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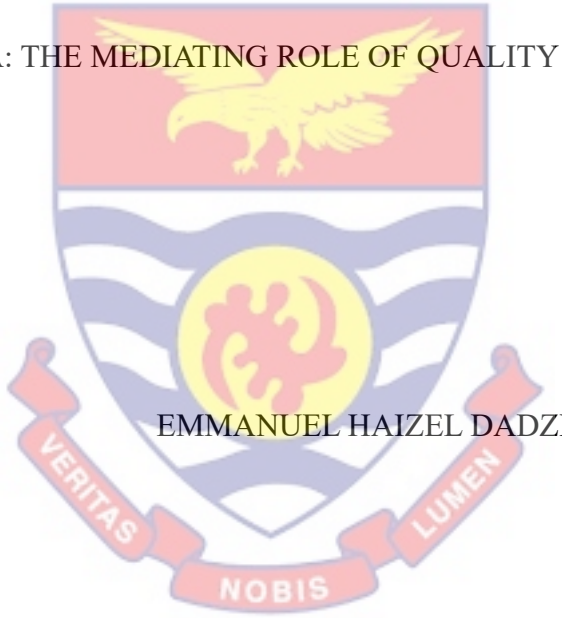

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2025

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COMMUNITY PARTICIPATION AND INFRASTRUCTURE SUSTAINABILITY IN THE AJUMAKO/ENYAN/ESSIAM DISTRICT, GHANA: THE MEDIATING ROLE OF QUALITY INFRASTRUCTURE

BY

EMMANUEL HAIZEL DADZIE

Thesis submitted to the Department of Management of the School of Business, College of Humanities and Legal Studies, University of Cape Coast, in partial fulfilment of the requirements for the award of a Master of Philosophy degree in Public Policy and Management.

MARCH 2025

DECLARATION

Candidate's Declaration

I hereby declare that this thesis is my original work and that no part of it has been submitted for any other degree at the university or elsewhere.

Candidate Signature…… Date…….

Name: Emmanuel Haizel Dadzie

Supervisor's Declaration

I hereby declare that the preparation and presentation of the thesis were supervised in accordance with the University of Cape Coast's guidelines on thesis supervision.

Supervisor's Signature…… Date……

Name: Mr. Isaac Kosi

ABSTRACT

Community participation has long been recognised as crucial for ensuring infrastructure sustainability. The success of any development relies deeply on actively involving communities in all stages, from design to implementation and maintenance, as these projects directly impact their quality of life. This study examined the influence of community participation on infrastructure sustainability, focusing on the mediating role of infrastructure development in Ajumako-Bisease of Ajumako/Enyan/Essiam District, Ghana. Using a quantitative research approach and explanatory design, data were collected from 125 households through a structured questionnaire utilizing the multi-stage sampling technique. The analysis was conducted using SPSS and PLS-SEM. The outcome of the study showed that (1) community participation positively relates to quality infrastructure, (2) quality infrastructure has a positive effect on infrastructure sustainability, (3) community participation positively relates to infrastructure sustainability, and (4) there is a positive indirect effect of quality infrastructure on community participation and infrastructure sustainability. These findings highlight the importance of institutionalising community participation in aligning infrastructure projects with user needs and fostering sustainability. The study suggests that government agencies and stakeholders should adopt inclusive frameworks to encourage active community participation at all stages of infrastructure development.

KEYWORDS

Community participation

Quality infrastructure

Infrastructure sustainability

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I am extremely indebted to my supervisor, Mr. Isaac Kosi, for his supervision and inspiration, which played a pivotal role in shaping this thesis to its existing level. His inspiration, vigorous assessments, and determined efforts heightened the quality of this research. I also continue my sincere appreciation to all lecturers and staff of the School of Business, UCC, for their undaunted encouragement throughout my study period. Special thanks go to Mr. Michael Essel, Samuel Debrah, Emmanuel Addy Koomson, Miss Grace Essel, Helen Haizel Dadzie, and colleagues for their honest assistance and inspiration. Their presence and encouragement were a constant source of strength and inspiration.

DEDICATION

To my late grandmother, Elizabeth Acquah, and my niece, Stephanie Aseda Debrah.

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CHAPTER ONE

INTRODUCTION

The sustaining of government-funded infrastructure projects is an increasing issue across various developing nations (Yusuf et al., 2020), such as Ghana, where lack of community participation has led to several infrastructure projects being abandoned (Sakyi-Darko & Osei, 2020). As infrastructure development continues to increase, the government, developers, community leaders, and residents must acknowledge and tackle the challenges associated with ensuring the sustainability of these projects. Community participation, particularly during the planning, design, implementation, and maintenance phases, can enhance shared responsibility, capacity building, and a sense of ownership among stakeholders (Mutanguha & Kamuhanda, 2021). Mahama & Badu-Nyarko, (2014) argued that infrastructure sustainability largely depends on a participatory approach. Olanipekun et al. (2014) highlighted the need for the government to commit additional effort and actively promote broader community participation in quality infrastructure development and its sustainability. This study analyses the effect of community participation on infrastructure sustainability, focusing on the quality of infrastructure development in Ajumako-Bisease, Ajumako-Enyan-Essiam District.

Background to the Study

Decentralisation is a widely recognised and used approach to ensuring people's participation in local development. Perhaps no other institution is comparable to the local government in offering the scope and platform necessary for people's participation in local development. The local government is an administrative, executive, and legislative framework

designed to aid power decentralisation, national integration, governance efficiency, and belongingness at the local level (Salako & Agibade, 2019). The local government is a kind of governance that ensures people within a given territory of a country collaborate to ensure their welfare (Ndreu, 2016). This means that people should be allowed to participate in projects that touch their lives, rather than being imposed on them. This is both a fundamental human right and a democratic deal.

The issue of sustaining government-funded infrastructure projects is a test all over the world, both in developed and developing economies such as Ghana (Odonkor & Sallar, 2021). The sustainability of infrastructure projects at the local level has been a tireless test to the governments of most developing countries, including Ghana, where the government ensures budgets and funds are committed to the provision of infrastructure to reduce the infrastructure deficit (Nana-Addy et al., 2023). Developing countries, including Ghana, are most concerned about the issue of infrastructure sustainability and its negative impact on the general prosperity and environmental safety (Anarfi et al., 2020). Consequently, sustaining infrastructure projects should be properly figured out to deal with general prosperity and environmental safety threats (Thacker et al., 2019). Although sustainability is a general concern in the Ajumako-Enyan-Essiam, there is a need for local authorities and communities to focus on and accept the challenges for infrastructure sustainability (Kinyata & Abiodun, 2020). This will promote participatory approaches to quality infrastructure development and its sustainability as well as capacity building, sense of ownership, and shared responsibility (Ezeh et al., 2024). Rangwaga & Dlamini (2021) posit that the sustainability of infrastructure does not only

depend on technical and financial factors but also on the active participation of communities that utilise the facilities.

For a long time, the government's approach to infrastructure provision has been top-down, in which well-intentioned authorities or political representatives at the national, regional, and district levels decide the requirements of communities, to the detriment of project beneficiaries. As a result, communities believe that infrastructure sustainability is the sole responsibility of the government (Andrews et al., 2023), which provides little or no innovation to ensure infrastructure sustainability (Mold, 2012), causing projects to be underutilised and abandoned even after completion (Nana-Addy et al., 2023). Thus, communities at the local level are central to driving the sustainability of infrastructure projects (Ezeh et al., 2024). In the Ajumako-Enyan-Essiam District, community participation has played a vital role in the success and sustainability of key government-funded infrastructure projects. Facilities such as schools, a market, a health centre, a durbar ground, and a community library in Ajumako-Bisease were made possible through the active involvement of residents. Their contributions—including labour, fundraising, provision of land, and material support—greatly facilitated project implementation. This collective effort fostered a strong sense of ownership among community members. As a result, the infrastructure continues to be well-maintained and effectively utilized. Nana-Addy et al. (2023) claim that infrastructure sustainability is one area researchers, project managers, and practitioners should emphasise to help advance the sustainable development call, and to ensure project success.

Yusuf et al. (2020) noted that infrastructure sustainability essentially relates to end-users' behaviour towards maintaining infrastructure operations and services. According to these authors, sustainability is premised on "people-centred" and user-need-driven infrastructure projects. According to the Brundtland Commission (1983), humanity can make development sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs. This suggests that sustainability is significantly achieved when development action and process are inclusive and foster community empowerment.

The conclusions drawn from the review of the studies (Aga et al., 2017; Obar et al., 2017; Kinyata & Abiodun, 2020; Mutanguha & Kamuhanda, 2021; Augene, 2022) indicate that community participation plays a prominent role in improving government-funded infrastructure and its sustainability. (Aga et al., 2017) averred that actively involving project beneficiaries during needs assessment and planning stages has a significant positive effect on behavioural intentions of the project beneficiaries towards project sustainability. The authors seem to suggest that because community participation can promote capacity building, sense of ownership, and shared responsibility, community members feel enthused and are part of initiatives designed for their benefit, thereby energising them to take maintenance responsibilities for the benefit of the community. Muniu et al. (2018) noted that community participation inspires and empowers community members to voluntarily partake in initiatives.

The United Nations (2016) defined community participation as a fundamental human right, which is an end in itself that performs a vital role in

the well-being of the people and their community by enabling grassroots groups to undertake an active role in projects designed to address their needs to improve their lives and livelihoods. This means that community participation tends to unleash the potential of community members and empower them to voluntarily take on roles in development initiatives. Adesida & Okunlola (2015) corroborate this view by stating that community participation creates an enabling environment for sustainability by allowing users to guide key investments and management decisions, commit resources in support of their choices.

According to the participatory development theory by Robert Chambers (1983), participation is an approach in community development that highlights the essential function of local communities in shaping their future by engaging in the decision-making process associated with interventions. In addition, the participatory development theory seeks to give communities a part in initiatives designed for their benefits in hopes that development projects will be more sustainable if local people are engaged in the development process (Cornwall, 2002).

Other studies have reported that quality infrastructure – reliable, affordable, and accessible – is among the elements that can spur sustainability of infrastructure in communities. This is because infrastructure plays a prominent role in achieving 72% of the targets of the Sustainable Development Goals, either directly or indirectly (Thacker et al., 2019). Dzineku (2021) describes quality infrastructure as the basic structures, technical facilities, and community-level systems that are essential for sustaining the lives and livelihood of a community's population. Thacker et al.

(2019) and Nana-Addy et al. (2023), who examined the link between infrastructure and sustainability, concluded that the government should provide infrastructure that adequately serves the needs of the local people to ensure its sustainability. The participatory development theory considers infrastructure as one of the physical assets that communities need to pursue to promote sustainable livelihoods (Cornwall, 2012).

Given the opinion that community participation tends to render quality infrastructure (Trevidi & Khan, 2014), and that quality infrastructure tends to drive its sustainability (Rangwaga & Dlamini, 2021), it is rationally anticipated that the association concerning community participation and infrastructure sustainability is more likely to be mediated by quality infrastructure – reliable, affordable, and accessible (Nana-Addy et al., 2023). Despite these advances, the literature remains silent on how quality infrastructure mediates this relationship, specifically within the context of the Ajumako/Enyan/Essiam District. This gap hinders the formulation of targeted interventions aimed at enhancing infrastructure sustainability through community participation. Thus, this study sought to examine community participation on infrastructure sustainability in the Ajumako-Enyan-Essiam District of Ghana by examining the mediating role of infrastructure development.

Problem Statement

Infrastructure sustainability is prominent to community development, particularly in districts such as Ajumako/Enyan/Essiam, where quality infrastructure such as water systems, schools, markets, health facilities, etc, play a crucial role in improving livelihoods. Recognising the limitations of

top-down development approaches, decentralisation reforms in Ghana have increasingly emphasised community participation as a strategy to enhance effective, efficient, and sustainable infrastructure (Hackman et al., 2021). However, despite various interventions, infrastructure projects in the Ajumako/Enyan/Essiam district suffer from neglect and underutilisation, raising concerns about their long-term sustainability.

While studies (Ezeh et al., 2024; Zeliku, 2022; Fakere & Ayoola, 2018) recognise community participation as a prominent element in quality infrastructure delivery, there remains a significant gap in understanding the precise nature and extent of its influence in infrastructure delivery. Studies (Augene, 2022; Boadu et al., 2021) have claimed that community participation is highly significant in community-led infrastructure projects and less significant in infrastructure projects spearheaded by external agents, specifically the government (Mela et al., 2023). This is because infrastructure delivery by external agents, specifically the government, is predetermined, allowing communities to significantly contribute in the implementation stage and poorly in other stages, including sustainability (Sakyi-Darko & Mensah, 2020).

In addition, prior studies (Thacker et al., 2019; Rangwaga & Dlamini, 2021) have recognised the link between quality infrastructure and sustainability. These studies only focused on the financial and fiscal value of infrastructure, neglecting other value measures such as the socio-economic value of infrastructure in achieving sustainability (Zuluaga et al., 2021). Aizawa (2019) emphasised the importance of quality infrastructure in

addressing persistent disparities in infrastructure access and the infrastructure financing gap to promote sustainability.

Moreover, limited studies have linked community participation to the sustainability of infrastructure. However, a gap remains in understanding the extent to which community participation influences the sustainability of infrastructure. These studies (Aga et al., 2017; Obar et al., 2017) have revealed that community participation is a tool for project implementation, rather than how active, inclusive, and continuous involvement influences the long-term sustainability of projects (Kinyata & Abiodun, 2020). Nana-Addy et al. (2023) concluded that the effect of community participation on sustaining infrastructure may not be a direct one, as this can be achieved by providing user-need infrastructure.

Given the earlier and foregoing arguments, this study, therefore, sought to fill the gaps and contribute to the literature by examining community participation influence on infrastructure sustainability in the Ajumako-Enyan-Essiam District of Ghana by examining the mediating role of infrastructure development. Addressing these gaps is essential for guiding development planning, improving community participation strategies, and ensuring that infrastructure investments are not only implemented but also sustained in the long term.

Purpose of the Study

This study aims to examine the influence of community participation on infrastructure sustainability in Ajumako/Enyan/Essiam District and the role of quality infrastructure in mediating this nexus.

Research Objectives

The objectives of this study are:

1. Examine the effect of community participation on quality infrastructure.
2. Assess the effect of quality infrastructure on infrastructure sustainability.
3. Examine the effect of community participation on infrastructure sustainability.
4. Assess the indirect role of quality infrastructure in the relationship between community participation and infrastructure sustainability.

Research Hypotheses

The hypotheses of this study are to:

H1: Community participation positively relates quality infrastructure.

H2: Quality infrastructure has a positive effect on infrastructure sustainability.

H3: Community participation positively relates to infrastructure sustainability.

H4: Quality infrastructure mediates the relationship between community participation and infrastructure sustainability.

Significance of the Study

Community participation is essential in community development projects in Ghana and other developing countries. The goal is to improve the quality of life of the community population. The findings of this study will assist Ajumako Enyan Essiam local government, traditional authorities, community leaders, non-governmental organisations, and other development agencies in considering different approaches to involving dwellers in community development projects.

The findings of this study will also serve as a background for community development programs, assisting the government, policymakers, and development agencies in identifying the importance of community participation in their project cycles, and aiding in the modification and re-strategising of how participation can be used in problem-solving efforts to foster quality of life. This study will establish a database for future research and serve as a valuable resource for planners, international organizations, non-governmental organizations (NGOs), and anyone interested in community development.

Delimitation

The study was conducted in Ajumako-Bisease town in Ajumako Enyan Essiam District, in the central region of Ghana. It focused on issues related to community participation in providing community infrastructure facilities, specifically its role in meeting community needs and community support for infrastructure facilities. In addition, this study focused on the influence of quality infrastructure in ensuring community participation and infrastructure sustainability.

Limitation

This study focuses on residents in Ajumako-Bisease of Ajumako-Enyan-Essiam District. Therefore, the outcomes of the study may not apply to other populations. The findings should be interpreted within the context of the chosen sample. The study relied on survey data, which may have limitations in capturing the full participants' experience. However, relevant literature was used to support the findings and ensure comprehensiveness. It should be noted that the research is conducted within a specific time frame, usually one year,

and may not thoroughly explore longitudinal aspects. This limitation could affect our ability to track changes over an extended period.

Organization of the Study

The study is structured into five chapters. Chapter One includes the introduction of the study, background to the study, problem statement, objectives of the study, hypotheses, significance of the study, delimitation, limitations, and organization of the study. Chapter Two presents a literature review that critically analyses the previous research linked to the study. Chapter Three entails the research design and method used. Chapter Four offers presentations and discussions of the study's results. Finally, Chapter Five summarizes the main findings, concludes, and provides recommendations. The outline for the organization of this study conforms to the university's guidelines for presenting thesis work

CHAPTER TWO

LITERATURE REVIEW

Introduction

The study aims to determine the influence of community participation on infrastructure sustainability and the role of quality infrastructure in mediating the relationship. Considering the research problem, objectives, and hypotheses in the preceding chapter, this chapter elucidates the study's theoretical background and previous research on community participation, infrastructure development, and infrastructure sustainability.

Theoretical Review

The study adopts the participatory development theory as the leading theory that gives support to the findings and analysis. The subsequent section describes the theory's specifics and its pertinent to the study.

Participatory Development Theory

Organisation for Economic Co-operation and Development (1994) describes participatory development as a partnership between actors in setting agendas based on local views, opportunities, strengths, and challenges. The participatory development approach thus seeks to develop projects at the local level based on issues identified by local communities, whose needs are to be addressed by those development projects. Opposition to the decision-making model advocates for participatory approaches to development as alternatives before the 1960s. The need to encourage participation at the local level in decision-making paved the way for community-based development, decentralisation, and participation carried out by both donor organisations and governments (Mansuri & Vijayendra, 2013). In the 1980s, critics of the top-

down approach moaned the lack of performance by the approach in improving conditions of the local communities, who seemed marginalised by the central government when resources were being distributed (Christens & Speer, 2006). This led to a push for participatory development approaches led by Robert Chambers (1983), popularly known for his Participatory Rural Appraisal Approach. At the same time, the World Bank was pushing for the sustainability of development programmes. The common stand was that community development and sustainability should play a crucial role in encouraging community participation in development (Mansuri & Rao, 2013).

Fals-Borda et al. (1991) claimed that the participatory development paradigm has dominated the field of development in the past decades, and there are two significant schools of thought on participation. One school of thought saw participation as the inclusion of people in development agendas. This describes the top-down approaches as those that had excluded people from actively participating in development agendas. According to this school, people have skills and knowledge that can lead to the success of projects. The second school of thought views participation in light of tackling structural problems that cause societal problems. Exclusion of people means that they do not have access to the resources that they need to better their livelihoods. The participatory development paradigm becomes an important process where people seek to gain influence, giving them access to resources that they can use to better their livelihoods.

(Mansuri & Rao, 2013) further noted that participatory development can be categorised into organic and induced. The organic participatory development paradigm describes participatory actions by social movements

that are in opposition to the government's top-down approach, which has little participation by the people. The main objective is to fight for the rights of the local people who have been marginalised by the government. It is done through the creation of membership organisations to help improve the livelihoods of the local people. Induced participatory development paradigm, on the other hand, refers to participatory actions that are advocated for through policy change by the government. The most common forms of induced participatory actions include decentralisation and community-driven development.

This theory, as examined by Nelson & Wright (1995), Schuler & Namioka (1993), and Stohl & Cheney (2001), outlined reasons for participatory approaches in development discourse. First, the author claimed that participation as a concept is seen as a requirement for government and institutions interested in greater productivity at low cost. Second, participatory development is perceived as an instrument for greater investment as well as a new source of investment. Participatory approaches bring a close knowledge of the local communities, which government bureaucrats do not have, and a network of relations, essential both to the success of ongoing projects and long-term sustainability in local communities. In this context, local communities are becoming the infrastructure through which investments are made. Lastly, the author described the participatory approach as a good fundraising device. In the past decades, development-oriented non-governmental organisations (NGO's) have become the new call. This is due to the reputation of NGO's and their participatory and less bureaucratic

approaches allow them to meet the needs of the people with greater efficiency and at less cost.

According to Mutanguha & Kamuhanda (2021) and Okafor (2005), community participation helps in empowering communities, capacity building, sense of ownership, improving efficiency, yields better projects, encourages sustainability, and effectiveness. Therefore, the theory proposes that communities that are the beneficiaries of poverty reduction projects should be seen as targets, but also as assets and partners in development projects. In the context of this study, participatory development theory provides a framework for understanding how community involvement influences infrastructure outcomes. The theory supports the notion that when communities are actively involved—from planning to implementation—they develop a sense of ownership, enhance project relevance, and contribute to sustainability. This theoretical lens underpins the examination of the mediating role of quality infrastructure between community participation and sustainability in the Ajumako-Enyan-Essiam District.

Conceptual Review

A conceptual review aids in reviewing variables and concepts directly related to the topic under study. This section is essential because it enhances our understanding of the variables that underlie this study. The variables or concepts underpinning this study include community participation, infrastructure sustainability, and infrastructure development.

Community

The term community is commonly used in everyday life. A community can be groups with shared needs living in a certain geographical area (Alman,

2015). However, heterogeneous groups and individuals can form a community and collectively take action to attain shared and specific goals (Dalmazzo et al., 2014). Furthermore, individuals may belong to multiple communities at the same time, and the core meaning of community is that something is shared (Ahmad & Abu Talib, 2016).

A definition of community can be categorized in terms of 'place-centred' features, such as geographical terms, or 'people-centred' characteristics that may be used to describe a group of people who share the same basic interests (Ngo et al., 2019). A place-centred community is a community that is defined in geographic terms and refers to a group of people living in the same place or one locality by sharing the same values and organisations (Kuruvilla et al., 2020). A people-centred community refers to a group of people who have a common cause, a common interest or common ideas (Ahmad & Abu Talib, 2016). However, the interest of such a group of people can change over time, and therefore, community members can also change over time (Liberato et al., 2011). In community-related issues, people's attachments to place are often intertwined with their sense of community (Mao & Chen, 2021). The sense of community is a feeling of membership or belongingness to a group, including an emotional connection based on a shared history, as well as shared interests or concerns (Mao & Chen, 2021). Both senses of community and place attachment manifest themselves behaviourally in participation.

Participation

As part of the efforts to make governance closer to the local people, the local governance system – Metropolitan, Municipal, and District Assemblies

(MMDAs) – was introduced under the authority of the 1992 Constitution (Article 240 (1) and the Local Government Act 2016 (Act 936) to spearhead these mandates. The local government system is seen as a laboratory and also a principal agent for advancing the cause of equal opportunity, redistribution of wealth, and reducing poverty (Adu-Gyamfi, 2014). In Ghana, the local government system plays a prominent role in the country's socio-economic development, facilitating the provision of essential public services such as health care, sanitation, education, etc. Their significance was amplified by the decentralisation reforms of the late 1980s, which shifted service delivery from the central government to local authorities (Haynes & Kumah-Abiwu, 2024). These reforms empowered the MMDAs to manage resources and deliver services that directly impact the local population, making them key agents in the country's effort to improve living standards and local economic development (Otoo & Danquah, 2021). Thus, the local government system offers the scope and the platform necessary for people's participation in local development.

Participation is a concept that involves shifts in power between people, policy makers, and institutions in charge of resource allocations, within communities and the structure of those organisations (Fung, 2015). Suphattanakul (2018) emphasises the participation process as a transformative tool for social change. Yoerger et al. (2015) mentioned that participation is the involvement of people with significant control over the decisions concerning the organization to which they belong. He argues that some development scholars and practitioners regard participation as an end in itself, whereas others see it as a means to achieve other goals. Many of them view

participation as an instrument to enhance the efficiency of projects or as the co-production of services. In addition, the involvement of community members is intended to produce better decisions, and thus more efficiently benefit the rest of society (Ngo et al., 2019). Arnstein (1969) is one of the early attempts to create an abstract order of participation. According to Ngo et al. (2019) participation refers to the social process of taking part (voluntarily) in either formal or informal activities, programmes and/or discussions to bring about a planned change or improvement in community life, services and/or resources.

Although participation can occur at many levels, a key objective is the incorporation of local knowledge into the project's decision-making process (Mubita et al., 2017). It is argued that incorporating local knowledge in the project can improve targeting and guarantee a higher-quality monitoring of the program implementation (Chambers, 2012).Such advantages are only likely to be realized when there are institutions and mechanisms to ensure accountability (Pandeya et al., 2016).

While governments often cherish their perceived independence and authority, the reality in local government is that they are becoming increasingly aware that they are not capable of developing and implementing policies without the support of and contributions from others (Ngo et al., 2019). Moreover, according to Vincent et al. (2022), participation may be thought of as an instrument of empowerment. According to this view, development should lead to an equitable sharing of power and a higher level of people's, particularly the weaker groups, political awareness and strength.

Community Participation

Community participation is often used interchangeably with citizen participation and public participation. It is the involvement of the local people in the planning, implementation, and delivery of developmental projects in their neighbourhood. The nature and extent of involvement differ from one community to another, which could be a result of different factors such as culture, education, social, and economic background (Akin and Oyetunji, 2010). Community participation promotes a partnership between residents of the same neighbourhood; the government or authorities in charge of the development, and those who formulate policies, it is more than simply attending community meetings or consultation (Swapan, 2016).

Howard & Wheeler (2015) further describe it as the engagement of communities and individuals in the decision-making process about things that affect their lives. Akin (2016) sees it as an indigenous, decentralised and homogenous local organisation whereby all those having common goals and whose interests are best served by collaboration are involved in the development process. Decentralised means that decision-making is the responsibility of the local people or community organisations, while they are supported by agencies, either government or non-governmental development agencies that provide technical and financial assistance (Guha & Chakrabarti, 2019). In other words, community participation ensures that development projects meet the needs of the recipient communities and that it is of, for, and by the people. Community participation involves an extensive commitment from the recipient community, irrespective of who benefits or not (Adom, 2017). Apart from collective manual labour and attendance at meetings, etc.,

community participation might include financial contribution, collection of signatories to petitions to city authorities, taking part in demonstrations, and organising bazaars or lotteries to generate funds for communal use.

Fitzgerald et al. (2016) outline the advantages and disadvantages of community participation. According to the authors, community participation has advantages for both the community and the government in the process of making decisions as well as the outcomes of the process. The main advantages in the decision process are mutual education, a better understanding between the two main actors, as well as an increasing trust and building connections between them. The advantages do not only result in the process but also the outcomes, as it helps to achieve the goals and objectives, reduces the deadlock, and yields better policies and better implementation decisions for projects.

They further highlighted some disadvantages of the implementation of community participation in government decision-making. The issues that give the most disadvantages in the decision process with community participation are time-consuming. It can create problems for the government if there is no budget for community participation, or it is pointless if the decisions made by the community are ignored. The outcomes could also face disadvantages, especially a bad decision that has been heavily influenced by opposing interest groups, or there being a shortage of budget for implementation, which has been caused by a costly budget for community participation. According to many researchers, the community-based approach may face some limitations, which include: (i) difficulties in creating mutual trust between communities and stakeholders (Bridoux & Stoelhorst, 2022); (ii) difficulties in integrating

the community in the preparation and management of the project (Valladares, 2017); (iii) reluctance on the part of the key stakeholders, especially governments, to give substantial power to communities (Schemes, 2017) and (iv) in decision making, the reduction of participation to sweat equity instead of active participation (Opdyke et al., 2019).

In many projects, the advantages of community participation have been paid attention to, so that people believe that it is the only acceptable method towards sustainable development (UNDRO, 1982; CIDA, 1999). Despite the limitations of recent discussions about the disadvantages and negative aspects of community participation, it is suggested that this approach needs to be carefully considered and should not be overestimated in developing countries (Ngo et al., 2019b).

In reality, the performance of community-based projects depends on a complex interaction of participants, interests, objectives, resources, and processes that go beyond the benefits of the participation of the beneficiaries. This does not mean that the participation of beneficiaries is not positive; in fact, it is crucial (Valladares, 2017). Increased community participation and improved local government capacity will lead to better outcomes of the projects. A properly structured interaction and deliberation process among stakeholders can help to create more effective and innovative solutions to complex public issues (Boadu et al., 2021). Changes and reforms will help to reduce the constraints of participation and have an impact on the outcomes. Agency actions (or inactions) have a significant impact on both Process and Outcome success (Hassenforder et al., 2015). Agencies contribute to success, according to researchers, by providing technical assistance (Boadu et al.,

2021), initiating approaches to engage in and improve dialogue with neighbourhood people (Fakere & Ayoola, 2018), engaging liaisons to encourage participation (January & Kim, 2019), committing to follow recommendations (Fakere & Ayoola, 2018), and providing neutral, competent facilitation (Miniu et al., 2018), among others.

For this study, the description of community participation by the United Nations (2005), cited in Bappi et al. (2018), would be adopted. This definition clearly and practically explains community participation as a method of empowering members of communities to directly engage in the development process, exert influence over it, and reap the benefits of development outcomes.

Dimension of Community Participation

The study developed community participation in two dimensions of depth and width of participation, following the work of Berry et al. (1993), who advance from the concept of strong participation. Inspired by Dahl's precondition for a polyarchy, Berry et al. (1993) have formulated two dimensions of participation that are important for a system of strong participation. These are the width and depth of participation, which together determine the strength of participation in the policy process.

1. Width of Participation

Several authors have studied the characteristics and motivation of those who actively engage in participatory processes. In the literature on participation, there is much debate on the inclusion and exclusion of participatory processes Edelenbos, 2005). By the width of participation, the number and variety of backgrounds of the participants are analysed. It is

argued that individuals who have special interests or stronger views tend to participate more than those who lack these characteristics, as do those who are wealthier and better educated (Fiorina, 1999). A low score on the width of participation means that there is a low number of participants and/or these are the 'usual suspects', meaning that these are the people who frequently are involved in the participatory process (Berry et al., 1993). According to Barber (1984), there are grounds of citizenship that create a community. These include economic contracts, political contracts, commitments to common processes and ends, and others. Wandersman and Giarmartino (1980) found that participation was more likely among those who were concerned about their neighbourhood, had more experience in community leadership, and felt that competent colleagues could be enlisted to support the project. Fung (2015) argues that an essential feature of participatory approaches is the way to select participants or to answer the question: Who is eligible to participate, and how do individuals become participants? He claims that a participatory process becomes more inclusive when the selection instrument is more focused on open (self-) selection. This is illustrated in the figure below.

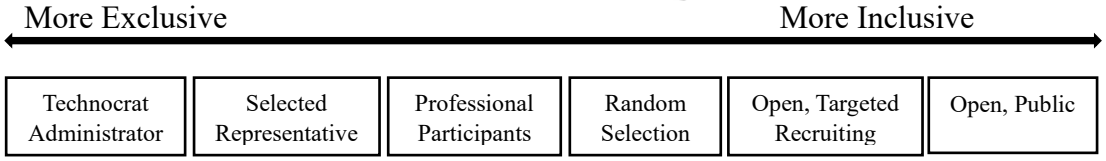

Figure 1: Inclusion Method.

Edelenbos (2005) argues that communities become active when invited to participate. The width of participation shows the accessibility of the community to the project as well as the opportunities for participation in the project. The analysis of the width of participation, the motivations, the duration, and the abilities of participation are shown.

2. Depth of Participation

The depth of participation implies the level of influence the community has on the formulation and implementation of policy, projects, and programmes (Berry et al., 1993). In order to analyse the depth of participation, the participation ladder constitutes a useful analytical tool (Edelenbos, 2005). There is a variety of ladders of participation developed by different scholars and organizations. The first and most well-known is Arnstein's ladder of participation, with eight rungs related to the distribution of power. Based on that, Choguill developed a participation ladder for developing countries. Other scholars like Edelenbos and Monnikhof (2001) also proposed ladders for participation. Alternative terms have also been suggested by other scholars for different rungs of the ladder (e.g., Biggs, 1989; Pretty, 1995; Goetz & Gaventa, 2001). The first two rungs in Arnstein's and Choguill's ladder represent the level of non-participation. In all five models of the participation ladder, the lowest level of participation is identified as Inform or Informing. The ladders can be divided from 3 to 5 and 6 rungs to the highest level of participation of Co-decide (Citizen control/ Empower/ Participate).

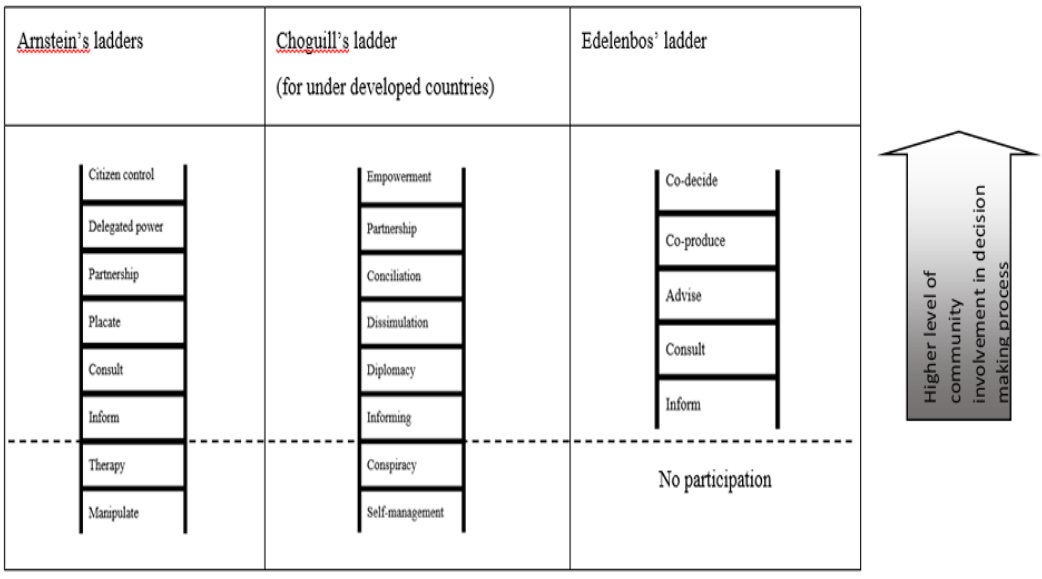

Figure 2: Ladder of Participation/Degree of Participation

In this study, the participation ladder outlined below is used as it focuses on dimensions that are the most relevant to the cases being investigated (Edelenbos 2000).

Informing: To a large degree, politicians and administration determine the agenda for decision making and inform those involved. They will not use the opportunity to invite interested actors to have input in policy development. This is the lowest level of depth of participation

Consulting: To a large degree, politicians and administration determine the agenda but regard those involved as a useful discussion partner in the development of policy. Politicians do not, however, commit to the results of these discussions.

Advising: In principle, politicians and administration determine the agenda but give those involved the opportunity to raise problems and formulate solutions. These involved actors play a full-fledged role in the development of policy. Politicians are committed to the results in principle but may deviate (if accounted for) from them in the final decision-making.

Coproducing: Together politicians, administration, and those involved determine a problem-solving agenda in which they search for solutions together. Politicians are committed to these solutions with regard to the final decision making, after having tested this outcome in terms of prior conditions.

Co-deciding: Politicians and administration leave the development and decision making of policy to those involved, and the civil service provides an advising role. Politicians simply accept the outcomes. The results of the

process have an immediate binding force. This is the highest level of depth of participation.

Quality Infrastructure

Quality infrastructure refers to the physical facilities that provide services consumed by end-users. Silvius et al. (2023) defined infrastructure as the mediators between 'nature' and the production of the city. They are an intertwined systematic framework that underpins the productivity of human activities and social equity. They are also considered multifaceted technical, political, and economic systems that offer essential and critical services to society Silvius et al. 2023). Silvius et al. (2023) considered quality infrastructure as a major determinant of quality of life and well-being, which are crucial to creating an enabling environment for economic growth and the improvement of quality of life. Most definitions of infrastructure often suggest strong public sector involvement (Gil-Garcia et al., 2016). Generally, governments are involved in the provision and regulation of infrastructure development in order to reduce market failure, ensure equal distribution of development, and also facilitate their efficiency. Quality infrastructure is considered in this study as the physical facilities provided by the government and other stakeholders for economic growth and improvement of quality of life (Grum & Kobal Grum, 2020). They are considered as the bedrock on which all other development and economic activities hinge. However, it also requires a huge decision-making process and planning (Lienert et al., 2015). The success or failure of infrastructure is affected by the structure and effectiveness of the institutional framework. It requires extensive project

organization, which differs according to type of infrastructure projects (Kivilä et al., 2017).

Government agencies usually work together in the planning and designing of development, while they also work together as operators and project managers. Infrastructure is dynamic, capable of growth, and requires a continual planning process; however, it does involve huge budget allocation, performance standards, and work schedules (Minsker et al., 2015). Planning of infrastructure is more strategic than commercial and is rarely based on easy or obvious solutions, especially for major infrastructure projects. Consideration must be given to the technology, the environment, the community, the culture and values, etc (Silvius et al., 2023). It usually requires long-term planning and carefully thought-out solutions, as any ill-thought-out decision could lead to loss, failure, disappointment, and may affect many stakeholders.

The planning process for infrastructure development must be sustainable to meet the increasing demand for infrastructure, promote sustainability, and support national economic development (Thacker et al., 2019). However, it can be limited by uncertainty and ambiguity, especially where there is a lack of relevant information, scope, and requirement, coupled with the inherent risk of unforeseen changes. A change in the political and socioeconomic environment can affect the outcome of quality infrastructure development, including the schedule, cost of projects, and even the acceptance and sustainability of the infrastructure projects (Hussain et al., 2022). To overcome the challenges of uncertainty and ambiguity in infrastructure development planning, it is essential to consult with key stakeholders on the viability and relevance of the projects (Mok et al., 2017). The outcome of

quality infrastructure development depends on the success of the planning process, implementation, and the ability of the planning agents to uphold the plans.

Quality is defined as 'satisfactory' or standard quantity, and it is a relative term that is quite difficult to assess, as what is quality to an individual may be considered inadequate by another, depending on needs, which are affected by social, cultural, economic, and environmental factors (UN-Habitat, 2006). No fixed list describes what quality, good or perfect infrastructure development, as it often comes in different forms. Most existing studies on infrastructure provision in Africa seek to investigate the provision and effects of inadequate infrastructure, as well as the role of the public and private sectors (Mok et al., 2017).

There are few studies on the quality of infrastructure. Samli (2016) believes that any infrastructure that does not meet the country's economic needs is deemed inadequate, depending on its quality and quantity. Kayser et al. (2013) reviewed indicators for assessing domestic water service delivery and found that commonly used indicators are quantity, accessibility, service type, safety, reliability or continuity of service, equity, and affordability. He further revealed that there are intricate connections. For this study, three indicators outlined by Kayser et al. (2013)were adopted and used to operationalize infrastructure development: Accessibility, affordability, and reliability.

- Accessibility: Quality infrastructure should prioritize the needs of all users, including those who are low-income or vulnerable. According to Gutierrez et al. (2010), accessibility is central for economic growth,

social benefits, mobility, and environmental effects. It refers to how simply beneficiaries can access the physical structure and its services. However, merely providing physical infrastructure is insufficient. What truly matters is the ease of access for beneficiaries and the quality of the service provided (Akin, 2016). For instance, a well-built infrastructure facility may be abandoned without proper accessibility. Doi et al. (2008) proposed that assessing access to development opportunities should take into account the values and behaviours of the individuals involved. Marvin (1994) also argues that accessibility dimensions should be based on how users connect with and utilize the available services.

- Affordability: According to the study, affordability pertains to the capacity of individuals and households to afford necessary infrastructure services. Infrastructure must be priced in a way that is affordable for all users. Akin (2016) emphasizes that charges for using infrastructure facilities should not be a burden but should instead consider the users' income levels. If this is not done, it may lead to public rejection of the project and make it challenging for users to afford the fees. Consequently, this could result in environmental risks.
- Reliability: Reliable infrastructure significantly impacts the surrounding local communities by improving connectivity and mobility and contributing to their social and economic well-being (Kitchin, 2014). Studies have assessed the quality of infrastructure by analysing the need for services that result from physical installation (Arsen, 1997; Fox, 1994). This demonstrates that infrastructure's actual

value lies in its services. Therefore, I propose evaluating the quality of infrastructure based on the services it provides, such as meeting users' demands, service reliability, and service availability.

Infrastructure Sustainability

Sustainability is significantly achieved when development actions and processes are sustainable and inclusive and foster citizens' empowerment. Theron (2005), cited in Laah et al. (2014), remarked that sustainable development should result from community participation. This further describes sustainability as people-centred. According to Mahama & Badu-Nyarko (2014), sustainability largely depends on the participation of community members. As people are local experts, sustainability involves local choices, which is consistent with the concept of an indigenous knowledge system. Silvius & Schipper (2014) corroborated this by concluding that it is essential to include sustainability concepts in all facets of project planning, organization, execution, management, and governance.

According to the Brundtland Commission (1983), Humanity can make development sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs. Thus, while sustainable development implies constraints, it also calls for providing people with basic needs and the chance to realize their dreams of an improved life. In addition, Boswell and Walker (2004) defined sustainable development as the simultaneous accomplishment of four goals: social progress that admits the demands of all people, judicious utilization of natural resources, effective environmental protection, and the preservation of high and stable levels of employment and economic growth. Sustainable development

emerged as one of the most important contributions to humankind's quest for peace, harmony, and well-being during the 20th century.

Sustainable development incorporates infrastructure sustainability (Olanipekun et al., 2014). Odedairo et al. (2011) state that the environmental movement gave rise to the sustainable development paradigm, which has since gained importance in all spheres of human existence, including social, political, and economic. A social or physical phenomenon must persist in a given state for an extended period to be considered sustainable. However, Na & Raksakulthai. (2006) defined sustainable infrastructure as infrastructure that supports economic and environmental sustainability maintenance. Sustainability can be referred to as enduring, upholding, or supporting. Infrastructure sustainability is essential to the continuing success of development projects since it relates to end users' behaviours toward maintaining infrastructure operations and providing infrastructure services after completion (Yusuf et al., 2020). In light of this, Yusuf et al. (2020) adopted the operationalization of infrastructure sustainability. They relate infrastructure sustainability to end-users' behaviours toward maintaining infrastructure operations and providing infrastructure services after they are completed. By focusing on end-user behaviour, the study aligns with Yusuf et al.'s (2020)notion that sustainability is not only about technical and financial support, but also about how users actively support, maintain, and engage with infrastructure to prolong its utility and value.

Empirical Review

This section of the literature review enables researchers to critically evaluate past relevant studies that inform the study under investigation.

Considering the research objectives and hypotheses, an empirical review was carried out.

Community Participation and Infrastructure Development

Community participation in Africa is an exception rather than a practice in most African countries (Fakere & Ayoola, 2018), including Ghana. This has drawn the focus of researchers to the study of community participation and quality infrastructure development. From the Participatory Development theory (Chambers, 1983), communities should be part of initiatives designed for their benefit. Relying on the participatory development theory, community participation can be an essential tool to ensure that infrastructure projects reflect the needs of communities. Some existing studies include a survey of 120 respondents conducted by (Yusuf et al., 2020a), which found that meetings and cash contributions were vital in community participation in project organization, with weighted mean values of 1.62 and 1.50 for meetings and cash contributions, respectively, but low in most other project elements. Another study (Bekele, 2019) using the mixed-method approach found that community participation is done to solicit project funds. However, while these studies postulate an initial insight into the effectiveness of community participation, there may be a need for more knowledge of community participation, where the respondents perceive that community participation is limited to town hall meetings and cash contributions. This further recognizes that high-income earners will most likely be involved in infrastructure development.

Conversely, a mixed-methods approach study conducted by Laah et al. (2014), including 174 sampled populations and focused group discussions

with NGOs, CSOs, and community groups, found a significant difference in community participation in infrastructure development. The F-test value of 23.38 was more significant than the critical value of 21.03. This study provides further evidence of the involvement of community members (CSOs, NGOs, and groups) as representatives of the entire community in infrastructure development. Therefore, it is vital to ensure that community members (CSOs, NGOs, and groups) know their roles and responsibilities in infrastructure development.

Community participation in quality infrastructure aims to increase the well-being of community members by addressing their socioeconomic requirements. This was highlighted in a quantitative study conducted by Fakere & Ayoola (2018), who found that socioeconomic characteristics are significant indicators of community participation in infrastructure. They further found that among the socioeconomic characteristics – age, level of education, tenure status, marital status, gender, monthly income, household size, sources of finance, and employment status – age was not a significant predictor of community participation in infrastructure provision. This provides evidence for the claim of Fiorina (1999), who asserts that people who tend to be more engaged in a participatory process are individuals with more substantial or special interests and those with higher income and educational attainment.

Moreover, some studies have argued for institutionalizing community participation at the local government level. A mixed-method research approach conducted by Bekele (2019) found a need for coordination and ties among the local government, community leaders overseeing the projects, and the

community. Zeliku (2022) corroborated Bekele (2019) in his convergent mixed-design study and revealed the high disorganization and unsustainability of institutional frameworks that the local government put in place to engage communities in local development projects. This explains how infrastructure projects are carried out through campaigns rather than a participatory approach. This suggests that local governments should develop a framework that enables communities to participate in development initiatives and integrate local knowledge systems into infrastructure development. In-depth qualitative research carried out by Boadu et al. (2021) recognised no connection between local community knowledge systems – values, norms, and cultural realities – and community participation in development initiatives.

Following the critical reviews, it can be inferred that existing studies often reduce community participation to activities such as town hall meetings and soliciting of funds for projects (Yusuf et al., 2020), overlooking the need for critical participatory approaches in the planning, designing, implementation, and management of infrastructure projects. This creates a limited understanding of the full scope of community participation in government-led infrastructure projects. Moreover, while socio-economic factors have been studied (Fakere and Ayoola, 2018), there is inadequate exploration of how these factors affect equitable participation and representation in infrastructure development. This raises concern that people with high education, money, and status may dominate in community participation, excluding marginalised groups. Edelenbos (2005), classifies these people as the usuals who dominate in participation.

Summarizing the literature review above, it can be inferred that community participation in infrastructure development offers several benefits, including increased project efficiency and the provision of infrastructure projects that better reflect the needs of communities. Considering the discussion, the following hypothesis is proposed:

H1: Community participation has a significant effect on quality infrastructure.

Quality Infrastructure and Infrastructure Sustainability

Olanipekun et al. (2014) asserted that infrastructure sustainability is a crucial component of the broader framework of sustainable development. Moreover, Thacker et al. (2019) highlight the necessity for policymakers to develop ongoing visions for sustainable national infrastructure systems, guided by the Sustainable Development Goals (SDGs), to facilitate the creation of suitable infrastructure. The participatory development theory is described as a "needs approach to development" (Cornwall, 2002). The theory further argues that development initiatives that reflect the needs of the people are effective and sustainable, as they promote sustainable decision-making (Chambers, 1997). There are limited studies that focus on quality infrastructure and infrastructure sustainability. Thus, studies (Thacker et al., 2019; Yang et al., 2022; Zuluaga et al., 2021) can be linked to the subject. An attempt was made by Thacker et al. (2019), who utilized a quantitative approach in their study and revealed that infrastructure is directly or indirectly crucial in achieving Sustainable Development Goals (SDGs), impacting 72% of the targets.

In their study, Olanipekun et al. (2014) used a literature review to gather textual data on sustainable infrastructure development. The findings

shed light on Nigeria's current state of infrastructure development and highlight strategic approaches for achieving sustainable infrastructure. They emphasized the need for increased government efforts and the active involvement of civil society in driving sustainable infrastructure development in Nigeria. This study suggests that infrastructure sustainability should concern the government and the community. In their study, Yang et al. (2022) aimed to assess responsible innovation in infrastructure projects to promote sustainable development. They utilized a tripartite evolutionary game model. The results show that the government starts by taking on a leadership role and then transitions to a guardian role as the project progresses. To encourage reliable innovation by central initiatives and responsible supervision by the government, steps such as involving the public can be taken to promote sustainable development.

Beyond that, other studies relating to infrastructure and infrastructure sustainability have analysed the value of infrastructure systems in sustainable infrastructure development. In their research, Zuluaga et al. (2021) assessed the idea of value in the sustainability of infrastructure. The paper emphasized that the discourse of infrastructure value has frequently been driven by fiscal measures, excluding other relevant value measures. The authors argued that a transformation of how value is implied and assessed in the framework of infrastructure systems is vital to meet long-term sustainability goals. A study by Aizawa (2019) assesses sustainable development through quality infrastructure. The study emphasizes the importance of quality infrastructure in addressing persistent disparities in infrastructure access and the infrastructure financing gap to promote sustainable development.

While Aizawa (2019) touches on quality infrastructure, most studies (Zuluaga et al., 2021; Yang et al., 2022) primarily discuss sustainability in terms of governance, fiscal value, and policy frameworks without empirically examining how quality infrastructure contributes to the sustainability of infrastructure projects. In summary, the assessment of the studies above shows that there is a correlation between government-led quality infrastructure development and sustainability. Beyond that, infrastructure sustainability is an integral part of sustainable development, ensuring that infrastructure is designed and built to meet the evolving requirements and aspirations of communities. Considering the discussion, the following hypothesis is proposed:

H2: Quality infrastructure has a significant effect on sustainability.

Community Participation and Infrastructure Sustainability

One challenge hindering the development of Sub-Saharan African countries, including Ghana, is the unsustainability of infrastructure projects (Mutanguha & Kamuhanda, 2021). In developing approaches to improve the sustainability of projects, it has been argued that actively involving people in the local community might be a practical approach (Ismail, 2016). Prior research on community participation has advised pursuing projects that directly address people's expectations for the provision of public utilities. The participatory development theory is corroborated by describing community participation as promoting sustainable decision-making (Chambers, 1983, 1997). Rindarti et al. (2019) conducted a quantitative study on community participation criteria to achieve sustainable road projects. The sample population included government officials, road construction experts, and the

community. This study revealed the top five criteria for community participation in achieving sustainable road projects. They ranked Involving all representatives of affected communities as the first criterion with a mean score of 4.41, followed by the second criterion, the results of the decision on participation process are delivered equally to all affected communities. The third criterion is the result of participation can be applied in the field, and the fourth is the result of the participation process can be accepted by the affected community. The last criterion identified by the study is Providing information that is per the needs of affected communities. Their study provides valuable insight into the factors contributing to successful community participation in achieving project sustainability. Beyond that, Kinyata & Abiodun (2020) concluded in their research that community leaders need to embrace the challenges of project sustainability to guarantee community participation in project success. They further revealed that all community members should have access to well-kept, easily understood records and participate from the beginning of local projects to their practical completion to facilitate the sustainability of projects.

Also, an analytical study by Augene (2022) assessed the influence of community participation in sustainable rural development. It was discovered that community development is the best strategy for rural development because it provides a time agent of change in rural areas with authority over decisions and resources. He further opined that sustainable rural development results from local participation in rural development. The study emphasized women's participation. A mixed-methods approach study conducted by Mutanguha & Kamuhanda (2021) assessed the influence of community

participation on the sustainability of the WaterAid project. It revealed a significant correlation between community participation and infrastructure sustainability. They concluded that an improvement in the level of local members' participation enhances the sustainability of projects.

Aga et al. (2017); Obar et al. (2017)(Yusuf et al., 2020) employed a quantitative approach to establish the correlation between community participation and the sustainability of infrastructure projects. These studies revealed that actively involving project beneficiaries during needs assessment and planning stages has a significant positive effect on the behavioural intentions of the project beneficiaries towards project sustainability. According to this viewpoint, participation in project decision-making promotes effective outcomes (Zaden, 2010). He further observed water projects in Sub-Saharan Africa. He revealed that even if communities initially successfully started the project, they might need more connections or resources to maintain their efforts. However, the maintenance of community infrastructure frequently relies heavily on both community and external agents. The studies reviewed above explain how successful community participation promotes infrastructure sustainability.

Although prior studies show a positive relationship between community participation and infrastructure sustainability. These studies (Mutanguha & Kamuhanda, 2021; Yusuf et al., 2020) focused on the sustainability of community-led and Non-Governmental Organisation or donor projects. The authors paid no or little attention to the relationship between community participation and the sustainability of government-led

infrastructure projects. Considering the discussion, the following hypothesis is proposed:

H3: Community participation has a significant effect on infrastructure sustainability.

Indirect role of Quality Infrastructure

Quality infrastructure is central to increasing people's welfare and fostering economic growth (Ilyash et al., 2020). However, to achieve sustainable infrastructure, it must be developed adequately to fulfil the socio-economic requirements of the people. This will ensure the involvement of the people in attaining infrastructure sustainability. However, the indirect role of quality infrastructure in the relationship between community participation and infrastructure sustainability is yet to be explored. The participatory development theory explains the mediating role of infrastructure development. According to Cornwell (2002), the participatory development theory seeks To give the communities a part in initiatives designed for their benefit in hopes that development projects will be more sustainable if local people are engaged in the development process. Additionally, Past studies can be linked to the subject. Literature on community participation has suggested undertaking projects that directly respond to the expectations of people in providing public amenities such as health facilities, markets, and water.

Adesida & Okunlola (2015) utilized a structured interview schedule to collect data from 144 respondents. Their study discovered that most of the participants were well-informed and actively engaged in implementing projects within their communities. Rural households contributed to the project's sustainability by paying off counterpart funds, repairing damaged

components, providing labour, and ensuring security at the project site through local vigilante groups. These activities included safeguarding project assets, constructing fences, and participating in regular meetings to evaluate project performance and address any issues.

The review studies establish the importance of quality infrastructure and community participation in fostering the sustainability of infrastructure projects (Ilyash et al., 2020; Adesida & Okunlola, 2015). However, the indirect role of quality infrastructure in the nexus between community participation and infrastructure sustainability remains unexplored. In conclusion, communities ensure the effective and sustainability of infrastructure projects designed and built to meet their needs and aspirations. Considering the discussion, the following hypothesis is proposed:

H4: Quality infrastructure mediates the relationship between community participation and infrastructure sustainability.

Conceptual Framework

A conceptual framework consists of the collection of principles that guide a specific field of study or practice. However, the assessment of key concepts and past studies resulted in the formulation of four hypotheses. The conceptual framework aims to give a graphical representation, interpretation, and flow of information regarding the study. The framework connects community participation to quality infrastructure, quality infrastructure to sustainability, community participation to sustainability, and the indirect role of infrastructure development.

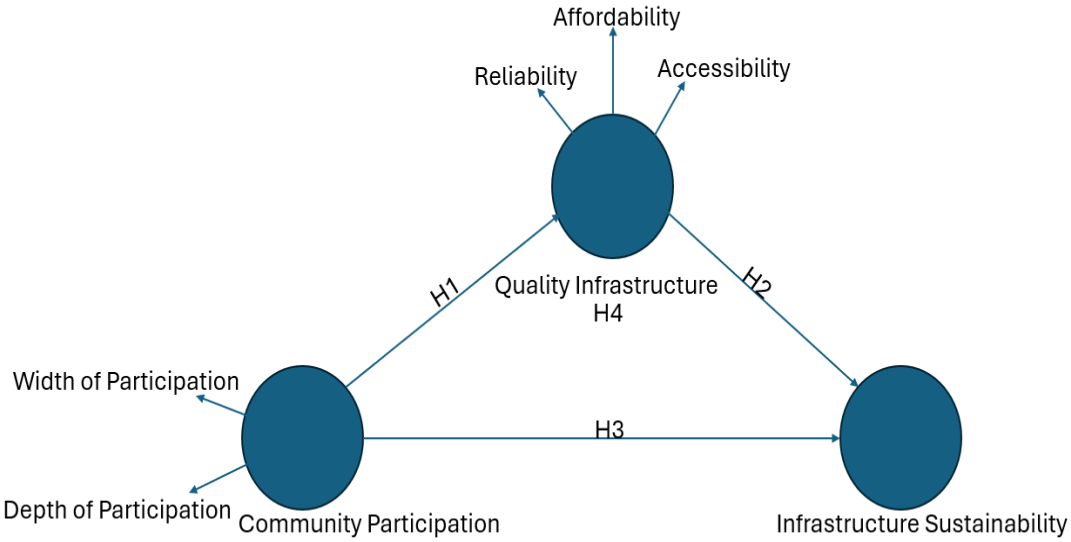

Figure 3: Conceptual Framework.

Source: Author's Construct, 2024.

The framework (figure 3) explains that community participation affects how community members sustain infrastructure facilities when user-need infrastructure facilities are offered. It can be established from the framework that a government that involves the knowledge and efforts of community members in infrastructure provision would naturally provide user-need infrastructure facilities. Thus, community members will ensure the sustainability of such facilities.

Chapter Summary

This study section reviewed the applicable theory, concepts, and previous literature based on the proposed research objectives and hypothesis. It defined, explained, and conceptualized the study and examined the relationships among the concepts. The chapter also discussed in detail the theory that underpins the study.

CHAPTER THREE

RESEARCH METHODS

Introduction

The study aims to determine the influence of community participation on infrastructure sustainability and the role of quality infrastructure in mediating the relationship. This chapter consists of the study methodologies and designs employed in the study. It outlines a summary of the procedures followed to conduct the research, including the research paradigm, research design, research approach, study site, study population, sample size and sampling procedure, data collection instrument, validity and reliability of the instrument, data processing and analysis, and ethical considerations.

Research Paradigm

According to Kuhn, (1962), a research paradigm denotes the gathering of shared beliefs and consensus among scientists regarding the understanding and solution of problems. Similarly, Hallebone & Priest (2008) described a research paradigm as encompassing the scientific philosophy and the most appropriate approach for studying a particular task, phenomenon, context, and focus. Four prominent paradigms guide research: positivism/post-positivism paradigm, constructivism/interpretivism paradigm, transformative/emancipatory paradigm, and post-colonial indigenous paradigm. This study employs the post-positivist research paradigm, which has risen as a response to the criticisms directed toward the positivist paradigm. (Panhwar et al., 2017).

Positivists argue that the scientific procedure is the only means to ascertain truth and objective reality (Habib, 2020). Nevertheless, post-

positivists challenge the rigid approach of positivists by emphasizing probability over absolute certainty (Crotty, 1998). It can be seen as a more flexible version of positivism. Post-positivists, like positivists, consider that there is a truth autonomous of our opinion that can be examined through scientific methods. However, post-positivism also identifies the possibility of observation inaccuracies and emphasizes revising theories (Trochim, 2006).

The post-positivist paradigm is relevant to the study because it promotes using quantitative methods and emphasizes knowledge creation through observable and measurable phenomena. Additionally, it allows researchers to maintain objectivity and distance from participants, ensuring reliability (Bazaanah & Mothapo, 2023). The design of the post-positivism paradigm enables a comprehensive, logical, and unbiased assessment of the study objectives. In addition, this approach allows for a thorough examination of data that is in line with the goals of the study (Bazaanah & Mothapo, 2023). It offers a systematic framework for assessing community participation, infrastructure development, and infrastructure sustainability.

Research Approach

Grove et al. (2012) have explained the quantitative approach to research as a formal, objective, systematic procedure that examines relationships and assesses causal associations among constructs. Tuli (2010) states that a quantitative method to research assesses social occurrences by collecting and analysing numerical data. Quantitative research methods outline generalizable findings by enquiring how many questions. The study adopted a quantitative approach, which is consistent with current studies on community participation. Additionally, it helps achieve broad coverage and is objective and measurable

(Golafshani, 2003). According to Savela (2018), the approach cannot provide an in-depth understanding of the analysed items due to the inherently reductive nature of classification. To overcome this limitation, prior studies were reviewed to broaden the research understanding. large-scale data gathering and annotation are time-consuming, which sets practical limitations on research. To address this challenge, the study used power analysis, which requires an optimal statistical power (usually 80%) and an effect size from prior studies to determine the sample size (Lakens, 2022). This approach helps reduce Type II error and prevents over- or underestimation of sample size (Kang, 2021).

Besides its suitability for this research, studies (Ukah et al., 2020; Fakere & Ayoola, 2018; Bappi et al., 2018; Rindarti et al., 2019; Yusuf et al., (2020) and Kamau et al. (2022) used quantitative methods to test the relationships between community participation and quality infrastructure.

Research Design

Myers et al. (2013) defines research design as the procedures that researchers employ for a study, such as the hypotheses and operational inferences leading to the ultimate analysis of the collected data. Choosing an appropriate research design is essential for obtaining reliable empirical outcomes (Saunders et al., 2007). The most familiar research designs are exploratory, descriptive, and explanatory (Richardson, 2005; Babbie, 2001). Additionally, these designs vary based on specific situations, such as the formulated research purpose, the hypotheses, and the procedures of data collection, which together define the most suitable strategy (Richardson, 2005; Babbie, 2001).

The study employed an explanatory design, which is suitable for identifying correlations among various measures of a phenomenon within a certain study (Babbie, 2001). Explanatory design is particularly effective for addressing complex causal relationships that cannot be adequately explored through survey strategies alone (Yin, 2003; Creswell & Plano Clark, 2011). This design thoroughly explores the correlation between community participation, infrastructure development, and infrastructure sustainability, aligning with the study's objectives.

Study Area

The study is set in Ajumako-Bisease, the largest community in terms of land size and population in the Ajumako-Enyan-Essiam District of Ghana's Central Region. The Ajumako-Enyan-Essiam District, established in 1988, is one of twenty administrative districts in the region (GSS, 2021). Ajumako-Bisease was selected for this study due to its significant exposure to infrastructure development through national initiatives such as the Ghana Shared Growth and Development Agenda I and II (GSGDA I & II). These programs sought to enhance local access to essential infrastructure, thereby improving the quality of life for residents.

Ajumako-Bisease has evolved from a small traditional settlement into a vibrant community. According to the 2021 Population and Housing Census, the population increased from 15,616 in 2010 to 28,110 in 2021, a growth largely attributed to available infrastructure and economic opportunities (GSS, 2021). The community hosts key infrastructure such as a market, a water system, a polyclinic, a town hall, durbar grounds, electricity, and educational institutions from basic to tertiary levels.

Geographically, the Ajumako-Enyan-Essiam District is bounded to the north by Asikuma-Odoben-Brakwa District, to the south by Ekumfi and Mfantseman Districts, to the east by Gomoa West, and the west by Assin South and Abura-Asebu-Kwamankese Districts. The district has a population of approximately 120,586, comprising 63,325 females and 57,261 males. It covers an area of 553 km² with a population density of 218 persons per km². The local economy is driven by agriculture (47%), services (41.7%), and industry (10.6%). The Akan ethnic group represents 96.8% of the population (GSS, 2021).

The selection of Ajumako-Bisease was based on purposive sampling, given the community's extensive exposure to government-led infrastructure development initiatives such as GSGDA I & II. This makes it an ideal case for examining the relationship between community participation and infrastructure sustainability. The community also offers a rich context of diverse infrastructure facilities and population dynamics, which align with the study's objective of assessing how quality infrastructure mediates community participation and sustainability outcomes. Moreover, the researcher's familiarity with the area and the community's accessibility further support its suitability for in-depth fieldwork.

Study Population

A population refers to a well-defined group of individuals sharing common characteristics, as determined by the researcher (Banerjee & Chaudhury, 2010). According to Leedy and Ormrod (2010), a population is the group about which the researcher seeks to acquire information and draw conclusions.

For this study, the target population consists of residents of the Ajumako-Bisease community, located within the Ajumako-Enyan-Essiam District in the Central Region of Ghana. Specifically, the study focuses on households, as they are the primary decision-makers in matters of community participation and local development initiatives. Moreover, household heads typically have direct knowledge and experience regarding the availability, utilization, and sustainability of infrastructure in the community.

According to the 2021 Population and Housing Census Analytical Report for the Ajumako-Enyan-Essiam District, Ajumako-Bisease comprises approximately 6,246 households. On average, there are about 3 households per house, 4.5 persons per household, and 3,123 houses.

Sample Size and Sampling Technique

The study employed the power analysis using an optimal power and an effect size from prior studies to determine the sample size (Lakens, 2022b). This method of determining sample size helps obtain an appropriate sample size by preventing under- or oversampling sizes (Kang, 2021). Also, this method aids in preventing Type II errors in research. In general, sample size determination and power analysis are determined by effect size, power (1-β), significance level, and type of statistical analysis (Becker et al., 2023). In determining sample size, the study utilized statistical power using the G*Power 3.1 test for correlation and regression analysis. According to Faul et al. (2009), G*Power is an objective power analysis program widely used in social, behavioral, and biomedical sciences for numerous statistical tests. Given the study's design and the test the researcher undertook, the Linear Multiple Regression: Fixed model, single regression coefficient statistical test

was suitable to establish the sample size. For this, the researcher selected an effect size (f^2) of 0.06 (Field, 2013), following Cohen's (1988) description of a medium partial R^2. Additionally, the researcher set an optimal power at 0.8 and the alpha level at 0.05 and conducted a two-tailed test. The sample size for the study is 125 households.

The researcher employed multi-stage sampling to ensure a comprehensive and representative selection process. In the first stage, stratified sampling was used to guarantee equal representation of neighborhoods within the community. To achieve this, the community was divided into homogeneous strata, corresponding to ten distinct neighborhoods in the community. Each neighbourhood represented a stratum, with its unique population characteristics, socio-economic dynamics, and access to infrastructure. This ensured representation from different segments of the community, accounting for potential differences in experiences and perspectives regarding community participation and infrastructure sustainability. These neighbourhoods include Odumase, Akropong, Abromaim, Nyatsiadze, Salem, Etsifi, Osenadze, Batoma, Odumabena, and New Site. These zones were identified in collaboration with community leaders. This approach aligns with the assertion by Anderson & Musterd (2010), who emphasized that individuals' socio-economic position significantly influences the neighbourhood context. In the final stage, households were randomly selected using objective criteria as outlined by Saunder et al. (2016). This method was accepted to facilitate the use of parametric tests in assessing the relationship between variables. The sampling frame was developed using Excel, which was used to randomly select 125

households from 6246, with an average of 2 households per house, and 3123 houses (GSS, 2021). The list of houses was obtained from the District Physical Planning Department, based on the data from the digital address exercise conducted in 2021.

Data Collection Instruments

The instrument used for this study was a structured questionnaire. The questionnaire is often used in quantitative research (Lerigo-Sampson, 2022). Sekaran & Bougie (2016) suggest that using a questionnaire for data collection ensures greater consistency, uniformity, and objectivity. It also allows for convenience and privacy for respondents, thereby providing greater anonymity (Neelankavil, 2015). This study used closed-ended questions to obtain the necessary responses for testing the research hypothesis and achieving the study's objectives. Closed-ended questions necessitate participants to select from a predetermined set of responses and evaluate each opinion independently. This questionnaire was administered to 125 respondents.

The questionnaire for the study consisted of four sections (A, B, C, and D) relevant to the study's objectives. The questionnaire was closed-ended, where respondents selected from a list of options provided by the researcher. Respondents selected from the options using a seven-point scale. This type of scale works better when testing behaviours, attitudes, or other phenomena of interest when there are multiple responses to choose from (Brace, 2018). Section A of the questionnaire contains self-developed items to collect respondents' demographic information, including gender, age range, educational level, employment status, and other relevant details. Section B comprises items to collect information on community participation adopted

from Mutanguha & Kamuhanda (2021) and the dimensions (width and depth) of participation identified in the work of Berry et al. (1993). Section C of the questionnaires was to collect information on quality infrastructure, adapted from Kayser et al. (2013) dimensions for measuring infrastructure service delivery. Section D of the questionnaire consists of items that were used to collect information on infrastructure sustainability, adopted from Yusuf et al. (2020).

Pre-Testing

The pre-testing procedure is a collective term for any small-scale exploratory research technique that utilizes sampling but does not apply rigorous standards. (Trevena et al., 2013). According to Pallant (2020), pre-tests are necessary before conducting the main survey. This process allows the researcher to ensure that questions, instructions, and scale items are well-defined and easily comprehensible. The Institutional Review Board approved the study questionnaire, and the researcher conducted pilot testing with twenty-five (25) household heads in Essakyir of Ekumfi District. This sample size is considered appropriate as it meets the criteria of ten (10) for pilot testing set by (Saunders et al., 2016). The outcome for each construct is outlined in Table 1.

Table 1: Pilot-test Results

Constructs	Items	Sample	Cronbach Alpha
Width of participation	4	25	0.745
Depth of participation	9	25	0.778
Accessibility	3	25	0.724
Affordability	3	25	0.704
Reliability	3	25	0.757
Infrastructure sustainability	8	25	0.715

Source: Author's Construct (2024)

Reliability and Validity of Instrument

Bowling (2010) argued that reliability is attained when information-gathering procedures yield consistent results, maintaining outcomes at a coherent level irrespective of changes in time and location. An instrument is deemed reliable when it accurately measures a construct and produces the same effect over time. The reliability of this study was evaluated using the frameworks established by Nunnally & Bernstein (1994), Chin (1998), Hulland (1999), Yoo & Alavi (2001), and Henseler et al. (2015). These researchers suggest that construct reliability can be examined by assessing the reliability of individual items, internal consistency reliability, and convergent and discriminant validity. Henseler et al. (2015) indicated that item factor loadings are considered reliable if their outer loadings are 0.7 or higher.

Validity, as explained in the literature, refers to the accuracy of the findings from a survey and whether those findings truly reflect what they are aimed to measure (Chin, 1998; Hair et al., 2014). To guarantee validity, the questionnaire was reviewed by my supervisor, and their recommendations were incorporated accordingly. This study employed the Average Variance Model to assess validity. Construct validity evaluates the consistency of

measurement items, similar to Cronbach's alpha (Hamed Taherdoost & Lumpur, 2016). Furthermore, Bagozzi & Yi (1988) asserted that composite indexes should be 0.7 or greater to confirm the validity of constructs.

Discriminant validity, as defined by Fornell & Larcker (1981), indicates the degree to which latent variables are distinct from other latent indicators. In this study, discriminant validity was established by using the Average Variance Extracted (AVE) for each latent variable (Fornell & Larcker, 1981). This method compares the square root of AVE scores with the correlation of the latent variable. Specifically, he square root of each construct's AVE should exceed its highest correlation with any other construct.

Data Collection Procedure

Sekaran and Boujie (2016) identified three primary ways a researcher can collect data using a questionnaire: hand delivery, the internet, and postal mail. The researcher used the hand-delivery method to collect data for this study. Given the nature of the study, obtaining responses from participants through mail or online questionnaires may take much work. Moreover, employing the preferred data collection method enabled the researcher to personally visit respondents and deliver the questionnaire, allowing the opportunity to address any concerns or questions.

The researcher obtained an introductory letter from the Institutional Review Board of the University of Cape Coast (UCCIRB/CHL/2024/094), which granted credibility to the study site. Before the survey, informed consent was sought from respondents through engagement with community leaders, and the aim of the study was described to the participants to ensure their acceptance. Information given by the participants was preserved with

confidentiality and participants' anonymity was maintained. The data collection encompassed all ten distinct neighbourhoods within the community and was conducted during the last quarter of 2024. Visits to respondents' homes were scheduled after working hours to accommodate their availability, resulting in a high response rate to the questionnaire. The participants answered each question according to scales that suitably defined the present situation in the community.

Measurement of Variables

This section of the study explains how the variables under study were measured. The variables are community participation, infrastructure development, and sustainability. They were assessed using a continuous scale of 1 – 7.

Dependent Variable

Following Yusuf et al. (2020), the infrastructure sustainability construct was measured based on maintenance on a seven-item scale. Several research Ukah et al. (2020), Laah et al. (2014), and Adesida & Okunlola (2015) accepted this instrument in measuring and attained an adequate validity and reliability of 0.82

Independent Variable

The community participation construct is measured based on the dimensions (width and depth) of participation identified in the work of Berry et al. (1993). To ascertain the engagement of the residents in the development process, the width of participation demonstrates the community's accessibility to the project and prospects for community involvement. Also, the depth of participation is incorporated into the project development process to establish

the level of community influence in projects, as evident in the study conducted by Mutanguha & Kamuhanda (2021). Several studies by Gamo & Park (2023) and Mutanguha & Kamuhanda(2021) accepted this instrument in measuring community participation and achieved an adequate validity and reliability of 0.7. Community participation was measured using a thirteen-item scale.

Mediating Variable

Quality infrastructure was measured by adapting indicators from Kayser et al. (2013) for measuring infrastructure service delivery. This study found that familiar used indicators include accessibility, quality, and affordability. This construct was measured using a nine-item scale.

Table 2: Measurement of Construct

Construct	Items (Continuous Scale 1-7)	Source
Community Participation	**Width of Participation**	Berry et al. (1993)
	The community is invited to participate.	
	The community participates voluntarily.	
	The community has access to project details and participate.	
	Participation is educative as the community learns to participate.	
	Depth of Participation	Mutanguha & Kamuhanda, (2021)
	The community is informed about project development.	
	Meetings are held between the government and community as a way of informing on projects to be embarked on	
	Ideas and suggestions are usually sought from community members before embarking on projects.	
	The community is actively involved in the decision-making process.	
	The community participates by providing labour for cash.	
	The community provides land for project implementation.	

	Implementation is done through partnership and joint equal decisions between the community and the government.	
	The community has control over all projects without support from external bodies.	
Quality Infrastructure	**Accessibility**	Kayser et al., (2013)
	Facilities are in a suitable area.	
	I travel a minimum distance to access a facility.	
	I easily access essential services.	
	Affordability	
	The cost of infrastructure services is within the average household income.	
	I need financial constraints to maintain essential infrastructure services.	
	I pay an average to access infrastructure facilities.	
	Reliability	
	The facilities meet the community's demand.	
	The facilities provide adequate services.	
	Community infrastructure facilities are well-maintained.	
Sustainability	The community undertakes communal labour.	(Ukah et al., 2022; Adesida & Okunlola, 2015)
	The community provides adequate security.	
	The community raises the maintenance committee.	
	The community raises funds for maintenance.	
	The community duly pays for services.	
	The community repairs abandoned projects.	
	The community proposes plans for sustaining projects.	
	The local government supports sustaining the facilities.	

Source: Author's Construct (2024)

Data Processing and Analysis

The study used the Statistical Package for Social Sciences (SPSS) version 25 and SmartPLS version 4 as analytical tools. SPSS was utilized for descriptive analysis, while SmartPLS was used to conduct structural equation modelling aligned with the study's hypotheses. Descriptive statistics, which include frequencies and percentages, were utilized to establish the respondents' biographic background analysis. The study's objectives were analysed using Structural Equation Modelling.

The partial least squares-structural equation modelling (PLS-SEM) estimation technique was employed to test the study's hypotheses. The technique was employed to establish the path coefficient (β), collinearity among variables make use of the variance inflation factor (VIF), alpha level with its associated p-values from 5000 bootstraps, effect size (f^2), goodness of fit with coefficient of determination (R^2), and predictive relevance (Q^2).

In addition, the PLS-SEM estimation technique was utilized to establish the structural model's reliability and validity. The PLS-SEM allows the estimation of individual factor loadings and path coefficients of a predefined structural model to be calculated simultaneously and avoids biased estimation of path coefficients and individual factor loadings. This study employed the PLS-SEM based on the premise that the model allows both reflective and formative indicators of a latent variable within one structural equation model (Gotz et al., 2010), and enables small requests on sample sizes (Frazier & Barron, 2004). The study utilized the reflective model to analyse both the lower-order constructs (width, depth, accessibility, affordability, and

quality) and higher-order constructs (community participation and infrastructure development) of the study.

Mediation Analysis

Mediation denotes the correlation between an independent and a dependent variable, which is affected by a third variable known as a mediator ((Baron & Kenny, 1986; Aguinis et al., 2016). Several methods exist for conducting mediation analysis, including those proposed by Sobel (1982). However, the study used the bootstrapping technique utilizing PLS-SEM. Hadi et al. (2016) argued that the bootstrapping method allows researchers to establish the indirect role with greater certainty compared to the Sobel test.

The bootstrapping procedure utilises the path coefficient and the alpha level along with their associated p-values, to assess the indirect effects on community participation and infrastructure sustainability. Additionally, the following metrics were calculated: effect size (f^2), goodness of fit with the coefficient of determination (R^2), and predictive relevance (Q^2).

Common Method Bias

Bagozzi & Yi (1988) described common method bias as the source of an estimation error. They further opined that these estimation errors do not accurately represent the study's results. However, studies (Podsakof & Organ, 1986) have outlined methods that can be used to address common method bias. Specific to this study, the researcher adopted past-tested scales to address common method bias (Alfes et al., 2013). Beyond that, a full collinearity test using PLS-SEM was carried out to measure the presence of common method bias by examining all the VIFs (Kock & Lynn, 2012).

Ethical Considerations

Ethical considerations include the confidentiality and anonymity of study participants. Ethical values are the conduct researchers follow in conducting their research. According to Saunders et al. (2007), social researchers must obtain permission from respondents, which should be done by stating their intentions and following research ethics. In this context, the researcher assured the confidentiality of the participants' responses by introducing a brief note in the questionnaire about the anonymity of the answers. Furthermore, the researcher explicitly informed the study participants that they could stop providing information. The researcher did not reserve any information about possible risks or benefits of the study and did not intentionally deceive the study participants regarding this aspect. Community leaders were informed that they should grant authorization to conduct the research.

Chapter Summary

The chapter discusses and supports the research design and approach utilized in the data collection and analysis. It also describes how data analysis was conducted and how the reliability and validity requirements of the research design were assessed. Above all, the chapter examines ethical considerations in the research.

CHAPTER FOUR

RESULTS AND DISCUSSION

Introduction

This chapter outlines the findings and a thorough discussion of the information generated from the survey. This sought to examine the effect of community participation on infrastructure sustainability and the mediating role of quality infrastructure in this relationship. Additionally, the study aims to know how directly involving communities in the planning, implementation, and management of infrastructure projects can lead to sustainable results, especially maintenance and long-term benefits. The study utilized the quantitative approach to research and a multi-stage sampling technique. Questionnaires were administered to 125 respondents (heads of household) to ascertain their perceptions and levels of engagement in infrastructure projects. The study further employed descriptive analysis and partial least squares structural equation modelling (PLS-SEM) to test the study hypotheses.

Demographic Characteristics of Respondents

The respondents' profiles provided general biographic information about the interviewed individuals. This includes age, gender, educational level, employment status, and length of community residence. These profiles offered a cross-sectional view of the study population, enabling a more comprehensive understanding of their features. This helps make inferences that reflect reality. The researcher randomly administered 125 questionnaires and obtained 125 responses from the study population. From the data, ages between 31 and 50 years were recorded as the highest (60%) age distribution. The age group above 50 years was 35%, while that below 30 years was 15%. The data also

indicated that males were 55% while females constituted 45%. A large proportion (85%) of the participants were employed in both formal and informal sectors. A small proportion (15%) of the respondents were unemployed. The majority (50%) of participants had attained a primary education level, 35% had achieved a secondary education level, and 15% had attained a tertiary education level. The survey also shows that a large proportion (65%) of the participants had resided in the community for more than 10 years, 25% of the participants had resided in the community between 5 to 10 years, and 10% were the least of the participants who had resided in the community below 5 years.

These demographic characteristics indicate that the respondents are predominantly economically active, long-term residents with basic educational backgrounds. This enhances the validity of the findings, as such individuals are more likely to influence and sustain community-based infrastructure projects. Table 3 provides biographic information about the study participants.

Table 3: Biography of Respondents

Variable	Frequency	Percentage
Sex		
Male	68	55
Female	56	45
Total	124	100
Age-range		
Below 30	19	15
31-50	62	50
Above 50	43	35
Total	124	100
Education Level		
Basic level	62	50
Secondary level	43	35
Tertiary level	19	15
Total	124	100
Employment Status		
Employed	105	85
Unemployed	19	15
Total	124	100
Length of Stay		
Below 5	12	10
5-10	31	25
Above 10	81	65
Total	124	100

Source: Field Survey (2024)

Measurement Model Evaluation

The quality of the study's constructs was evaluated using the measurement model. This assessment starts with an assessment of the factor loadings, followed by an analysis of internal consistency reliability using (using Cronbach's alpha and composite reliability), convergent validity (measured by average variance extracted (AVE), and discriminant validity (evaluated through the HTMT-criterion and the Fornell-Larcker ratio).

Factor Loadings Assessment

Factor loadings denote the extent to which each item in the correlation matrix correlates with a principal component. Factor loadings range from -1 to +1, with higher absolute values indicating a higher correlation of the item with the underlying factor (Prett et al., 2003). The factor loadings of the items in the

study were based on the recommended score of 0.50 (Hair et al., 2009) cited in Cheung et al. (2023). The factor loadings of items below the recommended score of 0.50 were eliminated to improve reliability. However, out of 30 items measuring various variables, nine failed to meet the recommended score of 0.50. Moreover, all the items of Accessibility and Reliability were maintained, with one out of four indicators of the Width of Participation removed. Additionally, three items out of the nine Depth of Participation were removed, and two items out of eight of Infrastructure Sustainability were removed. All items measuring Affordability – a dimension of quality infrastructure were removed. Table 4 shows the factor loadings of the retained items.

Table 4: Factor Loadings

	WP	DP	AC	RE	IS
WP1	0.818				
WP3	0.884				
WP4	0.726				
DP1		0.725			
DP2		0.881			
DP3		0.826			
DP4		0.799			
DP6		0.618			
DP8		0.675			
AC1			0.903		
AC2			0.733		
AC3			0.871		
RE1				0.909	
RE2				0.908	
RE3				0.819	
IS1					0.639
IS2					0.790
IS3					0.833
IS4					0.674
IS6					0.605
IS7					0.732

Source: Field Survey (2024).

From the Table above, it can be deduced that all retained items measured various latent variables loaded above the recommended score of 0.50. The lowest loading of the items was recorded (0.618), and the highest

loading was recorded (0.909). This indicates that all retained items used to assess variables in this study are reliable and well above the recommended loading value of 0.50.

Model Validity and Reliability

The internal consistency reliability of the constructs in this study was evaluated using composite reliability and Cronbach's alphas. Rossiter (2002) suggested that composite reliability is more suitable than Cronbach alpha for evaluating the internal consistency. The table below shows that all latent variables in the study are reliable, as they all loaded above the recommended score of 0.70 (Bagozzi & Yi, 1988). Specifically, the dimensions of Quality Infrastructure – Reliability (RE) and Accessibility (AC) – had composite reliability scores of 0.911 and 0.876, respectively. Additionally, the dimensions of Community Participation – Depth of Participation and Width of Participation recorded composite reliability scores of 0.890 and 0.852, respectively. Infrastructure Sustainability recorded a composite reliability of 0.862. These outcomes shows that the model has internal consistency reliability. The findings are displayed in Table 5;

Table 5: Construct Reliability and Validity

	Cronbach Alpha	Composite Reliability rho_A	Composite Reliability rho_C	Average Variance Extracted (AVE)
WP	0.740	0.768	0.852	0.659
DP	0.849	0.864	0.890	0.577
AC	0.785	0.799	0.876	0.704
RE	0.853	0.862	0.911	0.774
IS	0.808	0.818	0.862	0.514

Source: Field Survey (2024)

Convergent Validity Assessment

Convergent validity is examined through Average Variance Extracted (AVE), a criterion-related validity measure that reflects the degree to which a construct correlates with other measures of the same variable (Hair Jr et al., 2016). This concept illustrates how items converge to represent the main constructs. Convergent validity is determined when the AVE is 0.50 or greater, meaning that the construct explains more than half of the variance in its associated items. Conversely, an AVE value below 0.50 suggests that the items contain more unexplained variance than what is accounted for by the construct. According to the results shown in Table 6, all variables display an AVE value exceeding 0.50, with Reliability (RE) showing the highest value and Infrastructure Sustainability (IS) the lowest. This implies that the various variables in this model account for more than half of the variance in their corresponding items, thereby supporting convergent validity.

Discriminant Validity Assessment

Discriminant validity refers to the degree to which a construct is empirically distinct from other constructs (MacKinnon, 2008). The study employed both the Fornell-Larker criterion and Heterotrait-Monotriat-Ratio (HTMT) to evaluate discriminant validity. Initially, the Fornell-Larcker criterion was applied, which compares the square root of the Average Variance Extracted (AVE) for each construct with the correlations between the latent variables (Fornell-Larcker, 1981). According to Hair et al. (2013), the square root of each construct's AVE should exceed its highest correlation with the square root of any other construct's AVE to establish the discriminant validity.

Tables 6 and 7 show results for the Fornell-Larcker criterion and HTMT, respectively.

Table 6: Fornell-Larcker Criterion

	WP	DP	AC	QU	IS
WP	**0.812**				
DP	0.680	**0.759**			
AC	0.577	0.499	**0.839**		
RE	0.551	0.460	0.608	**0.880**	
IS	0.539	0.541	0.385	0.600	**0.717**

Source: Field Survey, 2024.

The Fornell-Larcker criterion is the most commonly used method to assess discriminant validity. However, a new approach has emerged: the Heterotrait-Monotrait-Ratio (HTMT). Henseler et al. (2015) suggest that discriminant validity should be validated using the HTMT of the construct's correlations. A latent variable was considered to have discriminant validity when its Heterotrait-Monotrait-Ration (HTMT) value was below 0.85. The results presented in Table 7 show HTMT scores of below 0.85.

Table 7: Heterotrait-Monotrait-Ratio of Correlation (HTMT)

	WP	DP	AC	QU	IS
WP	-				
DP	**0.838**	-			
AC	0.753	**0.620**	-		
RE	0.672	0.540	**0.739**	-	
IS	0.673	0.636	0.458	**0.712**	-

Source: Field Survey (2024)

Validating Reflective-Reflective Higher Order Constructs.

Community participation and Quality infrastructure were the higher-order constructs in this study. Community participation was based on two lower-order constructs: the depth and width of participation. In addition, Quality Infrastructure was based on three lower-order constructs: Reliability, Affordability, and Accessibility. This study measured community participation and Quality infrastructure as Reflective-reflective higher-order constructs. The factor loadings, reliability, and validity were evaluated to ascertain the validity of the higher-order constructs.

The factor loadings of all indicators for community participation and quality infrastructure were based on the requisite value of 0.50 (Hair et al., 2009). Factor loadings of indicators below the required value of 0.50 were further removed. Hence, the affordability indicator for quality infrastructure was removed to improve reliability. Reliability was measured using Cronbach's alpha and composite reliability. For the higher-order constructs, statistics for both Cronbach's alpha and composite reliability were more significant than the required score of 0.50 (Wasko & Faraj, 2003), signifying good reliability (Henseler et al., 2016). Convergent validity was acceptable because the higher-order constructs' Average Variance Extracted was higher than 0.50. Table 8 shows the higher-order constructs' factor loadings, reliability, and convergent validity results.

Table 8: Factor Loading, Reliability, and Convergent Validity of Higher Order Constructs

Latent variables	Indicators	Loadings	Composite Reliability rho_A	Composite Reliability rho_C	Cronbach Alpha	Average Variance Extracted.
CP			0.814	0.913	0.809	0.840
	DP	0.909				
	WP	0.924				
QI			0.768	0.891	0.756	0.803
	AC	0.879				
	RE	0.913				

Source: Field Survey (2024).

Discriminant validity was measured by likening the correlations among the latent variables with the square root of Average Variance Extracted – AVE (Fornell-Larcker, 1981) and the Heterotrait-Monotrait-Ratio (HTMT). The square root of the AVE) for each construct was established to be greater than its correlations with other constructs. Additionally, the HTMT values for all constructs were below the required threshold of 0.85. These results confirm the establishment of discriminant validity for the higher-order constructs–community participation and infrastructure development.

Table 9: Fornell-Larcker Criterion

	CP	ID	IS
CP	**0.916**		
QI	0.635	**0.896**	
IS	0.589	0.558	**0.717**

Source: Field Survey (2024).

Table 10: Heterotrait-Monotrait-Ratio

	CP	ID	IS
CP	-		
QI	0.812	-	
IS	0.655	0.632	-

Source: Field Survey (2024).

Structural Model Evaluation

The structural model evaluation is the second step in the model assessment, having met all the criteria and requirements regarding the reliability, discriminant, and convergent validity of constructs and items. According to Amini & Alimohammedlou (2021), structural model assessment is a critical stage in Structural Equation Modelling (SEM) that assesses the theoretical model's effectiveness, validity, and reliability and specifies correlations between latent variables. Generally, it comprises the path coefficient (β), collinearity among constructs using (VIF), predictive relevance (Q^2), the goodness of fit using the coefficient of determination (R^2), effect size (f^2), and alpha level with its associated p-values from 5000 bootstraps were determined to test the study's hypotheses. The result is displayed in Table 11.

Table 11: Study Findings

IV	DV	Path Coeff.	STDEV	t-Stats	P-values	R^2	f^2	Q^2	VIF
CP→	QI	0.635	0.055	11.610	0.000	0.404	0.677	0.319	1.00
QI→	IS	0.308	0.095	3.689	0.000	0.404	0.095	0.189	1.677
CP→	IS	0.393	0.085	4.124	0.000	0.404	0.115	0.189	1.677

Source: Field Survey (2024).

The model's VIF scores establish no common method bias for all the constructs because VIF scores did not exceed 3.3 (Kock & Lynn, 2012). A VIF value greater than 3.3 indicates the existence of pathological collinearity, suggesting that the model may be affected by common method bias. However, the minimum VIF score of the structural model is 1.00, and the highest is 1.677. These values obtained from the analysis established no potential collinearity problem or common method bias among indicators. The model's

effect size (f^2) values indicate how vital the predictor is in describing a dependent variable (Hair et al., 2019). According to Cohen (1988), effect size (f^2) figures of 0.02, 0.15, and 0.35 are measured as small, moderate, and large, respectively, in structural models. The model's minimum effect size (f^2) value is 0.095, and the highest is 0.677. According to Hair et al. (2020), t-statistic values should be less than -1.96 or greater than +1.96. However, the structural model recorded t-statistics greater than 1.96. The model recorded 3.689 and 11.610 as the least and highest t-values, respectively. The coefficient determination, commonly known as (R^2), is a statistical measure used to determine the goodness-of-fit of a structural model. It shows the proportion of variance in the dependent variable that is predictable from the independent variable(s) (Chicco et al., 2021). The (R^2) figures of 0.25, 0.50, and 0.75 are measured as weak, moderate, and considerable in a model, respectively (Henseler et al., 2009). However, the model recorded uniform (R^2) values of 0.404. From Table 11 above, it can be concluded that community participation (CP) weakly describes 40.4% of the variance in infrastructure sustainability (IS) and quality infrastructure (QI), respectively. The model path estimates and corresponding p-values were utilized to validate the study's proposed hypothesis.

Community Participation and Quality Infrastructure

The study's first objective sought to examine the influence of community participation (CP) on quality infrastructure (QI). The regression weight (β=0.635, p<0.000), as shown in Table 12 above, indicates a strong positive effect, meaning community participation contributes approximately 63.5% to the realization of quality infrastructure. This means that there is a

significant positive effect of community participation (CP) on quality infrastructure (QI). This finding conforms to the study hypothesis one, which states that a significant positive correlation exists between community participation (CP) and quality infrastructure (QI). This implies that involving communities in the planning, designing, and implementing government-funded infrastructure projects ensures the development of reliable and accessible infrastructure projects that meet the requirements and aspirations of the communities.

The finding of this objective is corroborated by the participatory development theory, which describes the bottom-up approach as a needs approach to development. This implies that engaging people in development processes facilitates the provision of infrastructure projects that address the people's needs. The theory's needs-based approach also explains that involving communities ensures that projects align with local needs and expectations, resulting in infrastructure that is functionally appropriate and socially acceptable. By fostering inclusiveness during planning and design, communities contribute insights that enhance usability and reduce disparities between projects and actual needs. Also, studies Fakere & Ayoola (2018); Boadu et al. (2021); Laah et al. (2014), corroborates the finding that community participation (CP) positively affects quality infrastructure (QI).

The study discovered that active community participation significantly fosters quality infrastructure, supporting a change from the "top-down" method often used in Ghana. By actively involving communities in decision-making, planning, and designing, infrastructure projects are better associated with the actual desires of end-users. This alignment encourages a sense of

ownership and responsibility among community members, which is essential for maintaining infrastructure after completion. This approach mitigates the problem of abandoned and poorly maintained projects by ensuring that infrastructure better serves the community's needs and receives their support.

However, the explanatory power ($R^2 = 0.404$) indicates that while participation substantially predicts infrastructure quality, it is not sufficient on its own. This nuance challenges the traditional participatory development theory assumption that community input alone guarantees quality outcomes. Instead, the study suggests integrating participatory approaches with technical expertise and governance mechanisms to achieve quality infrastructure.

Quality Infrastructure and Infrastructure Sustainability

Objective two of the study sought to examine the influence of quality infrastructure (QI) on infrastructure sustainability (IS). The model path estimate ($\beta=0.308$, $p<0.000$) demonstrates a significant positive effect of quality infrastructure (QI) on infrastructure sustainability (IS). This indicates that quality government-led infrastructure contributes approximately 30.8% to the sustainability of government infrastructure. This result aligns with hypothesis two of the study. This suggests that the provision of quality, reliable, and accessible infrastructure facilities sustains livelihoods as well as the facilities. This is coherent with prior studies by Buthelezi et al. (2024), Zuluaga et al. (2021), and Aizawa (2019) that revealed that providing valuable and quality infrastructure addresses persistent access disparities in infrastructure access and infrastructure financing gap, promoting infrastructure sustainability. In addition, the result is associated with the findings of a study carried out by Thacker et al. (2019). They revealed that quality infrastructure

positively performs a critical function in attaining the Sustainable Development Goals, directly or indirectly impacting 72% of the targets.

This relationship is consistent with the principles of Participatory Development Theory, which asserts that development interventions are more sustainable when communities actively engage in decision-making processes. By incorporating local perspectives and preferences during planning and implementation, infrastructure projects achieve higher quality standards that reflect actual user needs. This participatory approach not only enhances infrastructure quality but also fosters community ownership, increasing the likelihood of proper maintenance and continuous utilization. Consequently, the positive link between quality infrastructure and sustainability reinforces the theoretical argument that inclusive and participatory planning is instrumental in ensuring the long-term relevance and operational viability of infrastructure projects.

The study findings establish a significant positive effect of quality infrastructure on infrastructure sustainability, supporting that reliable and accessible infrastructure contributes to its practical use and long-term sustainability. Focusing on these dimensions during the planning and design phases makes projects more likely to remain operational and relevant, reducing the chance of abandonment.

Community Participation and Infrastructure Sustainability

Objective three of the study is to examine the influence of community participation (CP) on infrastructure sustainability (IS). The analysis revealed a significant positive path coefficient ($\beta = 0.393$, $p < 0.000$), indicating that community participation accounts for about 39.3% influence on the

sustainability of government-funded infrastructure. The finding relates to the proposed research hypothesis three, which assesses the significant positive effect of community participation (CP) on infrastructure sustainability (IS). This suggests that community participation leads to sustainable results.

The result is coherent with the participatory development theory, which describes community participation as a way to promote sustainable decision-making (Chambers, 1983;1997). Participatory development theory provides the theoretical foundation for interpreting the positive relationship between community participation and infrastructure sustainability, as it posits that participation fosters local ownership and commitment to maintenance, which are critical for sustainability. The theory also explains the empowerment process: when communities are given voice and agency in decision-making, they develop a vested interest in preserving the benefits of the project, ensuring it continues to serve its purpose over time. However, the findings extend participatory development theory by demonstrating that participation should not be limited to the planning and implementation stages. For sustainability to be achieved, participation must be institutionalized across the entire project lifecycle, including monitoring, evaluation, and maintenance.

Additionally, the result aligns with the findings of past studies by Muniu et al. (2018), Mutanguha & Kamuhanda (2021), Rindarti et al. (2019), and Musonda et al. (2024). They discovered that involving communities in project design, planning, implementation, monitoring, and management is crucial to ensure sustainability. The study results establish a positive association between community participation and infrastructure sustainability, indicating that communities involved in the development process are more

likely to support the continuing maintenance of projects. This finding is essential in countering the perception that only the government is responsible for sustaining infrastructure projects. By fostering a participatory approach, communities gain a shared responsibility, which helps mitigate the issue of project abandonment after completion. This study, therefore, expands the theory by emphasizing continuous participation and shared governance structures as essential elements of sustainable infrastructure.

Mediation Analysis

Mediation analysis is a statistical technique utilized to understand the means through which an independent variable (X) influences a dependent variable (Y) through a mediating variable (M) (Yoon, 2020). Table 12 displays the outcomes of the indirect analysis of the structural model.

Table 12: Indirect Analysis

IV	MV	DV	Path Coeff	STDEV	t-Statistics	p-values
CP→	QI→	IS	0.196	0.055	3.558	0.000

Source: Field Survey (2024).

Objective four aimed to examine the mediating role of quality infrastructure (QI) in the relationship between community participation (CP) and infrastructure sustainability (IS). The indirect effect of CP on IS through QI produced a significant path coefficient ($\beta = 0.196$, $p < 0.000$), indicating that the mediating pathway contributes approximately 19.6% to the sustainability of government infrastructure. This demonstrates that while community participation directly influences sustainability, part of its effect is channelled through the provision of quality infrastructure, supporting the critical role of quality infrastructure as a mediator. Thus, community

participation (CP) can ensure sustainability through reliable and accessible infrastructure. This aligns with the theory that underpins the study. The participatory development theory seeks To give the communities a part in initiatives designed for their benefit in hopes that development projects will be more sustainable if local people are engaged in the development process (Cornwall, 2008). Furthermore, the result relates to the finding of Muniu et al. (2017), who revealed that community participation in development projects leads to sustainable results.

However, this objective highlights a theoretical gap: participatory development theory traditionally focuses on social processes such as empowerment and inclusion, but does not explicitly incorporate infrastructure quality as a mediating factor. The findings, therefore, extend participatory development theory by demonstrating that participation alone is insufficient unless complemented by quality assurance mechanisms. This positions quality infrastructure as a critical link between participatory processes and sustainable development outcomes, advancing the theory toward a more integrated, systems-oriented framework.

Quality infrastructure partially indirectly positively impacts the correlation between community participation and infrastructure sustainability, demonstrating that when communities are involved in infrastructure projects, they serve as a bridge to greater sustainability. This supports the concept that the participatory approaches lead to fulfilling actual needs and long-term community support and maintenance.

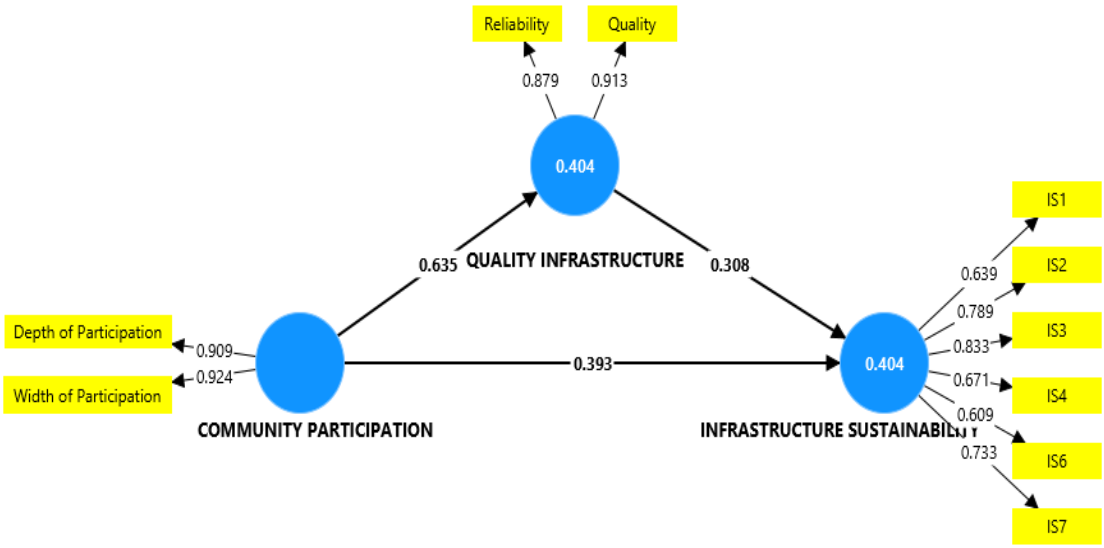

Figure 4: Outer and inner model results

Source: Field survey (2024).

Chapter summary

The chapter briefly described the background profile of the study respondents and examined the proposed hypotheses and objectives of the study. Additionally, the chapter explained how PLS-SEM and the measurement model were assessed. It further explained the model's reliability and validity, discriminant validity, convergent validity, collinearity statistic, effect size, predictive relevance, coefficient of determination, and structural model of the study objectives and hypotheses.

CHAPTER FIVE

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

This chapter is the last and concluding chapter of the study. It summarizes the study, presents a conclusion on the significance of the findings, offers recommendations based on the findings, discusses the limitations of the research, and suggests potential avenues for future research. However, the conclusions and recommendations will be presented in alignment with the four specific chapters outlined in Chapter Four.

Summary of the Study

The study aimed to examine the mediating role of quality infrastructure in the relationship between community participation and infrastructure sustainability. It specifically aimed to assess the effect of community participation on quality infrastructure, examine the impact of quality infrastructure on infrastructure sustainability, assess the effect of community participation on infrastructure sustainability, and, lastly, examine the mediating effect of quality infrastructure in the relationship between community participation and infrastructure sustainability.

Four proposed study hypotheses were formulated to achieve the study objectives. The study employed a quantitative research approach and an explanatory research design. Partial Least Squares-Structural Equation Modelling (PLS-SEM) was the primary statistical technique for testing the hypotheses. The study utilized statistical power using GPower version 3.1 to determine the sample size, with an effect size of 0.06, a statistical power of 0.80, and an alpha level of 0.05. The sample size for the study was 125

households in the community. The study employed a multi-stage sampling technique – stratified sampling and simple random sampling techniques. A self-administered questionnaire based on scales from reliable sources and extensive literature was pre-tested and later distributed to the study respondents. This was done to ensure the reliability of the instruments as well as prevent common method bias. The instrument focused on the respondents' characteristics and the variables examined in the study. In total, 124 valid responses were obtained from the community.

The respondents' demographic information was analysed using descriptive statistics, precise frequencies, and percentages using SPSS version 5. The objectives and the study hypotheses were analysed and tested using the Partial Least Squares-Structural Equation Modelling technique (PLS-SEM) with the help of SmartPLS 4.1. An alpha level of 0.05 was applied for all significance tests. The summary of the study findings is provided below.

The result for objective one, which examined the effect of community participation on infrastructure, indicated that community participation significantly positively influences quality infrastructure within the community with a path coefficient of (β=0.635, $p<0.000$). The study results also showed that community participation had the highest effect size on quality infrastructure. This implies that quality and accessible infrastructure are provided through community participation.

Regarding objective two, which assessed the effect of quality infrastructure on infrastructure sustainability, the study showed that quality infrastructure significantly positively influences infrastructure sustainability

within the community. Additionally, the findings indicated that community participation had the least effect size on infrastructure sustainability.

Regarding objective three, which assessed the effect of community participation on infrastructure sustainability, the study results indicated that community participation significantly influences infrastructure sustainability. This shows that community participation leads to sustainable results.

The study results for objective four, which examined the mediating role of quality infrastructure in the relationship between community participation and infrastructure sustainability, indicated that quality infrastructure significantly positively mediates the relationship between community participation and quality infrastructure. This suggests that community participation in development projects leads to sustainable results.

Conclusions

Both community participation and quality infrastructure significantly positively influence the sustainability of infrastructure in the community. Effective community participation directly ensures infrastructure sustainability and enhances quality infrastructure, contributing to infrastructure sustainability. Also, quality infrastructure significantly positively influences infrastructure sustainability. This indicates that providing reliable and accessible infrastructure that are "user needs" promotes infrastructure sustainability.

Having reliable and accessible "user-need" infrastructure influences the community to unite and organize to ensure its sustainability. Moreover, community participation has a significant positive effect on quality infrastructure. To provide reliable and accessible infrastructure that is "user-

need," the government should effectively engage communities in all quality infrastructure processes. Finally, the indirect effect of quality infrastructure on the relationship between community participation and infrastructure sustainability is significant and positive.

The results of the study contributed to a better understanding of the problem. The findings indicate that quality infrastructure significantly mediates the relationship between community participation and infrastructure sustainability. This denotes that community participation in development projects leads to sustainable results. This practically offers insights into improving community infrastructure facilities, which in turn promote the achievement of Sustainable Development Goals, impacting 72% of its target directly and indirectly (Thacker et al., 2019). The study findings validate the importance of community participation, countering the notion that other studies have against it and proving its role in ensuring that the needs and aspirations of the community are met.

Recommendation

The findings of this study have significant implications for local government and development agencies. The government and development agencies should establish community participation initiatives to promote the provision of "user-need" infrastructure projects, fostering the project's sustainability. The study recommends that the government and development agencies prioritize involving beneficiaries in planning, designing, implementing, and managing development projects. To operationalize these findings, local government and development agencies should institutionalize participatory approaches by formulating comprehensive frameworks and

policy instruments that mandate beneficiary involvement throughout all stages of the project cycle, including planning, design, implementation, monitoring, and sustainability.

This process should be complemented by systematic capacity-building programs aimed at equipping district officials and community leaders with skills in participatory planning, inclusive decision-making, and resource management. Furthermore, local governments should ensure that project approval processes incorporate structured public consultation forums, thereby guaranteeing that community priorities are documented and integrated into development plans. To strengthen accountability and ownership, the establishment of local project oversight committees with equitable community representation is imperative. This will encourage capacity building to address the challenges of sustaining infrastructures while promoting a sense of ownership and shared responsibility among stakeholders.

Additionally, community participation will ensure that community needs and aspirations are at the centre of development discourse, leading to efficient use of community resources and management. Community leaders, particularly traditional authorities and elected representatives, have an equally critical role to play in mobilizing and sustaining community engagement. This can be achieved through the organization of regular community forums that disseminate project information, solicit feedback, and clarify community responsibilities in the execution and maintenance of infrastructure. The formation of inclusive Community Development Committees (CDCs), incorporating women, youth, and marginalized groups, is essential for facilitating equitable representation and fostering collective decision-making.

Moreover, community leaders should institutionalize practices such as community labour days to promote a culture of volunteerism in routine infrastructure maintenance, while actively advocating for community needs in district planning and budgeting processes. The support of local communities for various strategies, plans, and projects largely depends on their sense of ownership, which can be achieved through community participation.

Collectively, these measures are expected to enhance project ownership, promote shared responsibility, and ensure that community aspirations remain central to the development discourse. By embedding participatory approaches within institutional structures and fostering collaborative partnerships among stakeholders, infrastructure sustainability can be significantly strengthened, thereby contributing to inclusive and democratic local governance

Suggestions for Future Research

Future investigations on community participation and infrastructure sustainability are expected to expand further to confirm the connection established in this study. Future research should analyse the moderating effect of quality infrastructure on the correlation between community participation and infrastructure sustainability. Further studies should be conducted and explored using a mixed-method approach to research to offer a more in-depth analysis and comprehensive understanding of the research problem. Also, further studies should be conducted using the qualitative approach to offer communities experience, perception, and understanding of the research problem. Finally, future studies could be performed in other regions.

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APPENDIX A: QUESTIONNAIRE

UNIVERSITY OF CAPE COAST

COLLEGE OF HUMANITIES AND LEGAL STUDIES

SCHOOL OF BUSINESS

DEPARTMENT OF MANAGEMENT

QUESTIONNAIRE FOR REPONDENTS

Dear Participant,

You are invited to participate in our research project, Community **Participation, and Infrastructure Sustainability in Ajumako/Enyan/Essiam District: The Role of Quality Infrastructure.** This is in partial fulfilment in the award of a Master's degree at the University of Cape Coast**.** We would be grateful if you could spare some time to help us complete this questionnaire. Please be assured that the information you provide will be treated with upmost confidentiality. Thank you for your time.

Section A: Demographic Data

Kindly provide an appropriate response and tick [√] what describes you.

1. Sex: Male [ ] Female [ ]
2. Age……
3. How long have you lived in the community? 1 – 5 [ ] 6 – 10 [ ] 11 and above [ ]
4. Level of Education: JHS [ ] SHS/ 'O' level/ 'A' level [ ] Diploma [ ] First degree [ ] Master's [ ] PhD [ ]
5. Employment status: Employed [ ] Unemployed [ ]

Section B: Community Participation

The table below indicates questions about your feelings concerning participatory activities in the community. Additionally, it indicates how inclusive the development process is and how the community influences it. Please indicate your agreement with each statement by ticking [√] the most appropriate column: Please choose the degree to which you can relate to each statement using the Likert scale. **The scale ranges from 1-7, with 1= strongly disagree, 2= disagree, 3= somewhat disagree 4= neutral, and 5= somewhat agree 6= agree 7=strongly agree**

Section B: Community participation	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Width of Participation							
1.. The community is invited to participate							
2.. The Community participates voluntarily							
3.. The community has access to project details and participate							
4.. Participation is educative as people learn when they participate							
Depth of Participation							
5.. Community is informed about project development							
6.. Meetings are held between the government and the community as a way of informing them of projects to be embarked upon							
7.. Ideas and suggestions are usually sought from community members before embarking on projects							
8.. The community is actively involved in the decision-making process							
9.. The community participates by providing labour for cash							
10.. The community provides land for project implementation							
11.. Implementation is done through partnership and joint equal decisions between the community and the government							
12.. The community has control over all projects without external bodies							

Section C: Quality Infrastructure

The table below indicates the perceptions about the adequacy of infrastructure development offered by the government in the community. Indicate the degree of your agreement with each statement by ticking [√] the most appropriate column. Please choose the degree to which you can relate to each statement using the Likert scale. **The scale ranges from 1-7, with 1= strongly disagree, 2= disagree, 3= somewhat disagree 4= neutral, and 5= somewhat agree 6= agree 7=strongly agree**

Section C: Infrastructure Development	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Accessibility							
1.. Facilities are located in an accessible area							
2.. I do not have to travel long distances to access essential facilities							
3.. I easily access essential infrastructure services when needed.							
Affordability							
4.. I enjoy affordable infrastructure services							
5.. It is affordable to maintain infrastructure services							
6.. I pay less to use the infrastructure facility							
Reliability							
7.. The facilities meet the community's demand							
8.. The facilities provide adequate services							
9.. Community infrastructure facilities are well-maintained							

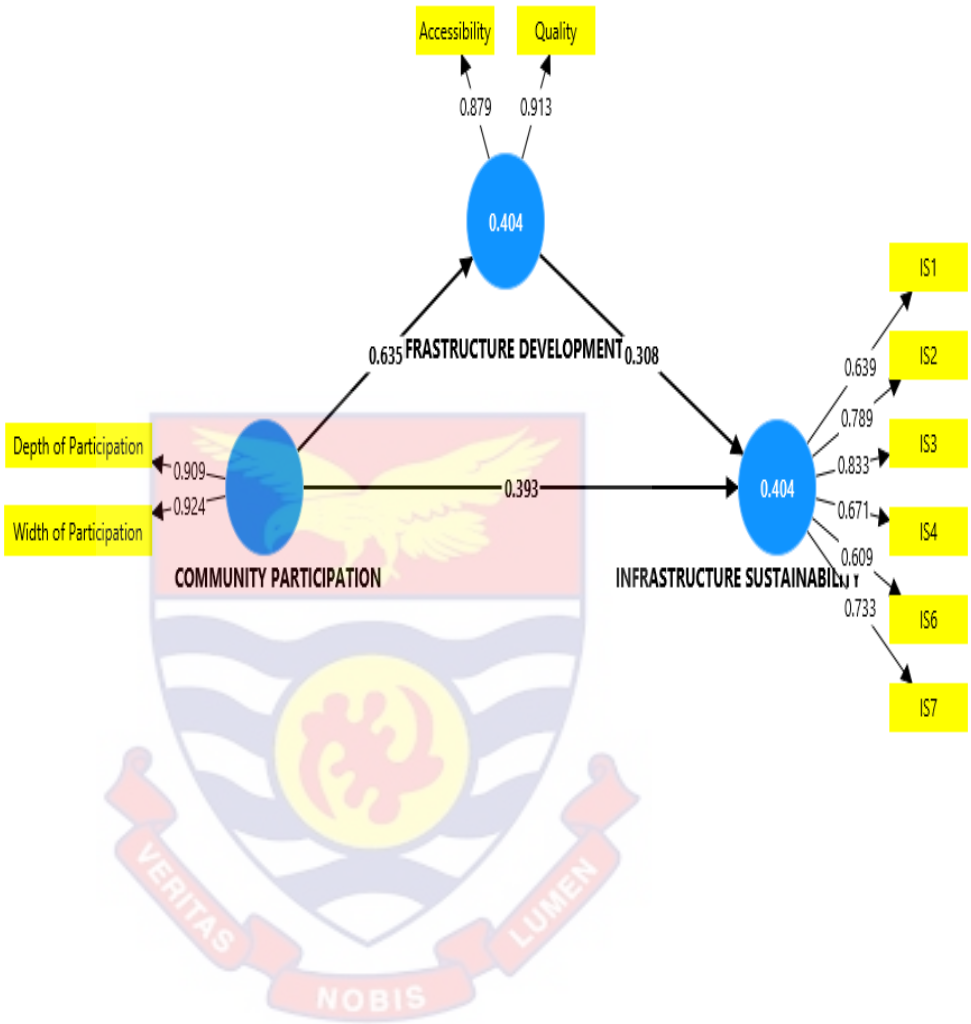
Section D: Infrastructure Sustainability

The table below seeks to identify how the infrastructures are sustained in your community. Please indicate the degree of your agreement with each statement by ticking [√] the most appropriate column. Please choose the degree to which you can relate to each statement using the Likert scale. **The scale ranges from 1-7, with 1= strongly disagree, 2= disagree, 3= somewhat disagree 4= neutral, and 5= somewhat agree 6= agree 7=strongly agree**

Section D: Sustainability	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1.. The community undertakes communal labour							
2.. The community provides adequate security							
3.. The committee raise maintenance committee							
4.. I attend meetings regarding the maintenance of projects							
5.. I contribute to propose plans for sustaining projects							
6.. I contribute to fund-raising for maintenance							
7.. I duly pay for services							
8.. The community seek support from the local government in sustaining projects.							

APPENDIX B

PATH MODELLING AND FACTOR LOADING RESULTS



APPENDIX C

CRONBACH ALPHA VALUES FOR THE VARIABLES

Table 6: Model Reliability and Validity

	Cronbach Alpha	Composite Reliability rho_A	Composite Reliability rho_C	Average Variance Extracted (AVE)
WP	0.740	0.768	0.852	0.659
DP	0.849	0.864	0.890	0.577
AC	0.785	0.799	0.876	0.704
RE	0.853	0.862	0.911	0.774
IS	0.808	0.818	0.862	0.514

Table 10: Fornell-Larcker Criterion

	1	2	3
CP	**0.916**		
QI	0.635	**0.896**	
IS	0.589	0.558	**0.717**

Table 11: Heterotrait-Monotriat Ratio Correlation

	1	2	3
CP	-		
QI	0.812	-	
IS	0.655	0.632	-

Table 12: Study Findings

IV	DV	Path Coeff.	STDEV	t-Stats	P-values	R^2	f^2	Q^2	VIF
CP	QI	0.635	0.055	11.610	0.000	0.404	0.677	0.319	1.00
QI	IS	0.308	0.095	3.689	0.000	0.404	0.095	0.189	1.677
CP	IS	0.393	0.085	4.124	0.000	0.404	0.115	0.189	1.677

Table Indirect Analysis Result

IV	MV	DV	Path Coeff	STDEV	t-Statistics	p-values
CP	QI	IS	0.196	0.055	3.558	0.000

APPENDIX D

ETHICAL CLEARANCE

UNIVERSITY OF CAPE COAST
INSTITUTIONAL REVIEW BOARD SECRETARIAT
TEL: 0558093143 / 0508878309
E-MAIL: irb@ucc.edu.gh
OUR REF: IRB/C3/Vol2/0510
YOUR REF:
OMB NO: 0990-0271
IORG #: IORG0011497

26TH AUGUST, 2025

Mr. Emmanuel Haizel Dadzie
Department of Management
University of Cape Coast

Dear Mr. Dadzie,

ETHICAL CLEARANCE – ID (UCCIRB/CHLS/2024/094)

The University of Cape Coast Institutional Review Board (UCCIRB) has granted Provisional Approval for the implementation of your study titled **Community Participation and Infrastructure Sustainability in Ajumako-Enyan-Essiam District: The Mediating Role of Infrastructure Development.** This approval is valid from **26th August, 2025 to 25th August, 2026.** You may apply for a renewal of ethical approval if the study lasts for more than 12 months.

Please note that any modification to the project must first receive renewal clearance from the UCCIRB before its implementation. You are required to submit a periodic review of the protocol to the Board and a final full review to the UCCIRB on completion of the research. The UCCIRB may observe or cause to be observed procedures and records of the research during and after implementation.

You are also required to report all serious adverse events related to this study to the UCCIRB within seven days verbally and fourteen days in writing.

Always quote the protocol identification number in all future correspondence with us about this protocol.

Yours faithfully,

.....
Kofi F. Amuquandoh
Ag. Administrator

.....
Prof Fiifi Amoako Johnson
Chairperson

CHAIRPERSON
INSTITUTIONAL REVIEW BOARD
UNIVERSITY OF CAPE COAST