

Advancing Agenda 2063 by Improving Mortgage Access in Greater Kampala: A Logistic Regression Analysis of Eligibility and Developer Challenges

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ABSTRACT

This study aims to model strategies for improving mortgage financing accessibility in the Greater Kampala Metropolitan Area (GKMA) using logistic regression modelling. By investigating how mortgage eligibility criteria impact the challenges faced by potential mortgagors, the study collected quantitative data through self-administered questionnaires to assess developers' perspectives on mortgage requirements. The findings reveal that a 2% mortgage processing fee significantly increases the likelihood of securing a mortgage (odds ratio = 2.011). At the same time, the requirement for verifiable income sources decreases the odds (odds ratio = 0.591), with property valuation and income verification showing minimal effects. The model demonstrates a good fit with a chi-square value of 73.317 ($p < 0.001$) and an AUC of 0.7473 on the ROC curve, indicating reasonable predictive accuracy. This research offers valuable insights into the impact of processing fees and income verification on mortgage access, providing practical guidance for enhancing mortgage accessibility strategies and refining approval criteria. By addressing these challenges, the study contributes to a more inclusive housing finance system that aligns with the broader goals of sustainable development outlined in Africa's Agenda 2063.

Keywords: mortgage accessibility, mortgage processing fees, income verification, challenges in mortgage acquisition, mortgage eligibility criteria

1.0 INTRODUCTION

Africa's Agenda 2063 envisages a transformative corridor for the continent, positioning Africa as a global leader in quality of life by 2063. This striving agenda sketches a vision of all-encompassing growth and sustainable development across several sectors, underlining the significance of socio-economic progress for all citizens (Royo et al., 2022). Aspiration 1 focuses explicitly on critical areas such as employment, agriculture, science and technology, gender equality, and youth empowerment, with a crucial component being the provision of safe and affordable housing.

Despite these aspirations, access to mortgage financing remains a formidable challenge in many developing African nations, including Uganda. Barriers to securing mortgage loans, including strict eligibility requirements, high interest rates, and limited financial literacy, continue to prevent individuals and families from achieving stable housing. This situation impacts personal well-being and stifles economic growth and urban development (Nakiwala et al., 2023).

In the Greater Kampala Metropolitan Area context, this paper investigates the challenges mortgagors face in accessing mortgage financing. While mortgagors are typically distinct groups, this study refers to the same individuals who both develop and seek to finance affordable housing solutions. The study applies logistic regression analysis to explore the factors affecting mortgage eligibility and to identify the challenges developers encounter in delivering affordable housing. By exploring these dynamics, this study aims to uncover actionable strategies for improving mortgage accessibility in Uganda, contributing to the realisation of Agenda 2063's goals. The insights presented here will help inform policymakers, financial institutions, and other stakeholders on building a more inclusive housing finance system that supports sustainable development in the region.

2.0 LITERATURE REVIEW

Aspiration 1 of Agenda 2063, titled "A Prosperous Africa Based on Inclusive Growth and Sustainable Development," aims to attain economic prosperity while ensuring that the benefits of growth are distributed equitably across all segments of society (Mosala, 2024). The aspiration seeks to achieve inclusive growth and sustainable development across Africa, ensuring that all segments of society share the benefits of growth (Nwozor et al., 2021). This vision aligns with Uganda's broader objectives to decrease poverty and advance access to essential services such as housing. In this context, the mortgage market is crucial in facilitating homeownership and urban development. However, the mortgage landscape in Uganda faces significant challenges, including limited access to financing, high interest rates, and stringent eligibility criteria (Nakiwala et al., 2022).

Mortgage financing is essential for facilitating homeownership and supporting urban development. Yap (2016) highlights that accessible and affordable mortgage loans help low and middle-income families secure homes and promote economic stability. However, in many African countries, the underdeveloped mortgage market limits access to financing, worsening housing shortages and pushing individuals into informal and inadequate housing (Abidemi Odusanya et al., 2021; DeLuca & Rosen, 2022). This issue is particularly evident in Uganda, where the mortgage penetration rate remains extremely low, accounting for less than 1% of the GDP despite efforts to address housing deficits (Kizza et al., 2020; Nathan et al., 2020).

In Uganda, mortgage accessibility is a critical barrier to homeownership, especially in the Greater Kampala Metropolitan Area (GKMA), with a growing demand for houses escalated by population growth. According to recent statistics, the population of the Greater Kampala Metropolitan Area is growing at 5.33% (Kibuule & Club, 2016). The demand for housing in Uganda is escalating, with urbanisation rates expected to double by 2040 (Anim-Odame, 2022; Group, 2015). However, the high cost of mortgages, which can exceed UGX 150 million (approximately USD 41,000), and interest rates ranging from 16% to 22%, make homeownership unaffordable for most low- and middle-income families (ATUHEIRE et al., 2014; Mubiru et al., 2024; Nakiwala et al., 2023). These barriers contribute to the housing deficit, with 60% of the urban population in Kampala residing in informal settlements or slums where essential services are scarce (Mukiibi & Machyo, 2021).

Uganda's housing finance system continues to struggle with high levels of exclusion (Bank, 2017). According to the Uganda Mortgage Market Report (2019), only about 35,000 mortgage accounts exist in a population of over 42 million, indicating a significant gap in access to formal mortgage finance (Ofori, 2024).

The limited accessibility to mortgages is a substantial barrier to realising Aspiration 1 of Agenda 2063, as it exacerbates social inequalities and hinders the ability of disadvantaged urban communities to benefit from inclusive growth fully. (Mubangizi, 2024).

Goal 11 of the 2030 Agenda for Sustainable Development aims to make cities and human settlements inclusive, safe, resilient, and sustainable. This goal underscores the importance of affordable housing and reducing the number of people living in slums (Jaramillo, 2020). As Uganda's urban population rapidly increases, especially in Greater Kampala, achieving Goal 11 becomes even more pressing. Approximately 5.5 million people live in Uganda's metropolitan areas, which is to double by 2040 (BoU, 2020; Pozhidaev, 2020). Unfortunately, Uganda faces a significant housing deficit, with 2 million housing units needed to meet the demand for affordable housing (Mukiibi, 2015).

Despite these challenges, mortgage access remains limited. Many Ugandans, especially those from the informal sector, cannot qualify for mortgages due to the lack of formal employment, collateral, and financial credit history (Nakiwala et al., 2022). High interest rates compound mortgage inaccessibility, making it unaffordable for most of the population, and short repayment periods (typically 10-15 years) fail to meet the financial realities of low- and middle-income earners (BoU, 2020). As a result, many are forced to rely on informal housing arrangements, undermining efforts to achieve inclusive and sustainable cities, as outlined in Goal 11 of Agenda 2063 (Nwozor et al., 2021).

Several factors hinder the accessibility of mortgages in Uganda. Financial literacy is a barrier, as many people lack knowledge about mortgage products and the associated processes (Moss et al., 2024). Research by Refera et al. (2016) highlights that low financial literacy levels among African populations often result in poor understanding of mortgage options, which leads to low mortgage application rates. In Uganda, this challenge is particularly acute among informal sector workers, who may not have the formal credit histories or documentation required by lenders (Nilsson, 2017).

Moreover, cultural attitudes towards mortgage financing and historical mistrust of financial institutions further exacerbate the problem. According to (Nilsson, 2017; Nwogugu & Nwogugu, 2018), many Africans prefer informal financial arrangements over formal mortgage systems, influenced by past negative experiences with financial institutions. This cynicism toward formal financing structures impedes refining mortgage uptake in Uganda and other African countries.

In addition to these factors, high interest rates, stringent eligibility criteria, and inadequate collateral requirements make mortgages unaffordable and inaccessible for many Ugandans. A study by Omede (2022) indicates that these barriers disproportionately affect those from lower-income backgrounds, who are often unable to meet the financial and legal requirements for mortgage approval. Furthermore, the absence of a comprehensive credit information system complicates the application process, as potential mortgagors struggle to prove their creditworthiness (Leal, 2024; Nakiwala et al., 2023).

Therefore, innovative financing models are required to overcome such barriers. Microfinance and community-based lending have shown promise as alternative financing models that offer more flexible terms and reduce dependency on traditional collateral (Kandpal et al., 2023). These models can help integrate informal sector workers into the formal mortgage market and improve access to affordable housing. Moreover, efforts to enhance financial literacy and develop comprehensive credit information systems can significantly expand access to mortgage finance (Bialowolski et al., 2022).

In line with Agenda 2063, addressing these systemic barriers is key to realising the aspirations for inclusive growth and sustainable urban development. In South Africa, government-backed mortgage insurance and affordable housing schemes have effectively increased homeownership among low-income households (Adetooto et al., 2024). Similarly, initiatives in Kenya to include informal sector workers in the formal mortgage market have demonstrated the potential for inclusive financial solutions (Feather & Meme, 2019). These examples provide valuable lessons for Uganda.

In conclusion, the literature highlights key challenges hindering mortgage access, which are crucial for achieving Agenda 2063's inclusive and sustainable urban development goals. High interest rates, strict eligibility criteria, limited financing options, and low financial literacy mainly affect low- and middle-income households, deepening social inequalities. The studies stress the need for innovative financing models, improved financial literacy, and policy reforms to enhance mortgage access and support sustainable growth.

Overcoming these barriers is essential for aligning Uganda's housing sector with the inclusive growth objectives of Agenda 2063.

3.0 METHODOLOGY

This section outlines the approach to investigate the factors influencing mortgage accessibility for housing developers in the Greater Kampala Metropolitan Area (GKMA). The study relies on inferential statistics, specifically logistic regression, to analyse primary data collected from 400 house developers through questionnaires. The objective is to develop a data-driven model that explores the relationship between the primary mortgage requirements (dependent variables) and the challenges (independent variables) that affect "developers' access to financing. The analysis adheres to key statistical assumptions, including linearity of the logit, independence of errors, and the absence of multi-collinearity and other data issues. This approach aims to identify critical barriers to mortgage access and provide recommendations that align with Africa's Agenda 2063 goals, fostering inclusive growth and sustainable development in the region.

3.1 Case Studies

The study conducted case studies with mortgagors from Centenary Bank and Housing Finance Bank in the Greater Kampala Metropolitan Area (GKMA). Researchers selected the GKMA for its status as Uganda's economic and financial hub, which has a high concentration of potential mortgagors and mortgage-related activities. Additionally, the rapid urbanisation in this region has increased demand for housing and mortgage financing, making it a critical area to explore the challenges of securing mortgages. The diverse socio-economic population of the GKMA provides a comprehensive representation of the various demographic factors influencing mortgage eligibility. These case studies aimed to capture the individual experiences of mortgagors, focusing on the challenges faced during the mortgage application process. Participants were selected to represent a broad range of demographics, ensuring a holistic view of the factors affecting mortgage access.

3.2 Data Collection and Variable Definition

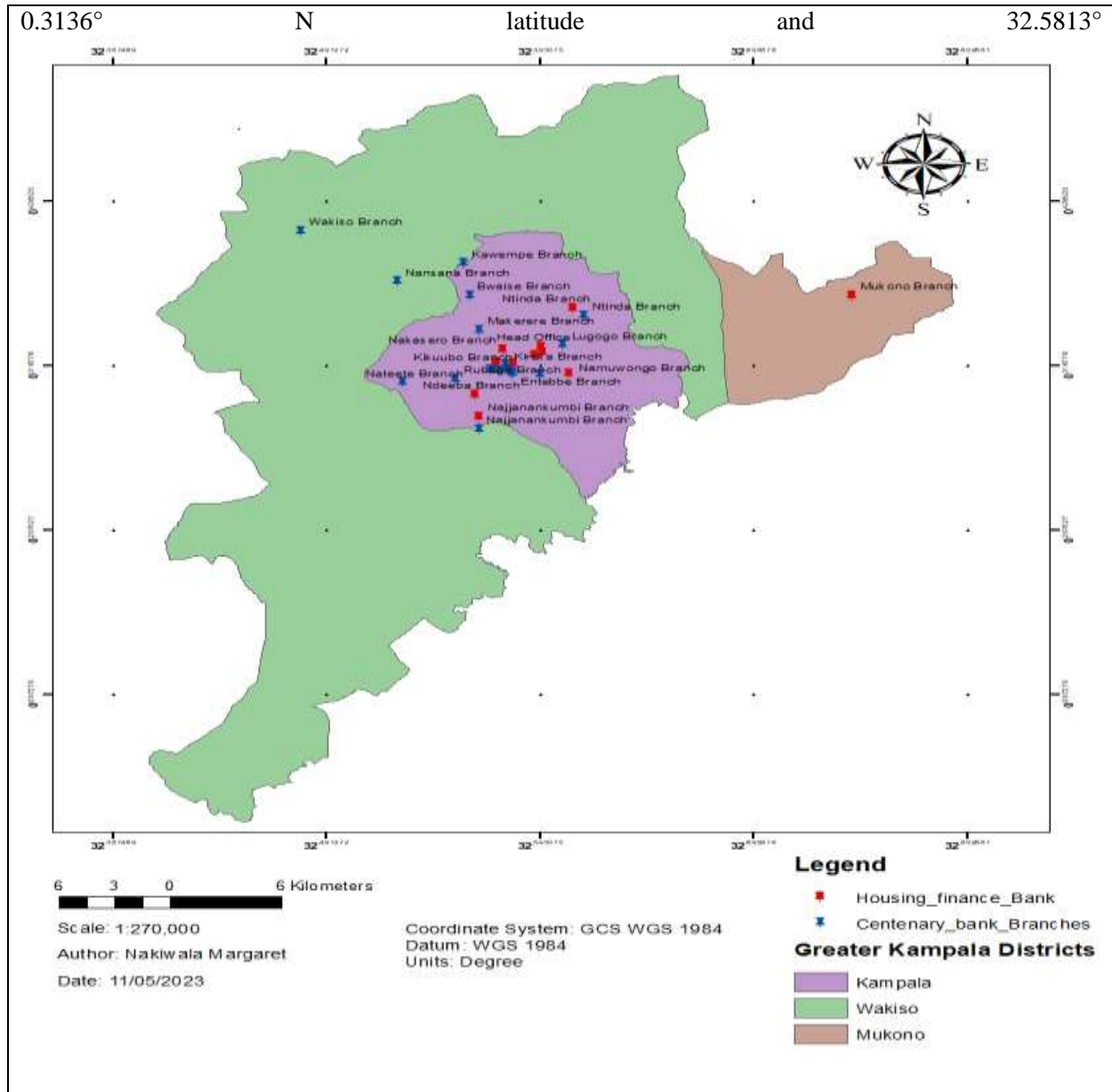
The study gathered primary data through questionnaires that focused on mortgagors' experiences with securing mortgage financing. Researchers used a stratified random sampling technique to select the sample, ensuring a random selection of participants based on time intervals as they entered the bank premises. The study aimed for an equal distribution of respondents from both financial institutions. Its primary objective was to assess the perspectives of house developers on mortgage eligibility requirements and the challenges they encounter in securing financing to develop a data-driven model to enhance mortgage accessibility.

3.3 Data Analysis and Ethical Considerations

Data analysis involved both descriptive and inferential statistics. Descriptive statistics summarised key variables, such as income levels and common challenges faced by mortgagors. Logistic regression examined relationships between mortgage eligibility and the challenges encountered. The researchers cleaned the data to address inconsistencies, missing values, and outliers, ensuring the dataset's accuracy and reliability. In this study, the dependent variables were the primary mortgage requirements, while the independent variables included the challenges developers face. The study employed logistic regression modelling to explore the relationship between these variables, adhering to essential assumptions such as the linearity of the logit, independence of errors, and the absence of multi-collinearity, outliers, perfect separation, and over-dispersion (Stevens, 2012).

The study followed ethical standards throughout the research process. Participants received precise information about the study's purpose and provided informed consent. Researchers ensured confidentiality and anonymity, securely storing personal data.

Figure 1. Map of Greater Kampala Metropolitan Area



4.0 RESULTS

The basic requirements for mortgage access, initially measured on a five-point Likert scale and later transformed into a binary variable for logistic regression analysis, were treated as the dependent variable. Statistical methods such as correlation analysis, factor testing, and factor analysis were employed to explore relationships among these requirements. The correlation analysis assessed the strength and direction of associations, while the factor analysis aimed to simplify the dataset by identifying vital underlying factors that explain variance in mortgage access. Results included correlation coefficients indicating relationships between variables and their significance levels, highlighting key factors influencing mortgage eligibility and access.

This study used a five-point Likert scale to measure housing developers' responses to various statements regarding mortgage eligibility criteria and the challenges they face. The scale ranged from "Strongly Disagree" to "Strongly Agree," with intermediate options of "Disagree," "Neutral," and "Agree." This scale allowed for a nuanced assessment of the developers' attitudes toward mortgage processing fees, income verification requirements, and other eligibility criteria. Using the Likert scale, the study could quantify the developers' perspectives, precisely measuring their agreement or disagreement with each statement. It is essential to analyse the factors affecting mortgage accessibility in the Greater Kampala Metropolitan Area.

Table 1. Correlation matrix and test values of basic requirements to acquire a mortgage in Centenary and HFB. (Source: Author)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1)Account holder	1.000									
(2)Filled mortgage form	0.239*	1.000								
	(0.000)									
(3)Age limit of 55years	0.136*	0.743*	1.000							
	(0.006)	(0.000)								
(4) 20 to 30% own CNT	-0.031	-0.365*	-0.300*	1.000						
	(0.538)	(0.000)	(0.000)							
(5)A client pays mtg fees	0.015	-0.383*	-0.335*	0.463*	1.000					
	(0.761)	(0.000)	(0.000)	(0.000)						
(6) Verified Income	-0.075	-0.192*	-0.210*	0.320*	0.411*	1.000				
	(0.133)	(0.000)	(0.000)	(0.000)	(0.000)					
(7) Signed loan doc	0.002	-0.060	-0.060	0.064	0.240*	0.452*	1.000			
	(0.973)	(0.230)	(0.233)	(0.198)	(0.000)	(0.000)				
(8) Phased disbursement	-0.045	-0.048	-0.070	0.210*	0.220*	0.369*	0.356*	1.000		
	(0.366)	(0.343)	(0.164)	(0.000)	(0.000)	(0.000)	(0.000)			
(9) Resident bank area	-0.118*	0.203*	0.217*	-0.067	0.110*	0.150*	0.195*	0.288*	1.000	
	(0.018)	(0.000)	(0.000)	(0.184)	(0.028)	(0.003)	(0.000)	(0.000)		
(10) 80% of fair market value	-0.099*	0.171*	0.107*	0.022	0.097	0.344*	0.197*	0.337*	0.458*	1.000
	(0.048)	(0.001)	(0.033)	(0.655)	(0.053)	(0.000)	(0.000)	(0.000)	(0.000)	

Notes *** p<0.01, ** p<0.05, * p<0.1

The correlation matrix analysis of mortgage requirements shows that bank account holders are more likely to engage in activities like completing mortgage forms and meeting age requirements. Conversely, completing these forms is less associated with contributing 20-30% of the property value, paying mortgage fees, having verified income, and signing loan documents.

Meeting age requirements correlates positively with several activities, while contributing 20-30% of the property value is negatively correlated. Paying mortgage fees and verifying income are positively linked to multiple activities, including opting for phased disbursement. The correlations reveal how various factors in the mortgage process are interconnected and influence clients' behaviours. Factor testing further assesses the suitability of these variables for detailed analysis based on their correlations and structure.

The determinant of the correlation matrix indicates how close the matrix is to being singular. A value near zero suggests that the matrix is nearly singular, meaning the variables are highly correlated or there are too many or few variables observations for practical factor analysis. Ideally, the determinant value should exceed 0.00001 to ensure a suitable matrix for analysis (Yong & Pearce, 2013). The determinant value is 0.068, above this threshold, so the basic requirements data are appropriate for factor analysis.

Bartlett's test of sphericity determines if the correlation matrix is an identity matrix, implying no correlation between variables and no factor structure. A low p-value (typically < 0.05) means the null hypothesis (that variables are unrelated) can be rejected, supporting the use of factor analysis (Yong & Pearce, 2013). The p-value is 0.000, which is very low, so the basic requirements data set has significant correlations among the basic requirements variables and a potential factor structure.

The Kaiser-Meyer-Olkin Measure of Sampling Adequacy measures how well the variables are suited for factor analysis based on their partial correlations. It ranges from 0 to 1, with higher values indicating better suitability. The rule of thumb is that the KMO should be greater than 0.6 (Kline, 2014). The KMO value for the basic requirements data set is 0.694, which is very good, implying that the data have adequate sampling for factor analysis.

Factor analysis using the principal-component method identified three factors from the basic requirements variables, as shown in Table 4.19. These factors explain the variance in the observed variables as linear combinations, with the eigenvalue reflecting the amount of variance each factor explains. The difference between eigenvalues shows changes in explained variance; the proportion measures each factor's contribution relative to the total, and the cumulative figure represents the running total of explained variance (Otun & Kaur, 2023).

When analysing factor analysis results, several key terms are essential to understand. Factor loadings are coefficients that indicate the contribution of each variable to a factor, with values ranging from -1 to 1; higher absolute values suggest stronger relationships. Variance measures how much variation in the data is explained by each factor, calculated by summing the squared loadings, with higher values indicating more significant factors. The difference between the variances of consecutive factors helps determine how many factors to retain, with a substantial drop suggesting fewer meaningful factors. The proportion represents the percentage of total variance explained by each factor, highlighting its relative importance. Finally, the cumulative proportion shows the total variance explained by each factor and all preceding factors, with higher values indicating more comprehensive factors. (Shrestha, 2021).

Table 2 shows the factor analysis results conducted on the mortgage basic requirements dataset, revealing a structure characterised by the eigenvalues associated with each factor. Eigenvalues represent the amount of variance explained by each element. In this analysis, factors with eigenvalues greater than one are retained, following the conventional criterion for determining the number of factors to extract.

Table 2. Factor analysis for mortgage basic requirements. (Source: Author)

Factor	Eigenvalue	Difference		Proportion	Cumulative
Factor1	2.797	0.634		0.280	0.280
Factor2	2.164	1.032		0.216	0.496
Factor3	1.132	0.259		0.113	0.609
Factor4	0.874	0.194		0.087	0.697
Factor5	0.679	0.014		0.068	0.765
Factor6	0.666	0.037		0.067	0.831
Factor7	0.629	0.197		0.063	0.894
Factor8	0.432	0.039		0.043	0.937
Factor9	0.393	0.158		0.039	0.977
Factor10	0.235	.		0.024	1.000

Notes: LR test: independent vs. saturated: $\chi^2(45) = 1065.35$ Prob> $\chi^2 = 0.0000$

Factor analysis/correlation

Number of observations = 400

Method: principal-component factors

Retained factors = 3

Rotation: (unrotated)

Number of parameters = 27

Factor 1 and 2 are the most influential, explaining nearly 50% of the variance, with Factor 3 adding 11.3%. The three factors account for 60.9% of the variance, while factors 4 through 10 have minimal impact. The likelihood ratio test confirms the significance of these factors in explaining mortgage variables.

Table 3. Factor loadings matrix and unique variances of basic requirements. (Source: Author)

Variable	Factor1	Factor2	Factor3	Uniqueness
Account holder	-0.200	0.040	0.878	0.188
Filled mortgage form	-0.604	0.627	0.229	0.189
Age limit of 55years	-0.583	0.589	0.162	0.286
20 to 30% own contribution	0.613	-0.236	0.213	0.523
A client pays mortgage fees	0.716	-0.090	0.238	0.423
Verified Income	0.719	0.269	0.129	0.394
Signed loan doc	0.495	0.378	0.206	0.570
Phased disbursement	0.532	0.447	0.043	0.515
Resident bank area	0.171	0.695	-0.273	0.413
80% of fair market value	0.300	0.677	-0.213	0.405

Factor 1 highlights financial aspects, strongly correlating with Verified Income (0.719) and Mortgage Fees Paid (0.716) but negatively with variables like Filled Mortgage Form (-0.604) and Age Limit of 55 Years (-0.583). Factor 2 addresses location and eligibility, positively correlating with Resident Bank Area (0.695) and 80% of Fair Market Value (0.677) while showing a mild negative correlation with 20-30% Own Contribution (-0.236).

Factor 3 focuses on the account holder status, which shows a strong positive correlation with Account Holders (0.878). It has weaker correlations with other variables and low negative correlations with specific location and value factors. The uniqueness values reflect the unexplained variance, with values greater than 0.6 indicating less favourable outcomes.

Figure 2. Scree plot with eigenvalues for the mortgage basic requirements variables. (Source: Author)

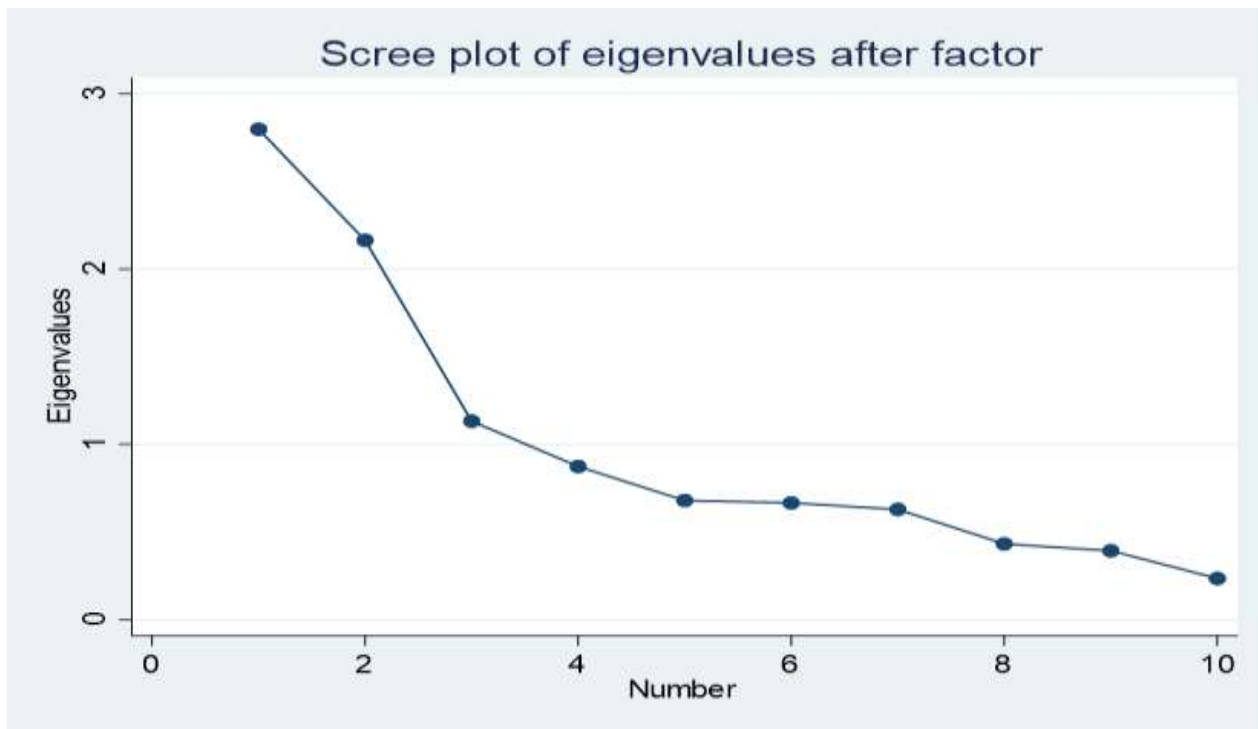


Figure 1 shows a scree plot from the factor analysis of mortgage requirements at Centenary Bank and Housing Finance Bank. The study identified three key factors explaining 60.9% of the variance, highlighting their significant role in understanding mortgage eligibility. The plot visually supports the choice of these three factors, demonstrating their importance in capturing the essential elements of mortgage acquisition.

Table Error! No text of specified style in document.. Rotation factor loadings of three factors retained from the basic requirements.(Source: Author)

Factor	Variance	Difference	Proportion	Cumulative
Factor1	2.498	0.042	0.250	0.250
Factor2	2.456	1.317	0.246	0.495
Factor3	1.139	.	0.114	0.609

Notes LR test: independent vs. saturated: $\chi^2(45) = 1065.35$ Prob> $\chi^2 = 0.0000$

Factor analysis/correlation
 Number of observations = 400
 Method: principal-component factors
 Retained factors = 3
 Rotation: orthogonal varimax (Kaiser off)
 Number of parameters = 27

Table 4 displays the results of an orthogonal varimax rotation method applied to simplify and interpret the factor structure of mortgage requirements data. The rotation, chosen for its appropriateness given the data’s cross-loading factors, showed significant results with a p-value of 0.0000 from the likelihood ratio test, indicating meaningful factors.

The authors modified the variable “sec_e_q6_verifiableincome” from the factor analysis by cloning it and creating a new binary variable, “everaquiremortgage_newDV,” to enhance the analysis of mortgage financing. They recoded the values into binary form, assigning 0 for uncertain sources of income and 1 for reliable income sources. They added labels to clarify the variable’s meaning, ensuring that “everaquiremortgage_newDV”

explicitly indicates access to mortgage financing. Combined with clear labelling, this transformation into a binary format streamlines the analysis and interpretation of mortgage financing challenges.

4.1 Factor test and analysis of mortgagor challenge variables deterring mortgage accessibility

The researchers performed critical factor tests to assess whether the dataset is ready for factor analysis on mortgagors’ challenges in accessing mortgage services. They examined the determinant value, which ranges from 0 to 1; values closer to 1 suggest stronger relationships among variables and less multi-collinearity or singularity. The researchers used the Bartlett test of sphericity, with a p-value between 0 and 1; a low p-value near zero indicates that factor analysis is appropriate. They also checked the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy, which ranges from 0 to 1; values close to 1 indicate that the dataset is suitable for factor analysis. These tests confirm the dataset’s readiness for exploring the underlying relationships among the variables.

The factor test results confirm that the homeowners’ mortgage access challenges dataset is suitable for factor analysis. A determinant value of 0.000 indicates strong multi-collinearity among the variables. The Bartlett test showed significant intercorrelations with a chi-square of 4576.034 and a p-value of 0.000, rejecting the null hypothesis of unrelated variables. The Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy also supported factor analysis with a high value of 0.942.

Table 5 presents the Eigenvalues and related statistics, showing the variance explained by each factor. It details the Eigenvalues, their differences, the proportion of variance explained by each factor, and the cumulative variance. This information is crucial for identifying and prioritising the main factors affecting mortgage access, streamlining the data into a more manageable set of key influences.

Table 5. Factor analysis for the challenges variables and eigenvalues. (source:Author)

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor1	6.973	5.979	0.697	0.697
Factor2	0.994	0.257	0.099	0.797
Factor3	0.737	0.256	0.074	0.870
Factor4	0.481	0.253	0.048	0.918
Factor5	0.228	0.047	0.023	0.941
Factor6	0.181	0.039	0.018	0.959
Factor7	0.142	0.035	0.014	0.974
Factor8	0.108	0.018	0.011	0.984
Factor9	0.090	0.023	0.009	0.993
Factor10	0.067	.	0.007	1.000

LR test: independent vs. saturated: $\chi^2(45) = 4587.62$ Prob> $\chi^2 = 0.0000$

Factor analysis/correlation

Number of observations = 400

Method: principal-component factors

Retained factors = 1

Rotation: (unrotated)

Number of parameters = 10

The investigation continued with an exploratory factor analysis on mortgage access difficulties using the principal factors approach, extracting a primary factor from ten parameters. Factor 1, with an eigenvalue of 6.973, accounts for 69.7% of the variance, while Factor 2 explains 9.9% and Factor 10 only 0.7%. A likelihood ratio test showed a chi-squared statistic of 4587.62 and a p-value of 0.0000, indicating that the factor model significantly underperforms compared to a saturated model, suggesting incomplete correlation capture.

Table 6 presents the dataset’s factor loadings and unique variances, focusing on Factor 1. Factor loadings indicate the influence of each challenge on Factor 1, while uniqueness values show unexplained variance. The analysis excluded variables with uniqueness values above 0.6. Using principal-component factors with

orthogonal varimax rotation helps clarify the data structure and identify key challenges in mortgage acquisition for mortgagors.

Table 6. Factor loadings matrix and unique variances of the Mortgagors’ challenges. (source:Author)

Variable	Factor1	Uniqueness
Corrupt banking officers (CH1)	-0.540	0.708
Payment of mortgage processing fees of 2% of the loan amount (CH2)	0.901	0.189
Proving verifiable income source (CH3)	0.944	0.110
Paying for the valuation report of property used as collateral (CH4)	0.910	0.171
Preparing BOQs for the house in case of construction (CH5)	0.930	0.134
20% to 30% own contribution of the mortgage (CH6)	0.165	0.973
The limiting loan mortgage period means the eligible client is not more than 55 years of age (CH7)	0.816	0.334
Financial institutions require audited books of account in the case of business (CH8)	0.935	0.125
Securing an approved architectural plan for the house in case of construction (CH9)	0.948	0.102
Proof of property ownership, genuine land title, or copy of certificate of title (CH10).	0.904	0.182

Factor analysis/correlation

Number of observations = 400

Method: principal-component factors

Retained factors = 1

Rotation: orthogonal varimax (Kaiser off)

Number of parameters = 10

Table 6 analyses mortgagors’ acquisition challenges, highlighting Factor 1’s role in identifying key issues. High factor loadings for challenges like “Paying for the valuation report” and “Securing an approved architectural plan” strongly connect with Factor 1. At the same time, issues like “20% to 30% own contribution” and “Corrupt banking officers” are less associated. Uniqueness values reveal how much variance in each challenge is not explained by Factor 1, with higher values indicating unique aspects. The orthogonal varimax rotation clarifies the main obstacles, helping policymakers and financial institutions target vital issues in Uganda’s mortgage process.

Table 7 presents the factor rotation matrix, emphasising the significance of Factor 1 in the context of mortgage challenges. The matrix and a likelihood ratio test validate the factor structure’s importance, offering a clearer understanding of mortgagors’ challenges and informing more effective strategies.

Table 7. Factor rotation matrix for challenges variables (source:Author)

Factor	Variance	Difference	Proportion	Cumulative
Factor1	6.973	.	0.697	0.697

LR test: independent vs. saturated: $\chi^2(45) = 4587.62$ Prob> $\chi^2 = 0.0000$

The factor rotation analysis reveals a dominant Factor 1, which explains 69.7% of the variance in mortgage acquisition challenges and has a large eigenvalue of 6.973, indicating it captures significant data information. Other factors have smaller eigenvalues and contribute less variance. The likelihood ratio (LR) test, comparing an independent model with a saturated model, showed a high chi-squared value (4587.62) and a very low p-value (0.0000), confirming that the independent model is inadequate and highlighting the significant correlations among challenges.

Table 8 details the factor loadings and unique variances for these challenges, showing the influence of each challenge on Factor 1. This table helps prioritise key difficulties and guides the development of strategies to address them effectively, improving the mortgage acquisition process for mortgagors.

Table 8. Sorted factor loadings and unique variances for Mortgagors’ challenges. (source:Author)

Variable	Factor 1	Uniqueness
Securing an approved architectural plan for the house in case of construction (CH9)	0.948	0.102
Proving verifiable income source (CH3)	0.944	0.11
Financial institutions require audited books of account in the case of business (CH8)	0.935	0.125
Preparing BOQs for the house in case of construction (CH5)	0.93	0.134
Paying for the valuation report of property as collateral (CH4)	0.91	0.171
Proof of property ownership, genuine land title or copy of certificate of title (CH10).	0.904	0.182
Payment of mortgage processing fees of 2% of the loan amount (CH2)	0.901	0.189
The limiting loan mortgage period means the eligible client is not more than 55 years of age (CH7)	0.816	0.334
20% to 30% own contribution of the mortgage (CH6)	0.165	0.973
Corrupt banking officers (CH1)	-0.54	0.708

This analysis examines factor loadings and unique variances related to mortgagors’ challenges in mortgage acquisition. Factor 1 shows high positive loadings for variables such as securing architectural plans, verifying income, and paying mortgage-related fees, indicating these challenges are closely related and significantly contribute to Factor 1. Low uniqueness values suggest that these variables are well-explained by Factor 1. Conversely, Factor 2 has a negative loading for “Corrupt banking officers,” highlighting it as a distinct challenge with higher uniqueness, meaning the other factors less explain it.

The findings underscore Factor 1 as central to understanding common challenges mortgagors face, while Factor 2 addresses a specific corruption-related issue. The Scree plot (Figure 2) helps identify the optimal number of factors by showing where eigenvalues stabilise, guiding the selection of factors for a more precise representation of the challenges.

Figure 3. Scree plot of eigenvalues for the housing developer challenges variables. (source:Author)

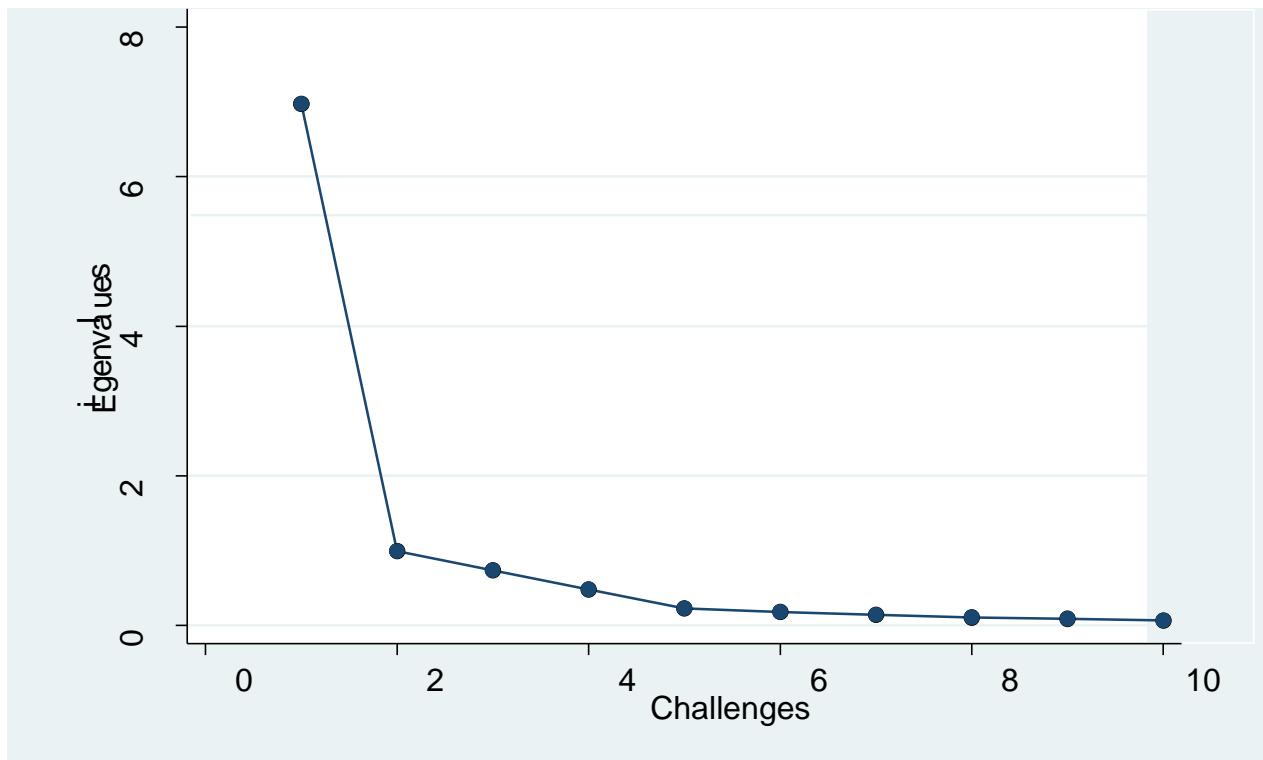


Figure 2 shows a Scree plot illustrating the factor structure of challenges faced by housing developers in mortgage acquisition. The plot indicates a sharp decline in eigenvalues after the first factor, suggesting that one dominant factor, “Difficulty of Obtaining a Mortgage Loan,” captures most of the variance in these

challenges. This unidimensional factor simplifies understanding the challenges by emphasising a central theme.

The factor analysis reveals that critical challenges such as securing architectural plans, proving income, and paying for property valuations are strongly associated with this primary factor. Conversely, issues like “20% to 30% own contribution” and “Corrupt banking officers” are less related and thus not included in this primary construct.

Table 9 further explores these relationships through logistic regression, showing how each challenge impacts the likelihood of acquiring a mortgage. Key variables affecting mortgage acquisition include payment of processing fees, proof of income, and property valuation. These findings offer targeted insights into improving mortgage accessibility by addressing the most significant challenges identified.

Table 9. Logistic regression between DV and challenges variables

Ever acquire mortgage	Odds ratio.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Payment of mortgage processing fees of 2% of the loan amount (G ₂) (sec_g_q2_2perproce~e)	2.011	.499	2.82	.005	1.237	3.271	***
Proving verifiable income source (G ₃) (sec_g_q3_incomever~e)	.591	.163	-1.91	.056	.345	1.014	*
Paying for the valuation report of property used as collateral (G ₄) (sec_g_q4_valuatnre~t)	1.419	.345	1.44	.15	.881	2.286	
Preparing BOQs for the house in case of construction (G ₅) (sec_g_q5_boqspreps~s)	.967	.256	-0.13	.899	.575	1.625	
The limiting loan mortgage period, such that the eligible client is not more than 55 years of age (G ₇) (sec_g_q7_limitedmt~d)	.858	.164	-0.80	.423	.59	1.247	
Financial institutions require audited books of account in the case of business (G ₈) (sec_g_q8_auditedbo~d)	1.54	.445	1.49	.136	.873	2.715	
Securing approved architectural plan for the house in case of construction (G ₉) (sec_g_q9_approveda~n)	1.383	.411	1.09	.275	.773	2.477	
Proof of property ownership, genuine land title or copy of the certificate of title (G ₁₀) (sec_g_q10_property~f)	.832	.193	-0.79	.43	.528	1.313	
Constant	.147	.061	-4.65	0	.066	.33	***
Mean dependent var	0.603	SD dependent var			0.490		
Pseudo r-squared	0.136	Number of observations			400		
Chi-square	73.317	Prob > chi2			0.000		
Akaike crit. (AIC)	482.271	Bayesian crit. (BIC)			518.194		

*** $p < .01$, ** $p < .05$, * $p < .1$

The model is statistically significant, with a chi-square value of 73.317 and a p-value of 0.000, confirming a solid relationship between mortgage acquisition and the challenges examined. Among the variables, paying mortgage processing fees shows a robust positive association with acquiring a mortgage, with an odds ratio of 2.011. This result indicates that individuals who can afford higher processing fees are significantly more likely to secure a mortgage, which is significant at the 0.01 level. Conversely, proving verifiable income sources harms mortgage acquisition, with an odds ratio of 0.591, suggesting that difficulties in income verification decrease the likelihood of obtaining a mortgage. However, this result is significant at just above 90% ($p < 0.1$).

The constant term, with an odds ratio of 0.147, represents the baseline odds of acquiring a mortgage without challenges. The model explains approximately 13.6% of the variance in mortgage acquisition (pseudo-R-squared of 0.136), with additional fit assessments provided by the Akaike and Bayesian Information Criteria (AIC and BIC). These findings highlight the significant impact of processing fees and income verification challenges on mortgage acquisition and offer guidance for policymakers and financial institutions to develop targeted strategies to improve mortgage access.

- (β_0) (Intercept) = 0.1470989
- (β_1) (sec_g_q2_2perprocessingfee G_1) = 2.011361
- (β_2) (sec_g_q3_incomeverifiable G_2) = 0.5911668
- (β_3) (sec_g_q4_valuatnreportpaymt G_3) = 1.419149
- (β_4) (sec_g_q5_boqsprepsbyclients G_4) = 0.9669161
- (β_5) (sec_g_q7_limitedmtgperiod G_5) = 0.8582354
- (β_6) (sec_g_q8_auditedbooksrqd G_6) = 1.539708
- (β_7) (sec_g_q9_approvedarcplan G_7) = 1.383172
- (β_8) (sec_g_q10_propertyownproof G_8) = 0.8324589

So the logistic regression equation from the challenges logistic regression model is as below;

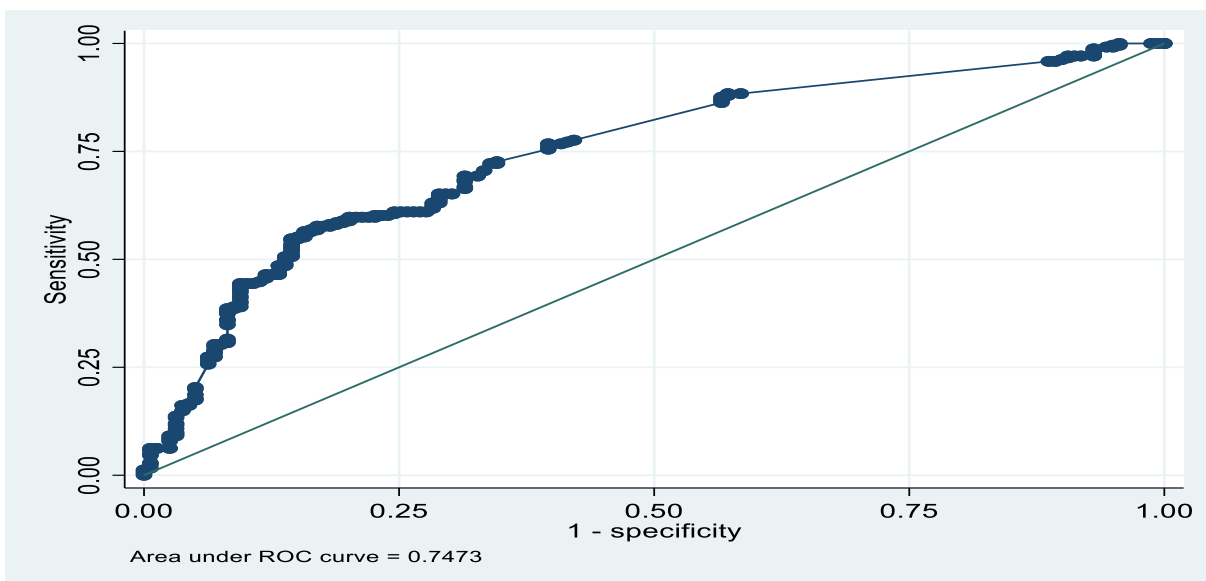
$$\ln\left(\frac{p}{1-p}\right) = 0.15 + 2.01G_1 + 0.59G_2 + 1.42G_3 + 0.97G_4 + 0.86G_5 + 1.54G_6 + 1.38G_7 + 0.83FG_8$$

Based on the challenges logistic regression model above, this equation represents the relationship between the challenges predictor variables and the log odds of ever acquiring a mortgage. Please note that the interpretation of the coefficients considers the log-odds scale, and if one needs probabilities directly, one can transform these log-odds using the logistic function:

$$P = \frac{e^{0.15+2.01G_1+0.59G_2+1.42G_3+0.97G_4+0.86G_5+1.54G_6+1.38G_7+0.83FG_8}}{(1 + e)^{0.15+2.01G_1+0.59G_2+1.42G_3+0.97G_4+0.86G_5+1.54G_6+1.38G_7+0.83FG_8}}$$

Figure 3 displays the Receiver Operating Characteristic (ROC) curve for the logistic model for analysing mortgage acquisition challenges. The ROC curve is essential for assessing the model’s predictive accuracy by showing the trade-off between sensitivity (valid positive rate) and specificity (valid negative rate). Based on the identified challenges, this curve helps evaluate how well the model distinguishes between those who successfully obtain mortgages and those who do not. Understanding this curve is crucial for assessing the model’s effectiveness in predicting mortgage outcomes and its practical application in addressing the challenges faced by individuals seeking mortgages.

Figure 3. Challenges receiver operating curve for the logistic model.



The ROC (Receiver Operating Characteristic curve) represents the model's ability to determine whether someone can acquire a mortgage. An AUC value of 0.7473 suggests the challenges of the logistic regression model can reasonably distinguish between the two classes, as it's greater than 0.5. This figure indicates the challenges that the logistic regression model has some predictive tendencies in determining whether individuals will acquire a mortgage.

5.0 DISCUSSION AND IMPLICATION OF RESEARCH

5.1 Discussion of study findings

In examining the challenges mortgagors (MGs) face in accessing mortgages, this study employs a factor analysis and a logistic regression model to identify and quantify the key variables influencing mortgage acquisition. While the factor analysis uncovered several challenges, it also highlighted some complexities. Notably, the extracted factors inadequately explained two variables, the percentage of own contribution to the mortgage (20% to 30%) and corrupt banking officers, as evidenced by their exceptionally high factor loadings of 0.973 and 0.708, respectively. These values suggest that these challenges possess unique characteristics that are not fully captured in the factor structure, warranting further investigation.

In the logistic regression analysis, the author focused on eight challenge variables most relevant to the dependent variable (DV) —mortgage approval odds. The results indicate that the overall model is statistically significant, as evidenced by a chi-square value of 73.317 ($p < 0.000$). The pseudo-R-squared value of 0.136 suggests that the model explains approximately 13.6% of the variation in mortgage acquisition odds. While this is a modest proportion, it highlights the importance of the identified factors in shaping mortgage approval outcomes.

In comparing these results with existing literature, the findings align with the work of Mwathi and Karanja (2017), who noted that the percentage processing fee (*sec_g_q2*) significantly increases the odds of mortgage acquisition. Their research focused on low-income earners in Kenya and found that higher processing fees signalled a commitment to lenders, aligning with the results of this study. Additionally, both studies recognise the negative effect of income verification (*sec_g_q3*) on mortgage approval odds, as challenges in proving stable income sources hinder mortgage access for low-income mortgagors.

However, this study's findings diverge from those of Domeher et al. (2014), who argue that higher processing fees in Ghana negatively affect mortgage demand and affordability. Their position suggests that increased processing fees may deter potential mortgagors, making mortgage acquisition less attainable. Similarly, (Domeher et al., 2014). challenge that income verification is a significant barrier for mortgagors with stable, formal income, contending that this issue is not as impactful for individuals in more secure employment.

In light of these contrasting viewpoints, this study's logistic regression model for MG challenges highlights two critical factors that significantly affect the odds of acquiring a mortgage in Greater Kampala: the payment of a 2% processing fee and the provision of verifiable income documentation. Interestingly, while paying the processing fee increases the likelihood of mortgage approval, reflecting the borrower's commitment and ability to manage the financial responsibility, providing proof of verifiable income appears to reduce these odds, potentially due to the instability or informality of income sources in the region. Other challenges, such as corrupt banking officers and issues with loan terms, did not demonstrate a statistically significant impact on mortgage acquisition.

Addressing the challenges that mortgagors face with mortgage eligibility criteria will contribute to the realisation of Sustainable Development Goal (SDG) 11, which focuses on making cities and human settlements inclusive, safe, resilient, and sustainable. Ugandan government ensuring access to safe, affordable housing is key to this goal. Given the ongoing issue of housing affordability in Uganda, this study seeks to support government efforts toward creating sustainable cities and communities by improving access to housing finance and addressing the barriers developers face.

5.2 Implication Of Study Findings

The implications of these findings are multifaceted. First, the study underscores the importance of commitment signals, such as processing fees, in the mortgage approval process, suggesting that lenders may interpret these fees as an indicator of a mortgagor's seriousness and financial capacity. Second, the study

highlights the need for more flexible income verification processes, particularly in urban areas like Greater Kampala, where a significant portion of the population is employed informally. Finally, the discussion draws attention to the complexities of addressing barriers to mortgage access. It suggests that policy adjustments targeting mortgagors and lenders may help mitigate some of these challenges, facilitating greater access to housing finance in the region.

6.0 CONCLUSION

This study provides valuable insights into the factors influencing mortgage access in Greater Kampala, specifically in the context of the challenges mortgagors and potential mortgagors face. The analysis identifies key variables that significantly affect the likelihood of mortgage approval by applying logistic regression models. The results suggest that mortgage lenders may interpret a 2% processing fee as an indicator of borrower commitment and financial seriousness, potentially improving the chances of loan approval. This finding emphasises the role of upfront financial commitments in shaping lenders' perceptions of risk.

Conversely, the study highlights that difficulties in income verification can significantly reduce a borrower's chances of securing a mortgage. These challenges are particularly pertinent in markets with prevalent informal employment or inconsistent income documentation. Lenders' concerns about the accuracy and reliability of income verification processes may result in cautious lending practices, which could exclude otherwise qualified mortgagors.

The logistic regression models developed in this study effectively pinpoint these and other crucial factors that influence mortgage eligibility in Greater Kampala. By identifying the variables that most strongly impact mortgage approval, this research offers actionable recommendations for both mortgagors and mortgagees. For mortgagors, the findings underscore the importance of improving their financial profiles, particularly by ensuring transparent, verifiable documentation of income and assets. By strengthening their economic standing and addressing potential barriers to income verification, mortgagors can enhance their mortgage eligibility.

On the lenders' side, the study suggests that adjusting approval criteria to account for the unique challenges in Greater Kampala, such as informal income structures or alternative documentation methods, could foster greater access to housing finance. Lenders may consider offering more flexible criteria that balance the need for financial security with a broader view of a borrower's commitment and capacity.

Ultimately, this paper contributes to the ongoing conversation about advancing the objectives of Agenda 2063 by improving access to affordable housing finance in urban areas like Greater Kampala. The findings underscore the importance of tailored policies that address the challenges both mortgagors and developers face in this context. By refining mortgage approval processes and offering more inclusive financing options, stakeholders can play a key role in fostering sustainable housing development and achieving broader socio-economic goals outlined in Agenda 2063.

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