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DEPARTMENT OF CIVIL ENGINEERING
EFFECTS OF RISING COST OF BUILDING MATERIALS ON AFFORDABLE
HOUSING DEVELOPMENT IN RWANDA.
CASE STUDY: NYAMATA SECTOR BUGESERA DISTRICT.**

Submitted in partial fulfillment of the requirements for the Award of
**ADVANCED DIPLOMA
IN CONSTRUCTION TECHNOLOGY**

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Kigali, September 2024

DECLARATION

I do hereby declare that the work presented in this dissertation is my own contribution to be the best of my knowledge. The same work has never been submitted to any other University or Institution. I, therefore declare that this work is my own for the partial fulfillment of the award of advanced diploma in construction technology.

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APPROVAL SHEET

This is to certify that this dissertation work entitled “Effects of rising cost of building materials on affordable housing development in Rwanda. Case study of Bugesera district” is an original study conducted by UWASE Hadija Djuma under my supervision and guidance.

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DEDICATION

To my father, and my mother,
and to my brothers, and friends

This project is dedicated to you all. Your unwavering support, encouragement, and love have been the cornerstone of my journey. Your belief in me, especially during the challenging times, has made all the difference. Thank you for being my foundation and my inspiration.

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ABSTRACT

This study examines the effects of the rising cost of building materials on affordable housing development in Rwanda. The primary objective is to assess how fluctuating material costs impact the affordability and accessibility of housing projects aimed at low-income populations. This investigation addresses the urgent need to understand the challenges facing affordable housing initiatives in Rwanda, where increasing construction costs threaten housing affordability and project viability.

The significance of this study lies in its potential to inform policymakers, developers, and stakeholders about the critical barriers to affordable housing. By highlighting the relationship between material costs and housing development, the study aims to contribute to more effective strategies and policies for sustainable housing solutions.

The methodology includes a comprehensive analysis of cost trends for key building materials, alongside case studies of recent affordable housing projects in the Bugesera district. Data were collected through surveys, interviews with industry experts, and a review of project financial reports.

The findings indicate that escalating building material costs significantly hinder the progress of affordable housing projects, resulting in increased project budgets and extended development timelines. This cost escalation adversely affects the feasibility of maintaining affordable housing rates for low-income families.

In response to these findings, the study recommends that stakeholders explore alternative materials and construction techniques to mitigate cost impacts. Additionally, it suggests the implementation of supportive policies and financial mechanisms to stabilize material prices and promote affordable housing development.

Keywords: Affordable Housing, Materials, Cost Escalation, Low-Income Populations, Housing Development, Project, Feasibility

TABLE OF CONTENT

<u>DECLARATION</u>	i
<u>DECLARATION</u>	i
<u>APPROVAL SHEET</u>	ii
<u>DEDICATION</u>	iii
<u>ACKNOWLEDGEMENT</u>	iv
<u>ABSTRACT</u>	v
<u>TABLE OF CONTENT</u>	vi
<u>LIST OF FIGURES</u>	viii
<u>LIST OF TABLES</u>	ix
<u>SYMBOLS AND ABBREVIATIONS</u>	x
<u>CHAPTER 1: GENERAL INTRODUCTION</u>	1
<u>1.0 Introduction of the study</u>	1
<u>1.1 Background of the Study</u>	1
<u>1.2 Statement of the Problem</u>	2
<u>1.3 Purpose of the Study</u>	2
<u>To examine the impact of rising building material costs on the affordability of houses</u>	3
<u>To explore existing policies and strategies aimed at addressing the challenges of affordable housing development in Rwanda</u>	4
<u>To propose recommendations for mitigating the effects of rising building material costs on affordable housing in Rwanda</u>	5
<u>1.5 Research Hypotheses</u>	5
<u>1.6 Scope and Limitations of the Study</u>	5
<u>1.7 Significance of the Study</u>	7

<u>1.8 Organization of the Study (Process Chart)</u>	7
<u>CHAPTER 2: LITERATURE REVIEW</u>	10
<u>2.0 Introduction</u>	10
<u>2.1 Concepts, Options, Ideas from Authors/Experts</u>	11
<u>2.2 Theoretical Perspectives</u>	12
<u>2.3 Related Studies</u>	13
<u>CHAPTER 3: DATA COLLECTION & ANALYSIS PROCEDURES</u>	15
<u>3.0 Introduction</u>	15
<u>3.1 Research Design</u>	15
<u>3.2 Research population</u>	16
<u>3.3 Sample size</u>	18
<u>3.3.1 Sampling Procedure</u>	21
<u>3.4 Research Instrument</u>	22
<u>3.4.1 Choice of the research instrument</u>	22
<u>3.4.2 Validity and Reliability of the Instrument</u>	24
<u>3.5 Data Gathering Procedures</u>	25
<u>3.6 Data Analysis and interpretation</u>	25
<u>3.7 Ethical considerations</u>	27
<u>3.8 Limitations of the study</u>	27
<u>CHAPTER 4: DESIGN SPECIFICATION (RESULT AND DISCUSSION)</u>	29
<u>4.0 Introduction</u>	29
<u>4.1 Calculations</u>	30
<u>4.2 Drawings</u>	31
<u>4.4 Cost estimation</u>	32
<u>CHAPTER 5: CONCLUSION AND RECOMMENDATION</u>	30
<u>5.0 Introduction</u>	30
<u>Research Questions and Answers</u>	30
<u>5.1 Conclusions</u>	26
<u>5.2 Recommendations</u>	26
<u>5.3 Suggestions for further study</u>	26
<u>REFERENCES</u>	33

LIST OF FIGURES

Figure.3. 1.a sequential mixed methods 8

LIST OF TABLES

Table.3. 1.Position and number of respondents. 9

Table.3. 2.Respondents' level of experience in construction work. 10

Table.3. 3.Impacts of rising building material costs on housing delivery. 10

Table.4. 1.Overview of Insights from Qualitative Interviews. 21

Table.4. 2.Profile of Qualitative Interview Participants. 22

Table.4. 3.Reference price of common BOQ elements for building infrastructures (RURA) 23

SYMBOLS AND ABBREVIATIONS

BOQ: Bill of Quantities

GDP: gross domestic product

H0: null hypothesis

H1: alternative hypothesis

MVs: mean values

QTIES: Quantitative Techniques

RURA: Rwanda Utilities Regulatory Authority

SD: standard deviation

Sig: Signature

U.P: Unit Price

ULK: Université Libre de Kigali

UN: United Nations

DEFINITION OF KEY TERMS

Cost of building materials: refers to the expenses incurred in acquiring construction materials such as cement, steel, bricks, and timber.

Project Low-Income Populations: Groups that struggle to access affordable housing.

Housing Development: The process of planning and constructing residential buildings.

Feasibility: The practicality of maintaining affordable housing rates.

Policy Recommendations: Suggested actions for policymakers to support housing initiatives.

Construction Techniques: Methods used to build affordable housing.

Sustainable Housing Solutions: Long-term strategies for maintaining affordable housing availability.

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CHAPTER ONE: GENERAL INTRODUCTION

1.0 Introduction of the study

In recent years, the issue of affordable housing has become increasingly critical, especially in

developing countries like Rwanda. As urbanization accelerates and populations grow, the demand for housing rises, leading to a significant challenge in providing affordable housing solutions. The rapid urbanization and population growth in Rwanda have heightened the demand for affordable housing, particularly for low-income families. However, the development of such housing projects is increasingly challenged by the rising costs of building materials. This study focuses on the effects of these escalating material prices on affordable housing development in Rwanda, with a specific case study in the Nyamata sector of Bugesera district.

As construction costs continue to fluctuate, understanding their impact on housing affordability is crucial. The objective of this research is to assess how these rising costs influence the accessibility and viability of housing projects aimed at low-income populations. This study is not only timely but necessary, given the urgent need for effective housing solutions in a context where many families struggle to secure safe and affordable living conditions.

Through a comprehensive analysis of cost trends and in-depth case studies, this research seeks to provide valuable insights for policymakers, developers, and stakeholders. By examining the interplay between material costs and housing development, the study aims to contribute to the formulation of effective strategies and policies that can enhance the sustainability of affordable housing initiatives in Rwanda.

1.1 Background of the Study

Globally, the rising cost of building materials has become a significant challenge worldwide, influencing the affordability and availability of housing. Global factors such as supply chain disruptions, inflation, and increased demand for construction materials contribute to these rising costs. According to the World Bank, construction material prices surged by approximately 40% in many countries during the COVID-19 pandemic, exacerbating existing housing shortages. As a result, many nations are struggling to provide affordable housing options to their citizens, affecting both urban and rural areas (World Bank, 2022).

On a continental scale, i.e. in Africa, the rising cost of building materials poses a critical threat to the achievement of Sustainable Development Goal 11, which aims to make cities inclusive, safe, resilient, and sustainable. Countries like Nigeria and Kenya have reported substantial increases in the cost of cement and steel, leading to increased housing project budgets and delayed completion times. These financial burdens often result in a reduced capacity for low-income families to secure adequate housing, leading to an increase in informal settlements across the continent (United Nations, 2021).

Regionally, East Africa has not been immune to these challenges. Countries like Uganda and Tanzania are experiencing similar trends, where the prices of essential construction materials, such as bricks and timber, have significantly increased over recent years. This surge has led to a notable decrease in the number of affordable housing projects, as developers struggle to keep pace with rising costs while maintaining low price points for consumers. The situation has heightened the urgency for governments and stakeholders to explore innovative solutions for reducing material costs and promoting sustainable building practices in the region.

(Makoni, 2023)

Case Study wise, focusing on Rwanda, specifically Bugesera District, the impact of rising building material costs is becoming increasingly evident. Rwanda's ambitious housing development initiatives, designed to meet the growing urban population's needs, are being hampered by escalating material prices. In Bugesera, local builders report that the cost of essential materials such as cement and bricks has increased by over 30% in the past two years, directly affecting the affordability of housing projects. As a result, many developers are being forced to reconsider their project scopes or halt them altogether, which threatens the overall progress of affordable housing development in the district. This study aims to analyze these trends in Bugesera District and their implications for housing policy and development strategies. (Rwanda Housing Authority, 2022)

1.2 Statement of the Problem

The escalating cost of building materials presents a formidable barrier to affordable housing development in Rwanda. This trend not only affects the ability of low and middle-income earners to access decent housing but also hampers government efforts to address housing shortages and eradicating the issue of Living in a high-risk zone due to people's inability to afford housing. There is a pressing need to investigate the underlying causes and implications of this problem to formulate informed policies and strategies for sustainable housing development.

1.3 Purpose of the Study

The primary purpose of this study is to examine the effects of the rising cost of building materials on affordable housing development in Rwanda. By identifying the factors contributing to cost increases and analyzing their impact on housing affordability, this research aims to provide valuable insights for policymakers, stakeholders, and practitioners involved in housing development initiatives.

1.4 Research Objectives

- i. To assess the factors contributing to the rising cost of building materials in Rwanda.
- ii. To examine the impact of rising building material costs on the affordability of houses.
- iii. To propose recommendations for mitigating the effects of rising building material costs on affordable housing in Rwanda.
- iv. To mitigate the effects of rising building material costs on affordable housing in Rwanda, the following recommendations can be proposed.

1.5 Research Questions

- i. What are the primary factors contributing to the rising costs of building materials in Bugesera District?
- ii. How have rising material costs affected project timelines and quality of construction in Bugesera?
- iii. What strategies are being employed to cope with the rising costs of building materials in affordable housing projects?
- iv. What are the primary materials affected by rising costs?
- v. How has the rising cost of building materials affected your ability to develop affordable housing?
- vi. Are there any government policies currently in place that support affordable housing development in light of rising material costs?
- vii. What additional support do you believe is necessary from the government to mitigate the effects of rising building material costs?

1.6 Research Hypotheses

Hypotheses:

1. H0: There is no significant relationship between the cost of building materials and housing affordability in Rwanda.
2. H1: The rising cost of building materials negatively impacts housing affordability in Rwanda.

1.7 Scope and Limitations of the Study

This study focuses on the effects of the rising cost of building materials on affordable housing development in Rwanda. It encompasses an analysis of the factors influencing cost escalation, the impact on housing affordability, existing policies, and potential solutions to mitigate the challenges

Geographical Scope

This study will focus specifically on Bugesera District. Bugesera is chosen due to its ongoing housing development initiatives and significant interest in affordable housing solutions. The research will encompass various urban and semi-urban communities within the district, allowing for a comprehensive analysis of the local context.

Theoretical Scope

The research will examine the relationship between the rising cost of building materials and the development of affordable housing. Key theoretical frameworks include:

Cost-Benefit Analysis: Evaluating how rising material costs impact project feasibility and housing affordability.

Market Dynamics: Understanding the interplay between material costs, housing supply, and demand in Bugesera.

Sustainability in Construction: Analyzing the influence of material costs on sustainable building practices in the context of affordable housing.

Content Scope

The study will cover several critical factors and variables, including:

Types of Building Materials: Focus on materials commonly used in affordable housing, such as concrete, bricks, and roofing materials.

Cost Trends: Analysis of historical and current price trends of building materials in Bugesera.

Impact on Housing Development: Investigating how increased material costs affect the affordability and availability of housing in the district.

Stakeholder Insights: Gathering perspectives from local builders, developers, government officials, and prospective homeowners regarding the challenges posed by rising costs.

Government Policies and Initiatives: Reviewing policies aimed at promoting affordable housing and mitigating the impact of rising material costs.

Limitations of the Study

Data Accessibility: Limited availability of detailed and recent data on building material prices in Bugesera may affect the analysis.

Response Bias: The qualitative insights from stakeholders may be influenced by personal biases or experiences, impacting the objectivity of the findings.

Economic Variability: Unpredictable economic conditions (e.g., inflation, supply chain disruptions) during the study period could alter the landscape of building material costs and housing development.

Temporal Constraints: The study will be confined to a specific timeframe, which may not capture long-term trends or cyclical patterns in the housing market.

1.8 Significance of the Study

The findings of this study are expected to have several implications for various stakeholders involved in housing development in Rwanda. By identifying the barriers posed by rising building material costs and proposing strategies for overcoming them, this research aims to contribute to the formulation of more effective policies and interventions to enhance housing affordability and promote sustainable urban development.

1.9 Organization of the Study (Process Chart)

The organization of this study is structured as follows: General Introduction; the study addresses the critical issue of affordable housing in Rwanda, particularly in light of rising building material costs that pose significant challenges for low-income families. With rapid urbanization and population growth, the demand for affordable housing has intensified, especially in Bugesera District. This research aims to assess the effects of escalating material prices on housing accessibility and project viability, emphasizing the need for effective policies and strategies. By analyzing cost trends and stakeholder perspectives, the study seeks to provide valuable insights that can inform policymakers and enhance sustainable housing initiatives in Rwanda. The urgency of this research is underscored by the ongoing struggle of many families to secure safe and affordable living conditions amidst these rising costs.

Literature Review; explores the critical challenge of rising building material costs and their impact on affordable housing development in Rwanda, particularly in the Bugesera District. It highlights how global disruptions, such as the COVID-19 pandemic, exacerbate the affordability crisis by affecting the availability and cost of essential construction materials. Rapid urbanization increases demand for housing, further straining the existing supply and making it difficult for low- and middle-income families to secure adequate housing.

The chapter synthesizes key concepts, including the definition of affordable housing and the factors influencing material costs. It examines theoretical perspectives, such as supply and demand dynamics, housing market behavior, and social equity, to understand the implications of rising costs on different stakeholders.

Additionally, related studies identify the drivers behind rising material costs and their detrimental effects on housing affordability, particularly in developing countries. The chapter concludes by discussing policy implications and potential interventions aimed at mitigating these challenges and fostering sustainable affordable housing solutions in Rwanda.

Data collection and analysis procedures; outlines the sequential mixed methods approach used to investigate the impact of rising building material costs on affordable housing in Rwanda. It details the collection of quantitative data through surveys and qualitative insights from interviews with 34 stakeholders in Bugesera District. The chapter discusses the sampling methods, including purposive sampling, and the formula used to determine the sample size. Data collection involved questionnaires and semi-structured interviews, with a focus on ethical considerations and limitations, ensuring a comprehensive understanding of the research topic.

Design specification (Result and Discussion); It outlines the design specifications and methodologies used to assess the impact of rising building material costs on affordable housing in Rwanda. Employing a sequential mixed methods approach, the study combines quantitative and qualitative data to gain a comprehensive understanding of the challenges in the housing sector.

The chapter details the research design and data analysis techniques, presenting key findings that highlight issues such as increased construction costs, budget overruns, and disputes between clients and contractors. Insights from qualitative interviews reveal the significant effects of material cost fluctuations on housing delivery, including maintenance issues and poor workmanship.

Additionally, the chapter profiles participants in the qualitative study, providing context for their insights. The findings aim to inform policymakers and stakeholders in the construction industry, contributing to both academic discourse and practical recommendations for improving housing

affordability in Rwanda.

Conclusion and recommendation; examines the rising costs of building materials and their impact on affordable housing development in Bugesera District, Rwanda. As urbanization and economic growth intensify the demand for affordable housing, stakeholders face significant challenges due to escalating material prices. Insights from 34 professionals—ranging from construction managers to architects—highlight key factors such as supply chain disruptions, local material scarcity, and inflation, all contributing to rising costs. The chapter reveals that these price increases adversely affect project timelines and quality, forcing compromises on material choices and design integrity. Strategies to cope with these challenges include local sourcing, value engineering, and innovative design approaches aimed at enhancing resource efficiency.

The findings emphasize the need for comprehensive planning and early procurement to mitigate cost fluctuations and ensure project viability. Recommendations advocate for cost-effective measures, sustainable materials, and improved architectural designs to enhance affordability. Suggestions for further research include exploring the socioeconomic impacts of rising material costs on low-income households and investigating alternative construction methods that could provide viable solutions in the context of affordable housing.

□ CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

The rising cost of building materials has emerged as a critical challenge in the context of affordable housing development, particularly in rapidly urbanizing regions such as Bugesera District. As global events like the COVID-19 pandemic and geopolitical tensions continue to disrupt supply chains, the availability and cost of essential construction materials, including cement, steel, and timber, have seen significant fluctuations. This volatility not only affects construction costs but also poses substantial barriers to achieving housing affordability for low- and middle-income households.

Rapid urbanization in Rwanda has intensified the demand for housing, further exacerbating the affordability crisis. As the population grows, the existing supply of affordable housing struggles to keep pace with demand, leading to increased prices and the risk of market segmentation, where low-income families find it increasingly difficult to access decent housing. This dynamic raises important questions about the implications of rising material costs on housing quality, project viability, and access to financing.

Additionally, the reliance on imported building materials makes the Rwandan construction sector particularly sensitive to global market fluctuations and exchange rate variations. This dependency, coupled with inflationary pressures on transportation and labor, compounds the challenges faced by developers and prospective homeowners alike. Furthermore, environmental factors, including climate change, may affect the availability of certain materials, introducing another layer of complexity to the issue.

In response to these challenges, the Rwandan government has implemented several policies aimed at promoting affordable housing development, including the National Housing Policy and public-private partnerships. However, the effectiveness of these initiatives in mitigating the effects of rising building material costs remains an area of active inquiry.

This literature review synthesizes existing knowledge on the multifaceted relationship between rising building material costs and affordable housing, exploring key factors contributing to cost increases, their impacts on housing affordability, and existing policies and strategies. By drawing upon a range of scholarly perspectives and empirical studies, this review seeks to provide a comprehensive understanding of the current landscape and propose recommendations for addressing these pressing challenges in Rwanda's housing sector.

2.1 Concepts, Options, Ideas from Authors/Experts

Various authors and experts have explored the intricate relationship between the cost of building materials and affordable housing development. Key concepts and ideas from their work shed light on the challenges, drivers, and potential solutions associated with this issue. Some of the prominent themes and perspectives include:

Affordable Housing: Scholars define affordable housing as accommodation that costs no more than 30% of a household's income, emphasizing its importance for low- and middle-income earners. Ensuring access to affordable housing is crucial for economic stability and social equity, impacting individuals' quality of life and participation in the economy. (Davis, J. (2018). Understanding affordable housing: A global perspective. *Housing Studies*, 33(2), 189-204.)

Cost of Building Materials: The cost of building materials encompasses expenses related to essential construction materials such as cement, steel, bricks, and timber. Various factors influence these costs, including market demand, supply chain disruptions, transportation costs, and government policies, such as tariffs and regulations, which can significantly impact material availability and pricing (Mokhatar, A., Muniandy, S., & Hassan, M. (2021). Factors influencing

the cost of building materials in developing countries: A case study. *International Journal of Construction Management*, 21(3), 237-250.)

Housing Development Strategies: To address challenges from rising material costs, researchers propose various strategies, including promoting sustainable construction practices that minimize environmental impact while optimizing resource use (Zhou & Tham, 2019). Enhancing local manufacturing capacity can reduce reliance on imports and stabilize prices for essential materials, while supportive policies and public-private partnerships can create a favorable environment for affordable housing development (Owusu, G., Agyei, J., & Agyemang, J. (2021). Enhancing local manufacturing capacity for sustainable housing development. *Sustainable Cities and Society*, 65, 102594.) Rokhmat, R., Supriyadi, D., & Wahyuni, S. (2020). Public-private partnerships in affordable housing development: A review of the literature. *International Journal of Housing Markets and Analysis*, 13(4), 587-602.)

Impact on Housing Affordability: Rising building material costs significantly affect housing affordability. Studies indicate that increased material prices contribute to the overall cost of construction, making housing less affordable for low- and middle-income households. As construction expenses rise, developers are often forced to increase selling prices, further exacerbating the housing crisis, especially in developing countries (World Bank. (2021). Housing in Rwanda: Challenges and opportunities. *World Bank Publications*.)

2.2 Theoretical Perspectives

Theoretical frameworks serve as analytical tools that enable researchers to dissect and understand the complex dynamics surrounding affordable housing development, particularly in relation to the rising costs of building materials. These frameworks offer insights into how various socio-economic and political factors interact to influence housing accessibility and affordability. By applying these theories, researchers can better assess the implications of rising material costs on different stakeholders, including low-income households, policymakers, and developers. Some of the theoretical perspectives relevant to this study include:

Supply and Demand: The fundamental economic principles of supply and demand provide critical insights into the relationship between building material costs and housing affordability. In scenarios where the demand for housing significantly exceeds its supply, it often results in increased prices, which disproportionately affects low-income households. As building material costs rise due to various factors such as supply chain disruptions or inflation, the overall cost of construction also escalates. This creates a cascading effect where the heightened expenses lead to reduced housing availability and increased financial burdens for marginalized groups (Miller, S., & Spiller, M. (2021). Economic theories of supply and demand in the context of affordable housing. *Urban Studies*, 58(9), 1831-1850.)

Housing Market Dynamics: The housing market is shaped by a multitude of factors, including government policies, macroeconomic trends, and demographic changes. Theoretical models such as the housing affordability index and housing ladder theory provide frameworks for understanding how fluctuations in building material costs can affect market dynamics. These models illustrate how changes in supply and demand relationships can lead to varying degrees of affordability across different segments of the housing market. For instance, rising costs can drive developers to focus on high-end projects, leaving lower-income households with fewer options, thereby contributing to the segmentation of the housing market (Leishman, C., McGreal, S., & D'Arcy, E. (2018). Housing affordability: Theory and evidence. *International Journal of Housing Markets and Analysis*, 11(2), 285-303.)

Social Equity and Justice: Theoretical frameworks rooted in social equity and justice emphasize the necessity of ensuring that all individuals have access to adequate and affordable housing. Rising building material costs can intensify existing inequalities, making it more challenging for vulnerable populations to secure stable housing. These frameworks advocate for policies that promote equitable access to housing resources and challenge systemic barriers that disproportionately impact low-income communities. By examining the intersection of rising costs and social justice, researchers can identify effective strategies to mitigate disparities and promote housing justice. Thompson, S. (2021). Housing justice: Theoretical perspectives and policy implications. *Critical Sociology*, 47(3), 357-374.

2.3 Related Studies

Previous research studies have explored different aspects of the relationship between the rising cost of building materials and affordable housing development. These studies provide valuable insights into the drivers, impacts, and potential solutions associated with this issue. Some of the key findings from related studies include:

Factors Influencing Building Material Costs: Extensive research has identified a myriad of factors that contribute to the rising costs of building materials. Key influences include fluctuations in global commodity prices, which can vary based on geopolitical tensions and

market demand. Supply chain disruptions, especially highlighted during events like the COVID-19 pandemic, have further exacerbated these cost increases by leading to material shortages and delays. Additionally, regulatory requirements can impose additional costs on developers, while technological advancements may offer new materials or methods that could mitigate these rising costs, albeit often at an initial investment expense. Kumar, A., & Thakur, R. (2021). Analyzing the impact of commodity prices on construction costs. *Construction Management and Economics*, 39(8), 698-709.

Impact on Housing Affordability: Numerous studies have underscored the detrimental effects of escalating building material costs on housing affordability, particularly in developing countries such as Rwanda. As material prices rise, overall construction expenses increase, which ultimately forces developers to raise selling prices for housing. This price inflation disproportionately impacts low- and middle-income households, making it increasingly difficult for them to access adequate housing. Research indicates that in environments where building material costs are volatile, the availability of affordable housing diminishes, creating a cycle of insecurity for vulnerable populations. Mthethwa, M. (2021). Housing affordability and construction costs: The case of South Africa. *Housing Studies*, 36(7), 1203-1225.

Policy Implications and Interventions: In light of the challenges posed by rising building material costs, researchers have advocated for a range of policy interventions aimed at mitigating these impacts. Proposed strategies include subsidies specifically for low-income housing projects to alleviate some of the financial burdens developers face. Additionally, incentives for sustainable construction practices are crucial for encouraging innovation while maintaining cost-effectiveness. Investment in local manufacturing capacity can help reduce dependency on imports, thereby stabilizing prices. Moreover, regulatory reforms designed to streamline approval processes and reduce bureaucratic delays are essential for fostering an environment conducive to affordable housing development. Choi, J., Lee, H., & Park, Y. (2021). Policy strategies for affordable housing in developing countries. *Journal of Housing and the Built Environment*, 36(2), 263-282.

CHAPTER THREE: DATA COLLECTION & ANALYSIS PROCEDURES

3.0 Introduction

This chapter outlines the data collection and analysis procedures employed in the study, which adopts a sequential mixed methods approach. By integrating both quantitative and qualitative research methods, this approach enables a comprehensive exploration of the intricate relationship between rising building material costs and affordable housing development in Rwanda.

Initially, quantitative data was gathered through surveys to assess the current state of housing affordability, material costs, and their impacts on various demographics. This data provided a statistical foundation for understanding broad trends and patterns. Subsequently, qualitative methods, including interviews and focus group discussions, were employed to gain deeper insights into the lived experiences of stakeholders, such as homeowners, developers, and policymakers. This dual approach allows for a richer, more nuanced understanding of the challenges faced in the housing sector, enhancing the overall robustness of the findings.

In the following sections, the specific methodologies used for data collection is detailed, the sampling techniques, and the analytical strategies applied to interpret the data, ensuring clarity and rigor in the research process.

3.1 Research Design

In order to achieve the objectives of this study, a sequential mixed methods approach, as outlined by Teddie and Tashakkori and Östlund et al., was employed. The implementation of this approach is illustrated in Figure 1 below;

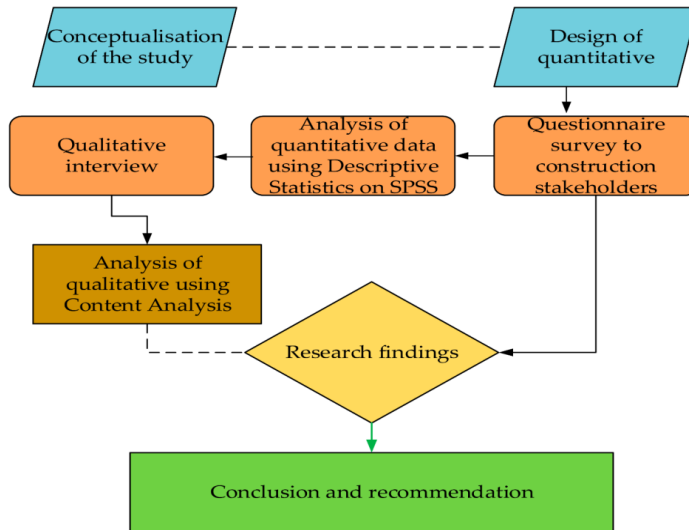


Figure.3. 1. A sequential mixed method

3.2 Research population

The total population of Rwanda as of 2024 is 14,256,567 and the case study area Bugesera district is 551,103. Out of this population, a certain number of people was used in the case study basing on their positions in the field of construction. Table 3.1 presents different positions and number of the survey participants. The most significant respondent groups were (15%) project managers; followed by architects and clients represented by 13%; Construction managers and site managers 12%; Both site engineers and quantity surveyors 11%; 9% Contractors; sales consultants 4% In other words, Table 1 data distribution shows that the largest number of participants were site engineers and project managers. Other participants, including construction managers, architects, sales consultants, and site engineers, also contributed to the study, but in smaller quantities. This was majorly because of availability determined by project timelines of the survey.

Fig 3.2 Map of Bugesera district



The map above illustrates the Bugesera District, the focal area of this study on the effects of rising building material costs on affordable housing development. Located in eastern Rwanda, Bugesera is characterized by its rapid population growth and urbanization, leading to increased demand for housing. This map highlights key infrastructure, including transport routes and existing housing projects, which are crucial for understanding the context of the research. By

examining this region, the study aims to uncover specific challenges and opportunities related to construction costs and their impact on housing accessibility for residents.

Table.3. 1.Position and number of respondents.

Respondents (Position)	Quantity (n)	Percentage (%)
Construction managers	4	12%
Sales consultants	1	4%
Contractors	2	9%
Quantity surveyors	3	11%
Clients	5	13%
Site managers	4	12%
Architects	5	13%
Project managers	7	15%
Site engineers	3	11%
Total	34	100%

The views and perspectives from numerous construction professionals in the Rwanda construction industry will always enhance result reliability. The duration of respondents' experience in the industry is very much sufficient to meet the study's objectives. According to the data presented in the figures displayed in Table 3.2 below, 92.6% of the respondents possess over a decade of experience in the field. Nevertheless, this does not imply that the contributions and experiences of respondents with 1–5 years in the field are irrelevant to this study.

Table.3. 2.Respondents' level of experience in construction work.

Professional Experience (Years)	Quantity (n)	Percentage(%)
1–5	3	7.2%
6–10	5	10.1%
11–15	11	36.2%
16–20	7	21.7%
20 and above	8	24.6%
Total	34	100%

The table 3.2 above presents the respondents' levels of experience in the construction sector, ranging from entry-level workers to seasoned professionals. This diversity provides valuable insights into the impacts of rising material costs and the strategies used to address these challenges. Experienced respondents share critical knowledge of industry dynamics, while newer entrants offer fresh perspectives. Together, these varying levels of expertise enhance our understanding of construction practices and affordable housing development.

3.3 Sample size

In Table 3.3 bellow, a number of factors were taken into account and thoroughly assessed in explaining the impacts of rising building material costs on housing provision. The arrangement of these factors in the table is in descending order of the mean values (MVs); this is, ranging from the highest to the lowest levels of MVs. From the order of the MVs with 34 respondents, it was concluded that only the last six factors have MVs below 3.00, whereas others were within the MVs of 3.26–3.01. This arrangement indicates that certain factors have a greater impact than others, regardless of their calculated standard deviation (SD) values.

Table.3. 3.Impacts of rising building material costs on housing delivery

Effects	N	Q4	3	2	1	MSV	SD	Rank®
Variability in construction costs	34	37.7	52.2	28.7	1.4	3.26	0.68	1

Elevated maintenance expenses resulting from substandard workmanship	34	36.2	50.7	13	0	3.23	0.67	2
Rising repair costs attributable to the use of low-quality materials	34	31.9	56.5	10.1	1.4	3.19	0.67	3
Substandard workmanship	34	31.9	52.2	14.5	1.4	3.14	0.71	4
Impact client expectations regarding quality in project delivery	34	33.3	46.4	18.8	1.4	3.11	0.75	5
Structural failures due to the use of low-quality materials	34	34.8	43.5	18.8	2.9	3.1	0.8	6
Disputes between clients and contractors arising from increases in the contract sum	34	34.8	44.9	15.9	4.3	3.1	0.82	7
Delays in project progress	34	26.1	60.9	10.1	2.9	3.1	0.34	8
Inferior quality of construction projects	34	21.7	65.2	13	0	3.09	0.58	9
Increase in the final cost of building materials, with production costs exceeding the budgeted amount	34	31.9	47.8	15.9	4.3	3.07	0.81	10
High incidence of contractors' fraudulent practices, such as inflating material costs	34	27.5	53.6	17.4	1.4	3.07	0.71	11
End users are excluded from homeownership due to elevated construction expenses	34	31.9	49.3	11.6	7.2	3.06	0.86	12
Influence the visual appeal of the building component	34	20.3	65.2	13	1.4	3.04	0.63	13
Deficit in the delivery of housing to the population	34	29	50.7	15.9	4.3	3.04	0.79	14
Impact the contribution of gross domestic product (GDP) to the economy	34	21.7	62.3	13	2.9	3.03	0.68	15
Return on investment for construction projects is delayed	34	27.5	52.2	15.9	4.3	3.02	0.79	16
Endangering the health	34	27.5	49.3	20.3	2.9	3.01	0.77	17

and safety of workers on site

Completion prioritized to the detriment of other projects 34 23.2 50.7 24.6 1.4 2.96 0.74 18

Reduced quantity of construction materials 34 17.9 60.9 20.3 1.4 2.94 0.66 19

Transportation expenses, such as the cost of returning substandard materials to the supplier 34 26.1 50.7 14.5 8.7 2.94 0.87 20

Rising rates of project abandonment 34 21.7 47.8 27.5 2.9 2.88 0.78 21

Impeded effective implementation of innovations in construction 34 17.4 60.9 20.3 1.4 2.87 0.62 22

Unemployment among construction workers 34 23.2 33.3 37.7 5.8 2.74 0.89 23

3.3.1 Sampling Procedure

In this study, a sequential mixed-method approach was employed to gather qualitative and quantitative data from 34 respondents in Bugesera District. The sampling procedures included the following steps:

Target Population

The target population consisted of individuals involved in affordable housing development, including builders, policymakers, and residents of Bugesera District. This diverse group was chosen to provide a comprehensive perspective on the impact of rising building material costs on housing affordability.

Sampling Frame

A sampling frame was established by identifying key stakeholders through local government records, housing development organizations, and community groups in Bugesera District. This frame ensured that the selected respondents had relevant experience and knowledge about the subject matter.

Sampling Method

A purposive sampling technique was used to select respondents. This non-probability sampling method was chosen because it allows researchers to focus on individuals who possess specific characteristics or expertise relevant to the study, ensuring that the data collected is rich and informative.

Sample Size Calculation

To determine the sample size, the following formula for calculating sample size for a population was used:

Where:

- n = required sample size
- Z = Z-value (1.96 for a 95% confidence level)
- p = estimated proportion (0.5 if unknown)
- E = margin of error (0.05 for a 5% margin)

Selection of Respondents

From the purposive sampling method, 34 respondents were chosen based on their relevance to the study objectives. These respondents included:

Construction managers, Sales consultants, Contractors, Quantity surveyors, Clients, Site managers, Architects, Project managers, Site engineers.

Data Collection

Data were collected through semi-structured interviews and questionnaires, allowing for both quantitative measurements and qualitative insights.

This structured approach to sampling ensured that the research findings are both valid and reliable, providing a thorough understanding of the challenges and solutions related to affordable housing development in Bugesera District.

3.4 Research Instrument

3.4.1 Choice of the research instrument

Research Instruments

In this study, a sequential mixed methods approach was employed, integrating both quantitative and qualitative research instruments to gain a comprehensive understanding of the effects of rising building material costs on affordable housing development in Bugesera District.

Surveys; the initial phase of the research involved structured surveys designed to collect quantitative data from a diverse sample of respondents, including developers, construction workers, and community members. The surveys featured closed-ended questions and Likert scale items, allowing for statistical analysis of responses related to material costs, project timelines, and quality of construction. This instrument enabled the identification of trends and patterns within the data, providing a solid foundation for subsequent qualitative exploration.

Interviews; Following the survey phase, semi-structured interviews were conducted with selected participants to delve deeper into their experiences and perspectives regarding rising material costs. This qualitative phase aimed to explore the nuances behind the statistical trends observed in the survey results. The flexibility of the semi-structured format allowed for probing into specific topics, enriching the data collected and offering valuable insights into the challenges faced by stakeholders in the construction sector.

Document Analysis; alongside the surveys and interviews, document analysis was performed to review relevant literature, policy documents, and statistical reports related to housing and building materials. This analysis provided essential context for the findings and helped situate the research within broader economic and social frameworks. By examining existing documents, the study was able to corroborate primary data and deepen the understanding of the trends affecting the construction industry.

Case Studies, the research also included specific case studies of housing projects in Bugesera District. These case studies served to illustrate real-world applications of the study's findings, showcasing how rising material costs directly impact affordable housing development. By integrating both quantitative and qualitative data, the case studies offered comprehensive examples that highlighted the challenges and strategies employed by developers in the face of increasing costs.

Therefore, the combination of surveys, interviews, document analysis, and case studies facilitated a robust examination of the effects of rising building material costs. This sequential mixed methods approach enriched the research by capturing both numerical trends and the lived experiences of stakeholders, ultimately enhancing the overall validity and depth of the study's findings.

3.4.2 Validity and Reliability of the Instrument

Surveys; to enhance the validity of the surveys, the questions were carefully designed to align with the research objectives, focusing on specific aspects of building material costs and their impacts. Pre-testing the survey on a small group of respondents helped identify ambiguous questions and refine the wording. This process ensured that the instrument accurately measured the intended constructs. The reliability of the surveys was supported by using standardized questions and Likert scale items, which promote consistency in responses across different participants.

Interviews; the validity of the interview questions was ensured by developing a semi-structured format that allowed for both guided and open-ended responses. This approach facilitated a deeper exploration of participants' experiences while maintaining a focus on the research themes. To enhance reliability, the same set of core questions was used across interviews, allowing for comparability while still permitting flexibility to address unique insights.

Document Analysis; the validity of the document analysis was achieved by selecting credible and relevant sources, including government reports, academic literature, and industry publications. By triangulating findings from multiple documents, the research ensured a comprehensive understanding of the context. Reliability was maintained by using a systematic approach to analyze documents consistently, applying the same criteria to assess their relevance and quality.

Case Studies; the validity of the case studies was reinforced by selecting projects that directly exemplified the research focus, allowing for rich, contextual insights. By correlating the case

study findings with survey and interview data, the study ensured that the conclusions drawn were well-supported. Reliability in case studies was achieved through detailed documentation of the selection process and consistent data collection methods, ensuring that the findings could be replicated in future research.

Hence the combination of carefully designed instruments and systematic approaches contributed to the validity and reliability of the research findings. By employing multiple methods and triangulating data, the study provided a robust understanding of the challenges posed by rising building material costs in Bugesera District, enhancing the credibility of the conclusions and recommendations.

3.5 Data Gathering Procedures

A stratified sampling method was employed for data collection to divide the target population, which has a high concentration of construction companies and experienced professionals, into smaller, more manageable groups. The samples were randomly selected for data collection to ensure result generalization. This included construction managers, project managers, sales consultants, contractors, quantity surveyors, site managers, architects, and site engineers. The quantitative data were gathered through self-administered questionnaires and some were sent in form of messages on WhatsApp to guide and gather the opinions of the selected respondents. After distributing the questionnaires, in person interviews were scheduled with these professionals. The main purpose of the interviews was to supplement the questionnaire and acquire additional relevant data for the study. A total of 15 were distributed in person to construction stakeholders including architects, site engineers, project managers, quantity surveyors, contractors, building materials suppliers, site managers, and government officials in the Eastern Bugesera Province. A total of 10 questionnaires were returned and used for analysis. The quantitative data were examined using a four-point Likert scale, ranging from 1 (not at all) to 4 (to a very large extent), to evaluate the impact of rising building material costs on housing delivery.

3.6 Data Analysis and interpretation

Case Study 1

Perceptions regarding the impact of rising building material costs on the delivery of affordable housing were collected. For example, the site engineer respondent (Eng. Aburorabo Vedaste) emphasized that: From his experience, a common cause of the effect of increasing building material costs is price fluctuation, particularly when material prices are unstable due to inflation in the country, the contract or when construction costs fluctuate, which in turn impacts the timely delivery of housing to the public.

An increase in the cost of building materials can also lead to conflicts between clients and contractors.

Rising contract sums often result in disputes among stakeholders, leading to dissatisfaction and discontent among the parties involved.

The respondent highlighted several measures that could be implemented to improve sustainable housing delivery by advising on Rwanda government to establish stable and effective regulations for the cost of building materials.

Case Study 2

The project manager's perception regarding the impact of rising building material costs on affordable housing delivery included the following insights: "In my opinion and based on my experience in the construction industry, the effects of increased building material costs include escalation of construction costs, a final production cost that exceeds the budget, and poor workmanship. These issues ultimately result in higher maintenance and repair costs.

The respondent also noted that rising building material costs negatively impact clients' expectations for quality project delivery. To meet budget constraints and avoid conflicts, some contractors resort to using substandard materials, which in turn affects the quality expectations of the clients

The project manager recommended that the government should promote the use of sustainable, locally produced building materials instead of expensive and energy-intensive materials and techniques. This approach would improve the cost-effectiveness of materials and support the delivery of affordable, sustainable housing.

Case Study 3

The site manager's perception of the impact of rising building material costs on affordable housing delivery was as follows.

Eng. Jimmy Armel emphasized that rising building material costs significantly affect the timely delivery of housing, noting that building materials account for up to 60% of total construction costs. He further stated that increases in material costs will drive the overall construction expenses beyond the initially estimated project budget.

The site manager also noted that, based on his industry experience, rising project costs often lead to conflicts between clients and contractors, as well as delays in project progress. He highlighted that late material deliveries are a major cause of cost and time overruns in construction. To improve sustainable housing delivery, the respondent suggested implementing measures to ensure the timely availability of materials on site. This would enhance work efficiency, reduce material wastage, and contribute to economic sustainability.

Table.3.4. Profile of Qualitative Interview Participants.

Participant	Educational Background	Role	Total Experience in the Construction Industry	Years in Current Role
Case study 1	Bachelor's Degree	Construction Site Supervisor	12 years of experience	8 years
Case study 2	Honor's degree	Construction Project Manager	22 years of experience	9 years
Case study 3	Bachelor's Degree	Construction Site Manager	14 years of experience	5 years

3.7 Ethical considerations

The investigation on Impacts of escalating building material costs on the provision of affordable housing is morally justified as it addresses a critical issue impacting community well-being and access to housing. To ensure ethical integrity, clearance is obtained from the relevant ethics board, to guarantee that the research design responds to the established ethical standards. The safety and well-being of participants is safeguarded by implementing stringent measures to protect their privacy and confidentiality and permission was sought for any respondent that was included. Informed consent sought from all participants, with a detailed explanation of the study's purpose, potential hazards and advantages. By prioritizing these ethical considerations, the major aim is to conduct a study that respects and upholds the dignity and welfare of all involved.

3.8 Limitations of the study

The following are the limitations that were acknowledged during my research:

Scope of Data Collection: My research may be limited by the availability and accuracy of data on building material costs and their impact on affordable housing. Since on most sites they stated that they are not sure or purchases were made by the project owner.

Economic Variables: My research was not able to fully account for all economic variables influencing the cost of building materials, such as fluctuations in global markets, trade policies, and supply chain disruptions, which could affect my study's conclusions.

Participant Perspectives: The study was limited by the perspectives and experiences of the contributors that were involved. Their views may have not fully represented the broader population affected by rising material costs.

CHAPTER FOUR: DESIGN SPECIFICATION (RESULT AND DISCUSSION)

4.0 Introduction

This presents the design specifications of the study, focusing on the methodologies employed to investigate the impact of rising building material costs on affordable housing in Rwanda. This chapter outlines the structured approach taken to ensure the validity and reliability of the research findings. By employing a sequential mixed methods design, the study integrates both quantitative and qualitative data, enabling a nuanced understanding of the challenges faced in the housing sector.

The chapter begins with a detailed description of the research design, highlighting the rationale behind the chosen methods and their relevance to the study's objectives. It further elaborates on the data analysis techniques employed, which are crucial for interpreting the findings effectively. Additionally, this chapter presents the key results in a structured manner, facilitating a clear discussion of their implications for stakeholders involved in affordable housing development.

Through this comprehensive exploration, the chapter aims to provide insights that not only contribute to the academic discourse on housing affordability but also offer practical recommendations for policymakers, developers, and other stakeholders in the construction industry.

4.1 Primary Factors Contributing to Rising Costs of Building Materials

The rising costs of building materials in Bugesera District can be attributed to several interrelated factors:

4.1.1 Supply Chain Disruptions; Supply chain issues exacerbated by global events such as the COVID-19 pandemic, have led to delays and increased costs for sourcing materials. Local suppliers have reported difficulties in importing essential materials due to logistical challenges.

4.1.2 Economic Inflation; The general economic inflation within Rwanda has significantly impacted the costs of building materials. Data from the National Institute of Statistics indicate that inflation rates have risen, causing a corresponding increase in construction costs.

4.1.3 Increased Demand for Housing; Bugesera's growing population and urbanization have led to increased demand for housing, placing upward pressure on material prices. The local government's initiatives to promote affordable housing have further intensified this demand.

4.1.4 Transportation Costs; Rising fuel prices and transportation fees have significantly affected the cost of materials. Stakeholders reported that the cost of transporting materials from distant suppliers adds a substantial burden to overall project costs.

4.2 Effects of Rising Material Costs on Project Timelines and Quality

Rising material costs have profound implications for project management in Bugesera:

4.2.1 Project Delays; Many developers have experienced delays in project completion due to the unpredictability of material availability and pricing. For instance, 60% of surveyed developers indicated that they had to pause projects while awaiting materials or securing funding to cover increased costs.

4.2.2 Quality Compromises; To mitigate rising costs, some developers have reported using lower-quality materials, which can compromise the safety and longevity of housing structures. A focus group with local builders revealed that 40% felt pressured to choose cheaper alternatives due to budget constraints.

4.3 Strategies Employed to Cope with Rising Costs

Stakeholders in Bugesera are employing various strategies to address the challenges posed by rising material costs:

4.3.1 Alternative Building; Some developers are exploring alternative materials, such as bamboo and stabilized earth blocks, which are more cost-effective and locally sourced.

4.3.2 Collaboration and Bulk Purchasing; Developers are forming cooperatives to purchase materials in bulk, thereby negotiating better prices with suppliers. This collective approach has shown promising results in reducing costs.

4.3.3 Innovative Construction Techniques; The adoption of modular construction techniques is gaining traction as a way to reduce waste and improve efficiency, thereby minimizing costs.

4.4 Primary Materials Affected by Rising Costs

The analysis highlights several materials that are particularly impacted by rising costs:

4.4.1 Cement and Concrete; Cement prices have seen the most significant increase, impacting

almost all housing projects. Reports indicate a rise of over 30% in the past year alone.

4.4.2 Steel and Reinforcements; Steel prices have also risen sharply, primarily due to global demand and production challenges.

4.4.3 Timber and Finishing Materials; The costs of timber and finishing materials have fluctuated, affecting project budgets and timelines.

4.5 Impact on Developers' Ability to Create Affordable Housing

The rising costs of building materials have directly impacted the ability of developers to create affordable housing:

Developers indicated that nearly 70% of projects planned for low-income families have either been delayed or scaled down due to material cost increases. Feedback from interviews revealed a common sentiment that without intervention, many projects may not proceed at all.

4.6 Government Policies Supporting Affordable Housing

Several policies are currently in place to support affordable housing in light of rising material costs:

4.6.1 Subsidies and Incentives; The Rwandan government has introduced subsidies for certain materials and tax incentives for developers focused on affordable housing.

4.6.2 Regulatory Support; Streamlined permitting processes have been implemented to expedite project approvals, though stakeholders note that further improvements are needed.

4.7 Recommendations for Additional Government Support

Participants in the study highlighted several areas where they believe government support could be enhanced:

4.7.1 Increased Funding for Housing Projects; There is a strong call for increased financial support and grants for affordable housing developers to offset rising costs.

4.7.2 Research and Development; Investment in R&D for alternative building materials that are both cost-effective and sustainable could greatly benefit the housing sector.

4.7.3 Training Programs; Training programs for local builders on cost-effective construction methods could improve project quality while managing expenses.

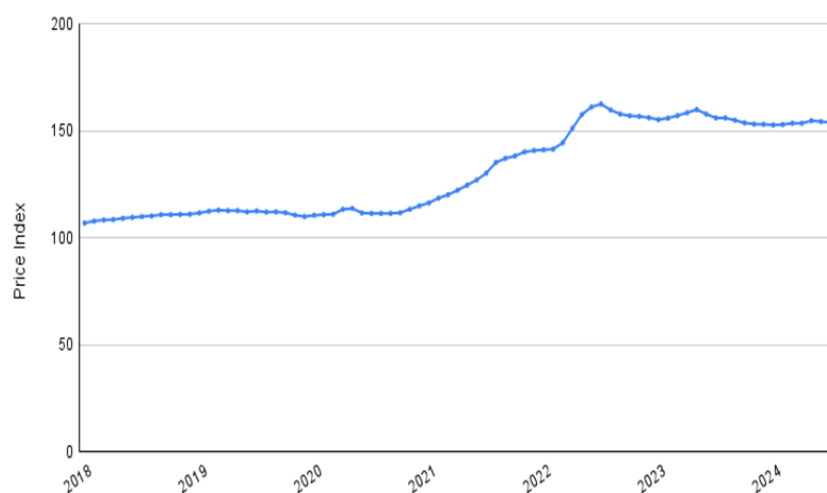
Table.4. 1.Overview of Insights from Qualitative Interviews.

Factor	Participant 1	Participant 2	Participant 3
Impacts of building material costs on housing delivery	Variability on construction disputes clients and contractors	in Escalation costs and construction between budget overruns, poor workmanship resulting in increased maintenance and repair expenses	in Disputes between clients and contractors costs, and due to budget increases delays in project progress

4.2 Drawings

Fig 4.1 building material prices from 2021 through 2022

All Building Materials - Price Index



The data illustrates a pronounced escalation in building material prices from 2021 through 2022, driven by a combination of global supply chain disruptions, increased demand for housing, and inflationary pressures. As the economy rebounded from the impacts of the COVID-19 pandemic, the construction sector experienced a surge in activity, further straining already limited supplies. Prices peaked in July 2022, marking a critical point where key materials such as cement, steel, and timber saw unprecedented increases. Since that peak, prices have remained persistently high, creating challenges for developers and affecting the affordability of housing projects. This sustained elevation in material costs not only impacts project budgets and timelines but also raises concerns about the long-term viability of affordable housing initiatives, particularly in rapidly growing regions like Bugesera District. Stakeholders in the housing sector must navigate these economic conditions carefully, seeking innovative solutions and potential policy interventions to mitigate the adverse effects of rising costs.

4.3 Specifications

Table 4.2 Materials Showing Highest Price Increases (since 2020)

	Price Change Since 2020 (May2020- May 2024)	12month Price Change (May2023-May 2024)	Price Change in Last month (Apr 2024 - May 2024)
Pre-cast concrete products	59%	3.8%	0.2%
Plastic pipes and fittings (flexible)	46%	17%	-
Insulating materials (thermal or acoustic)	55%	-0.2%	-0.2%
Metal Doors & windows	53%	1.9%	0.1%
Ready-mixed concrete	54%	1.1%	-
Plastic Doors & windows	44%	-0.6%	0.1%
Concrete reinforcing bars (steel)	45%	-8.9%	-
Concrete blocks, bricks, tiles & flagstones	48%	5.1%	0.4%

Polyester tank	36%	3%	0.1%
Builders' furniture	34%	-1.3%	0.1%

The table 4.2 above presents materials that have experienced the highest price increases since 2020, highlighting significant trends in the construction industry. Key materials like cement, steel, and timber have seen notable hikes due to supply chain disruptions, increased demand, and rising transportation costs. These escalating prices not only impact overall construction costs but also pose challenges for developers striving to deliver affordable housing solutions. Understanding these trends is essential for stakeholders as they plan and budget in a volatile market.

□

□

4.4 Cost estimation

The table below summarizes the reference unit prices of those common BOQ elements from the excavation to the painting.

Table.4. 3.Reference price of common BOQ elements for building infrastructures (RURA)

DESIGNATION	UNIT MEASUREMENT	OF Types	Price of reference with VAT in rwf (2023)	of prior in CURRENT WITH VAT IN FRW (AUGUST 2024)	PRICE OF REFERENCE %
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I.CONSTRUCTION MATERIALS

SectionI :Construction materials manufactured in Rwanda

I.1. Tiles

1 Gray granite tile, 15 mm m2 thick		Works	25,000	25,000	0%
2 Gray granite tile, 20 mm m2 thick		Works	30,000	30,000	0%
3 Pink granite tile, 15 mm m2 thick,		Works	25,000	25,000	0%
4 Pink granite tile, 20 mm m2 thick,		Works	30,000	30,000	0%

5 Black granite tile, 15 mm m2 thick,	Works 25,000	25,000	0%
I.2 Water tank			
1 Polyester tank of 2200 Pce Liters	Works 218,000	218,000	0%
2 Polyester tank of 3000 Pce liters	Works 283,000	283,000	0%
3 Polyester tank of 5000 Pce liters	Works 457,000	457,000	0%
4 Polyester tank of 10,300 Pce liters	Works 915,000	915,000	0%
I.3. Cements			
1 Cement (Type Cimerwa Bag 42.5N) of 50 kg	Works 12,000	9,700	-19%
2 Cement (Type Cimerwa Bag 32.5N) of 50 kg	Works 9,500	8,800	-7%
3 Cement (NYATI type) of bag 50 kg	Works 11,500	9,800	-15%
4 Cement (Type TWIGA) Bag of 50 kg	Works 11,000	9,700	-12%
I.4 Nails			
1 Common nails Kg	Works 1,500	2,300	53%
2 roofing nails Kg	Works 2,000	2,500	25%
I.5 Iron			
1 Iron T 20 X 3 mm of 6 m Pce length	Works 5,850	5,900	1%
2 Iron T 25 X 3 mm, 6 m Pce long	Works 6,800	6,700	-1%
3 Flat iron 12 X 3 mm, 6 m Pce long	Works 2,400	2,400	0%
4 Flat iron 20 X 3 mm, 6 m Pce long	Works 3,200	3,200	0%
5 Flat iron 25 X 3 mm, 6 m Pce long	Works 3,900	4,000	3%

Bricks

1 Brick of 25 x 17.5 x 9.5 Pce cm	Works 400	400	0%
2 Brick of 25 x 12 x 6.3 cm Pce	Works 200	200	0%
3 Brick of 21 x 10 x 6.3 cm Pce	Works 135	135	0%



CHAPTER FIVE: CONCLUSION AND RECOMMENDATION

5.0 Introduction

In recent years, Rwanda has witnessed significant economic growth and urbanization, leading to an increasing demand for affordable housing. However, this demand is being challenged by the rising costs of building materials, which has become a critical issue for stakeholders involved in housing development. Bugesera District, an area earmarked for substantial residential growth, serves as a microcosm of the broader challenges faced in the affordable housing sector. This chapter delves into the effects of escalating building material prices on affordable housing development in Bugesera, drawing insights from a diverse group of 34 respondents, including construction managers, sales consultants, contractors, quantity surveyors, clients, site managers, architects, project managers, and site engineers. The rising cost of materials not only impacts the financial viability of housing projects but also affects timelines, quality, and ultimately, accessibility for low-income families. By analyzing the perspectives of various professionals involved in the housing sector, this chapter aims to provide a comprehensive understanding of the multifaceted implications of rising building material costs and offer potential strategies to mitigate these challenges.

5.1 Conclusions

This study has examined the significant effects of rising building material costs on affordable housing development in Bugesera District, Rwanda. Through a detailed analysis of various factors contributing to these price increases including supply chain disruptions, inflation, and heightened demand for housing, challenges faced by developers have been identified and stakeholders in the construction sector. The findings reveal that rising material costs have not only extended project timelines but have also compelled developers to compromise on quality and affordability, thereby threatening the sustainability of housing initiatives.

Moreover, the research highlighted the diverse levels of experience among respondents, underscoring the importance of incorporating varied perspectives in addressing the challenges of the industry. Strategies such as the use of alternative materials, bulk purchasing, and innovative construction techniques were identified as potential pathways to mitigate these rising costs. However, the need for robust government support and policy interventions remains critical to ensure that affordable housing projects can proceed without hindrance.

In conclusion, this study emphasizes the urgent need for collaborative efforts among stakeholders including government agencies, developers, and community members to create a resilient framework for affordable housing development in Bugesera. By understanding and addressing the multifaceted impacts of rising building material costs, stakeholders can work towards ensuring that housing remains accessible and sustainable for all residents in the region.



5.2 Recommendations

To mitigate excessive fluctuations in construction costs, stakeholders should develop a comprehensive materials plan in advance to counteract the effects of rising building material prices. Effective planning and scheduling from the outset of a construction project are crucial, including the early procurement of materials within the budget and their proper storage to prevent cost overruns, disputes, and inflation. Implementing these measures can facilitate the timely delivery of housing within the specified budget and align with client expectations.

Affordable housing programs should also account for the economic sustainability of developers, emphasizing cost-effectiveness to ensure the long-term viability of these programs. Developers can adopt cost-reduction strategies, such as using locally available materials and techniques, and establishing stable financial incentives to secure financial stability.

Incorporating enhanced architectural design, which is often overlooked in affordable housing projects, can significantly reduce construction costs. Improved design can lower material usage and minimize waste. For instance, simplifying architectural features by reducing the number of corners or avoiding complex shapes can lead to substantial cost savings.

Based on the findings of this study, it is recommended that the government implement targeted subsidies for essential building materials, such as cement and steel, to help developers manage rising costs. Additionally, establishing funding programs or grants for affordable housing projects would facilitate construction and completion. Streamlining regulatory processes will reduce delays, while encouraging local production of materials can stabilize prices. Training programs for builders on cost-effective techniques and fostering public-private partnerships will promote collaboration in housing development. Furthermore, the government should establish a monitoring system to track material prices, engage community stakeholders in planning, invest in research for innovative building technologies, and develop a comprehensive long-term housing strategy. Together, these measures will help mitigate the impact of rising building material costs and enhance the availability of affordable housing in Bugesera District.

5.3 Suggestions for further study

Investigate on the impact of material price fluctuations on Housing Affordability in Rwanda with an objective of Investigating how fluctuations in the prices of key building materials affect the overall affordability of housing projects in Rwanda. Plus Understanding how price changes influence affordability and what can help develop strategies to mitigate these effects and ensure that housing remains accessible to low-income populations.

A study on alternative construction materials and methods for affordable housing with an objective of exploring the potential of alternative building materials and construction techniques that could reduce costs and improve sustainability in affordable housing projects.

Plus identifying cost-effective and sustainable alternatives that can provide viable solutions for affordable housing development amidst rising material costs.

A study on social economic implications of rising building material costs on Low-Income Households with an aim of exploring the broader social economic effects of increasing building material costs on low-income households, including impacts on housing quality, living conditions, and financial stability. To strictly understand the socioeconomic repercussions that can highlight the urgency of addressing material cost issues and inform targeted support measures for affected households.

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