ROAD CONSTRUCTION PROJECTS****ORWA SAMWEL OKINYI****Abstract**

Infrastructural development projects including road projects are key in improving living standards of a nation and ensuring economic growth. However, despite the increase in number of road construction projects over the years, a good number have been portraying poor sustainability as well as cost and time overrun. Even though, participatory project design is considered an important phase of a project, most project managers do not consider the participation of the stakeholders in project design as an important aspect. This paper analyzes the influence of participatory project design on sustainability of road construction projects. The study specifically sought to determine the influence of participatory goal setting, participatory resource planning and participatory project scheduling influences and sustainability of road construction projects. The study was anchored on System theory and Stakeholder theory. The findings indicated that participatory project design has an influence on sustainability of road construction projects. Specifically, the study found that participatory goal setting has a significant influence on sustainability of road construction projects. The participation of stakeholders in needs assessment, development of objectives and identification of indicators leads to an improvement in the sustainability of road construction projects. In addition, the study found that participatory resource planning has a significant influence on sustainability of road construction projects. This implies that the participation of stakeholders in identification of resource requirements, resource mobilization and resource allocation/budgeting has a significant influence on sustainability of road construction projects. Also, the study established that participatory project scheduling has a significant influence on sustainability of road construction projects. This shows that the participation of stakeholders in identification of tasks, prioritization of tasks and task duration estimation has a significant influence on sustainability of road construction projects.

Key Words: *Participatory Project Design, Project Sustainability, Road Construction Projects*

Introduction

All over the world, infrastructure development including roads and bridges are important in economic growth and development. Road construction projects have laid down the physical and technological foundations upon which modern civilization has developed. They also create investment opportunities across various related sectors and are vital to the achievement of national socio-economic objectives. In the last three decades, many and large infrastructure projects have been proposed and built all over the world, but these projects have portrayed poor sustainability in terms of public support, environment and economic considerations. Lower than predicted revenues and cost overruns place the viability of these projects at risk and redefine projects that were initially considered effective economic growth vehicles as possible obstacles to such growth.

Poor sustainability of road construction projects is a global problem and not just developing countries' problem. Muhamad and Mohammad (2018) indicate that the allocation of financial resources in respect to road projects has increased in the recent times. This has happened as a result of realization that roads are significant to socio-economic development of any nation. Even though efforts are being made in a way to ensure economic development through road infrastructure projects, developing countries are still faced by challenges such as delayed benefits of the projects, public support and environmental impact. Project sustainability is considered to be a state where the target beneficiaries are able to take responsibility for ensuring people in the current and future generation are able to benefit from the projects by sustaining its outcome, processes, resources and human capacity. However, projects need to include not only the social considerations of a project, but also other considerations like cost implications, safety, health and workforce education (Uwera & Kariuki, 2017). Therefore, the sustainability of a project should encompass social considerations, economic considerations and environmental considerations.

The complexity of construction projects has led to an increase in uncertainties involved in the design and planning phases of projects as well as low involvement of various stakeholders, over the years. Traditionally, stakeholders were not involved in construction projects have separated design and planning from construction processes leading to changes related to design and scope during project implementation. The separation of project design from the construction leads to problems where the designs require changes during project implementation and this negatively affecting performance in terms of cost overrun, schedule delays, and loss of productivity. In addition, lack of stakeholders' involvement in construction projects necessitates changes and repairs after sometime thus affecting the economic (cost) and social sustainability (utilization) of the building project. As such, project design changes should be minimized as much as possible during the implementation of a project. Different authors have highlighted the importance of project design in ensuring the sustainability of road projects (Bassa, Reta, Alyew & Tora, 2019).

Aslam, Baffoe-Twum and Saleem (2019) observed that low or lack of stakeholder participation during project design leads to design errors necessitating design changes during construction, which in turn leads to increase in total cost of construction and delivery time. In addition, design errors also lead to reworks in construction projects account for between 5 and 20 percent of increase in project cost. In Malaysia, Muhamad and Mohammad (2018) observed that low stakeholder participation in project designs leads to design changes during project implementation in terms of change of requirements/specifications, addition or omission or scopes, unclear initial design, lack of coordination, discrepancies in design and inexperienced consultants, which lead to project cost overrun, schedule delay and increase environmental pollution due to demolitions and reconstruction.

In addition, Bassa, Reta, Alyew and Tora (2019) found that in Ethiopia, the main cause of project design change was low participation of stakeholders leading to lack of design review during design process, errors and omission in design, change of plans, incomplete contract document and differing site conditions. Changes in design in turn lead to completion schedule delay, increase in project cost, wastage of materials during rework, productivity degradation and working extra hours (overtime) to meet deadlines of the project. In Kenya, Mutiku and Mutiso (2020) indicate that the collaboration of different stakeholders including architects, quantity surveyors, interior designers and structural engineers is important in ensuring the sustainability of building projects in Nairobi County measured in terms of building safety. Poor collaboration between various stakeholders' during project design leads to structural failures, on-occupancy collapse, collapse of buildings during construction and considerable damage of properties.

Statement of the problem

There is a need to improve on roads as they are the main type of transport in the country. Roads are used to carry about 80% of passengers and cargo within the country and hence are a key incentive to spurring economic growth. The allocation of the cost budget in respect to road projects has increased in the recent times. This has happened as a result of realization that roads are significant to socio-economic development of any nation. Even though efforts are being made in a way to improve on road projects, Kenya is still faced by challenges such as delays in completion of road projects, demolitions that are experienced in businesses houses, abortive works and cost overruns.

In most developing countries, including Kenya, most of the constructions projects end up incurring cost overruns and hence exceed the contract amount that was planned for initially. In Africa, public roads construction projects have been increasing from one period to another. Completion of the project within the stipulated time remains to be a problem. Road construction projects, mainly in developing countries are characterized by time and cost overrun as well as poor quality, failure to meet the objectives and stalling of projects (Mauléon & Bergman, 2019). An instance of unsuccessful implementation of road projects leads transportation inconveniences. According to Senaratne and Jayarathna (2012) the utilization of participatory project design can go a long way in improving project sustainability in terms of social aspects (delivery on time and continued benefit to the community), economic considerations (completion cost, expected development and economic growth) and environmental considerations (pollution, environmental degradation and energy efficiency).

However, despite the investment in participatory project design such as participatory goals setting, participatory resource planning and participatory scheduling, the sustainability of road construction projects in developing countries still remains low. In Nigeria, Akinbile, Oladoja, Awoniyi and Adisa (2016) found that road construction projects exceeded the planned completion time with an average delay of 51%, failed to achieve the objectives and most of the projects did not satisfy the clients and the users. In Uganda, Musyoki, Kisimbii and Kyalo (2020) indicate that roads are constructed at an average rate of 0.01km per day with time and cost overruns of 83% and 46%, respectively.

Mwanza, Namusonge and Makokha (2020) indicates that road construction projects in Kenya challenges in social, economic and environmental sustainability. For instance, during the construction of the Thika Super Highway, there was an increase in cost to 34.45 billion from 26.44 billion. Furthermore, there was a change in the completion deadline to July 2013 from July 2011. In addition, the system of sewerage located along Thika Super Highway project changed after its completion. Due to overruns in cost, there is stagnation in the development of economic and the realization of vision 2030. Further, while technological innovations have been found to improve quality management processes in roads constructions projects, the adoption of various technological innovations

has been slow. It is therefore important to understand how participatory project design affects the sustainability of road construction projects.

Studies conducted on participatory project design and sustainability of projects have been limited to specific regions and countries around the world. For instance, Acero, Ramirez, Mejía and Díaz (2019) examined the influence of participatory design on sustainable development in developing countries; Uwera and Kariuki (2017) examined the relationship between project design practices and sustainability of information communication technologies infrastructure projects in Rwanda; Kyalo (2017) examined the relationship between Influence of participatory design approach and sustainability of donor funded water projects in Mwala Sub County. This study therefore seeks to investigate the the influence of participatory project design on the sustainability of road construction projects.

Objectives of the study

General Objective

The general objective of the study will be to examine the influence of participatory project design on the sustainability of road construction projects.

Specific Objectives

The objective of the study will be;

- i. To determine the influence of participatory project goal setting on sustainability of road construction projects
- ii. To establish how participatory project resource planning influences sustainability of road construction projects
- iii. To examine how participatory project scheduling influences sustainability of road construction projects

Theories guiding the Study

A theory is a coherent group of tested general propositions, commonly regarded as correct, that can be used as principles of explanation and prediction for a class of phenomena. The role of a theory in research is to identify the starting point of the research problem and to establish the vision to which the problem is directed. This study is anchored on system theory and stakeholder theory.

System Theory

General System Theory (GST) was originally founded by Hungarian biologist Ludwig von Bertalanffy in 1972 (Von Bertalanffy, 1972). From a sociological perspective, systems theory is the transdisciplinary approach of an organization (Morgeson, Mitchell & Dong, 2015). A sociological system comprises of four things, namely; objects, attributes, internal relationships among objects and environment. According to Barile, Orecchini and Saviano (2018), objects are considered to be parts, elements, or variables within the system. Attributes are the properties, characteristics of qualities of a system and its objects (Valentinov, Hielscher & Pies, 2016). Every system has internal relationships that exist among its objects. In addition, a system exists in an environment.

A system is a set of objects of things that influence one another within an environment and form a larger pattern that is different from any of the parts (Steblyanskaya, Jun & Vasiev, 2021). A system can also be considered as a collection of entities that act together to perform a specific purpose (Broks, 2016). A system is separated from its environment by a boundary, which separates what is in the system and what is not (Moldogaziev & Resh, 2016).

A system can either be open or closed. An open system can interact with its environment and it is characterized by exchanges of matter and information with the external environment.

Road construction projects are open systems that interact regularly with external forces such as other government agencies, suppliers, community members and donors. On the contrary, in a closed system there is no exchange of information and matter with the external environment (Valentinov, Hielscher & Pies, 2016). The open system theory focuses on the relationships between various stakeholders in a project or organization. In applying the concept open system theory, Morgeson, Mitchell and Dong (2015) indicate that an organization is a system built by an energetic input-output, where the energy coming from the output reactivates the system.

Road construction projects are open systems that are characterized by interrelationships between various stakeholders within the project (engineers, project managers and contractors) as well as other stakeholders such as the beneficiaries and regulatory authorities such as National Construction Authority and National Environment Management Authority among others. Inaccuracies, errors and incompleteness in project designs result from inadequate communication and feedback in the project. Therefore, to improve project designs, project managers should ensure participatory project goal setting (including defining goals and using a visual aid to communicate objectives), participatory project resource planning (budgeting) and participatory project scheduling through involved all the stakeholders.

Stakeholder Theory

The stakeholder theory was first developed by Edward Freeman in the 1980s. According to the theory, stakeholders encompass individuals, groups or other organizations that affect or are affected by decisions and operations of an organization. The theory emphasizes on the interconnections between an organization and all those who have a stake in it including customers, employees, suppliers, the community and regulatory bodies (Gaziyev, 2019). The stakeholder theory argues that the organization has relationships with many constituent groups and that it can engender and maintain the support of these groups by considering and balancing their relevant interests. The theory further posits that an organization is only successful when it delivers value to its stakeholders, and such value can come in many forms beyond financial benefits (Uribe, Ortiz-Marcos & Uruburu, 2018). The theory therefore emphasizes that an organization or a project should endeavor to satisfy all its stakeholders (Marjamaa, Salminen, Kujala, & Tapaninaho, 2021).

The stakeholder theory assumes that an organization can only be considered successful if it delivers value to the majority of its stakeholders (Gaziyev, 2019). The theory further assumes that the actions of the management of an organization have the potential to affect a wide range of individuals, and that the pursuit of organizational objectives can easily be disrupted by the actions of unexpected groups (Uribe, Ortiz-Marcos & Uruburu, 2018). Stakeholder theory offers an appropriate way of considering a more complex perspective of the value that stakeholders seek, as well as new ways to measure it. Different stakeholders in an organization will have different interests and expectations. According to Eskerod and Huemann (2017), the stakeholder theory argues that a firm should endeavor to satisfy all its stakeholders. This means that an organization should seek to satisfy its customers, satisfy and ensure the growth of teams, operate within the set budget, and ensure that the government's objectives are met.

The study uses the stakeholder theory to show how participatory project design influences sustainability of road construction projects. Road construction projects have a wide range of stakeholders who include the client (the government), community members (beneficiaries), contractors, designers, civil engineers, structural engineers, suppliers, project teams and government authorities like National Construction as authority and National

Environment Management Authority among others. The participation of these stakeholders during project design helps in ensuring that all their interests and views are considered during project implementation so as to ensure sustainability. The participation of the beneficiaries helps in ensuring that their needs are considered, civil and structure engineers ensure that the road projects are safe for use with minimal accidents, participation of regulatory authorities ensures that various licenses and certificates are provided on time and the participation of project teams ensures that they understand the goals and objectives of the project.

Project sustainability

Project sustainability is an approach to business and organizations that balances economic, social and environmental aspects of project -based working to meet the needs of various stakeholders without overburdening or compromising future generations. Morfaw (2018) defines project sustainability as systematic concept that relates to the continuity of social, environmental, and economic aspects of human society. Project sustainability is a means of ensuring configuration of civilization and human activity so that society, community members and its economies are able to meet their needs and express their greatest potential in the present, while preserving biodiversity and natural ecosystems, and planning and acting for the ability to maintain these ideals indefinitely. According to Adams, Muir and Hoque (2014), project sustainability encompasses social aspects, economic aspects and environmental aspects. In addition, Njeri and Omwenga (2019) observed that the measures of sustainability include economic sustainability, environmental sustainability and social sustainability. Environmental measures of sustainability include natural resource conservation and emission levels, occupational health and safety, energy efficiency, preservation of biodiversity and climate change. Economic measures of sustainability include affordability, growth and development, maintenance cost and completion within budget. Social measures of sustainability include benefits to the community, equity and equality, community relations, human rights, beneficiary ownership and completion within schedule.

Participatory Project Design

The independent variables in this study will be components of participatory project design, which include participatory project goal setting, participatory project resource planning and participatory project scheduling.

Participatory Project Goals Setting

Participatory goal setting fosters shared commitment to the project among stakeholders in projects including beneficiaries, funders, experts, contractors, engineers and construction managers among others. In addition, Li and Butler (2017) defines participatory goal setting as a joint and negotiated decision making process where project managers, project team members and other stakeholders in a project agree on the goals to be implemented. Participatory goal setting should take place as part of a project so that common consensual goals are set by the time project actually begins (Groen, 2018). However, preliminary participatory goal setting process is rare as it requires resources, time, personal commitments that are not usually available prior to the project funding. The goal setting process should ensure that the goals are aligned with interests and goals of various stakeholders and partners.

Working with primary stakeholders enables projects to be established in which the objectives are driven by local realities. Working with communities to understand what they feel is a successful outcome and what social change means to them is challenging and requires patience, time and resources (Latham & Steele, 2020). Ideally, a wide group of stakeholders and community members would be involved, facilitated by inclusive processes and dialogue, and an empowering research approach. It is important that project managers do not impose visions of what change means on to the people they work with, so the initial steps of understanding what changes are sought

and how they will be measured are critically important (Li & Butler, 2017). While it may be tempting to forego the use of participatory approaches to setting indicators due to lack of time and other resources, it is important to take a long-term perspective that considers the benefits of participatory goal setting.

Participatory Project Resource Planning

Participatory project resource planning involves the mobilization and allocation of resources such as skills sets, team members, financial resources as well as equipment and the best fit for the job. According to Umulisa, Mbabazize and Shukla (2018), participatory project resource planning refers to the determination of resources including people, finances, material and equipment as well as their quantities that should be used in performing project activities. Participatory project resource planning involves the participation of different stakeholders in identification of types of labor required, roles and responsibilities of the labor, number of people needed to complete a specific task, equipment needed for the project and raw material list (Mubita, Libati & Mulonda, 2017). It maximizes efficiency by helping teams to manage their utilization rates, track capacity, and monitor progress, to keep projects on budget and work on track.

Participatory resource planning in road construction projects plays a key role in identifying schedules and overseeing internal and external resources necessary for the successful implementation of projects. It helps in measuring the productivity of team members and in implementation of proactive measures to maximize their strategic and billable utilization (Umulisa, Mbabazize & Shukla, 2018). It also plays a key role in visualization of underutilized resources or those getting rolled off from tasks and reallocates them to suitable project vacancies. The participation of stakeholders in resource planning maximizes project budget spending and enhances project workflow process through reporting and forecasting. Allocating the right resource to the right project ensures the timely delivery of the project within the budget. Planning for resources eliminates the deployment of over and under-skilled resources on project tasks. If resources are under-qualified, a delay in project timelines is inevitable, and if overqualified, can spike project costs.

Participatory Project Scheduling

Participatory project planning refers to inclusion of community members in coming up with activities that will help achieve the set objectives for the project (Matu, Kyalo, Mbugua & Mulwa, 2020). Participatory project scheduling involves the participation of stakeholders including the beneficiaries in identification of tasks, prioritization of tasks, allocation of times for each tasks and delegation of tasks. According to Kerzner (2017), it involves the participation of stakeholders in identification of tasks, allocation of task durations, identify parallel tasks, identify predecessor tasks, identify dependent tasks, define the critical path and identify risks. The main goal of participatory project scheduling is to ensure the implementation of project on time, on plan and on budget. Following the participatory definition of various activities in a project, the activities are associated with time to create a project schedule. The project schedule provides a graphical representation or predicted tasks, milestones, dependencies, resource requirements, task duration and deadlines (Kinyata & Abiodun, 2020). The project schedule should be detailed enough to show each work breakdown structure task to be performed, the name of the person responsible for completing the task, the start and the end of each task, and the expected duration of time it will take. Various stakeholders are involved in the implementation and utilization of the project and hence their participation in task identification and task duration estimation is important to the sustainability of the project.

Relationship between the Variables

Participatory project design has a significant effect on sustainability of projects. Kyalo (2017) observed that when stakeholders including community members are involved in the project designs, there is a high level of usefulness

and efficiency of development projects if stakeholders view their involvement and contribution. The participation of the stakeholders in project goal setting ensures that all their needs and interests are considered, which reduces design changes and errors and hence an improvement in sustainability of the projects. Magassouba, Tambi, Alkhlaifat and Abdullah (2019) indicate that stakeholders' involvement in goal setting has a significant influence on sustainability of projects. This is similar to Noori (2017) argument that participatory needs assessment had a significant effect on sustainability of development projects.

The participation of the stakeholders in project resource planning ensures that all the resources required in project implementation are identified, mobilized and allocated in a timely manner so as to ensure an improvement in the sustainability of the projects. Abdi and Mbugua (2019) observed that the participation of stakeholders in resources' requirement identification, resource mobilization and resource allocation leads to an improvement in project sustainability. In addition, Tsurkan, Sotskova and Oksana (2016) indicate that participatory budgeting had a significant influence on sustainability of projects. The participation of stakeholders in project scheduling ensures that all the stakeholders provide information on the duration of time their tasks will take so that it can be used in development of a Gantt chart. According to Al-Keim (2017), the participation of clients, contractors, beneficiaries and engineers in project scheduling leads to an improvement in sustainability of projects. Further, Suresh and Sivakumar (2019) observed that the participation of schedule management planning has a significant influence on sustainability of projects.

Review of related Literature

This section presents a review of empirical literature on the relationship between participatory project goals setting, participatory project resource planning and participatory project scheduling and sustainability of projects as presented by other authors in different parts of the world.

Participatory Project Goals Setting and Sustainability of Projects

Using a systematic review of literature, Magassouba, Tambi, Alkhlaifat and Abdullah (2019) examined the influence of stakeholders' involvement in goal setting, in terms of project identification and development of projects goals, on development project performance in Guinea. The results indicated that the involvement of different stakeholders, such as the Government through the operating Ministries, International Institutions such as United Nations Development Program, World Bank, Africa Development Bank, Construction and Manufacturing Companies as well as non-governmental organizations involved in infrastructure projects in the development of goals led to an improvement in the sustainability of development projects.

In Afghanistan, Noori (2017) examined the effect of community participation in needs assessment during goals setting on sustainability of development projects. A mixed method research approach, including both qualitative and quantitative research approaches were used in the study. Quantitative approaches included self-administrated questionnaires and qualitative approaches included interviews, observations, reports and archived documents. The results indicated that participatory needs assessment had a significant effect on sustainability of development projects.

Mwanza, Namusonge and Makokha (2020) studied the influence of stakeholders' participation in project goals and objectives development on performance of Construction Projects in Kakamega County, Kenya. The study adopted a mixed research design which included descriptive survey, and correlation. The target population was 1761 respondents comprised of 925 Early Childhood Development Education managers, 62 County polytechnics managers, 765 modern stall managers and 9 managers of County modern markets. For primary data questionnaires was used as the main data collection instruments and was in form of a five likert scale. The results

indicated that even though stakeholder involvement in development of projects goals and objectives had a significant influence on performance of construction projects, there was low participation of stakeholders including beneficiaries.

In Nairobi County, Ndungu and Karugu (2019) studied the role of needs assessment and projects goals development on the performance of donor funded youth projects in Korogocho, Nairobi City County, Kenya. The study utilized a descriptive study targeting 1650 Youth initiative Kenya (YIKE) members and 3 project managers from Oxfam Kenya with a sample size of 165 respondents. The study utilized primary and secondary data that was sourced using a semi-structured questionnaire and published reports respectively. The primary data was collected using a key informant interview schedule. The results indicated that community participation in needs assessment, prioritization of projects and projects goals development has an effect on the performance of donor funded youth projects in Korogocho slums.

Korir, Kyalo and Mbugua (2021) examined community participation in project scope planning and its impact on the performance of community water supply projects in Kericho County, Kenya. The descriptive survey design was used to describe characteristics of the population being studied whilst a correlational research was used to describe the degree to which variables under the study were related. The target population comprised 8369 people from which a sample of 382 was considered and out of which 310 responded. The results indicate that community participation in scope planning in terms of needs assessment and development of projects goals and objectives has an effect on the performance of community water supply projects in Kericho County, Kenya.

Proposition 1: *Participatory project goal setting influences sustainability of road construction projects*

Participatory Project Resource Planning and Sustainability of Projects

In the Russian Federation, Tsurkan, Sotskova and Oksana (2016) studied the influence of the participatory budgeting on the infrastructural development. The study used a systematic review of literature on studies conducted in the Russian Federation. The results indicated that budgeting is a process of allocating the budget funds to address the primary local problems, which leads to improving territorial infrastructure development. The results also indicated that there was an updated conceptual basis of participatory budgeting; indicators reflecting the influence of the participatory budgeting on infrastructural development and criteria for its implementation in the municipalities.

In Nigeria, Akinbile, Oladoja, Awoniyi and Adisa (2016) studied the influence of community participation in resource mobilization on the sustainability of rural water projects in Oyun local government area of Kwara State. Six wards were randomly selected out of the eleven wards in the local government and one village was purposively selected from each ward based on the presence of rural water projects. Twenty respondents were interviewed in each village, giving a total sample size of 120 respondents. The findings of the study showed that community participation in fund and people mobilization had a significant effect on sustainability of rural water projects.

Shema and Shukla (2017) studied the effect of beneficiaries' participation in resource mobilization on project sustainability in in Papsta Agricultural Projects in Bugesera District, Rwanda. The study adopted a descriptive research design and the target population was World Bank employees and former Papsta Agricultural Projects' employees. Stratified sampling technique was used and both primary and secondary data were utilized. The results indicated that beneficiaries' participation in resource mobilization affected sustainability of Papsta projects. The study concluded that clients or government entities should put efforts into developing inspiring projects that bring together residents, small groups and local businesses to improve social, their economic engagement, their life chances and their local environments.

Using a descriptive survey research design, Ochieng' and Sakwa (2018) conducted a study to examine the effect of participatory resource mobilization in the implementation of community water projects on the well-being of beneficiaries' households in Kisumu County. The target population was 360 households drawn from four areas in Kisumu (Obunga, Panga, Wandiege and Asengo). Sampling techniques used was stratified, giving a sample size of 189 households. Data collection was done using questionnaires. The results indicated that participative resource mobilization measured in terms of participative labor sourcing, finance mobilization and sourcing project materials led to efficient project implementation as well as the well-being of beneficiaries of community water projects in the informal settlement of Kisumu.

Musyoki, Kisimbii and Kyalo (2020) examined participatory resource planning approaches among community development initiatives in low resourced countries. The study used a desktop review of literature from five articles, which were searched using Zotero through Google network support. The study found that there is a concern going forward since community participation has been misrepresented by governments and the donor community in low resourced countries. The results also indicated that projects are created to satisfy community-based or people-centered needs where their input to the project resource planning will be critical. There is therefore a need of emphasizing on a policy framework that improves community participation on all development community projects.

Proposition 2: *Participatory project resource planning influences the sustainability of road construction projects*

Participatory Project Scheduling and Sustainability of Projects

In the United States, Al-Keim (2017) examined the strategies to reduce cost overruns and schedule delays in construction projects. Primary data were obtained from semi-structured interviews with 3 senior managers from different construction project management companies who have successfully managed construction projects in Qatar. Data analysis process included a modified Van Kaam method. The findings indicated that managing the approval of the project components during the design stage contributes to reducing changes during construction, which is helpful to control cost and time. The findings also indicated that project managers should obtain approvals from clients, contractors, beneficiaries and engineers.

Using a survey research design, Suresh and Sivakumar (2019) studied the effect of schedule management plan on the effectiveness of project management. A close ended questionnaire is used as a tool to collect the data on the perception of 208 employees about relevance of schedule management planning in their project management strategy. The results indicated that schedule management plan had a significant effect on the effectiveness of project management. However, the schedule management planning was influenced by factors such as resource allocation, competency of the team, resources inventory and availability of labor and raw materials. However, to address challenges related to these factors managers can ensure the involvement of suppliers, financiers or donors, administrators and procurement team during project design.

Amade, Achaka and Ubani (2016) conducted an assessment of the effectiveness of scheduling techniques on the success of mechanical construction projects in Nigeria. This study focused on scheduled and unscheduled sets of constructed silo tanks. In addition, the study was based on the combination of scheduling techniques (Critical Path Method & Gantt chart) with the aid of Microsoft Project for the scheduled project sets, as these techniques helped in evolving a planned activity resource cost. The results indicated that the combination of scheduling techniques were effective in reducing variance within the scheduled project set, while the earned value analysis exposed the minor variance which existed, the variance were not sufficient to deter the project success. One of the factors that negatively influenced the effectiveness of scheduling techniques was low participation of stakeholders.

Using a descriptive survey design, Kyalo (2017) conducted a study on the influence of participatory design measured in terms of budget preparation on sustainability of donor funded water projects in Mwala Sub County, Machakos County, Kenya. The researcher engaged 6 project coordinators of the funding agencies as key informants. In order to enrich the data, triangulation was adopted hence the researcher included all the 15 National Government Administration Officers (Chiefs) and the Sub County Water Officer. Data was collected by use of questionnaires and Key informant interviews. The results indicated that donor organizations involved the stakeholders in design but partially. While donor organization utilized the opinions of the community in the design of water projects, they did not involvement them in the preparation of budgets. The donor organizations prepared the budgets and presented them to the community during project implementation. As such, the community members were partially involved in the designs of the projects.

Wamugu and Ogollah (2017) studied the role of stakeholders’ participation in schedule planning on the performance of constituency development fund projects in Mathira East constituency in Kenya. A descriptive research design was adopted, whereby both quantitative and qualitative data was collected using a questionnaire from Mathira East constituency. The study population was the entire CDF project initiated in Mathira East Constituency. The findings of the study indicated that the participation of stakeholders in scheduling planning had a positive and significant effect on performance of CDF projects.

Proposition 3: *Participatory project scheduling influences the sustainability of road construction projects*

Conceptual Framework

A conceptual framework explains the relationship between independent variables and dependent variables under investigations. It gives clear illustrations of areas that may likely have meaningful interactions. The independent variables in this study will be participatory project goals setting, participatory project resource planning and participatory project scheduling. The dependent variable in the study will be sustainability of road construction projects.

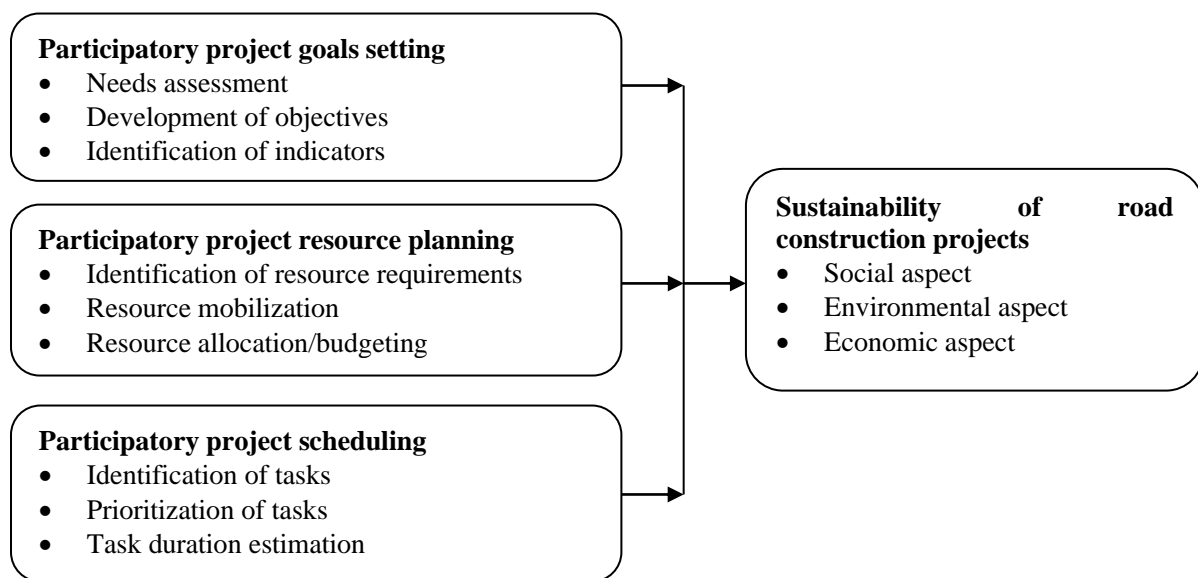


Figure 1: Conceptual Framework

Propositions

Proposition 1: Participatory project goal setting influences sustainability of road construction projects

Proposition 2: Participatory project resource planning influences the sustainability of road construction projects

Proposition 3: Participatory project scheduling influences the sustainability of road construction projects

Conclusions

The study concludes that participatory project design has an influence on sustainability of road construction projects. Specifically, the study found that participatory goal setting has a significant influence on sustainability of road construction projects. The participation of stakeholders including project managers, beneficiaries (community members), civil engineers, structural engineers, contractors and materials suppliers in needs assessment, development of objectives and identification of indicators leads to an improvement in the sustainability of road construction projects. In addition, the study concludes that participatory resource planning has a significant influence on sustainability of road construction projects. This implies that the participation of stakeholders in identification of resource requirements, resource mobilization and resource allocation/budgeting has a significant influence on sustainability of road construction projects. Also, the study concludes that participatory project scheduling has a significant influence on sustainability of road construction projects. This shows that the participation of stakeholders in identification of tasks, prioritization of tasks and task duration estimation has a significant influence on sustainability of road construction projects.

References

- Abdi, A. A. & Mbugua, J. (2019). Project design factors influencing implementation of infrastructural development projects in devolved governments: A case of Marsabit and Isiolo Counties, Kenya. *International Academic Journal of Information Sciences and Project Management*, 3(4), 429-457
- Abou- Warda, S.H. (2014). Mediation effect of sustainability competencies on the relation between barriers and project sustainability (the case of Egyptian higher education enhancement projects). *Sustainability Accounting, Management and Policy Journal*, 5(1), 68-94.
- Acero, A., Ramirez, C., Mejía, M. & Díaz, E. (2019). Participatory Design and Technologies for Sustainable Development: an Approach from Action Research. *Systemic Practice and Action Research*, 32, 10-24.
- Adams, C. A., Muir, S. & Hoque, Z. (2014). Measurement of sustainability performance in the public sector. *Sustainability Accounting, Management and Policy Journal*, 5(1), 46-67.

- Akinbile, L., Oladoja, M., Awoniyi, F & Adisa, B. (2016). Effects of community participation on perception of sustainability of rural water projects in Oyun local government area of Kwara State, Nigeria. *Journal of Food, Agriculture & Environment*, 4(3&4), 257-261.
- Al Amri, T. & Marey-Perez, M. (2020). Key Quality Issues Affecting the Sustainability of Construction Projects. *International Journal of Advanced Science and Technology*, 29(3), 4330 – 4338.
- Al-Keim, A. (2017). *Strategies to Reduce Cost Overruns and Schedule Delays in Construction Projects*. Retrieved from <https://scholarworks.waldenu.edu>
- Amade, B., Achaka, C. & Ubani, E. (2016). An Assessment of the Effectiveness of Scheduling Techniques on the Success of Mechanical Construction Projects. *International Journal of Emerging Trends in Engineering and Development*, 3(1), 391-402.
- Aslam, M., Baffoe-Twum, E. & Saleem, F. (2019). Design Changes in Construction Projects – Causes and Impact on the Cost. *Civil Engineering Journal*, 5(7), 1647-1655.
- Barile, S., Orecchini, F. & Saviano, M. (2018). People, technology, and governance for sustainability: the contribution of systems and cyber-systemic thinking. *Sustainability Science*, 13, 1197–1208.
- Bassa, M., Reta, A., Alyew, A. & Tora, M. (2019). Causes and Effects of Design Change in Building Construction Projects in Three Selected Southern Ethiopia Zones. *International Journal of Engineering Research & Technology*, 8(12) 757-761.
- Eskerod, P. & Huemann, M. (2017). Sustainable development and project stakeholder management: what standards say. *International Journal of Managing Projects in Business*, 6(1), 36-50.
- Gaziyev, M. (2019). Integrating Sustainability into Project Stakeholder Management A Literature Review. *Australian Journal of Environmental Management*, 5(3), 110-123.
- Groen, B.A. (2018). A Survey Study into Participation in Goal Setting, Fairness, and Goal Commitment: Effects of Including Multiple Types of Fairness. *Journal of Management Accounting Research*, 30(2), 207–240.
- Kerzner, H. (2017). Project Scheduling. *Project Management Case Studies*, 12, 201-209)
- Kinyata, G.S. & Abiodun, N.L. (2020). The Impact of Community Participation on Projects' Success in Africa: A Bottom up Approach. *International Journal of Research in Sociology and Anthropology*, 6(3), 01-08.
- Kissi, E., Agyekum, K., Baiden, B.K., Tannor, R.A., Asamoah, G.E. & Andam, E.T. (2019). Impact of project monitoring and evaluation practices on construction project success criteria in Ghana. *Built Environment Project and Asset Management*, 9(3), 364-382.
- Korir, J. K., Kyalo, D. N., & Mbugua, J. (2021). Community Participation in Project Planning: A panacea to improved Performance of Community Water Supply Projects in Kericho County, Kenya. *Advances in Social Sciences Research Journal*, 8(3), 385–418.
- Kyalo, D. M. (2017). *Influence of participatory project management approaches on sustainability of donor funded water projects in Mwala Sub County, Machakos County, Kenya*. Retrieved from <http://www.secheresse.info>

- Latham, G.P. & Steele, T.P. (2020). The Motivational Effects of Participation versus Goal Setting on Performance. *Academy of Management Journal*, 26(3), 33-45.
- Li, A. & Butler, A. (2017). The Effects of Participation in Goal Setting and Goal Rationales on Goal Commitment: An Exploration of Justice Mediators. *Journal of Business and Psychology*, 19, 37-51.
- Magassouba, S., Tambi, A., Alkhlaifat, B. & Abdullah, A. (2019). Influence of Stakeholders Involvement on Development Project Performance in Guinea. *International Journal of Academic Research in Business and Social Sciences*, 9(1), 1111-1120.
- Marjamaa, M., Salminen, H., Kujala, J. & Tapaninaho, R. (2021). Sustainable Circular Economy: Exploring Stakeholder Interests in Finland. *South Asian Journal of Business and Management Cases*, 10(1), 50-62.
- Matu, J., Kyalo, D., Mbugua, J. & Mulwa, A. (2020). Stakeholder Participation in Project Planning: Prerequisite to Effective Completion of Urban Road Transport Infrastructure Projects in Kenya. *Journal of Building Construction and Planning Research*, 8, 73-91.
- Morfaw, J. (2018). *Fundamentals of project sustainability*. Newtown Square, PA: Project Management Institute.
- Morgeson, F. P., Mitchell, T. R., & Dong, L. (2015). Event System Theory: An Event-Oriented Approach to the Organizational Sciences. *Academy Of Management Review*, 40(4), 515-537.
- Mubita, A., Libati, M. & Mulonda, M. (2017). The Importance and Limitations of Participation in Development Projects and Programmes. *European Scientific Journal*, 13, 90-102.
- Muhamad, N. H. & Mohammad, M. F. (2018). Impact of Design Changes in Construction Project. *Malaysian Journal of Sustainable Environment*, 2(3), 1-18.
- Musyoki, B. M., Kisimbii, J., & Kyalo, D. N. (2020). Participatory Project Planning Approaches: Reflections from Community Development Initiatives in Low Resourced Countries. *Journal of Entrepreneurship & Project Management*, 4(5), 51-67.
- Mutiku, J. K. and Mutiso, J. (2020). Influence of Project Design Collaboration on Building Safety in Nairobi City County, Kenya. *The Strategic Journal of Business & Change Management*, 7(3) 195 – 205.
- Mwanza, P.W., Namusonge, G.S. & Makokha, E.N. (2020). Influence of Project Stakeholders' Practice on Performance of Construction Projects in Kakamega County, Kenya. *International Journal of Social Sciences and Information Technology*, 5(9), 21-32.
- Ndungu, J., & Karugu, J. (2019). Community Participation and Performance of Donor Funded Youth Projects in Korogocho, Nairobi City County, Kenya. *International Journal of Current Aspects*, 3(3), 227-240.
- Njeri, J. W., & Omwenga, J. Q. (2019). Influence of Monitoring and Evaluation Practices on Sustainable Projects – A Case Study of the National Aids Control Council. *The Strategic Journal of Business and Change Management*, 6(2), 132 – 152.
- Noori, H. (2017). Community Participation in Sustainability of Development Projects: A Case Study of National Solidarity Program Afghanistan. *Journal of Culture, Society and Development*, 30, 27-39.

- Ochieng', F. O., & Sakwa, M. (2018). Impact of Participatory Resource Mobilization in the Implementation of Community Water Projects on the Well-Being of Beneficiaries' Households in Kisumu County. *The Strategic Journal of Business & Change Management*, 5(4), 709 - 1720
- Shema, R. & Shukla, J. (2017). Effect of Beneficiaries' Participation on Project Sustainability in Rwandan Agriculture Industry Case Study of Papsta Agricultural Projects in Bugesera District. *Journal of Management*, 5(7), 1-13.
- Steblyanskaya, A., Jun, Y. & Vasiev, M. (2021). General systems theory for sustainable green development. *Journal of Project Management*, 12(2), 263-283
- Suresh, D. & Sivakumar, A. (2019). Impact of Schedule Management Plan on Project Management Effectiveness. *International Journal of Engineering and Advanced Technology*, 9(1), 33-50.
- The World Bank (2013). *The Global Program on Sustainability*. Washington D.C: The World Bank.
- Tsurkan, M. V., Sotskova, S. U. & Oksana, N. T. (2016). Influence of the Participatory Budgeting on the Infrastructural Development of the Territories in the Russian Federation. *International Journal of Environmental & Science Education*, 11(15), 7684-7702.
- Umulisa, A., Mbabazize, M. & Shukla, J. (2018). Effects of Project Resource Planning Practices on Project Performance of Agaseke Project in Kigali, Rwanda. *International Journal of Business and Management Review*, 3(5), 29-51.
- Uribe, D. F., Ortiz-Marcos, I. & Uruburu, Á. (2018). What Is Going on with Stakeholder Theory in Project Management Literature? A Symbiotic Relationship for Sustainability. *Sustainability*, 10(4), 1300-1321.
- Uwera, P. & Kariuki, P. M. (2017). Effect of Project Design Practices on Sustainability of Information Communication Technologies Infrastructure Projects in Rwanda: A Case of Regional Communication Infrastructure Project. *International Journal of Science and Research*, 6(9), 1880 – 1884.
- Valentinov, V., Hielscher, S., & Pies, I. (2016). Emergence: A Systems Theory's Challenge to Ethics. *Systemic Practice & Action Research*, 29(6), 597-610.
- Von Bertalanffy, L. (1972). The History and Status of General Systems Theory. *Academy Of Management Journal*, 15(4), 407-426.
- Wamugu, J. W. & Ogollah, K. (2017). Role of stakeholders participation on the performance of constituency development fund projects in Mathira East constituency in Kenya. *International Academic Journal of Information Sciences and Project Management*, 2(1), 104-125.