HOUSING PRIORITIES AND RESIDENTIAL MOBILITY IN INFORMAL SETTLEMENTS: THE CASES OF MTANDIRE AND MGONA IN LILONGWE, MALAWI

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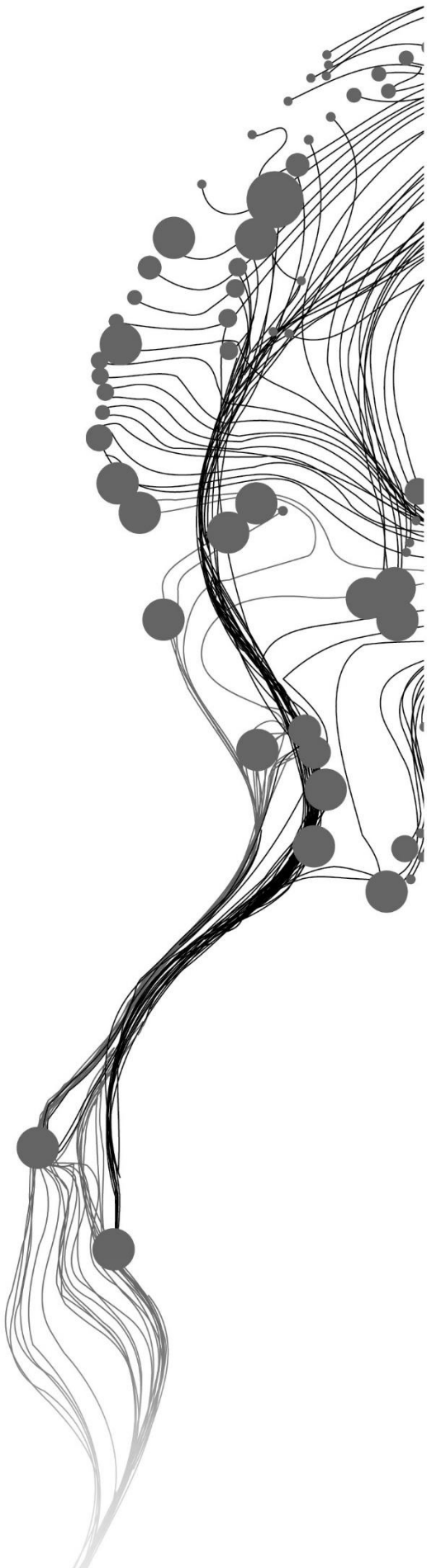

HOUSING PRIORITIES AND RESIDENTIAL MOBILITY IN INFORMAL SETTLEMENTS: THE CASES OF MTANDIRE AND MGONA IN LILONGWE, MALAWI

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ABSTRACT

Rapid urbanization and the continuous expansion of informal settlements in Malawi's capital city of Lilongwe is a recurring challenge among urban practitioners and policymakers. Formulating effective solutions in response to the challenge of informal settlement growth requires understanding the housing priorities of low-income groups and how these evolve and spatially manifest in the city.

Thus, this study aims to understand the intra-urban mobility of low-income residents living in the informal settlements of Lilongwe using Turner's model of intra-urban mobility. Intra-urban mobility is explored by identifying the categories of low-income residents, their housing priorities, and reasons for settlement choice. The study findings are derived from household surveys conducted in Mtandire and Mgona informal settlements in Lilongwe and interviews with key informants.

The study found that low-income residents in Mtandire and Mgona fall within the bridgeheader and consolidator categories of Turner's model. Bridgeheaders, who are classified into two sub-types, prioritize access to cheap rental accommodation, while Consolidators prioritize security of tenure. However, the study was not able to identify Status seekers, who are the third group of low-income residents in Turner's model. The current housing priorities for Bridgeheaders and Consolidators are expected to change among households that intend to relocate from two settlements in the near future. The expected future mobility of residents would result in a change in housing priorities with a strong preference for location-specific attributes such as security, quietness, and less congestion. An evaluation of the identified housing priorities and reasons for residential mobility against the current slum upgrading policies and practices shows that Government's strategies for informal settlement improvement mainly align with the priorities of Consolidators and Bridgeheaders, who intend to consolidate over time.

Key Words: Intra-urban mobility, housing priorities, settlement choice, informal settlements

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1. INTRODUCTION

1.1 Background Context

Housing forms an essential part of the urban landscape accounting for more than 70% of land use in many cities worldwide (UN-Habitat, 2016). As a crucial part of the landscape, housing development plays a role in realizing sustainable urban growth as the consideration of where people live is central to developing towns and cities. However, despite its significance, access for all to safe, adequate, and affordable housing remains a challenge for policymakers today (United Nations, 2020).

In most developing cities, access to decent and affordable housing is a challenge for low-income households due to the limited housing stock, increasing demand, and housing prices (World Bank, 2015; Bah et al., 2018). Consequently, alternative solutions have to be sought after by low-income residents in the city to satisfy their housing needs outside the formal housing market. Such alternatives typically include finding housing and settling in informal settlement areas or slums[1] where rentals and land prices are considered affordable (Andreasen & Agergaard, 2016). Once settled in these areas, either by finding cheap rental housing or by staying with relatives and friends (Yakubu et al., 2021), there is intra-urban mobility within the city for the migrants searching for better housing and economic conditions (Landau, 2014).

To understand the intra-urban mobility process, the urban settlement model proposed by John C. Turner (1968) has been influential in housing studies as it describes the movement of informal settlers in an urban area from arrival as new migrants from rural areas with low income to becoming urban settlers. The model is considered an integration of the processes of rural-urban migration, intra-urban mobility, upward socio-economic mobility, and the expansion of informal settlements (Hirse, 1984). The advancement of the model is based on Turner's observations surrounding squatter settlements and self-help housing in Lima, Peru, and other Latin American Cities.

Turner's urban settlement model categorizes migrants into three major class groups (Turner, 1968). The first category is Bridgeheaders which consists of new rural migrants whose priority is locating in the city

[1] According to UN-Habitat(2003), Informal settlements are considered as residential areas where 1) inhabitants have no security of tenure, 2) the neighbourhoods lack or have limited access to infrastructure and basic services, and 3) the housing is typically located in a geographically unsuitable location and is constructed without compliance to planning and building regulations. On the other hand, Slums are considered as informal settlements that are more deprived and excluded with high levels of poverty and dilapidated housing (UN-Habitat, 2003).

centre to access employment opportunities. The second category is Consolidators, who have stayed in the city longer and have accumulated assets of value such as housing which they aim to protect by prioritizing security of tenure (Turner, 1968). Lastly, the Status seekers are a category of those who earn considerably more income and prioritize modern amenity standards as a symbol of prestige (Potter, 1985). According to the model, the residential choice for low-income residents is considered a trade-off of three housing priorities: Location, security of tenure, and amenities (Turner, 1968). The movement of migrants through the three stages and the subsequent change in housing priorities can be observed as an outward urban expansion on a city-wide scale.

Overall, Turner's model continues to be influential in housing studies four decades after its first application in Latin America (Adianto et al., 2019). The model's relevance centres around its ability to provide an insightful framework for understanding housing needs and priorities for low-income migrants living in informal settlement areas. Such an understanding is required to ensure that government actions with regard to improving informal settlements are aligned with people's needs (Turner, 1968).

1.2 Research Problem

Rapid urbanization in Malawi, estimated at 5.3% per annum (Government of Malawi, 2019b), and the continuous expansion of informal settlements in major cities such as Lilongwe continue to be a recurring challenge for policymakers at all levels. These informal settlements are characterized by a lack of access to infrastructure and basic services, tenure insecurity, and inadequate housing (Lindstrom, 2014). As a response to informal settlement growth, the Malawi Government aims to improve living conditions by upgrading and regularizing existing informal settlements through policy development, sites and services projects, and issuing of land titles (Government of Malawi, 2019). Although a necessary step in ensuring that informal settlements are improved, implementing slum upgrading initiatives without understanding the housing priorities of low-income households and how these evolve and spatially manifest in the city reduces the effectiveness of such initiatives. Against this background, the research explores the applicability of Turner's housing priority model in understanding the intra-urban residential mobility of low-income residents living in informal settlements of Lilongwe, Malawi.

1.3 Research Objectives and Questions

General Objective

The general objective is to explore the applicability of Turner's Model to understand the intra-urban mobility of low-income residents in Lilongwe.

Specific Objectives

1. To apply Turner's Bridgeheader-Consolidator-Status seeker stages in categorizing residents in informal settlements of Lilongwe.

   1.1 Which indicators can be used to categorize residents[2] according to the Bridgeheader-Consolidator-Status seeker stages?

   1.2 What are the categories of residents based on the identified indicators?

   1.3 What other resident categories can be identified beyond the Bridgeheader-Consolidator-Status seeker stages?

2. To explore the housing priorities that influence settlement choice for residents within each identified category.

   2.1 What are the housing priorities associated with each category of residents?

   2.2 How have housing priorities of long-term residents changed since settling in the area?

   2.3 How did the housing priorities of new residents change from their last place of residence?

   2.4 How do residents expect their housing priorities to change in the next five years?

3. To reflect on the applicability of Turner's intra-urban mobility model and its practical application based on the research findings.

   3.1 To what extent are the Bridgeheader, Consolidator and Status seeker categories and their associated housing priorities applicable in informal settlements of Lilongwe?

   3.2 What are the practical implications of the research findings on the current slum upgrading policy and practice in Lilongwe city?

[2] The term "residents" is used as a collective term, however, the study targeted one household member who self-identified as the household head or living with the household head.

1.4 Theoretical Framework

This research applies the theoretical foundations proposed by Turner in the housing priority model summarised in figure 1 below. The **housing priority model** is a subset of the urban settlement model that covers the behavioural aspect of residential mobility. The application of the model provides insights into the housing priorities and the choice of settlement made by low-income households. In this study, *housing priorities* are defined as elements of a house or settlement that an individual or household would regard as more important compared to others. In relation to Turner's model, these elements are location, security of tenure, and amenities. *Housing and settlement choice* refers to an individual or household's decision about where they want to live based on their current opportunities, available resources, and limitations (Mulder, 1996).

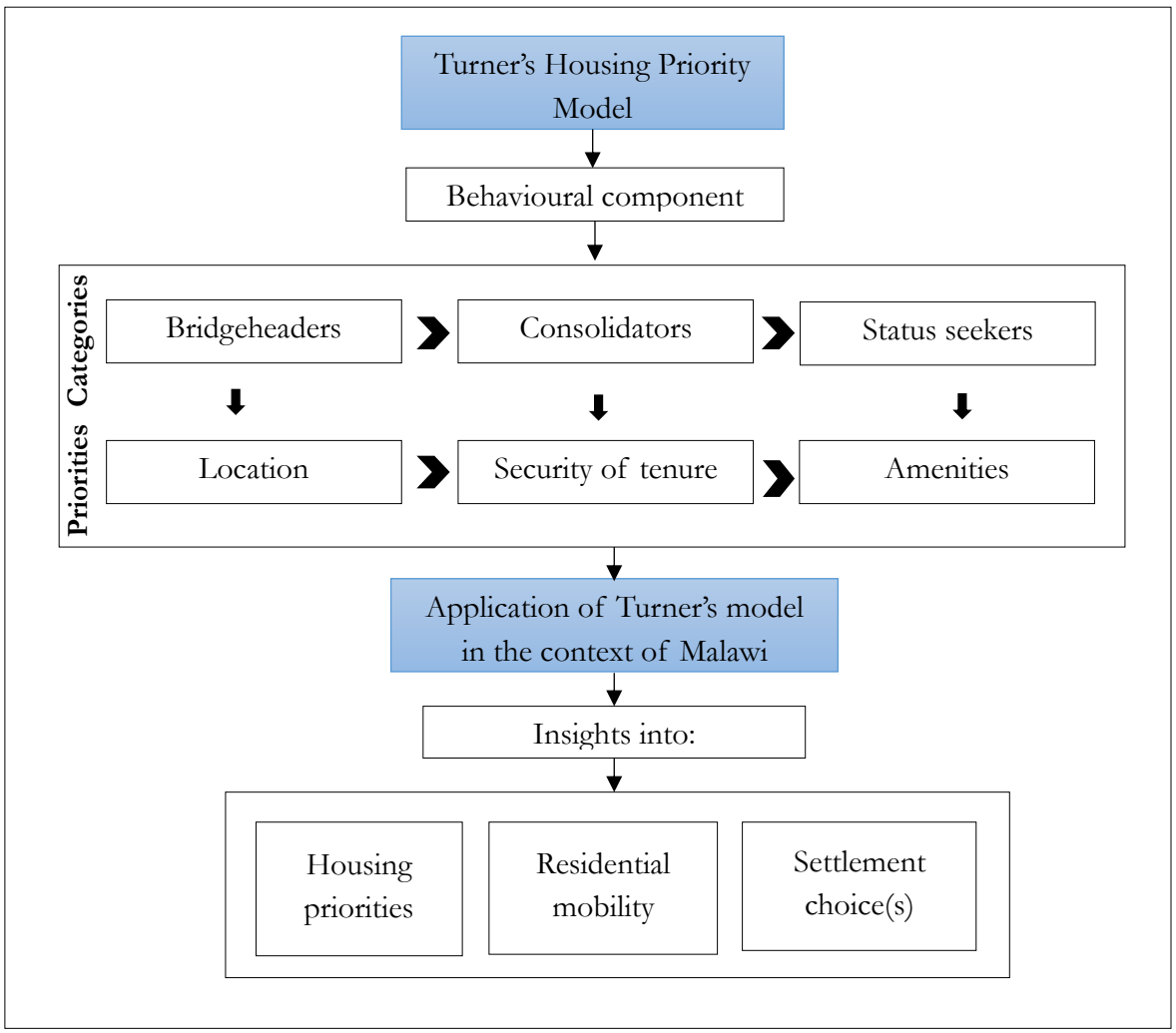

Figure 1: Theoretical Framework

The application of Turner's housing priority model in the context of Lilongwe, Malawi is done by adopting a mixed-method design. In the mixed-method design (details in the Methodology section), the qualitative approach is used to answer the research questions, which centre around assessing the behavioural component of intra-urban mobility. By applying this approach, the study provides insights into the housing priorities and reasons behind settlement choices made by low-income households living in Lilongwe's informal settlements. A quantitative approach is used in analyzing the data collected, and the results are interpreted in light of the theoretical foundations proposed in the housing priority model.

1.5 Structure of the Thesis

Chapter 1: Introduction

The introduction section provides an overview of the background context of the study, the research problem, research objectives and questions, and the theoretical framework.

Chapter 2: Literature Review

The literature review section discusses the process of intra-urban mobility, the factors that influence intra-urban mobility, models employed in intra-urban mobility, criticisms against Turner's intra-urban mobility model, and some of the notable additions to Turner's model.

Chapter 3: Methodology

The methodology section details the methods used to investigate the research problem and answer the research questions. The section covers the research design, data collection tool (s), sample size, sampling technique, and the analysis process used in the study.

Chapter 4: Results

The results section presents the main research findings in line with the research questions posed for each objective.

Chapter 5: Discussion

The implications of the research study based on the results and existing literature are covered in the discussion section.

Chapter 6: Conclusion and Recommendations

The conclusion section summarizes the significant outcomes of the study as they relate to the research aim, objectives, and questions. Recommendations are presented that give insight into the possible solutions or measures that can be implemented based on the research findings.

2. LITERATURE REVIEW

In this chapter, the following sub-sections are considered: the concept of intra-urban mobility and its importance as a study (section 2.1), the different models that provide a framework for understanding intra-urban mobility (section 2.2), Turner's intra-urban mobility model (section 2.3), the application of Turner's model in different contexts (section 2.4), criticisms against Turner's intra-urban mobility model (section 2.5), and the notable additions to the model (section 2.6). An overview of the literature review is presented in figure 2 below.

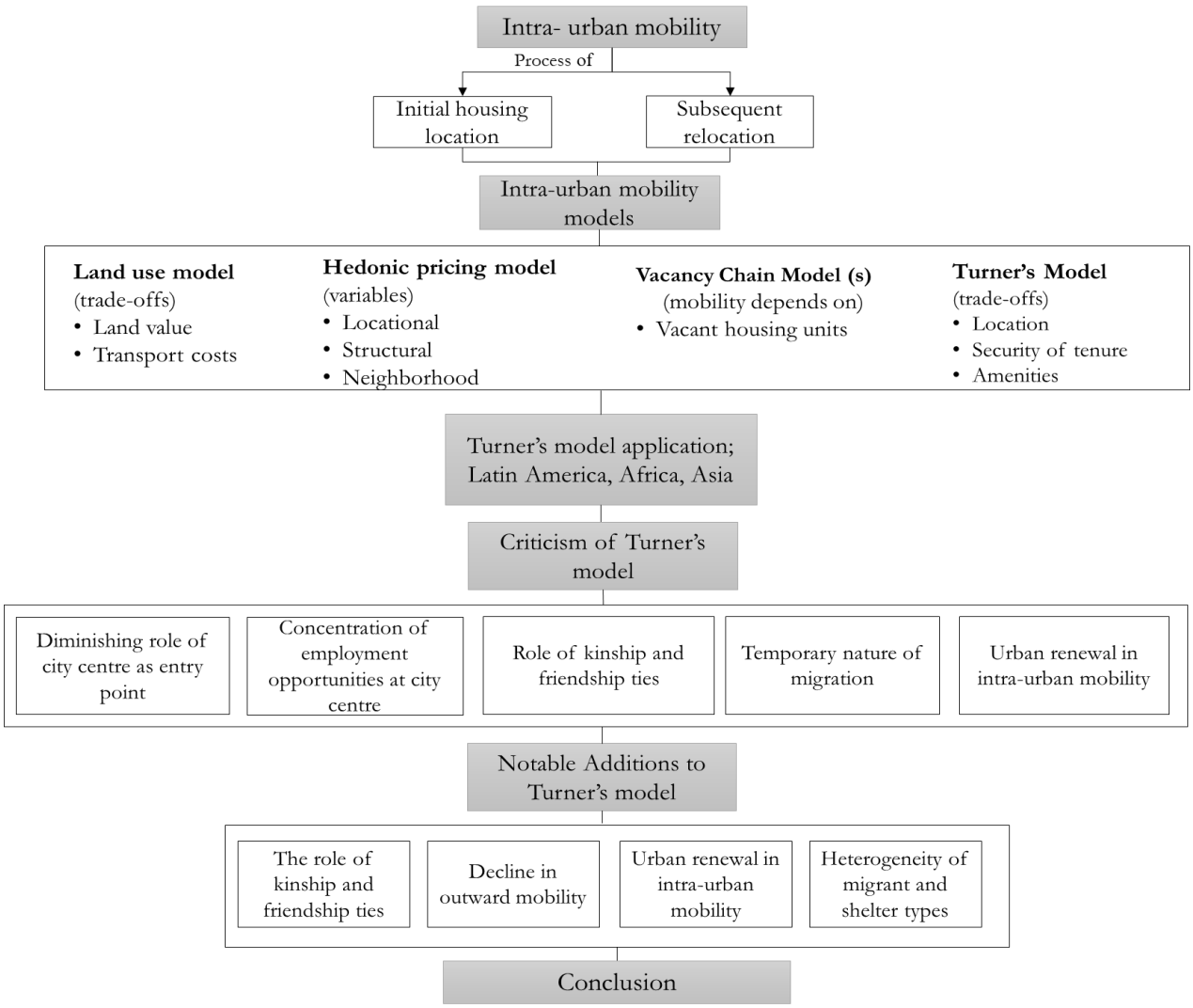

Figure 2: Literature review overview

2.1 Intra-Urban Mobility

This section aims to answer the following questions with literature;

1. What is Intra-urban mobility?
2. Why is it important to study Intra-urban mobility?

Intra-urban mobility is defined as the movement of households and individuals within a metropolitan area (Weinberg, 1979). A decision to move by an individual or household forms the starting point of intra-urban mobility. Jolaoye et al. (2021) note that a household's decision to move depends on the need for ideal housing conditions. Such optimal housing conditions are presented as housing and neighbourhood characteristics relative to the household's needs and preferences. Thus, households weigh their satisfaction with their current home against their satisfaction with alternatives to decide whether to move or not (Jolaoye et al., 2021). Although intra-urban mobility begins with a decision to move, the consequences of such moves can be observed at a larger spatial scale as individuals and households reorganize themselves in different parts of the city.

Over the years, research on intra-urban mobility has increased, with considerable attention given towards understanding determinants of intra-urban residential mobility from different viewpoints. Through the various studies, the importance of understanding intra-urban residential mobility is highlighted. In a broader sense, studying residential mobility is essential to explaining the growth of residential areas in cities and the formulation of housing and other economic policies (Afolayan, 1982, p. 315). Additionally, examining residential mobility as a process provides a basis for understanding the social, economic, and morphological changes happening within the city (Nkeki & Erimona, 2018).

More specifically, and as applied in this study, research on intra-urban mobility provides a basis for understanding low-income residents' housing priorities and mobility patterns in urban areas (Turner, 1968; Conway & Brown, 1980; Kliest & Scheffer, 1981). Taking low-income residents as the point of inquiry on intra-urban mobility acknowledges their role in transforming cities of developing countries. Such an inquiry is necessary to successfully formulate low-income housing policies and future city planning by urban authorities in developing cities (Turner, 1968; Ulack, 1983).

2.2 Overview of Intra-Urban Mobility Models

This section aims to answer the following question with literature;

1. Which models provide a framework for understanding the process of Intra-urban mobility?

Models are employed to understand the intra-urban mobility process by providing theoretical frameworks that can be used to explain and predict mobility patterns. The following intra-urban mobility models are considered: the Land use model, the hedonic pricing model, the vacancy chain model, and Turner's model.

2.2.1 Land Use Model

The Land use model by Alonso (1964) provides that different land uses compete for locations according to their position on the bid rent curve and accessibility requirements to the city centre. Specifically for residential land use, the model provides a basis for distinguishing the location choices among households who have different accessibility requirements to the city (Alonso, 1964; Galster, 1977). The Land use model

captures how vacant land surrounding employment centres is priced and allocated to different households, particularly the urban labour force. A households position on the bid rent curve is underscored by the willingness to pay for a piece of land at a specific price relative to the distance from the city centre while still retaining a certain degree of utility (Galster, 1977; Cheshire & Sheppard, 1995; Chiarazzo et al., 2014). Therefore, the bid can be considered as a function of, among other things, the household's land preference, travel time, income, and the cost of transportation (Alonso, 1964; Galster, 1977; Schirmer et al., 2014).

Although the Land use model offers a readily adaptable framework for the analysis of the location choice of both voluntary and non-voluntary movers (Galster, 1977; Wheaton, 1977), the general treatment of land as a function of a household's utility results in weaker empirical findings (Muth, 1971). As Cheshire & Sheppard (1995) note, the premise that households will choose a location to live close to their places of work in the city centre lacks realism in light of the decentralization of employment centres. Galster (1977) also argues that residential location choice is no longer just a function of proximity to work and land parcel size but also the quality of the land and neighbourhood within which the land is located. Accordingly, other factors such as land size, accessibility, size and quality of the house situated on the land, neighbourhood and pollution conditions, availability of public services, among others, are factored into the household's consideration of residential location choice (Galster, 1977).

2.2.2 Hedonic Pricing Model

The hedonic pricing model, which builds upon the theoretical foundations of hedonic prices (Rosen, 1974), has been adopted in investigating property pricing in the housing market (McLeod, 1984; Cheshire & Sheppard, 1995; Chin & Chau, 2003). The hedonic price model considers goods as having inherent attributes upon which implicit prices can be derived (Rosen, 1974). When applied to residential properties, the hedonic price model considers the price differentiation among properties owing to their inherent attributes (Chin & Chau, 2003; Kong et al., 2007). These attributes, which can be expressed in both a qualitative and quantitative manner (Williams, 1991), are typically classified into three; locational, structural, and neighbourhood attributes (Chin & Chau, 2003; Kong et al., 2007). A selection of variables from these attributes forms essential considerations for a household when deciding on a residential location.

Overall, the hedonic pricing model provides a valuable theoretical foundation for understanding and predicting residential location choices (Wheaton, 1977; Bhattacharjee et al., 2012). There are, however, some limitations associated with the hedonic pricing model, such as its heavy consideration of the housing demand side with less regard for the housing supply side (Maclennan, 1977). Commonly, housing market prices arise from an interaction between supply and demand and not just from satisfying housing demand conditions. Also, the impact that different institutions have on the housing market is not fully considered in the model, with attention mainly given to the presence of a willing buyer and seller (Maclennan, 1977; Chin & Chau, 2003). Chin & Chau (2003) further argue that the notion of a market equilibrium that underpins the model's

applicability may be an over-assumption considering that the housing market in the real world is often riddled with imperfections. Finally, the idea that buyers and sellers have complete knowledge about the housing product and pricing may not always be accurate in practice (Chin & Chau, 2003).

2.2.3 Vacancy Chain Model(s)

Vacancy chain model(s) formulated around the early 1970s (White, 1971) have been applied to housing studies to explore linkages between residential mobility and the availability of vacant housing units (Emmi & Magnusson, 1995a Nordvik, 2004). According to the model, residential mobility occurs when a vacant housing opportunity is created within the housing market. Such a vacant housing opportunity provides a starting point of mobility for households actively searching for housing (Nordvik, 2004). When the housing search is successful, mobility occurs as the household moves into a new house, leaving behind a vacancy for the previous home, which is then filled up by another family (Chase, 1991; Nordvik, 2004). Therefore, in residential vacancy chain models, a vacant unit forms the basic unit of analysis (Emmi & Magnusson, 1995a).

Central to the residential vacancy chain model is the concept of filtering. Filtering denotes how the upward housing mobility of higher-income groups, who move into newly constructed better houses, creates vacant housing opportunities for low-income groups to easily enter the housing market (White, 1971; Nordvik, 2004). Filtering in residential mobility demonstrates how households typically change residence to improve their housing condition shown by moving into a home that is better than their previous home (Rundquist, 1977). Therefore, residential vacancy chain models provide a framework for understanding a household's residential mobility and the supply of housing market opportunities (Nordvik, 2004).

Despite the model's relevance in understanding and predicting residential mobility patterns (Emmi & Magnusson, 1995a), the model lacks association with the behavioural aspect of residential mobility, such as what motivates households to move (Emmi & Magnusson, 1995b). Furthermore, the stochasticity associated with mobility is not fully captured, given the model's deterministic nature (Nordvik, 2004). Regarding the concept of filtering, as Irazabal (2009) notes, 'one size does not fit all' when it comes to housing supply markets in different countries. Therefore, contrary to the assumption that the low-income groups will find their way into the housing market through filtering mechanisms, such may not be the case owing to the different housing supply market structures and dynamics (Liu, 2015).

2.2.4 Turner's intra-urban mobility Model

Turner's behaviouristic model of intra-urban mobility is based on his observations of the complexities surrounding squatter settlements and self-help housing in Peru and other Latin American countries (Turner, 1968). The model integrates rural-urban migration, intra-urban mobility, upward socio-economic mobility, and the expansion of low-income settlements (Turner, 1968; Hirse, 1984; Liu, 2015).

Unlike the three models discussed above, formulated and more applicable in an advanced economy (Liu, 2015), Turner's model is specifically designed for cities in developing countries. The applicability of Turner's model in cities of developing countries in general, and informal areas in particular, provides a suitable theoretical framework for this research. The model's theoretical foundations, which capture the behaviouristic aspects of intra-urban mobility, ensure that low-income groups' housing needs, priorities, and residential location choices are better understood. In the subsequent sections, a description of Turner's model is provided, including its applicability in other contexts, criticisms, as well as some notable additions.

2.3 Turner's Model

Using a case study of Lima, Turner (1968) purports that migrants in a city can be classified into three successive groups; Bridgeheaders, Consolidators, and Status seekers. He further argues that movement from one category to the next will occur with an upward shift in socio-economic conditions. The progression of migrant groups through the stages can be observed at a spatial level as individuals or households move from rented housing in the inner city ring to self-constructed housing towards the periphery (Turner, 1968; Conway & Brown, 1980; Kliest & Scheffer, 1981). It is from the self-improved housing that the housing needs and aspirations of the low-income groups are visibly expressed. Earlier, Turner coined the term "progressive development" to refer to the incremental nature of low-income groups' housing construction (Turner, 1967).

Turner (1968) further identifies three housing priorities (location, security of tenure, and amenity considerations) associated with each migrant category, with location being the first consideration for new migrants into the city. Prioritization of location is mainly linked to accessibility to income-generating opportunities, which is a primary objective for a new migrant trying to get a foothold within the urban system (Conway & Brown, 1980; Sheng, 1989; Klak & Holtzclaw, 1993). Similar to the Land use model, the city centre is considered a prime location that provides better accessibility to employment opportunities. Therefore, according to Turner, **Bridgeheaders** are expected to find cheap accommodation in the inner city ring as they wait for their economic conditions to change through new employment opportunities. Once Bridgeheaders have accumulated enough savings, their housing priorities are expected to change (Gilbert & Varley, 1990; Klak& Holtzclaw, 1993). With a change in priorities, the main driving factor behind residential location choice becomes less about location with the need to find employment and more about consolidating what has been accumulated over the years (Turner, 1968; Hirse, 1984).

Consolidators, who form the second group of low-income migrants, are therefore seen to prioritize security of tenure over location (Conway & Brown, 1980). The assumption is that after the migrant has lived in the city for a few years, they can use some accumulated savings to invest in homeownership. Considering that

homeownership is a significant investment regardless of one's financial standing in society, ensuring that the investment is secured to a certain degree becomes a priority. Andrews & Phillips (1970) note that the shift from Bridgeheader to Consolidator may take 15 to 20 years. According to Klak & Holtzclaw (1993, p. 261), becoming a consolidator may occur by the end of the first ten years. However, the length of transition from Bridgeheader to Consolidator may differ from context to context depending on the existing policies and practices that surround informal housing development.

Status seekers form the top tier group of low-income migrants who have achieved a certain degree of security over their accumulated assets and now prioritize having better amenities as their income increases (Turner, 1968; Hirse, 1984). These amenities range from having a house with more rooms and permanent roofing materials to having access to water, electricity, and better sanitary facilities. Thus, as a class of migrants, status seekers are viewed to be highly concerned with the quality of their housing and the amenities in their environment (Hirse, 1984; Sheng, 1989).

In general, Turner's intra-urban mobility model provides an insightful framework for understanding residential location choice, housing priorities, and the subsequent housing geography for low-income groups living in informal settlements. Based on the model, residential choice is considered a trade-off between location, security of tenure, and housing or environmental amenities.

2.4 Applications of Turner's Model

This section aims to answer the following questions;

1. What are the different country or regional contexts within which Turner's Model has been applied?
2. Based on the empirical evidence, what conclusions are drawn on the model's applicability in each context?

Initially developed for a Latin American context, Turner's model has been widely adopted and applied in other regional contexts.

2.4.1 Latin American Context

Conway & Brown (1980) build upon Turner's proposed housing priorities to create an alternative framework that explains the movement of low-income migrants in an urban area. The alternative framework is considered an expansion of Turner's ideas as it incorporates the migrants' attitudes towards relocation, housing aspirations, and kinship affiliations (Conway & Brown, 1980). One crucial assertion in the alternative model is the role of group and kinship ties in shaping the relocation process. Using evidence from Port of Spain and Mexico City, the authors find that kinship ties are essential when new migrants find their initial location in the city and decide to relocate afterward (Conway & Brown, 1980). Therefore in terms of housing priorities, kinship ties are seen to be much more important to Bridgeheaders than finding

a location close to employment opportunities. Despite the evidence, the authors conclude that further studies are required to support the notion that kinship ties continue to be relevant beyond the Bridgeheader stage into subsequent relocation decision-making (Conway & Brown, 1980).

Klak & Holtzclaw (1993) adopt Turner's model as a benchmark for their research on housing, geography, and mobility of low-income migrants in Quito, Ecuador. The study is based on a survey conducted by housing agencies of 1000 households in Quito in 1989. Turner's argument on the progression of households through the three stages is tested. The study findings reveal that most low-income Quiteños are within the Bridgeheader stage. The results capture how movement through the Bridgeheader-Consolidator-Status seeker stages is difficult due to Quito's land market (Klak & Holtzclaw, 1993). Although there is a large concentration of Bridgeheaders, the study supports that Bridgeheaders eventually become Consolidators (Klak & Holtzclaw, 1993). The study also reveals that distance to work is longer for house owners (Consolidators) than those renting rooms in the city (Bridgeheaders). This finding supports the assertion that Bridgeheaders will locate closer to employment opportunities. The link between intra-urban mobility and upward economic mobility is also supported in the case of Quito (Klak & Holtzclaw, 1993). Since Turner's model was partially applicable to Quito, the authors conclude that the application of the model in other contexts should be less rigid and focus more on the specific conditions found in the city under investigation.

2.4.2 African Context

Kliest & Scheffer (1981) apply Turner's model in the context of Sub- Saharan Africa. The study is restricted to elements of Turner's model that relate to the role of the city centre in receiving new migrants, the importance of relatives in a migrant's integration process, and the supposed link between Bridgeheaders and the geography of employment (Kliest & Scheffer, 1981). The study conclusions highlight the temporary nature of rural to urban migration in African cities and the likelihood of Bridgeheaders remaining as Bridgeheaders with no aspirations to consolidate in the city. Also, ethnic relations play an essential role in intra-urban mobility in the Sub-Saharan context. Finally, Kliest & Scheffer (1981) highlight that not all intra-urban mobility is related to upward economic mobility and a shift in housing priorities. Instead, the process can sometimes be artificial as slum clearance and relocation schemes force households to move from inner-city rings to peripheries.

Hirse (1984) applies Turner's model in a regional context of West Africa. Specifically, the study examines how far Turner's model is valid for the secondary city of Jos in Nigeria. In this study, 394 households are surveyed to test the assumptions implicit in Turner's model and distinguish permanent and temporary migrants (Hirse, 1984). The study findings show that contrary to the assumption by Turner (1968) that new migrants will settle in the city centre, most new migrants in Jos settled in the areas outside the inner city. Furthermore, the role of kinship relationships in facilitating the integration of new migrants was significant

in the case of Jos, although this aspect is not considered in Turner's model (Hirse, 1984). The prioritization of employment by Bridgeheaders, as argued by Turner, was confirmed in the case of Jos. However, decentralization of employment meant that jobs were concentrated not only in the city centre but also in the peripheries of Jos (Hirse, 1984). On consolidating in the city, Hirse (1984,p. 97) found that most of the respondents intended to go back to their hometowns after retirement. The study concludes that Turner's model cannot be applied without modifications, particularly in a context where migration is predominantly temporary.

2.4.3 Asian Context

Adianto et al. (2019) apply Turner's model in a study conducted in five kampongs[3] of Jakarta, Indonesia. Using data collected through questionnaires, the authors identify the demography of households and preferences behind housing choices. The study findings show a high preference for migrants to live near family or kin (Adianto et al., 2019). Living close to family or kin ensures that new migrants successfully adjust to city life. The authors find that new migrants would rather have a longer commute time to work than stay far from family or kin. Based on this finding, the authors propose a new stage before the Bridgeheader stage called "kindred campers" (Adianto et al., 2019). Overall, the study supports the other three stages in Turner's model while also giving insight into new migrants' preferences, particularly on the importance of family or kinship. The authors conclude that further research is required in more kampongs to get insight into the existing variations of housing preferences for low-income migrants.

To conclude, the application of Turner's model in the various contexts has tested the model's implicit assumptions and examined the extent of its validity. The empirical evidence from the different studies provides a relevant grounding on additional aspects to be considered in this research. Among the essential considerations is the possibility of identifying other migrant stages aside from the Bridgeheader-Consolidator-Status seeker stages proposed by Turner (1968). Drawing from Adianto et al. (2019), the kindred campers stage should be considered a pre-bridgeheader stage that caters to migrants prioritizing proximity to kinship groups over employment. Consequently, expanding the migrant stages also means broadening the housing priorities to include kinship ties, an aspect also highlighted in studies by Conway & Brown (1980) and Kliest & Scheffer (1981).

Empirical evidence from Hirse (1984) and Kliest & Scheffer (1981) suggests that the temporary nature of migration, particularly in the African context, needs to be acknowledged. Such an acknowledgement allows further distinguishing of households that may fall under the Bridgeheader stages into sub-groups of temporary migrants or pre-consolidating migrants. Applying this distinction within the context of this study caters to adapting Turner's model to allow for modifications based on relevant migratory characteristics.

[3] Kampong refers to a high-density urban settlement (Adianto et al., 2019).

2.5 Criticisms of Turner's Model

The following question is answered in this section;

1. How is Turner's Model critiqued based on the empirical evidence from the different studies that have applied the model?

Turner's model has been criticized based on empirical evidence from the different studies that have applied the model. Most of the criticism centres around the model's implicit assumptions.

One assumption made by Turner (1968) is that new migrants choose the central core as their entry point into the city to locate close to employment opportunities. Following a change in housing priorities over time, relocation occurs with a preference toward the city periphery. Accordingly, the periphery is not considered a point of entry for new migrants but is characterized by self-help housing built by low-income households seeking consolidation (Turner, 1968; Eyre; 1972). Studies by Morse (1971) and Ward (1976) support this assertion, particularly in the context of Latin American migration.

However, evidence in literature mainly points toward the diminishing role of the city centre as a point of entry for new migrants into the city (Harvey & Brand, 1974; Hirse, 1984; Gilbert & Varley, 1990; Wu, 2008). The declining role of the city centre is attributed to high population densities found in the central core, the expansion of commercial land uses, and urban renewal initiatives that call for slum clearance and relocation (Conway & Brown, 1980; Kliest & Scheffer, 1981; Wu, 2008; Patel et al., 2015). Simon (2008) provides evidence supporting the importance of peripheries in absorbing new migrants seeking to merge urban and rural livelihood activities

Another implicit assumption in Turner's model is the concentration of employment activities in the inner city that attracts first-time migrants. This assumption is valid as the search for employment is an important pull factor in rural-urban migration (Lyu et al., 2019; Hanif et al., 2020). A study of cities in South Africa by Harrison & Todes (2015) also confirms this assumption as it shows how city centres act as sources of employment opportunities for low-income groups, including those intending to venture into the informal sector. However, the proposition that jobs are primarily found in the city centre no longer applies in many contexts owing to the decentralization of employment as most industries are now located in the periphery area (Janssen, 1979; Hirse, 1984; Criekingen et al., 2007; Wu & Wang, 2021). The decentralization of employment further diminishes the attractiveness of the city core for Bridgeheaders.

Turner (1968) also argues that Bridgeheaders prioritize location in their search for housing in the city. However, studies show that this argument negates the role of kinship relationships in both the reception and further integration of new migrants (Conway & Brown, 1980; Hirse, 1984; Wu, 2008; Adianto et al., 2019). Upon arrival, most new migrants are received by their relatives or friends already established within the city. Thus, rural-urban migration is not a spontaneous process. Instead, a plan is created that includes

having contact points upon arrival in the city (Kliest & Scheffer, 1981). Once settled, the new migrants use their family contacts to secure jobs and slowly integrate into the urban system. Conway & Brown (1980) note that kinship ties may extend beyond just supporting the migrants' initial location in the city well into relocation to self-help housing. Sheng et al. (2019) argue the contrary, as they consider kin-based ties a potential constraint on the migrants' mobility decision making and long-term integration in the city.

The progression of migrants from Bridgeheader to Consolidator is an essential aspect of Turner's model. Turner (1968) considers the city as the ultimate destination such that a commitment to consolidate is expected from new migrants as they progress upwards in the social hierarchy (Kliest & Scheffer, 1981). However, studies have shown that consolidation is not the ultimate goal for most migrants who view the city as a temporary place of residence (Peil, 1976; Kliest & Scheffer, 1981; Hirse, 1984). Consequently, migrants may prefer renting accommodation while mobilizing resources to consolidate back in their hometowns (Kliest & Scheffer, 1981; Tacoli, 2002; Madhavan & Landau, 2011). The temporary nature of migration, particularly in the African context, likely suggests that consolidation is far-fetched, as Bridgeheaders may remain Bridgeheaders (Kliest & Scheffer, 1981; Hirse, 1984). Contrary to this, studies by Gilbert & Crankshaw (1999) and Posel & Marx (2013) provide evidence that the migrants may prefer to settle in the city instead of going back to their hometown.

Turner's model emphasizes upward socio-economic mobility as a necessary factor for the progression of migrants through the different stages. Contrary to this proposition, Kliest & Scheffer (1981) suggest that intra-urban mobility is not always linked to improved socio-economic conditions. Instead, sometimes intra-urban mobility can be an artificial process induced by slum clearance and relocation schemes (Kliest & Scheffer, 1981). A study by Yakubu et al. (2021) supports the notion of development-induced mobility of low-income residents in the case of Tamale, Ghana. Implementing infrastructure development works such as roads as part of urban upgrading resulted in the demolition and forced relocation of households living in Tamale. Patel et al. (2015) further note that displacement of households due to urban renewal and infrastructural projects may inadvertently result in their impoverishment as they are distanced from employment opportunities and better services.

2.6 Notable Additions to Turner's Model

This section answers the following questions using literature;

1. What are the notable additions to Turner's model?
2. How relevant are these model additions in light of current spatial reconfigurations of cities?

The application of Turner's model has meant that additional factors outside the model have been presented through the different studies.

One notable addition is the role of kinship and friendship ties in the intra-urban mobility of low-income groups (Klak & Holtzclaw, 1993). Several studies have confirmed the importance of considering kinship ties in intra-urban mobility (Conway & Brown, 1980; Kliest & Scheffer, 1981; Hirse, 1984; van Lindert, 1991; Wu, 2008; Adianto et al., 2019; Lin et al., 2020), a component neglected in the Turner model. The importance of kinship and friendship ties is seen to supersede the prioritization of proximity to employment opportunities by new migrants (Adianto et al., 2019). Therefore, considering this addition to the model provides a broader interpretation of the mobility process, particularly in contexts where rural-urban migration centres around extended family and kinship relationships.

Another notable addition is the decline in outward mobility from the city centre to the periphery, with intra-urban mobility occurring within the same area (Feldman, 1975; Ulack, 1983; Ward, 1990; Wu, 2010). According to Wu (2010), mobility is limited within the same area to reduce unfamiliarity and to continue taking advantage of already established connections. Therefore, Turner's city centre to periphery mobility argument may be irrelevant in such a context. Ulack (1983) notes that using the premise that mobility is limited in distance, the future mobility of low-income residents can easily be predicted.

According to Turner (1968), residential mobility is expected as households improve their social and economic conditions. However, as studies have shown, intra-urban mobility may be a consequence of forced relocation than upward economic mobility (Janssen, 1979; Kliest & Scheffer, 1981; Patel et al., 2015; Yakubu et al., 2021). As commercial land uses continue to expand (Wu, 2008) and urban authorities seek to invest in better city infrastructures, the destruction of cheap accommodation in the city centre due to urban renewal should be considered.

Lastly, the increase in density in informal settlement areas is more likely to contribute to heterogeneous migrant and shelter types (Klak & Holtzclaw, 1993). Thus, contrary to the proposition that Bridgeheaders will be found in the city centre and Consolidators will be located at the periphery, both or more migrant categories can be found within one settlement. Similarly, different shelter types can be found within settlements that are not restricted to geographic patterns argued in Turner's model (Conway & Brown, 1980; Klak & Holtzclaw, 1993). Therefore, taking into account the heterogeneity of migrant groups and shelter types would provide better insight into the housing geography of low-income groups.

The notable additions discussed above bear importance in how Turner's model is applied in this study. The role of kinship and friendship ties as a model addition is considered in the research as a housing priority that influences settlement choice. The premise that mobility is limited in distance and that outward mobility is declining provides support for conducting the research focusing on specific settlements and not at a city-wide scale. Conducting the study at a settlement scale is also supported by the assertion that migrant groups and shelter types are considerably heterogeneous within the informal settlements. Essentially, taking into

account the notable additions broadens the use and value of the model in understanding the priorities and mobility of low-income groups living in informal settlements.

2.7 Conclusion

Evidence from literature shows that Turner's model continues to be influential in housing studies, particularly in understanding the evolving housing priorities for low-income households in developing country contexts. Although research on the model's validity has criticized some of the implicit assumptions made by Turner (1968), the various studies have also provided evidence to support the model's applicability resulting in notable additions made to the model.

Drawing from Klak & Holtzclaw (1993), Turner's model should be considered an evolving model that can be applied to different contexts resulting in a better understanding of the urban- shelter-geography of low-income residents living in developing cities. Therefore, using empirical evidence, this research contributes to the existing body of literature on the applicability of Turner's model in understanding intra-urban mobility of low-income groups in Malawi.

In the succeeding chapters, the applicability of Turner's model to understand the intra-urban mobility of low-income residents in Lilongwe is tested. The study attempts to categorize residents according to the Bridgeheader-Consolidator-Status seeker stages. This categorization uses different indicators that influence intra-urban mobility to identify homogeneous groups of cases. These indicators (summarised in table 1 below) are derived from reviewing the qualitative characteristics prescribed to the different resident categories in Turner's model (section 2.3) and its application in the different contexts (section 2.4). The model provides no guidelines for identifying the three categories of residents. Consequently, the formulation and use of indicators to quantitatively determine resident groups constitutes this study's advancement from a qualitative characterization of Bridgeheaders, Consolidators, and Status-seekers inherent in Turner's model. Therefore, using such a systematic approach to identifying the different low-income residents can also be used by other studies that apply Turner's intra-urban mobility model.

Turner's three housing priorities of location, tenure security, and amenities are used to understand the priorities associated with each identified category of residents. As argued by Turner, priorities between long-term and short-term residents will vary depending on their socio-economic conditions. Such a distinction of housing priorities is also reflected in their current shelter type: cheap rented accommodation or self-help housing. Accordingly, the study also attempts to assess the expected change in housing priorities and shelter type as economic conditions change as part of the model's applicability in the informal areas of Lilongwe.

Objective 1: To apply Turner's Bridgeheader-Consolidator-Status seeker stages in categorizing residents in informal settlements of Lilongwe.

RQ 1. *Which indicators can be used to categorize residents*[4] *according to the Bridgeheader-Consolidator-Status seeker stages?*

Table 1: Summary of Indicators for the Categorization of Residents according to Turner's Model

Indicators	Sub-Indicator	Rationale
Financial costs	Rent levels	Access to cheap rental accommodation is an important consideration, particularly for new arrivals into the city who are unemployed (Turner, 1968; Klak & Holtzclaw, 1991). Based on Turner's model, new arrivals will likely locate within the city centre to access cheaper housing.
Location	Employment opportunities	The ability to generate income through work is a primary objective for new migrants (Turner, 1968). Therefore, new migrants prioritize location for better employment opportunities, enabling them to progress through the migrant stages.
	Employment location	Proximity to existing or potential employment opportunities is also considered a priority for new migrants into the city (Turner, 1968; Hirse, 1984; Wu & Wang, 2021).
Security of tenure	Tenure type	The differences in access to land and land tenure types in uncontrolled settlements lead to heterogeneity of shelter types within those settlements (Hirse, 1984). Individuals or households with temporary tenure rights will likely seek rental housing options over consolidation.
Amenities	Access to social facilities	Access to better neighbourhood and housing amenities is essential, particularly for status-seekers who form the top-tier low-income groups (Turner, 1964; Sheng, 1989).
	Road accessibility	
	Availability of water	
	Availability of electricity	
Other indicators	Length of residence	The length of residence is distinguished between Bridgeheaders and Consolidators, with the former expected to consolidate after the end of a decade (Turner, 1968; Klak & Holtzclaw, 1991).

[4] The term "residents" is used as a collective term, however, the study targeted one household member who self-identified as the household head or living with the household head.

Kinship ties	Kinship ties act as a source of social capital required for new migrants to get their foothold and further integrate into the city (Conway & Brown, 1980; Kliest & Scheffer, 1981; Hirse, 1984; Wu, 2008; Adianto et al., 2019).
Household size	Bridgeheaders are expected to be young, single individuals with limited family responsibilities who opt for cheap shared accommodation (Turner, 1968; Hirse, 1984; Klak & Holtzclaw, 1991). On the other hand, Consolidators require more spacious housing for their growing household.
Dwelling type	Shelter categories such as rented rooms, shared housing with friends or family, and owner-occupied housing are associated with the different categories of low-income groups (Turner, 1968; Klak & Holtzclaw, 1991).
Income	High-income levels allow individuals and households to search for and secure better housing conditions such that Bridgeheaders are expected to have very low income compared to Consolidators (Turner, 1968; Kliest & Scheffer, 1981).

*Indicators are derived from a literature review on the application of Turner's model. These indicators are used in generating clusters and interpreting these clusters according to the categories of residents proposed by Turner (1968).

Overall, determining the extent to which Turner's Bridgeheader-Consolidator- Status seeker categories are applicable in the context of Lilongwe provides empirical evidence to broaden the model's interpretation. More so, reflecting on the practical implications of the model on the existing slum upgrading policy and practice in the city of Lilongwe offers an opportunity to gain insight into the extent to which government initiatives and actions to improve informal settlements are aligned with the priorities of the intended beneficiaries.

3. METHODOLOGY

In this chapter, the methodology of the research is presented. The chapter starts with an introduction of the study area (section 3.1), followed by a description of the research design (section 3.2), data collected (section 3.3), data analysis to answer the research questions (section 3.4), and the ethical considerations (section 3.5).

3.1 Study Area

The research has been conducted in two informal settlements of Lilongwe, the capital city of Malawi. A review of literature on informal settlements in Lilongwe and liaising with an informant from Lilongwe City Council provided the basis for the selection of these case study areas. The first settlement is Mtandire, established in 1971 and located at 13°56'20.36" S, 33°44'32.80"E. Mgona is the second settlement established in 1982 and located at 13°54'20.29" S, 33°46'36.48" E (see figure 3 below).

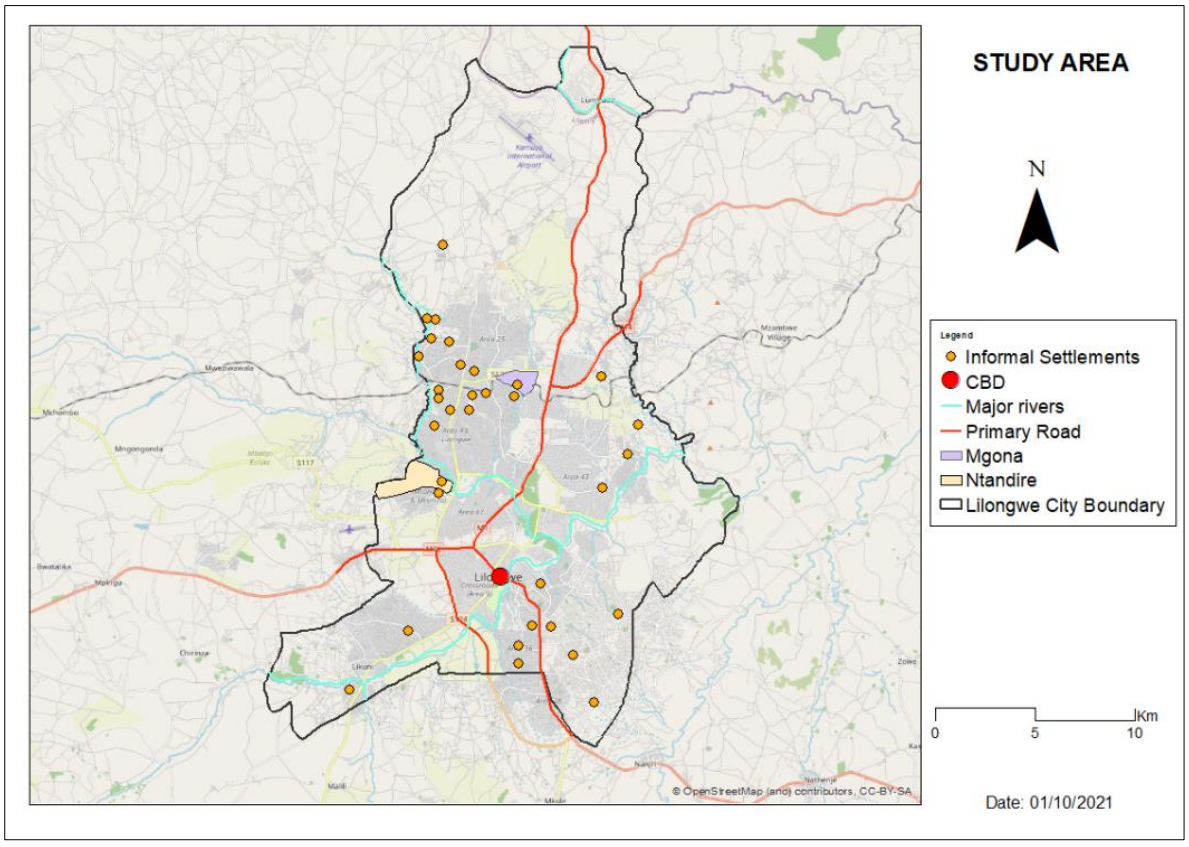

Figure 3: Location of informal settlements and selected cases

The two areas exhibit similar characteristics (see figures 4 and 5 below), such as heterogenous shelter types classified as permanent, semi-permanent, and traditional (National Statistical Office, 2009). Permanent housing is made of burnt bricks, concrete, or stones with iron sheets, tiles, or concrete roofing, while non-

permanent housing is made of sun-dried blocks of thatched roofing (National Statistical Office, 2009). Traditional housing has both non-permanent walls and grass-thatched roofing.

Photo credit: Rodney Bango

Figure 4: Mtandire Settlement

Photo credit: Rodney Bango

Figure 5: Mgona Settlement

Housing occupancy is also distinguished between homeowners and renters (Lindstrom, 2014). Aside from different housing and occupancy types, both settlements have a mix of customary, leasehold, and freehold tenure forms (Lindstrom, 2014, p. 14). Public services such as electricity and water in both areas are supplied by government parastatals, namely ESCOM and Lilongwe Water Board. However, access to these paid services varies amongst households depending on their income. The variations in housing and occupancy types, tenure forms, and access to public services ensure that evolving housing needs and priorities pertinent to this research are better studied. The two settlements also enable the comparison of housing priorities at different geographic locations in the city, with Mtandire situated close to the Central Business District (CBD) and Mgona relatively further from the CBD.

3.2 Research Design

The research design describes the approach used in investigating the applicability of Turner's Model to understand the intra-urban mobility of low-income residents in Mtandire and Mgona. A mixed-method

design integrates qualitative and quantitative approaches in the data collection and analysis process. A qualitative approach is adopted to obtain empirical data that captures people's perspectives on their housing priorities, reasons for settling in either settlement and future mobility aspirations. The data obtained is then quantitively analysed and interpreted within the contextual framework provided by the model.

3.3 Data collection

3.3.1 Primary Data

Household Survey

Primary data was collected from participating households using a semi-structured questionnaire (appendix 1). A summary table of the questions asked and the sources used in developing the questionnaire is provided in appendix 2. The questionnaire was generated using Epicollect 5, a free mobile data collection platform. Once completed, the questionnaire was published and accessed by the data collection team, who had downloaded the Epicollect 5 mobile app on their tablets. The data collection team, which comprised six people, was given online training before the data collection exercise started on administering the questionnaire and uploading the responses. When the data collection commenced, the team leader provided updates on the exercise at the end of each day, allowing for clarification on any survey questions or the use of the app. The data collection exercise was completed in ten days, and the data from the survey was available for download in CSV format.

Data was collected from 264 households living in Mtandire and 250 households from Mgona. Mtandire and Mgona are split into several small community blocks. Six blocks were selected in no particular order from each settlement, and each data collector was responsible for interviewing households within a single block. Since the survey was conducted during working hours, the data collectors mostly encountered women who were at home during this time while their spouses were at work or out doing business. Therefore, before administering the questions, the respondents who self-identified as not being the household heads were informed that the responses they would provide should represent the entire household. However, using the convenience of sampling households within a particular block may limit the generalization of the results for the whole population of Mtandire and Mgona.

Both migrant and native residents of Lilongwe city were targeted as participants in the survey because both groups are more likely to be subjected to relatively similar land and housing market conditions (van Lindert, 1991). As van Lindert (1991) further points out, there is no clear evidence that indigenous low-income households would have different housing priorities from low-income migrants to the city. The household survey provided data on socio-economic and dwelling characteristics, reasons for mobility and settlement choice, and housing aspirations of residents in Mtandire and Mgona.

Key Informants Interviews

Aside from the household surveys, interviews were also conducted with key informants. The informants included one local chief from each settlement and one official from the following institutions: Lilongwe City Council, the Department of Lands, Housing and Urban Development, Lilongwe District Council, and CCODE[5]. A summary table of the questions asked and the sources used in developing the interview questions are presented in appendices 3 and 4. The interview questions were generated using Epicollect 5, which provided an option of recording the discussion. Two of the six data collectors conducted the interviews because they understood the topic better and could easily translate the questions to the local language of Chichewa for the local chiefs. Six audio recordings for each interview were uploaded in Epicollect5 after the data collection exercise, and these were manually transcribed for use in the research.

The interviews with the local chiefs provided information on the historical development of the two settlements and their current conditions regarding housing, infrastructure development, and security of tenure. Interviews with officials from the different institutions provided information on the development of the settlements and significant infrastructure or tenure security improvements planned or already carried out in these areas. Additionally, the interviews provided information on the opportunities and legal limitations surrounding housing development and improvement in the informal settlements of Lilongwe.

3.3.2 Secondary Data

Spatial data sources (see table 2) were also used to generate the study area map (shown in figure 3), the migrant origin maps and the future mobility destinations of residents living in Mgona and Mtandire.

Table 2: Spatial data sources

No	Data	Data Type	Source
1	Lilongwe city Boundary	Vector	http://www.masdap.mw/
2	Roads	Vector	https://www.openstreetmap.org/
3	Major rivers	Vector	http://www.masdap.mw/
4	Building Footprints	Vector	https://www.openstreetmap.org/
5	Informal settlement boundary extents	Vector	Lilongwe City Council
6	Socio-economic data	-	Household survey
7	Malawi district boundaries	Vector	http://www.masdap.mw/
8	Water Bodies	Vector	http://geoportal.rcmrd.org/layers/servir%3Aafrica_water_bodies#license-more-above
9	African countries shapefile	Vector	http://geoportal.icpac.net/layers/geonode%3Aafr_g2014_2013_0

[5] Centre for Community Organisation and Development (CCODE) is a Malawian non-profit organisation that works in alliance with Federation of the rural and urban poor in Malawi on activities such as slum prevention and slum upgrading.

3.4 Data Analysis

3.4.1 Household Survey

A two-step clustering technique in SPSS is used to determine the categories of residents based on the variables presented in table 3 below.

Table 3: Input Variables for Categorization of Residents according to Turner's Model

No	Variable	Type
1	Dwelling type	Categorical (nominal)
2	Material type	Categorical (nominal)
3	Occupancy type	Categorical (nominal)
4	Road accessibility	Categorical (ordinal)
5	Access to social facilities	Categorical (ordinal)
6	Average monthly income	Categorical (ordinal)
7	Household size	Continuous
8	Length of residence	Continuous
9	Availability of water	Categorical (nominal)
10	Availability of Electricity	Categorical (nominal)

Using all the variables as direct input to generate clusters resulted in the formulation of poor clusters, as only four out of the ten variables were predominantly being used in the clustering. Although the other six variables had a low contribution to the formulation of the clusters, the inclusion of these variables still impacted the overall cluster quality. To resolve this problem, exploratory factor analysis was used, which reduced the nine variables to a smaller set of variables that could effectively be used in the clustering and resolve any multicollinearity problems that may have arisen.

Step 1: Categorical Principal Component Analysis

Dimension reduction for the categorical and binary variables was done using categorical principal component analysis (also known as CAPTCA), which uses an optimal scaling approach. Unlike a standard principal component analysis that assumes linearity between numeric variables, CAPTCA through optimal scaling, allows quantifying categorical variables based on non-linear relationships between these variables (Meulman et al., 2004; SPSS version 26 documentation). The transformation of nominal data is based on an optimal quantification (scoring), whereas for ordinal data, a monotonic spline (monotonic transformation) is applied to maintain the original order of the data (Meulman et al., 2004). The output from CAPTCA was a set of variables transformed into numerical variables. The transformed variables were then used as input in the exploratory factor analysis step.

Step 2: Exploratory Factor Analysis (EFA)

The outputs from the CATPCA plus the two continuous variables of household size and length of residence were used as input in the exploratory factor analysis (EFA). EFA is a dimension reduction technique used to reduce a large set of variables to a smaller set while retaining as much information as possible from the

original dataset (Field, 2018). EFA deals with the problem of dimensionality and multicollinearity of variables by combining variables into a small set of factors. One major assumption of EFA is the existence of latent factors which underlie the observed data (Osborne, 2014). Based on this assumption, EFA, unlike PCA, focuses on explaining covariances or the correlations between variables and not on explaining the cumulative variance in the variables (Field, 2018; Osborne, 2014). Evaluation of the EFA was done using the Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of sphericity. KMO values closer to 1 were considered acceptable while values less than 0.5 were unacceptable. A statistically significant value ($p \leq 0.05$) was required for Bartlett's test of sphericity.

Step 3: Cluster Analysis

Cluster analysis is a technique used to identify homogeneous groups that present similar characteristics in the two settlements. For this case, a two-step clustering method is used, which starts with the construction of a cluster feature (CF) tree that puts the first case or entry at the root of the tree, in a leaf node that holds the attributes for that particular case (Bacher et al., 2004). In the next step, the successive cases are either attached to the existing node or a new node based on the similarities between the cases and a distance measure that computes the probability of cluster membership (Șchiopu, 2010). A log-likelihood distance measure is used, which computes probabilities of cluster memberships based on one or more probability distributions (SPSS version 26 documentation).

The cluster analysis resulted in the formation of three clusters which were evaluated using the Silhouette Index and the Akaike Information Criterion (AIC) for model fit. The Silhouette Index (SI) shows the degree to which the cases are close within the cluster (cohesion) and how different the clusters are (separation). Interpretation of the three clusters is made according to Turner's Bridgeheader-Consolidator-Status seekers categories.

Descriptive Statistics

The second objective, which explores the housing priorities that influence settlement choice for the identified resident categories, uses descriptive analysis to generate frequency tables. Questions related to housing priorities, reasons for settlement choice and future mobility were open-ended, to which the respondents gave a wide range of responses. As a first step in the analysis, a frequency distribution of the responses was done to facilitate a thematic grouping. The thematic grouping of responses is guided by Turner's housing priorities of location, security of tenure, and amenities. Interview responses from key informants provide a broader settlement context that would explain why specific housing priorities are deemed more important than others.

Chi-Square Test of Independence

A chi-square test of independence was used to determine whether there is an association between housing priorities and the identified resident categories in each settlement. The chi-square test has two main assumptions related to independence and expected frequencies (Field, 2018). The assumption of independence states that each item only contributes to one cell in the contingency table, while the expected

frequencies assumption says that 2x2 contingency tables should not have expected counts less than 5. However, when an association is tested between three or more categorical variables, the rule is that all expected counts should be greater than 1, and no more than 20% of expected counts should be less than 5 (Field, 2018). A statistically significant association between housing priorities and resident categories means the null hypothesis that the variables are independent is rejected.

3.4.2 Key Informant Interviews

The transcribed interview responses from key informants are analysed using thematic analysis. Thematic analysis is a qualitative data analysis technique used to identify patterns or themes within the data (Maguire & Delahunt, 2017). Thematic analysis entails the identification of recurring responses within the data that can be grouped into different themes. The thematic grouping of responses, done in line with the housing priorities, aims to highlight the specific conditions underlying these priorities in Mgona and Mtandire. The analysis provided insights into the underlying conditions influencing mobility and settlement choice in the two informal settlements.

For the third objective, the applicability of Turner's model is evaluated by reflecting on the results from the categorization of residents and their housing priorities. The reflection allows for synthesizing the model's relevance and applicability in the context of Lilongwe. The housing priority findings are examined in light of the city's current slum upgrading policy and practice. Such an examination provides a basis for making recommendations on the best approach that combines the needs and priorities of the beneficiaries with the government's interventions and actions.

3.5 Ethical Considerations and Data Management

The ethical aspects of the research include obtaining full consent from the participants before administering the household survey and the interviews (see consent forms in appendix 5). Key informants were also explicitly asked for their permission to record the interviews. The data obtained from the household survey and interviews were anonymized to ensure privacy was maintained and respected. Secondary data is referenced and used according to the usage and dissemination guidelines specified for the data in case of educational purposes.

The data obtained from the household survey was stored in the form of a CSV format, while transcribed interviews were stored in Ms Word format. Secondary data in the form of spatial data sets were stored as shapefiles (.shp). Following the completion of the research, open source data (spatial data sets) will be deposited in the ITC DANS Easy repository. Sharing of the household survey and interview data would require permission from participants in accordance with the General Data Protection Regulation (GDPR) guidelines.

4. RESULTS

This chapter presents the research findings in line with objectives 1 and 2 of the study and the research questions posed under each objective.

4.1 Characteristics of Respondents

4.1.1 Socio-Economic Characteristics of Respondents

The socio-economic characteristics of the respondents are presented in table 4 below. For Mtandire and Mgona, the highest proportion of respondents are female[6] and within 20-40 years. Primary education is the highest level of education for most residents living in the two settlements. The average monthly income significantly varies among residents, which can be attributed to differences in income sources (see figure 6). Despite the various sources of income, most residents in both settlements mainly earn their living from wage employment, owning a business, and day labour jobs.

Table 4: Socio-Economic Characteristics

	Mtandire (n=264)	**Mgona (n=250)**
Age	**%**	**%**
< 20 years	5	6
20-40 years	70	76
40-60 years	20	13
>60 years	5	5
Missing values	0	0
Gender		
Female	75	83
Male	25	17
Education level		
No formal education	4	6
Primary level	52	64
Secondary level	40	31
Tertiary level	5	0
Household size		
Avg. Household size	5	5
Average Monthly Income (1 Malawi Kwacha = 0.0012 Euro)		
< MK 20,000 (€ 23.44)	17	25
MK 20,000-40,000 (€ 23.44 - € 46.88)	28	29
MK40,000-60,000 (€ 46.88 - € 70.31)	19	24
>MK 60,000 (€ 70.31)	31	21
Missing values	4	1

[6] The high proportion of females compared to male respondents is attributed to the fact that data collectors mostly encountered women who were at home during working hours while their spouses were at work or out doing business.

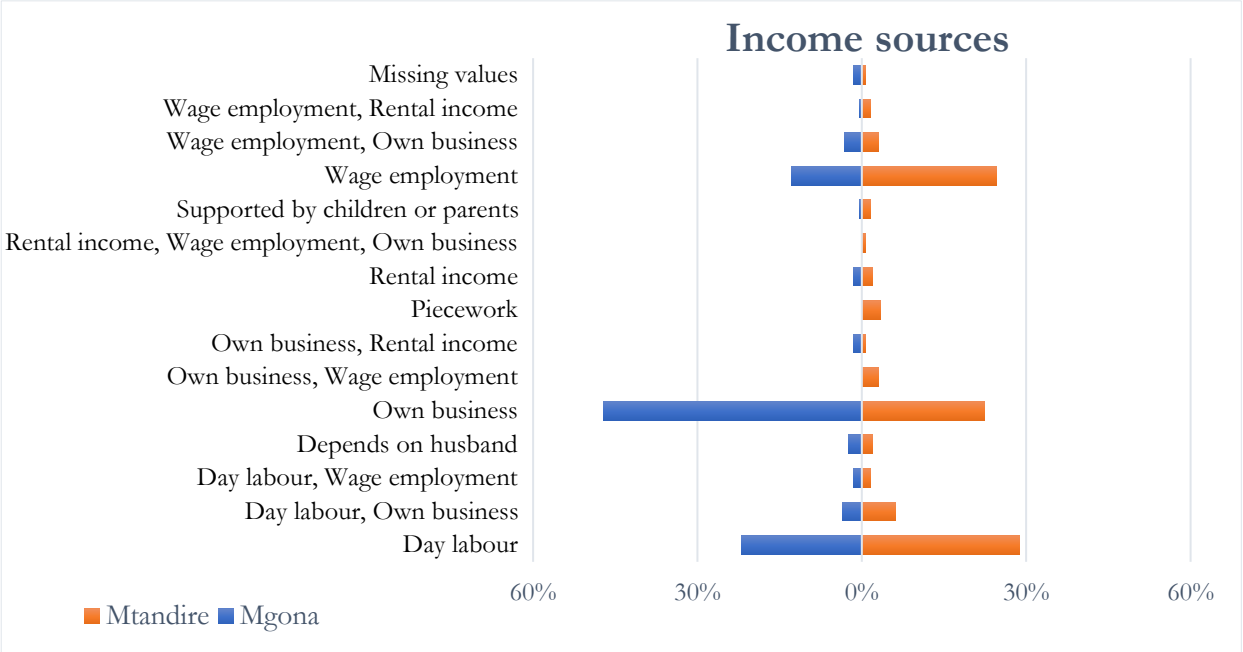

Figure 6: Income sources for respondents in Mgona and Mtandire

4.1.2 Dwelling Characteristics of Respondents

In terms of housing, semi-detached housing is the predominant type of housing, as is the use of semi-permanent materials for home construction (see table 5). The most common form of housing occupancy in both settlements is renting compared to homeownership. The majority of households also perceive a high level of tenure security, despite most of the land being held under customary tenure rights, which offer the right to own, use or dispose of land without formal documentation provided by a government statute. The presence of different housing amenities is noted in both settlements, but for the majority of households, the availability of amenities is limited to only sanitation facilities. Regarding neighbourhood amenities such as roads and social facilities, residents in Mtandire have good road accessibility compared to those living in Mgona. However, access to social facilities is quite limited for households in both settlements.

Table 5: Dwelling Characteristics

	Mtandire (n=264)	Mgona (n= 250)
Dwelling/shelter type	**%**	**%**
Detached	47	33
Semi-detached	48	62
Missing values	5	5
Shelter material type		
Permanent	29	23
Semi-permanent	66	68
Traditional	4	9
Missing values	1	0
Occupancy type		
Living with friends/family	2	0
Owner and tenants	0	2
Owner-occupied	30	25
Rented	68	73
Missing values	0	0
Land tenure status		
Customary	72	82
Freehold	2	0
Leasehold	2	1
Don't Know	24	17
Amenities		
Sanitation facilities	39	68
Water	1	0
Electricity	2	0
Water, Sanitation facilities	14	2
Water, Electricity	2	1
Electricity, Sanitation facilities	14	15
Water, Electricity, and Sanitation facilities	21	12
None	7	2
Road accessibility		
Very low	18	33
Low	10	5
Moderate	30	24
High	34	27
Very high	8	10
Missing values	0	1
Access to social services		
Very low	41	34
Low	18	8
Moderate	7	20
High	16	25
Very high	18	13
Missing values	0	0
Level of tenure security		
Very Low (Less secured)	14	10
Low	18	20
Neutral	8	15
High	20	28
Very high (More secured)	40	24
Missing values	0	3

4.1.3 Migration Characteristics

Households are distributed based on migrant and non-migrant categories for Mgona and Mtandire. For Mgona and Mtandire, the percentage of migrants is 65% and 69%, respectively. Native residents account for 35% in Mgona and 31% in Mtandire. The spatial distribution of migrant origins shows that more than half of the residents that migrated to Mgona and Mtandire come from the southern region of Malawi (figure 7). The origin-destination network also reveals that some migrants living in the two settlements come from neighbouring countries like Mozambique, Tanzania, and Zambia.

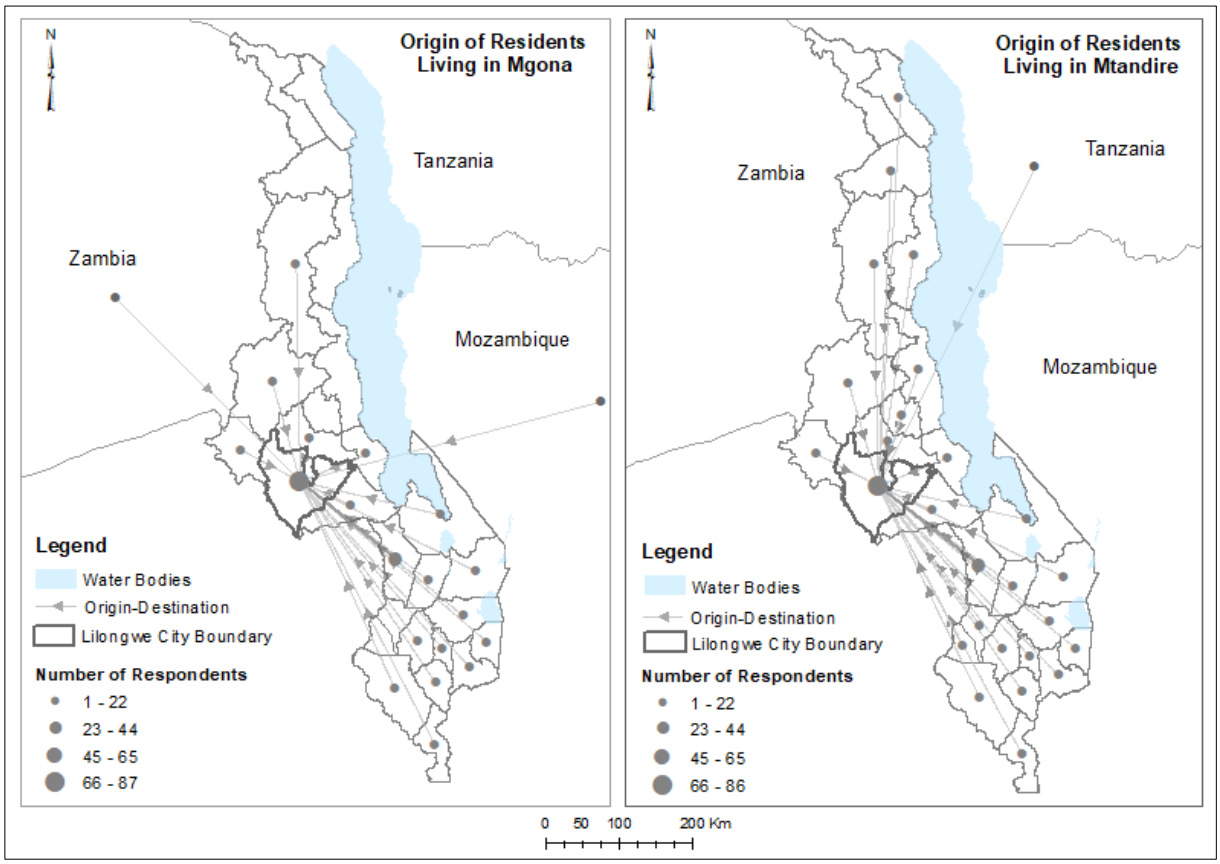

Figure 7: Origin of residents living in Mtandire and Mgona

4.2 Categorization of Residents in Mgona and Mtandire according to Turner's Model

Objective 1: To apply Turner's Bridgeheader-Consolidator-Status seeker stages in categorizing residents in informal settlements of Lilongwe.

RQ 2. *What are the categories of residents based on the identified indicators?*

RQ 3. *What other resident categories can be identified beyond the Bridgeheader-Consolidator-Status seeker stages?*

The clustering of households was based on factors extracted using an exploratory factor analysis (EFA). As an output, the EFA resulted in the extraction of three factors (see factor matrix in appendix 6) based on the Eigenvalue rule (Eigenvalues > 1 are retained in the factors analysis). The appropriateness of the EFA was evaluated based on an acceptable output from the Kaiser-Meyer-Olkin test (KMO= .623) and Bartlett's test of sphericity which showed a statistically significant value(sig =.000). Based on a threshold value of 0.4, the

variables of occupancy type, length of residence, dwelling type, and household size strongly contribute to **factor 1**. The variables that strongly contribute to **factor 2** include average monthly income, access to social facilities, and road accessibility. **Factor 3** constitutes variables of availability of water and availability of electricity. These three factors were then used as input in the cluster analysis.

The cluster analysis resulted in a three-cluster solution with an overall good cluster quality (Silhouette Index = 0.5) and a good model fit evaluated based on the AIC values (see appendix 7). The three clusters generated are interpreted according to Turner's Bridgeheader, Consolidator, and Status seeker resident categories (see figure 8 and table 6 below). The results show that households in Mtandire and Mgona fall within two out of the three resident groups proposed in Turner's model. The identified groups are Bridgeheaders, who are further classified into two types, and Consolidators. From the results, Bridgeheaders types 1 and 2 are more dominant in Mgona, while most Consolidators are in Mtandire.

Bridgeheaders type 1 are predominantly renters living in semi-detached housing made of semi-permanent materials such as a mix of mud blocks and iron sheets. About 34% of type 1 Bridgeheaders have access to electricity, while only 17% have access to water amenities. Bridgeheaders type 1 have, on average, the shortest length of residence and less number of people per household compared to the other resident categories. At least one-third of type 1 Bridgeheaders have an average monthly income of more than MK 60,000 (€70.31). The predominant transport-related asset for households in this category is a bicycle, although public transportation usage is higher than cycling, which may be due to the longer commute time to work (more than 50 minutes).

Bridgeheaders type 2 are also predominantly renters living in semi-detached housing constructed using semi-permanent materials. About 28 % of type 2 Bridgeheaders have access to electricity, while only 27% have access to water. On average, type 2 Bridgeheaders have lived in the settlements three years longer than type 1 Bridgeheaders, although their household size is approximately the same. Average monthly income also differs significantly between the two categories of Bridgeheaders as more than one-third of type 2 Bridgeheaders earn less than MK 20,000 (€ 23.44). Bicycles are also the primary transport-related asset for residents in this category, although unlike Bridgeheaders type 1, the commute time to work is shorter (less than 30 minutes), which may explain why walking is the preferred mode of transportation.

Consolidators are primarily homeowners living in detached housing constructed mainly using semi-permanent materials. Compared to Bridgeheaders, the ratio between households with electricity and water and households without these amenities is significantly higher. Consolidators have an extended length of residence, with an average of 28 years, and a larger household size than Bridgeheaders. Regarding their average monthly income, at least one-third of Consolidators earn more than MK 60,000 (€70.31). Similar to Bridgeheaders type 1 and 2, bicycle ownership is higher than other transport-related assets. Also, like type

2 Bridgeheaders, a short travel time to work for most households makes walking the prevalent means of transportation among Consolidators.

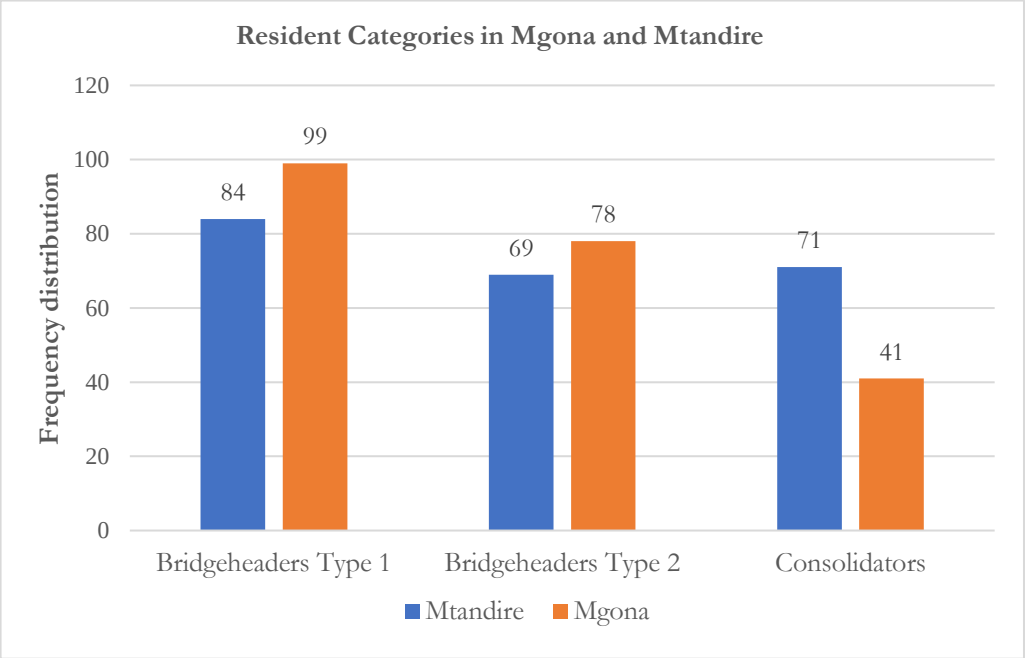

Figure 8: Distribution of Resident Categories in Each Settlement

Table 6: Housing and Economic Characteristics of Residents in Each Category

Characteristics	Mtandire (N = 264)			Mgona (N = 250)		
	Bridgeheaders Type 1 (N=84)	Bridgeheaders Type 2 (N=69)	Consolidators (N=71)	Bridgeheaders Type 1(N=99)	Bridgeheaders Type 2 (N=78)	Consolidators (N=41)
	%	%	%	%	%	%
Dwelling Type						
Detached	25	46	85	21	21	80
Semi-detached	75	54	15	79	79	20
Material Type						
Permanent	23	29	37	27	14	32
Semi-permanent	76	64	58	70	74	51
Traditional	1	7	6	3	12	17
Occupancy Type						
Living with friends/family	0	1	4	0	0	3
Owner & Tenants	0	1	0	0	3	8
Owner-occupied	0	6	93	3	13	86
Rented	100	92	3	97	85	3
Availability of:						
Sanitation facilities						
Yes	94	81	85	96	100	98
No	6	19	15	4	0	2
Water						
Yes	24	36	56	11	21	17
No	76	64	44	89	79	83
Electricity						
Yes	37	28	51	31	27	24
No	63	72	49	69	73	76

Access to social facilities						
Very low	0	99	46	0	100	7
Low	43	0	14	15	0	15
Moderate	8	0	8	30	0	32
High	31	1	11	35	0	29
Very High	18	0	20	19	0	17
Average Monthly Income						
< MK20,000 (€ 23.44)	6	33	23	5	53	32
MK20,000 - 40,000 (€ 23.44 - 46.88)	27	42	25	30	29	22
MK40,000-60,000 (€ 46.88 - 70.31)	29	4	17	35	10	15
>MK60,000 (€ 70.31)	38	20	35	30	8	32
Average Length of Residence	10 years	11 years	28 years	9 years	14 years	28 years
Average Household Size	4	4	6	4	4	6
Transport-related assets						
Bicycle	26	15	25	27	2	12
Car	1	1	2	0	0	0
Motorcycle	2	5	4	0	1	0
Travel time to work (in minutes)						
< 30	21	42	50	35	76	50
30-40	16	16	18	29	19	14
40-50	7	9	7	9	3	14
> 50	56	33	25	28	3	23
Travel mode to work						
Cycling	18	14	18	5	1	10
Driving	1	5	4	10	8	7
Public transport	38	21	24	66	38	34
Walking	42	60	53	19	53	49

4.3 Current Housing Priorities that Influence Settlement Choice

Objective 2: To explore the housing priorities that influence settlement choice for residents within each identified category.

RQ 1: *What are the housing priorities associated with each category of residents?*

The choice to settle in Mtandire or Mgona is influenced by different housing priorities. Table 7 below shows the housing priorities associated with Bridgeheaders and Consolidators. From the results, mobility and choice of settlement for the majority of type 1 Bridgeheaders from Mtandire and Mgona is determined by financial costs such as wanting to pay for cheap housing rentals. According to the local chiefs in Mgona and Mtandire, the availability of affordable rental housing attracts new residents to the settlements and makes them stay for an extended period. For example, the local chief from Mgona made the following remark with regards to access to cheap rental housing in the settlement;

"*When someone comes to live in Mgona, for example, if they are transferred from Blantyre for a job at Kanengo industrial area, they set up roots in Mgona. Even if they have no formal employment, it is easy to get day jobs at Kanengo, such as loading or offloading goods. Staying in Mgona is made possible by how cheap the rentals are compared to other areas. People only get to move when their companies transfer them to a different area".*

A representative from CCODE, an NGO working on slum upgrading and slum prevention, notes that "*people are not willingly attracted to Mtandire or Mgona. However, these areas provide affordable housing options for low-income families in Lilongwe*." While the sentiment shows the need to access cheap rental housing is a priority among households, settling in the Mtandire or Mgona is seen as a lack of options rather than a choice.

For type 2 Bridgeheaders in Mgona, other factors such as avoiding disagreements with neighbours or the landlord and living in a low-flood risk area form the highest priority. Type 2 Bridgeheaders in Mtandire consider minimizing housing costs as a priority, similar to type 1 Bridgeheaders in the settlement.

The majority of Consolidators in both settlements that provided their reasons for settlement choice consider tenure security their highest housing priority. However, based on the interview with CCODE, "*tenure security in the two settlements is considered in terms of residents owning their homes and not really about land ownership. This is because Mgona is located on private land owned by private companies, while Mtandire is located on public land owned by the Government".* Regardless, most Consolidators prioritise tenure security through homeownership which is guaranteed by the land transaction agreement made with the local chiefs who are responsible for allocating the land.

Table 7: Current Housing Priorities for Each Category of Residents in Mgona and Mtandire

			Mgona				Mtandire			
			Bridgeheaders Type 1 (N=99)	Bridgeheaders Type 2 (N=78)	Consolidators (N=41)	Chi-square test	Bridgeheaders Type 1 (N=84)	Bridgeheaders Type 2 (N=69)	Consolidators (N=71)	Chi-square test
Housing Priority	**Priority sub-group**	**Reasons for settlement choice**	**%**	**%**	**%**	P-value	**%**	**%**	%	P-value
Financial costs	**-**	Cheap rent	32	9	0	0.02**	46	32	0	0.001***
Location	Economic opportunities	For better job opportunities For better business opportunities	16	9	0		7	9	0	
	Proximity	Proximity to work Proximity to place of business	1	3	2	0.06*	2	6	0	0.01**
	Attractiveness	I wanted a change of location	4	8	0		4	7	0	
Living with friends/family	-	To live with friends Followed spouse	5	6	5	0.56	8	12	4	0.25
Security of tenure	-	I moved into my own house	0	3	29	0.001***	0	1	41	0.001***
Amenities	-	For better amenities Wanted a bigger house	15	10	2	0.39	16	7	0	0.008
Other factors	-	Disagreements with landlord or neighbours, or spouse House affected by floods	13	30	0	0.001***	14	16	0	0.02**
Missing responses			14	22	62		3	10	55	

*** P < 0.01, **P <0.05, *P < 0.1. Based on the chi-square test, a statistically significant association (p < 0.05) between housing priorities and resident categories means the null hypothesis that the variables are independent is rejected. Location sub-priorities (economic opportunities, proximity, and attractiveness) are combined for the chi-square test.

The emergence of the different housing priorities is enabled by specific conditions that influence residents' decisions to settle in Mgona and Mtandire (see table 8). The variation in rental housing prices, which allows households with different income levels to access housing in Mtandire and Mgona, is considered an important factor by local chiefs and urban practitioners. According to local chiefs in Mtandire and Mgona, individuals or households are mainly attracted by proximity factors, such as living close to places of work and business. On the other hand, urban practitioners from Lilongwe city council and the Ministry of Lands, Housing, and Urban Development regard the easy land acquisition process, access to cheap construction labour, and lack of adherence to planning guidelines as the most attractive factors influencing individuals or households' decision to settle in the two informal settlements.

Table 8: Specific Conditions for the Different Housing Priorities derived from Key Informant Interviews

Housing Priority	**Cost or Benefit to Residents**	**Specific conditions in each settlement**	
		Mgona	**Mtandire**
Financial costs	Benefit	• Rental housing costs between MK 10,000 (€ 12) – MK 60,000 (€ 70).	• Rental housing costs between MK 8,000 (€ 10) – MK 70,000 (€ 84).
Location	Benefit	• Proximity to Kanengo Industrial area (less than 1 km), which offers employment and business opportunities.	• Proximity to Lilongwe CBD (less than 5 km), which offers employment and business opportunities.
Living with friends/family	Benefit	-	-
Security of tenure	Benefit	• Land allocated by local chiefs. • Proof of land transaction provided by the local chief in the form of a signed and stamped agreement. • Average land costs around MK2 million (€ 2,000) compared to a high-density plot in a planned area which costs on average MK 5million (€6,000). • Average housing construction labour costs MK 140,000 (€ 168). • No requirement to submit buildings plans for scrutiny by physical planning committee.	• Land allocated by local chiefs. • Proof of land transaction provided by the local chief in the form of a signed and stamped agreement. • Land costs between MK 800,000 (€960) - MK 3 million (€ 3,600) compared to a high-density plot in a planned area which costs an average of MK 5million (€6,000). • Average housing construction labour costs MK 150,000 (€ 180). • No requirement to submit buildings plans for scrutiny by physical planning committee.
	Cost	• Settlement located on private land owned by private companies. • Possibility of eviction.	• Settlement located on public land owned by the Government. • Possibility of eviction.
Amenities	Benefit	• Supply of water and electricity by government parastatals. • Target settlement for National Slum Upgrading Programme (starting from 2022) which will include infrastructure interventions.	• Infrastructure interventions undertaken as part of the Informal Settlement Upgrading Programme (ISUP), implemented from 2010-2013. • Supply of water and electricity by government parastatals.
Other factors		-	-

4.4 Housing Priorities for Long-Term and New Residents in Mgona and Mtandire[7]

RQ 2. *How have housing priorities of long-term residents changed since settling in the area?*

RQ 3. *How did the housing priorities of new residents change from their last place of residence?*

Aside from determining the categories of residents based on Turner's model, households are also distinguished based on how long they have lived in the area, as shown in table 9. The distinction between long-term and new residents provides insights into whether housing priorities differ as households live in the settlement over an extended period. The results show that at least 80% of households have lived in the two settlements for more than three years. Furthermore, the majority of new residents from both settlements consider location as their highest housing priority. Security of tenure is a priority consideration among 5% of new residents in Mtandire, while no household in Mgona has that consideration. The need to lower financial costs by accessing cheap rental housing is the highest priority among the majority of long-term residents in Mtandire. On the contrary, most long-term residents in Mgona prioritize other factors such as wanting to avoid conflicts with neighbours, the landlord or spouse, and the need to live in a low flood risk area.

Table 9: Housing Priorities for Long-Term and New Residents in Mgona and Mtandire

	Mgona			**Mtandire**		
	New residents (N=40)	Long-term residents (N =178)	Chi-square test	New residents (N = 40)	Long-term residents (N = 184)	Chi-square test
Housing Priority	%	%	P-value	%	%	P-value
Financial costs (i.e. cheap rent)	18	8	0.4	32	23	0.8
Location (i.e., proximity to work or business areas, to seek jobs or business opportunities).	68	11	0.001***	40	7	0.001***
Living with friends/family	10	5	0.5	10	6	0.7
Security of Tenure	0	8	0.02**	5	15	0.01**
Amenities	5	14	0.03**	7	9	0.5
Other Factors (i.e., Disagreements with the landlord/spouse/neighbours, living in a settlement with low flood risk).	0	22	0.001***	3	12	0.02**
Missing responses	-	33	-	3	28	-

*** $P < 0.01$, ** $P < 0.05$. A statistically significant association ($P < 0.05$) between the housing priorities and resident types means the null hypothesis of variable independence is rejected, and the alternate hypothesis of dependence is accepted.

[7] Long-term residents are considered as those who have lived in the settlement for more than 3 years while new residents have lived in the area for less than 3 years.

4.5 Expected Housing Priorities for the Different Resident Categories In 5 years

RQ 4. *How do residents expect their housing priorities to change in the next five years?*

Future housing priorities for Bridgeheaders and Consolidators in Mgona and Mtandire are presented in table 10 below. About 49% of type 1 Bridgeheaders in Mgona and 55% of type 1 Bridgeheaders in Mtandire said they plan to relocate to a different settlement within Lilongwe city in the next five years. For most households in this category, the decision to move and settlement choice will be mainly influenced by the attractiveness of the target locations. Regarding attaining security of tenure through consolidation, fewer type 1 Bridgeheaders in Mtandire intend to consolidate within the settlement than type 1 Bridgeheaders in Mgona.

For type 2 Bridgeheaders in Mgona, at least 80% intend to relocate to a different settlement within the city compared to 65% of type 2 Bridgeheaders in Mtandire with a similar intention. Although the proportion of type 2 Bridgeheaders planning to relocate is higher for Mgona than Mtandire, location attractiveness is a common relocation factor amongst most type 2 Bridgeheaders in the two settlements.

Different from the Bridgeheaders, most of the Consolidators in Mgona and Mtandire have no intention of leaving the settlements. However, for the few Consolidators who would like to move from Mgona and Mtandire, their mobility decision will be highly determined by economic opportunities and the attractive attributes of their chosen destination areas which include security, quietness, and less congestion.

A chi-square test of independence to determine the significance of association between future housing priorities and the resident categories was not done due to a violation of the expected frequency assumption of the chi-square test. For the chi-square test to be valid, not more than 20% of the expected frequencies should have a value less than five. As a remedial measure to this problem, some housing priorities can be combined to increase the expected frequency value. However, this would not be meaningful since determining the variations in housing priorities of low-income households is an essential aspect of the study.

Table 10: Future Housing Priorities for Residents in Mgona and Mtandire in the next five years

			Mgona			Mtandire		
			Bridgeheaders Type 1 (N=99)	Bridgeheaders Type 2 (N=78)	Consolidators (N=41)	Bridgeheaders Type 1 (N=84)	Bridgeheaders Type 2 (N=69)	Consolidators (N=71)
Expected Priorities	**Priority-Sub group**	**Reasons for Future Mobility and Future Settlement Choice**	**%**	**%**	**%**	**%**	**%**	**%**
Financial costs	**-**	Cheap rent and cheap cost of living Cheap land	1	3	2	11	7	3
Location	Economic opportunities	Good location for business and employment opportunities Good location for farming	9	12	7	14	10	11
	Proximity	Proximity to family Proximity to work Proximity to my current settlement Proximity to CBD	9	3	0	7	9	4
	Attractiveness	The area is more secure The area is quiet The area is not congested The area is well planned It's where the city is expanding Good location to raise children The area is not affected by floods	18	39	7	12	19	13
Security of Tenure	-	That is where I built my house That is where I plan to build my house	6	1	0	1	3	0
Amenities	**-**	To access better social facilities To have access to better housing amenities Good road accessibility	3	4	0	5	4	6
Living with family		To live with family	0	0	0	1	0	0
Other Factors	-	It is my hometown To live far from the CBD To live far from family	2	4	0	4	3	3
No idea	-	-	0	14	0	0	1	0
No plan to move from the settlement			51	20	84	45	44	60

4.6 Future Mobility Locations

Residents in Mgona and Mtandire that intend to leave these settlements provided locations they aspire to move to (see figure 9). Out of 104 households from Mgona that gave a location for their future mobility, 58% would like to move to areas close to Mgona within a radius of 3.5 km. For residents in Mtandire who intend to move, 114 provided their destination areas within the city of Lilongwe. Out of 114, 61% plan to move to locations within an 8km radius of Mtandire. Interestingly, future mobility destinations for at least 90% of residents intending to relocate from the two informal areas are not other informal settlement areas but medium and low-density planned settlements such as area 47, area 25, area 43, and area 49. For residents planning to move from the two settlements, their planned future intra-urban mobility is quite limited in distance.

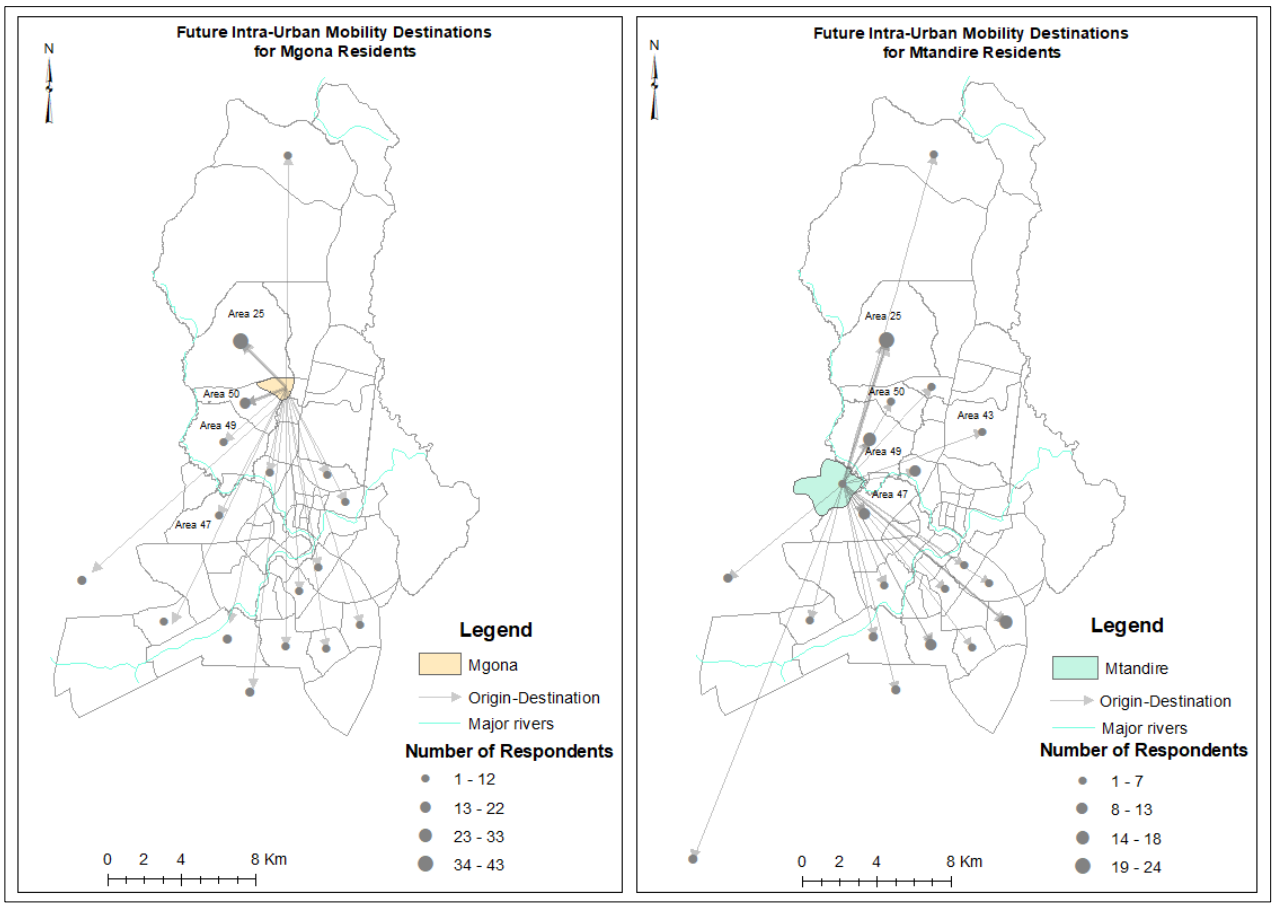

Figure 9: Future mobility destinations for Mtandire and Mgona residents

5. DISCUSSION

The implications of the research study based on the results presented above and existing literature are covered in this discussion section. First, research question 1 of objective 3 is covered (section 5.1), followed by a reflection on the identified current and future housing priorities that influence settlement choice (section 5.2 and section 5.3). In addition to reflecting on the applicability of Turner's model, the implications of the research findings are reviewed in light of the current slum upgrading policy and practice in Lilongwe City, Malawi (section 5.4).

5.1 Reflection on the applicability of Turner's Categories of Residents in the context of Lilongwe, Malawi

Objective 3: To reflect on the applicability of Turner's intra-urban mobility model and its practical application based on the research findings.

RQ 1. *To what extent are the Bridgeheader-Consolidator and Status seeker categories and their associated housing priorities applicable in informal settlements of Lilongwe?*

The applicability of Turner's model in the two informal settlements of Lilongwe is assessed based on the categories of residents and their housing priorities, the differences in economic conditions among the resident types, and their housing geography in the city.

Turner (1968) proposed three categories of low-income households: Bridgeheaders, Consolidators, and Status seekers. The application of Turner's model to the informal settlements of Lilongwe has resulted in the identification of the following categories; Type 1 and 2 Bridgeheaders and Consolidators (shown in figure 8). The limited availability of amenities to households and low-income levels in general limits the identification of status seekers. Although type 1 and type 2 Bridgeheaders share similarities, such as living in rented semi-permanent housing and having relatively similar household sizes, the two types of Bridgeheaders differ mainly in terms of their income, length of residence, and access to amenities (as shown in table 6). Consolidators in Mgona and Mtandire are predominantly homeowners living in self-constructed detached housing. Furthermore, on average, Consolidators have a larger household size and a longer length of residence, which are all aspects highlighted in Turner's model.

One of the model's assumptions is an upward shift in economic conditions as residents progress through the different categories. This assumption is assessed by checking if there are considerable differences in income between the two types of Bridgeheaders and Consolidators. The results in table 6 show a variation in income within and across all resident groups, contrary to Turner's assumption that Consolidators will have a higher income than Bridgeheaders.

The applicability of Turner's model in Mtandire and Mgona is also considered based on the housing geography of Bridgeheaders and Consolidators in Lilongwe city. The research findings show that Bridgeheaders are predominant in Mgona, while most Consolidators are in Mtandire. The predominance of

Bridgeheaders in Mgona and Consolidators in Mtandire can be attributed to the differences in land ownership between the two settlements. The interviews established that Mgona is located on private land owned by industrial companies while Mtandire is on public land, which the government owns (refer to table 8). From a possible eviction standpoint, the likelihood of eviction for residents in Mgona is considerably higher than for residents in Mtandire. The high possibility of eviction for residents in Mgona contributes to a low inclination to consolidate within the settlement and increases the chances of relocation among those intending to consolidate. This assertion is also noted by Hirse (1984), who states that differences in land tenure types in uncontrolled settlements result in heterogenous shelter types, and a likelihood for households with temporary tenure rights to seek rental housing over consolidation.

On a spatial level, Turner (1968) suggests that Bridgeheaders will locate close to the city centre while Consolidators will construct their self-help housing towards the city periphery. While Mtandire is located close to the CBD and Mgona in the city periphery, none of the settlements are located within a kilometre of the city centre. Despite this limitation, the high presence of both Bridgeheaders and Consolidators within the same settlement still points towards a housing-geography pattern different from the one proposed in Turner's model. The heterogeneity of low-income resident types within one area is also noted by Klak & Holtzclaw (1993) in the case of Quito, Ecuador.

In summary, the findings on the categories of residents in Mgona and Mtandire support the validity of the Bridgeheaders and Consolidator stages proposed in Turner's model. The results also show that contrary to Turner's assumption of considerable income differences between Bridgeheaders and Consolidators, income levels vary within and across the resident categories. Regarding the spatial distribution of Bridgeheaders and Consolidators in the city, the study finds that more than one shelter type and resident category can be found within an informal settlement. The finding is contrary to Turner's model assumption that Bridgeheaders will primarily be located in the city centre while Consolidators will be located in the periphery.

5.2 Current Housing Priorities and Settlement Choice

Turner (1968) proposes specific housing priorities for each category of residents. Thus, Bridgeheaders, Consolidators, and Status seekers will prioritize location, security of tenure, and amenities, respectively. Although having relatively different characteristics, both types of Bridgeheaders in the two settlements have similar housing priorities centred around location and accessing cheap rental housing. The prioritization of location by Bridgeheaders is supported in studies by Turner (1968), Hirse (1984), and Klak & Holtzclaw (1993). According to Turner (1968), security of tenure is a priority among Consolidators, an assertion also valid for Consolidators in Mtandire and Mgona. While the findings support Turner's proposed housing priorities for low-income groups, the results also show that housing priorities are not only specific to one group of residents. For instance, Bridgeheaders do not only prioritize location as they also have other housing preferences such as accessing better amenities, living with friends or family, avoiding conflicts, and living in low flood risk areas (as shown in table 7).

In addition to supporting Turner's proposed housing priorities, the results also confirm the importance of family or friendship ties, which is also noted in studies by Conway & Brown (1980), Kliest & Scheffer (1981), and Adianto et al. (2019). However, living with friends or family as a housing priority is not restricted to a specific group of residents described by Adianto et al. (2019) as "Kindred Campers." Instead, the results show that a small proportion of Bridgeheaders (type 1 and type 2) and Consolidators consider living with friends or family an important housing priority.

Aside from determining the different housing priorities for low-income households in Mtandire and Mgona, it is also important to note the specific conditions that make it possible for these priorities to emerge (shown in table 8). In the case of Mgona, new residents are attracted by the cheap rental accommodation and the settlement's proximity to the Kanengo industrial area. As noted in section 4.3., the local chief in Mgona observes that once someone moves to the area, the person is more likely to set up roots even if they have no formal employment. This is mainly due to the ease of getting day labour jobs such as loading and offloading goods at Kanengo. The proximity of Mtandire to the CBD makes it a prime location for new residents looking for cheap rental housing, employment, and business opportunities within a short distance of the city centre.

A combination of benefits such as cheap land prices, simple land transactions, cheap labour, accessible building materials, and no submission of building plans makes consolidation possible for residents who have lived in the settlements for an extended period (as depicted in table 8). Security of tenure for Consolidators in both settlements is mainly about owning their homes and not about having formal documentation for their land. As shown in table 8, land allocation in Mgona and Mtandire is done by the local chiefs, who provide proof of land transaction as a signed and stamped agreement in the presence of a witness. The signed agreement is considered adequate documentation for the land in lieu of formal land titles.

5.3 Housing Priorities Influencing Future Mobility and Settlement Choice

Aspirations for future residential mobility are influenced by housing priorities that households have with regard to the choice of settlement. However, the validity of future housing priorities is uncertain as these represent stated preferences rather than priorities based on the household's current available resources, opportunities, and limitations. Although the validity of future housing priorities may be uncertain, these priorities still give insight into what residents consider important when making their decision about housing and settlement choice.

Future mobility and settlement choice for Bridgeheaders and Consolidators intending to relocate will mainly be determined by pull factors such as the preference to live in quiet, more secure, well-planned, and less congested areas. Thus, the attractiveness of target locations based on these factors is considered more important than consolidation. Even though the intention to consolidate is low among households planning to relocate from Mgona and Mtandire, there is still a high inclination to continue living in the city (as seen

in figure 9), a finding also noted by Posel & Marx (2013). The preference to remain in the city over the long term may result in a change of priorities towards consolidation, as noted by Turner (1968).

Future mobility for most households planning to leave Mgona and Mtandire is limited in distance, a finding also noted in studies by Ulack (1983), Ward (1990), and Wu (2008). The fact that future destination locations that households aspire to move to are medium and low-density planned settlements shows dissatisfaction with living in informal areas. From a housing policy point of view, the discontentment of living in the informal settlements reflected in reasons for future mobility and settlement choice provides a good starting point for incorporating the needs and aspirations of low-income households within the current and future policies. From a future planning point of view, knowledge of future mobility destinations ensures that planning measures can be implemented to prevent the possible densification of these target locations.

5.4 Implications of the Research Findings on the Malawi Housing Policy, Malawi Urban Policy, and Malawi's Vision 2063

RQ 2. *What are the practical implications of the research findings on the current slum upgrading policy and practice in Lilongwe city?*

The findings from the research have practical implications on the slum upgrading policy and practice in Lilongwe city. The categories of residents identified and their associated housing priorities provide a basis for evaluating if the recently formulated housing and urban policies provide strategies that target the different groups of low-income households.

Although Malawi does not have an independent slum upgrading policy, informal settlements are considered a priority area in the Malawi Housing Policy (Government of Malawi, 2019a) and the Malawi Urban Policy (Government of Malawi, 2019b). The inclusion of informal settlements as priority areas in these policies points toward the need for the government to create solutions for low-income households living in these settlements. Some of the strategies proposed for informal settlements include;

- The provision of serviced land for housing of the urban poor.
- Promoting efficient financing and implementation of housing, infrastructure, and services.
- Officially recognizing and regularizing existing informal settlements located in appropriate sites.
- Setting up structures at national and local levels to coordinate slum upgrading initiatives.
- Mobilizing adequate finances for upgrading informal settlements.

Both policies call for an integrated and participatory community-driven approach to slum upgrading.

In practice, an in-situ upgrading approach focusing on infrastructure and service provision has been favoured in Lilongwe's few slum upgrading interventions. For instance, about ten years ago, Mtandire was one of the two targeted settlements for the Informal Settlement Upgrading Programme (ISUP) under the Lilongwe City Development Strategy Umbrella (Refstie & Hunga, 2015). The programme led to the improvement of roads, drainage systems, and the construction of water kiosks in Mtandire. However, the

project was only partially implemented and stopped two years before the planned completion date (Refstie & Hunga, 2015).

Based on the interview with one of the key informants from CCODE (result in table 8), it was established that Mgona is one of the target settlements for a MK1.2 Billion (approximately € 1.4 million) National Slum Upgrading Programme aimed at developing new housing and improving infrastructure in informal settlements. Although the project commencement date was not mentioned during the interview, it was clear that funding has already been secured by CCODE, who will implement the programme in conjunction with Lilongwe City Council.

From the strategies outlined in the policies and the slum upgrading practice, it is evident that the most targeted aspects in the improvement of informal settlements in Lilongwe are housing finance, security of tenure through issuing of titles, provision of serviced land, basic infrastructures, and services. From the research findings, identifying the different types of low-income groups and their housing priorities leads to the question of whether the strategies outlined in the policies and the general practice of slum upgrading comprehensively cater to the different low-income groups and their varying housing priorities.

For consolidators in the two settlements, issuing formal titles that guarantee tenure security ensures that households own their homes and land. Although consolidators in both Mtandire and Mgona perceive a high level of tenure security, the added formal documentation provided through the formal recognition and regularization would further strengthen their property rights and their ability to use their home as collateral which may encourage long-term home improvements (Payne et al., 2012; Bah et al., 2018). Land titling also benefits Bridgeheaders that intend to consolidate who will be guaranteed that their planned housing investment is protected.

The strategies outlined in the Malawi Urban Policy (Government of Malawi, 2019b), such as the provision of housing finance loans, supply of serviced land, infrastructure, and services, may act as incentives for Bridgeheaders intending to consolidate in the city. Based on the research findings, we note that the proportion of Bridgeheaders is higher compared to Consolidators and that most Bridgeheaders do not consider tenure security through homeownership a priority. However, since Bridgeheaders prioritize location based on the need to minimize financial costs by seeking cheap rental accommodation, reducing entry barriers to homeownership by increasing access to affordable land and housing finance can be a much-needed intervention that encourages more Bridgeheaders to consolidate.

Even though housing finance and supply of serviced land, infrastructure, and services would act as incentives for Bridgeheaders, it is essential to note that not all Bridgeheaders aspire to consolidate. So far, neither policies provide strategies for this group of low-income households that prefers renting over homeownership. Despite this, the lack of policy comprehensiveness can be seen as an opportunity to integrate slum upgrading policies with other policies that would provide complementary interventions, for example, in economic areas. Consequently, Bridgeheaders with no intention to consolidate can still benefit

from economic interventions that target skills development, employment creation, and small-scale business support. Such economic interventions are, for example, outlined in the Malawi Growth and Development Strategy III, under priority area 2: Education and skills development (Government of Malawi, 2017). Strengthening complementarity between slum upgrading policies and other economic policies or strategies broadens the capacity of using such policy instruments in dealing with the multi-faceted nature of challenges in informal settlements (Cities Alliance, 2021).

In addition to strengthening complementarity between policies, the preference for rental housing over incremental self-constructed housing by some low-income households should signal to the government that there is a need to create an enabling policy and economic environment for scaling rental housing development. Scaling of rental housing development can also be initiated by introducing social housing programmes that provide affordable rental housing. With clear guiding policies in place, the Government is more likely to incentivize and foster partnerships with other key players in the rental housing market to develop more affordable housing (Bah et al., 2018).

Lastly, Malawi's vision 2063 (National Planning Commission, 2021, p. 21), which captures the country's aspirations, stipulates that laws will be formulated to halt the development of informal settlements in Malawi under pillar 3: urbanization. One strategy presented in the vision is the establishment of schemes to promote the construction of low-income housing. However, to meet such ambitious aspirations of Malawi becoming a country with no or fewer informal settlements would require a continuous evaluation of changing housing priorities for low-income households and having these reflected in the various policies, strategies, and interventions.

5.5 Limitations of the Study

The research has the following limitations;

The study was conducted on a settlement scale and not a city-wide scale, which reduces the generalizability of the findings to other informal settlements in the city. This is due to the fact that informal settlements in Lilongwe city have different levels of development. While some settlements have very traditional housing, no access to public services, and have never been targeted for slum upgrading initiatives, others have mixed housing types, access to public services, and some upgrading initiatives have been initiated, or there is a plan for upgrading. For this study, the focus was on two settlements with mixed housing types, where households have access to some public services, and slum upgrading has either been undertaken or is planned. Thus, the level of development would also result in identifying different resident categories, housing priorities, and reasons for settlement choice depending on the specific conditions in each informal settlement.

The convenient sampling of households living in specific blocks in Mtandire and Mgona limits the generalization of the results to the rest of the population living in these two settlements. Aside from limiting the generalization of the findings, the sampling method also introduces bias as households were not

randomly selected from different blocks. Instead, the survey targeted households from a few selected blocks. These limitations could be rectified using random sampling, which reduces bias and increases the generalizability of the results. Regarding the sample, although each respondent represented the entire household, the predominance of female participants compared to male participants is considered a limitation as a more balanced distribution may have possibly yielded different insights on housing priorities and reasons for settlement choice.

Data collection was also done in the absence of the researcher due to covid-related travel restrictions. Although the data collection exercise was successful, the ability of the researcher to go to the field would have provided an opportunity for visual observations and interaction with the participants, which is helpful in better understanding the settlement context.

Another limitation is noted regarding the household survey questions, which capture responses on current and future housing priorities but not past housing priorities. Consequently, the results do not depict the change from past housing priorities to current housing priorities for households in Mtandire and Mgona. The validity of future housing priorities may also be uncertain as these may represent residents' ambitious aspirations, such as living in a low-density affluent neighborhood, rather than being based on their available resources, current opportunities, and limitations.

Future Research

I. The specific indicators used in this study are only derived based on the qualitative descriptions of resident categories made in Turner's model and its application in other contexts. However, Turner's model does not elaborate on how certain aspects of the model can be measured, such as upward socio-economic mobility, which is a prerequisite for progressing from one resident category to the next. As an advancement from the indicators used in this research, further studies can include additional indicators that can be used to determine the progression from one resident category to the next based on the upward or downward shift in socio-economic conditions.

   Aside from income and household size, which are used in this study, additional socio-economic mobility indicators such as education (i.e., the number of school years completed or highest level of degree obtained) and occupation may be considered. However, these indicators may not be straightforward in the context of informal settlements. Thus, depending on the settlement context, additional considerations might be needed, such as quality of education or informal rather than formal occupations. Additionally, data for the indicators would be required for two periods to determine whether there is an upward or downward shift in the household's socio-economic conditions over time.

II. This study focuses on two informal settlements in Lilongwe city. However, further research can be carried out on a city-wide scale to provide better insights into the different types of low-income

households, their housing priorities, and the spatial distribution of these households within Lilongwe.

III. Examination of housing priorities of low-income groups in other case studies can further expand the priorities based on specific conditions such as the COVID-19 pandemic. For instance, studies can explore housing priorities and residential mobility in informal settlements in light of physical distancing and hygiene COVID-19 safety guidelines.

6. CONCLUSION AND RECOMMENDATIONS

This chapter concludes the study by summarizing the main research findings in relation to the research objectives and questions and the contribution to the existing literature and practice. The section will also cover recommendations based on the study findings.

The study explored the applicability of Turner's model to understand the intra-urban mobility of low-income residents in Mgona and Mtandire informal settlements. The study found that low-income residents in the two informal settlements fall within the Bridgeheader and Consolidator categories of Turner's model. However, Status seekers who form the top-tier low-income group in Turner's model were not identified for the two informal settlements. Typically, Status seekers search for high amenities and have a higher income, which is not the case for low-income residents in Mtandire and Mgona. The study further distinguished Bridgeheaders into two subtypes (type 1 and type 2) based on differences in average income, length of residence, and level of access to amenities (section 4.3). The distinction of Bridgeheaders into type 1 and type 2 reflects a flexible adoption and modification of Turner's model that highlights specific low-income resident characteristics living in the two informal settlements of Lilongwe city.

The results also confirm the relevance of Turner's proposed location, security of tenure, and amenity housing priorities that influence mobility and choice of settlement. As argued by Turner (1968) and as found in this study, type 1 and type 2 Bridgeheaders prioritize location and cheap rental accommodation, while Consolidators prioritize tenure security. However, housing priorities are not specific to only one category of residents. Instead, there are variations in preferences within and across resident groups. For example, type 1 Bridgeheaders mainly prioritise accessing cheap rental housing, economic opportunities, and amenities, while type 2 Bridgeheaders prioritise access to affordable rental housing and avoiding conflicts with their neighbours or landlord.

The difference in land tenure status between Mgona and Mtandire also plays a role in the predominance of specific resident categories and their housing priorities in each settlement. As Mtandire is located on public land, with a low eviction pressure for residents, the informal settlement has more Consolidators who secure tenure through self-help housing construction. Mgona, on the other hand, is located on private land, with a high possibility of eviction, such that the settlement has more type 1 and type 2 Bridgeheaders who prioritize rental accommodation over self-help constructed housing. Although these variations in housing priorities are a reflection of what the different low-income residents consider important when it comes to housing and settlement choice, specific conditions within the city, such as the geography of employment and business opportunities and land allocation practices, play an essential role in enabling the emergence of the different housing priorities.

The findings also show how housing priorities that influence the choice of settlement change over time among low-income residents. Whereas reducing financial costs, accessing economic opportunities, and other factors such as avoiding conflicts with neighbours are currently the main priorities among type 1 and type 2 Bridgeheaders, their future mobility and settlement choice will largely be determined by attractive location characteristics such as security, quietness, and less congestion. Future prioritization of better living environments by type 1 and type 2 Bridgeheaders can be considered similar to Status seekers' priorities of better housing and environmental amenities. To satisfy these future housing priorities, predominantly medium and low-density planned settlements are noted as potential destination areas for households planning to relocate from Mgona and Mtandire. As Lilongwe is a rather sprawling city, relocation of low-income households from informal settlements to better-planned neighbourhoods would be at the expense of living closer to the city centre. Despite this trade-off in housing priorities and choice of settlement, the preference to remain in the city creates an opportunity for type 1 and type 2 Bridgeheaders to consolidate over time.

The study findings contribute to the existing literature on the applicability of Turner's model in understanding intra-urban mobility of low-income groups in cities of developing countries (Conway & Brown, 1980; Klak & Holtzclaw, 1991; Adianto et al., 2019). The study also contributes to a systematic method of identifying Turner's categories of low-income groups, which can be applied in other studies that make use of Turner's intra-urban mobility model. The identification of low-income groups using specific indicators is an advancement from Turner's qualitative characterization of Bridgeheaders, Consolidators, and Status-seekers. However, it is also clear that the characteristics of each group are not as crisply defined as Turner's model suggested.

Evidence from this study provides a basis for evaluating the extent to which the current slum upgrading policies align with the priorities of low-income residents in the informal settlements of Lilongwe. The evaluation of the housing and urban policies shows that the strategies covered within these policies would incentivize bridgeheaders to consolidate through initiatives that lower the entry barrier to homeownership. Consolidators would particularly benefit from the land regularisation provide through slum upgrading programmes. Even though the policies may not comprehensively cater to bridgeheaders with no intention to become homeowners, this group of low-income households can benefit from complementary economic interventions that promote scaling of rental housing development, skills improvement, job creation, and small-scale business support. Although the strategies outlined in the policies cater to the different resident categories, continuously evaluating the housing priorities of low-income groups should still be a prerequisite before implementing slum upgrading interventions.

Based on the results, the following recommendations should be considered;

1. Policymakers should formulate policies that promote the development of rental housing options that cater to low-income households that prefer renting over homeownership. These policies should be supported by an enabling economic environment that incentivizes different players in the housing market to provide affordable housing solutions for low-income groups.
2. Strategies to improve informal settlements should be complemented by other policies or strategies that, for example, cover economic interventions to ensure different low-income household priorities are considered.
3. The current water and electricity service gap in the two settlements should be prioritized as part of the planned slum upgrading infrastructure interventions. The water and electricity supply should meet the current high demand and also contribute to the settlement's attractiveness to new residents. However, for this to be achieved, there is a need for partnership between organisations working in slum upgrading, such as CCODE and government parastatals responsible for water and electricity supply i.e., Lilongwe Water Board and Electricity Supply Cooperation of Malawi.

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APPENDICES

Appendix 1: Household Survey

Settlement Name …….
Interviewer Name ……
Date of Interview ……..

SECTION 1: DWELLING CHARACTERISTICS

1. How do you describe your dwelling?
   a) Detached (i.e., a stand-alone house)
   b) Semi-detached (i.e., share a common wall with the next house)
   c) Room (s) of the main house
   d) Other (specify)
2. What type of materials is your dwelling made of?
   a) Permanent materials (i.e., iron sheets, brick walls, cement floors)
   b) Semi-permanent materials (i.e., Mix of permanent and traditional)
   c) Traditional materials (i.e., Grass thatched roof, mudbrick walls)
3. What is the tenure status of your dwelling?
   a) Owner-occupied
   b) Owner and tenants
   c) Rented
   d) Living with friends/family
   e) Other (specify)
4. Do you have other dwellings or room(s) in your house that you rent out?
   a) Yes
   b) No
5. What is the tenure status of the plot of land on which your dwelling is located?
   a) Freehold
   b) Leasehold
   c) Customary
   d) Don't know
6. Please respond to the following statement: " I fear that I will be evicted from my land" (on a scale of 1-5)?

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	2	3	4	5

7. What type of amenities does your dwelling have?
   a) Water
   b) Electricity
   c) Sanitation facilities
   d) All of the above
   e) None
8. How accessible is the main road from your dwelling (on a scale of 1-5)?

Very low	Low	Moderate	High	Very High
1	2	3	4	5

9. How accessible are social facilities (e.g., school, hospital) from your dwelling (on a scale of 1-5)

Very Low	Low	Moderate	High	Very high
1	2	3	4	5

SECTION 2: HOUSING PRIORITIES AND CHOICE OF SETTLEMENT

10. Were you born in this city?
    a) Yes
    b) No
11. If no, where were you born?
12. When did you move to this area?

For New-comers (Those who have lived in the area for less than three years)

13. Where did you live before moving here?
14. Why did you move from your previous residence?
15. Why did you choose to live here? (Choose all that apply)
    a) For better job opportunities
    b) Cheap rent
    c) To live with friends or family
    d) To live in my own house
    e) For better amenities (water, electricity)
    f) Other reasons (specify)

For Long term residents (Those who have lived in the area for more than three years)

16. Since first moving to the area, have you changed housing (i.e. moved from one house to another)?
    a) Yes
    b) No
17. If yes, why did you move from the last house?
18. What recent improvements (if any) have you made to your house?
    a) Painting and decorating
    b) Major renovations (e.g., changing the roofing or flooring)
    c) Extension of the house
    d) Other improvements (specify)

SECTION 3: HOUSING ASPIRATIONS

19. Do you intend on staying in the area for the next five years?
    a) Yes
    b) No
    c) Don't know
20. Have you acquired a plot for housing? (Question for those who do not live in their own housing)
    a) Yes
    b) Yes, but not in the area
    c) No

21. If the acquired plot is developed, do you plan to:
    a) Occupy it yourself
    b) Rent the house out
    c) Both (a) and (b) mentioned above
    d) Not sure
22. If you would like to move to a different area in Lilongwe, where would you move to?
23. Why would you move to the area mentioned above?
24. Do you think you will ever return to your previous residence? (Question for those that migrated to Lilongwe city)
    a) Yes
    b) No
    c) Don't know

SECTION 4: RESPONDENT SOCIO-ECONOMIC CHARACTERISTICS

25. Are you the household head?
    a) Yes
    b) No
26. What is your age?
27. What is your Gender?
    a) Female
    b) Male
    c) Other
    d) I prefer not to answer
28. What is your marital status?
    a) Single
    b) Married
    c) Divorced
    d) Widow/widower
    e) I prefer not to answer
29. What is your education level?
    a) Primary level
    b) Secondary level
    c) Tertiary level
    d) No formal education
30. If not the household head, what is your relationship with the head of the household?
    a) Spouse
    b) Son/daughter
    c) Parent of the head or spouse
    d) Other (specify)
31. How many people live in your household?
32. What is your household's main source(s) of income during the last 12 months? (choose all that apply)
    a) Wage employment
    b) Own business
    c) Rental income
    d) Pension
    e) Other (specify)
33. What is the average monthly income for your household?
    a) < Mk 10,000
    b) Mk 10,000 - 20,000
    c) Mk 20,000 – 30,000
    d) Mk 30,000- 40,000
    e) > Mk 40,000
34. Which of the following assets do you own? (choose all that apply)
    a) Smartphone
    b) Television
    c) Computer
    d) Refrigerator
    e) Electric stove
    f) Bicycle
    g) Motorcycle
    h) Car
    i) Other Assets (specify)

35. Compared to 5 years ago, has your income?
    a) Increased
    b) Decreased
    c) Remained the same
    d) Don't know
36. What major assets (if any) are you planning to acquire in the next five years? (Choose all that apply)
    a) A house
    b) Piece of land
    c) A car
    d) A motorcycle
    e) Other assets (specify)

37. How long does it take you to travel to your place of work?
    a) <30 minutes
    b) 30-40 minutes
    c) 40-50 minutes
    d) > 50 minutes
38. How do you usually travel to work?
    a) By walking
    b) By cycling
    c) By driving
    d) By using public transport
    e) Other mode (specify)
39. Compared to 5 years ago, has the distance to your place of work?
    a) Increased
    b) Decreased
    c) Remained the same
    d) Don't know

Appendix 2: Household Survey Question Sources

Dwelling Characteristics	
Question	Source
1. How do you describe your dwelling?	Developed by researcher
2. What type of materials is your dwelling made of?	
3. What is the tenure status of your dwelling?	
4. Do you have other dwellings or room(s) in your house that you rent out?	
5. What is the tenure status of the plot of land on which your dwelling is located?	
6. Please respond to the following statement: " I fear that I will be evicted from my land" (on a scale of 1-5)?	
7. What type of amenities does your dwelling have?	
8. How accessible is the main road from your dwelling (on a scale of 1-5)?	
9. How accessible are social facilities (e.g., school, hospital) from your dwelling (on a scale of 1-5)?	
Housing Priorities and Choice of Settlement	
10. Were you born in this city?	Developed by researcher
11. If not, where were you born?	Developed by researcher
12. When did you move to this area?	(Andreasen, 2016)
13. Where did you live before moving here?	(Limbumba, 2010)
14. Why did you move from your previous residence?	(Limbumba, 2010)
15. Why did you choose to live here? (Choose all that apply)	(Andreasen, 2016)
16. Since first moving to the area, have you changed housing (i.e. moved from one house to another)?	Developed by researcher
17. If yes, why did you move from the last house?	Developed by researcher
18. What recent improvements (if any) have you made to your house?	Developed by researcher
Housing Aspirations	
19. Do you intend on staying in the area for the next five years?	Developed by researcher
20. Have you acquired a plot for housing? (Question for those who do not live in their own house)?	(Hirse, 1984)
21. If the acquired plot is developed, what is your plan with the house?	(Hirse, 1984)
22. If you would like to move to a different area in Lilongwe, where would you move to?	(Andreasen, 2016)
23. Why would you move to the area mentioned above?	(Andreasen, 2016)
24. Do you think you will ever return to your previous residence? (Question for those that migrated to Lilongwe city)	Developed by researcher

Respondents Socio-Economic Characteristics	
25. Are you the household head?	Developed by researcher
26. What is your age?	
27. What is your Gender?	
28. What is your marital status?	
29. What is your education level?	
30. If not the household head, what is your relationship with the head of the household?	
31. How many people live in your household?	
32. What is your household's main source(s) of income during the last 12 months? (choose all that apply)	
33. What is the average monthly income for your household?	
34. Which of the following assets do you own? (choose all that apply)	
35. Compared to 5 years ago, has your income?	
36. What major assets (if any) are you planning to acquire in the next five years? (Choose all that apply)	
37. How long does it take you to travel to your place of work?	
38. How do you usually travel to work?	
39. Compared to 5 years ago, has the distance to your place of work?	

Appendix 3: Interview Questions for Local Chiefs and Question Sources

Initial settlement development	
Question	Source
1. When was the area developed?	Developed by researcher
2. Why did the area develop?	
3. Where did the first residents that settled in this area come from?	
4. What was the first residents main line of employment?	
5. How can you describe the residents living here now?	
6. What is the main line of employment for the current residents?	
Settlement change in the last ten years	
7. How would you describe the speed of development of the area over the years, fast, slow?	(Limbumba, 2010)
8. Why do you think the area has developed this way?	(Limbumba, 2010)
9. In what ways have urban authorities influenced the development of the area over the last 10 years?	(Andreasen, 2016)
10. What major changes (in the last ten years) have occurred in your area regarding housing, infrastructure and/or services, and tenure security?	(Andreasen, 2016)

11. Why do you think people are attracted to this area?	(Limbumba, 2010)
12. For how long do residents typically live here?	Developed by researcher
13. Do you notice any changes with regard to the socio-economic status of residents?	
14. What do you think makes this settlement the most attractive place to live in?	
Future settlement changes (5-10 years)	
15. In your opinion, what changes do you think will occur in the area in the next 5-10 years?	Developed by researcher

Appendix 4: Interview with the Key Informants and Question Sources

Settlement development	
Question	Source
1. How would you describe the speed of development of the area over the years, fast, slow?	(Limbumba, 2010)
2. Why do you think the settlements have developed this way?	(Limbumba, 2010)
3. What major improvements have been done in the areas with regard to housing, infrastructure, and services, tenure security? (within the past ten years)	(Andreasen, 2016)
4. Why do you think people are attracted to these informal settlements?	(Limbumba, 2010)
5. What opportunities exist for informal residents based on the following aspects; a) The location of the settlements b) Tenure security c) Access to better amenities (i.e., electricity, water, sanitation)	(Limbumba, 2010)
6. What are the legal limitations to housing development and improvement in informal settlements?	Developed by researcher
7. Are there any official plans for improvement or upgrading (now or in the near future)?	(Andreasen, 2016)

Appendix 5: Consent Forms for Household Survey and Interview with Key Informants

CONSENT FORM

Topic Title: Housing Priorities and Residential Mobility in Informal Settlements: The Cases of Mtandire and Mgona in Lilongwe, Malawi

This study is being conducted by:
Memory Kumbikano,
MSc student in Geo-information Science and Earth Observation specializing in Urban Planning & Management
Faculty of ITC, University of Twente
Enschede, Netherlands

I am conducting a study on **housing priorities and residential mobility in informal settlements** focusing on two settlements in Malawi, Mtandire and Mgona. The purpose of the study is to explore the intra-urban mobility of residents living in these areas and how their different priorities and preferences influence their choice of housing and settlement. You are being asked to participate in this study as a resident of this settlement whose insights are relevant for the realization of the research objectives.

If you agree to participate in this study, a questionnaire will be administered to you. Some questions would require explanations from you which will be noted down and/or recorded. Participation in this study is voluntary such that you are free to not answer any question or withdraw your participation at any time. There is no compensation associated with taking part in this study, therefore, any participation should be based on your willingness to do so. To ensure your privacy is respected, any personal information obtained that may result your identification as a participant as well as any recordings made will be stored securely with access limited to the researcher. Also, the representation of the information in the research will be fully anonymized.

Statement of Consent:

I have read the above information. I have asked questions and have received answers. I consent to participate in the study.

Tick if you;

☐ Agree ☐ Disagree

CONSENT FORM

Topic Title: Housing Priorities and Residential Mobility in Informal Settlements: The Cases of Mtandire and Mgona in Lilongwe, Malawi

This study is being conducted by:
Memory Kumbikano,
MSc student in Geo-information Science and Earth Observation specializing in Urban Planning & Management
Faculty of ITC, University of Twente
Enschede, Netherlands

I am conducting a study on **housing priorities and residential mobility in informal settlements** focusing on two settlements in Malawi, Mtandire and Mgona. The purpose of the study is to explore the intra-urban mobility of residents living in these areas and how their different priorities and preferences influence their choice of housing and settlement. You are being asked to participate in this study as a key informant whose insights are relevant for the realization of the research objectives.

If you agree to participate in this study, you will be asked questions which require explanations that will be noted down and/or recorded. The interview will take approximately **45 minutes** to complete. Participation in this study is voluntary such that you are free to not answer any question or withdraw your participation at any time. There is no compensation associated with taking part in this study, therefore, any participation should be based on your willingness to do so. To ensure your privacy is respected, any information obtained in the form of recordings will be made accessible only to the researcher and will be presented in an anonymous manner.

Statement of Consent:

I have read the above information and I consent to participate in the study.

Tick if you;

☐ Agree ☐ Disagree

Appendix 6: Factor Matrix Containing the Three Factors used in the Cluster Analysis

Variables	Factor		
	1	2	3
Occupancy type	.751	-.310	.039
Length of residence	-.606	.198	-.172
Dwelling type	.518	-.243	.017
Household size	-.423	.218	.029
Material type	.204	.057	.042
Access to social facilities	.360	. 778	-.079
Road accessibility	.206	.673	-.063
Average monthly income	.320	.450	.223
Availability of water	-.175	-.034	.680
Availability of electricity	-.081	.109	.614
Extraction Method: Principal Axis Factoring. a. 3 factors extracted. 19 iterations required.			

Appendix 7: Akaike's Information Criterion for Model Fit of the Three-Cluster Solution Output

Auto-Clustering				
Number of Clusters	Akaike's Information Criterion (AIC)	AIC Change[a]	Ratio of AIC Changes[b]	Ratio of Distance Measures[c]
1	929.612			
2	719.199	-210.413	1.000	1.112
3	531.163	-188.036	.894	2.051
4	445.651	-85.512	.406	1.332
5	384.442	-61.208	.291	1.008
6	323.789	-60.654	.288	1.559
7	289.175	-34.614	.165	1.598
8	272.013	-17.162	.082	1.335
9	262.176	-9.837	.047	1.308
10	257.486	-4.690	.022	1.441
11	257.906	.421	-.002	1.026
12	258.623	.716	-.003	1.148
13	260.793	2.170	-.010	1.326
14	265.381	4.588	-.022	1.003
15	269.991	4.610	-.022	1.289
a. The changes are from the previous number of clusters in the table.				
b. The ratios of changes are relative to the change for the two cluster solution.				
c. The ratios of distance measures are based on the current number of clusters against the previous number of clusters.				