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Navigating affordability challenges and opportunities in mixed-income housing: a case study of Cornubia in South Africa

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ABSTRACT

This article offers a comprehensive exploration of the complex dynamics within the Cornubia mixed-income housing development. Positioned as a microcosm of challenges in creating sustainable living environments for affordable housing, the paper navigates through theoretical discussions to propose actionable strategies. The study employs a rigorous qualitative methodology rooted in a relativist perspective, utilizing semi-structured interviews, context-sensitive approaches, and local collaboration to delve into participants' affordability challenges and the constraints/limitations of living in the Cornubia mixed-income housing. The findings, driven by the experiences of 254 low-income residents, illuminate two key themes on affordability: high living costs and affordable living in Cornubia. Findings highlight three factors that exacerbate high costs of living: Electricity, Water, and Transport. These multifaceted challenges underscore the urgent need for targeted interventions. In the context of sustainable development, the study identifies key areas for lasting impact, aligning with environmental sustainability and social equity goals.

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1. Introduction

Recent discourse emphasizes the necessity for 'affordable housing' that remains economically accessible to individuals with limited means while achieving sustainability and maintaining a minimum standard (Gan et al. 2017; Sharma 2018). The Cornubia mixed-income housing development, currently accommodating primarily low-income residents earning less than R3500 monthly income, exemplifies the complexities involved in fostering sustainable living environments within affordable housing communities. Mixed-income housing refers to developments designed to include households from various income levels, incorporating low-income units such as those provided under South Africa's Reconstruction and Development Programme (RDP) and social housing models. Although Cornubia is intended to serve residents across different income groups, it presently caters predominantly to low-income residents.

Situated on the periphery of urban areas, Cornubia epitomizes the intricate dynamics of mixed-income housing communities. The development is projected to house a diverse population spanning various income groups, whose experiences often reflect their economic strata. This distinction is crucial, as the challenges faced by low-income residents in RDP units may differ significantly

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from those of higher-income residents in bonded housing. It is important to reiterate that while the low-income component is currently operational, plans are underway to commence the construction of components for other income groups.

This neighbourhood transcends being a mere collection of houses; scholars assert that neighbourhoods are communities where individuals and families navigate the complexities of balancing economic constraints with the pursuit of a dignified quality of life (Aule, Majid, and Jusan 2024, 2022). The essence of this article lies in its commitment to transition from theoretical discussions to actionable strategies.

Sustainable living within the context of Cornubia extends beyond a mere buzzword, aiming to create an environment where residents thrive economically, socially, and environmentally. 'Sustainable living' in this context encompasses access to quality housing, reliable utilities, and community cohesion, which are essential for enhancing the well-being of residents from diverse socio-economic backgrounds (Baba, Achoba, and Otaru 2015).

The journey to understand the challenges and aspirations of Cornubia's residents is grounded in a rigorous methodology. Rooted in a relativist perspective within the qualitative paradigm, this study employs semi-structured interviews as the primary research method, capturing personal responses and providing insights into residents' lived experiences regarding their perceptions of affordability. To address potential biases, stratification among low-income earners in Cornubia housing was conducted. This approach ensures that the diverse experiences of low-income earners within Cornubia are adequately captured. This helps to create a more equitable and inclusive community through targeted housing policies and interventions (Abildgaard et al. 2018).

To overcome potential language barriers, local collaborators were integrated into the research team, ensuring linguistic accuracy and cultural sensitivity in interpreting participants' responses. This collaboration aligns with the principle of community participation, where end-users contribute to developments affecting them (Abildgaard et al. 2018). The formulation of interview questions strategically blends categorical and open-ended inquiries, fostering a rich dataset that reflects the diversity of experiences within the community. Furthermore, Cornubia's cultural and linguistic diversity underscores the importance of leveraging local insights to ensure the validity, reliability, and trustworthiness of data (Aule, Majid, and Jusan 2022b; Aule et al. 2022; Isah, Khan, and Davis 2015).

The qualitative data collection commenced with face-to-face semi-structured interviews conducted in IsiZulu, the local language spoken by the people of Cornubia. This linguistic choice respects the cultural intricacies embedded in communication and establishes a profound connection that fosters openness and trust among participants. The subsequent translation of data into English, facilitated by local collaborators, ensures a seamless transition while preserving the cultural nuances and contextual meanings embedded in the responses. Thematic and content analysis techniques were then applied to explore emerging patterns, providing a comprehensive understanding of perceptions of affordability. This method aligns with the view of scholars that exploring themes from qualitative content is the hallmark of ethnographic study or phenomenology (Isah et al. 2016; Sharma, Vinayak, and Marwaha 2015; Yanes et al. 2019).

Navigating through the findings, a panoramic view of residents' perceptions in Cornubia unfolds, with top concerns being electricity, water, and transport, serving as a compass guiding understanding. Acknowledging the diversity within the community, the findings highlight distinct experiences among low-income residents. For instance, while unemployed residents often prioritize affordability and utility access, employed residents may focus more on community facilities and lifestyle amenities (Nowzari, Armitage, and Maghsoodi Tilaki 2023). The majority of participants perceived living in Cornubia as expensive, shedding light on the financial strains that necessitate an individual exploration of housing affordability, utility expenses, and the overall cost of living. The significant cost of electricity underscores the pivotal role of energy access in housing constraints (Nowzari, Armitage, and Maghsoodi Tilaki 2023), prompting the exploration of sustainable solutions that enhance both quality of life and environmental sustainability. The findings resonate with the voices of the 254 low-income interview participants, offering a personal understanding of

their experiences. Beyond statistical percentages, the anecdotes and insights shared reveal a community grappling with the high cost of living, electricity challenges, concerns over water accessibility, and transportation costs.

These findings are further dissected in the subsequent sections of this article, weaving them into an actionable narrative that suggests not just theoretical solutions but pragmatic steps toward transformative change. The call to action resonates in each word, urging stakeholders to move beyond rhetoric and embrace the challenge of turning obstacles into opportunities for sustainable living in Cornubia housing.

2. Literature review

The concept of mixed-income housing is very ambiguous because it has been used by numerous researchers, academics, policymakers, commentators, etc. to define various processes, outcomes, and supports (Thwala and Aigbavboa 2016). This made it challenging to describe 'mixed-income housing' in a way that applied to everyone. Although there is not a single, universal definition of mixed-income housing, the one provided by researchers Brophy and Smith describes key aspects of the approach and has been adopted by many researchers and academics (Levy, McDade, and Bertumen 2013). Mixed-income housing is described as a 'deliberate effort to construct and/or own a multifamily development that has the mixing of income groups as a fundamental part of its financial and operational plans' by Brophy and Smith (Levy, McDade, and Bertumen 2013). According to this description, the programme is intended to provide housing for residents from low-income households to high-income households. Regarding income and socioeconomic diversity, this description was consistent with that offered by Brophy and Smith. In order to enhance diverse household characteristics, Galster, Booza, and Cutsinger (2008) describe mixed-income housing as a wide variety of communities where income-diverse areas are prioritized. It should be mentioned that these two definitions, offered by Galster, Booza, and Cutsinger (2008), look at housing in terms of development and neighbourhood from an all-encompassing perspective. The provision of affordable housing, such as mixed-income housing, is essential for ensuring basic human dignity, alleviating poverty, and fostering sustainable urban development (Olaniran, Musvoto, and Aule 2024a).

The Department of Human Settlement in South Africa established the mixed-income housing socio-economic policy framework to handle housing delivery. This strategy, along with rental and project-linked housing, aims to improve housing accessibility and foster community integration across different income levels (Aigbavboa and Thwala 2013). Mixed-income housing often leverages private initiatives to meet diverse housing needs (Thwala and Aigbavboa 2016). The Breaking New Ground (BNG) initiative promotes mixed-income housing as a comprehensive approach to housing delivery, emphasizing integrated developments to enhance local socioeconomic opportunities (Landman 2012b). The BNG guidelines encourage inclusive approaches that support a mix of income groups in new developments, reducing the marginalization of low-income households (Onatu and Baloyi 2020). To provide clarity on the revenue spread for the various income groups; housing with full government assistance is available for households making less than R3,500 (\$187) combined monthly income; while, 'gap market' housing is for households making between R3,500 (\$187) and R10,000 (\$535) combined monthly income, and free market/affordable housing is for households making more than R10,000 (\$535) combined monthly income (Klug, Rubin, and Todes 2013).

Discussions on mixed-income housing projects began at the 2005 Housing Indaba in Cape Town, leading to the Social Contract for Rapid Housing Delivery, which mandates that 20% of project value in commercial developments be spent on affordable housing (Kajimo-Shakantu and Evans 2006). Although no official national policy framework exists, the National Department of Housing (NDOH) has engaged with international experiences and developed a draft national inclusive housing policy framework (Olokun 2007). Also, some provinces, like the Western Cape and

Gauteng, have created draft policies for mixed-income housing, and local governments in cities like eThekweni and Johannesburg have encouraged developers to include affordable housing units (Hanlon 2010; Klug, Rubin, and Todes 2013; Landman 2012b; Lukhele 2015; Msweli 2019; Turok 2013). Mixed-income housing aims to combat concentrated poverty, residential segregation, and the development of public housing exclusively for low-income residents (Kotane 2016).

Scholars highlight mixed-income housing as a creative and inclusive method of housing provision, promoting economic diversity and community interaction (Darcy 2010; McCormick, Joseph, and Chaskin 2012; Onatu 2010; Onatu 2012). Projects like Cosmo City in Johannesburg and Cornubia in Durban incorporate social mix ideas, although they primarily focus on ownership models rather than a mix of rentals and ownership (Erwin 2017). Mixed-income housing can vary in form, with some developments grouping housing units by income level, while others integrate different residential options within the same development (Haferburg 2013). The introduction of mixed-income housing aims to increase affordable housing delivery and reduce segregatory urban policies, fostering greater neighbourhood inclusion and integration (Gaumer 2021).

Chaskin (2013) outlines goals for mixed-income housing, including improving racial and economic balance in new residential construction, providing housing options for low – and lower-middle-income families, increasing affordable housing availability, enhancing private sector housing supply, utilizing existing stock for new housing opportunities, and making better use of sustainable human settlement infrastructure. Research on mixed-income housing in South Africa is growing, with studies indicating that such developments improve the environment, create safer neighbourhoods, revitalize urban areas, and integrate various cultures (Thwala and Aigbavboa 2016). Successful public-private partnerships can integrate the poor into urban systems, promoting inclusivity and sustainability (Onatu 2010).

Despite its potential, mixed-income housing faces challenges such as project viability and the exclusion of targeted low-income households (Adebayo 2010). The Western Cape Provincial Spatial Development Framework highlights the limited capacity of mixed-income housing to provide affordable housing at the necessary scale (Jarbandhan et al. 2016). Landman (2012a) argues that mixed-income housing is helping South African cities become more diverse and integrated, but it has not yet been widely adopted in typical housing development. Increasing public awareness of successful projects could change perceptions and demonstrate the benefits of mixed-income housing in vibrant settings. While mixed-income housing has the potential to address various socio-economic issues in South Africa, there remains a significant gap in its ability to provide affordable housing at the scale required to meet the needs of low-income households. The limited capacity to deliver affordable units, coupled with the exclusion of the lowest-income groups from some developments, highlights the need for further research into sustainable and inclusive strategies that can effectively bridge this affordability gap and ensure equitable access to housing for all income levels. It is therefore the intention of this study to look at the affordability of Cornubia mixed-income housing through qualitative interactions with residents of the development.

3. Materials and methods

The approach undertaken in this research employs a relativist perspective firmly rooted in the interpretive knowledge of the qualitative paradigm. The research design centres on semi-structured interviews, a method chosen deliberately to capture perceptive responses and gain insights into the lived experiences of residents in the Cornubia mixed-income housing development perception of affordability. To address potential biases and stratify findings accordingly, low-income participants occupying double-storey, semi-detached units were selected from the different areas within the Cornubia mixed-income development. To enhance the study's acceptability and overcome potential language barriers, local collaborators from the neighbourhood were integrated into the research team, ensuring a more accurate interpretation of participants' responses.

The formulation of interview questions was a strategic process, blending categorical and open-ended inquiries. While categorical questions enable predictability, open-ended questions are a powerful tool for gaining a deeper understanding of complex issues and capturing the full range of human experiences. As advocated by Brown-Luthango, Reyes, and Gubevu (2017), this approach encourages participants to share their diverse experiences and perceptions freely, providing a rich and diverse dataset for analysis.

Qualitative data collection began with face-to-face semi-structured interviews conducted in Isi-Zulu, the local language. Subsequently, the data underwent transcription into English with the support of local collaborators, a practice recommended by scholars like Siame (2013) and Stewart (2015), ensuring the preservation of cultural shades and contextual meanings. Thematic and content analysis techniques were then applied to explore emerging themes and patterns within the dataset, shedding light on the multifaceted nature of Cornubia housing. This method ensures data validity and the retention of nuanced contextual insights critical for understanding the lived experiences of participants (Aule et al. 2022).

The summary of the methodology employed in this study reflects a comprehensive and rigorous approach to comprehending residents' perception of affordability in Cornubia Housing. The strategic use of semi-structured interviews, the integration of local researchers into the process, and the meticulous application of analysis techniques collectively contribute to the reliability and depth of the findings. By stratifying responses according to low-income earners, the methodology further accounts for the unique experiences of residents across areas within the housing development, addressing potential biases identified during the research process (Abildgaard et al. 2018). These insights, derived from a culturally sensitive methodology, hold significance for informing sustainable improvements in the neighbourhood.

4. Results and discussions

This section explores the participants' perception of affordability in the Cornubia mixed-income housing, providing assessments of the factors perceived to be making the place expensive.

4.1. Background information of participants

The majority of individuals in the sample are identified as 'House Owners,' comprising 89.37% of the total. This suggests a predominantly homeowner population within the dataset. This implies a strong representation of individuals who own their residences. This surpasses the national housing ownership of about 65%, in South Africa (Republic of South Africa 2023). In contrast, the 'House Tenant' category constitutes a smaller proportion, with 5.12% of the total. This indicates a relatively minor presence of individuals classified as tenants, suggesting that the majority of the sampled population are property owners rather than renters. The remaining 5.51% have alternative housing status which differentiates them from the main categories of house ownership and tenancy. This variation reflects the diverse nature of the community, including both homeowners and tenants, contributing to a mixed socio-economic landscape. Understanding the distribution between house owners and tenants, according to Mouratidis and Andersen (2023), can be crucial for community planning and policymaking, addressing the diverse needs and concerns of both groups.

The finding on residents' living periods in Cornubia mixed-income housing shows a diverse range of duration. A small percentage of residents have lived there for less than a year (1.57% for a few months and 3.14% for one year). The majority of residents have been living in Cornubia for 2–4 years, with 17.71% for 2 years, 16.14% for 3 years, and 16.54% for 4 years, indicating a relatively stable community. Additionally, 12.20% of residents have lived there for 5 years, 5.51% for 6 years, and 3.14% for 7 years, reflecting both new arrivals and long-term residents who have established roots in the community. Recognizing the duration that residents have lived in the area can

inform infrastructure planning, as long-term residents may have different needs compared to those who recently moved in (Conger, Conger, and Martin 2010).

4.2. Residents' perception of affordability of Cornubia mixed-income housing

4.2.1. Financial challenges and high living costs in Cornubia

The overall sentiment towards residents' perception of affordability is quite mixed. The findings from the study suggest that 62% of the participants perceived the cost of living in Cornubia housing as expensive. This indicates a general perception among participants that certain items or aspects are considered expensive. Electricity and water are frequently cited as the primary factors making living in Cornubia expensive. Several participants also mentioned transport costs and the overall basic services as contributing factors to the high cost of living. This perception is influenced by the financial strength of some participants. Unemployment exacerbates the financial strain, with many residents struggling to afford basic utilities and services. One participant (P75) commented:

This place is very expensive to live. I understand that I am currently unemployed, however, the standard of living is high. This is caused by high utility rates. In addition to this, malls are not here, we only have tuck shops that sell groceries at exorbitant prices. Malls are not easily accessible, because I have to take taxis to sort things out

The participant (P75) above acknowledges she is unemployed at the moment, but emphasizes that the high cost of living is primarily due to expensive utility rates. Additionally, the lack of nearby malls forces residents to rely on local tuck shops, which sell groceries at high prices. The inaccessibility of malls, requiring the use of taxis, further exacerbates the financial strain. This situation highlights the compounded challenges of high living costs and limited access to affordable goods and services in the area.

Another participant (P61) expressed similar concerns by saying;

If I am to be frank with you, this place is very expensive compared to the former place we were living. In the shacks where we came from, we did not pay for electricity and water, because they were provided for us free of charge. When we first got here, I thought everything is free in this place, however, the government is charging us for electricity and water, even though they know that many of us rely on the R350 monthly grants

This quotation by participant (P61) above highlights the financial challenges faced by a resident who moved from informal housing (shacks) to Cornubia mixed-income housing. In their previous living situation, essential services like electricity and water were provided free of charge. Upon moving to Cornubia, the resident initially assumed that these services would also be free. However, they soon discovered that the government charges for electricity and water, which adds a significant financial burden, especially since many residents depend on a modest R350 monthly grant for their livelihood. This underlines the disparity between the expectations and the reality of living costs in the new housing environment

Further corroboration by a participant (P120), who is a pensioner and has been living in Cornubia for 6 years revealed that:

Cornubia is expensive in terms of affordable. I am a pensioner living on a limited income and the high cost of living in Cornubia is a constant worry for me. From the expensive groceries in local tuck shops to the skyrocketing electricity and water bills, it feels like everything is not working for me. I have had to cut back on essentials just to make ends meet. It is heart-breaking to see that my economic situation is getting worst due to these exorbitant costs

This captures the struggles of a pensioner living in Cornubia mixed-income housing. The resident, who relies on a limited income, finds the high cost of living in Cornubia to be a constant source of worry. These financial pressures have forced the participant to cut back on essential items just to make ends meet. She expresses a deep sense of frustration and sadness, noting that her economic situation is deteriorating due to these exorbitant costs. This reveals the harsh reality faced by those

on fixed incomes in high-cost living environments, emphasizing the need for more affordable living solutions and support for vulnerable populations.

The comments from participants highlight that Cornubia is perceived as very expensive, primarily due to the high costs of electricity and water. These utilities are frequently mentioned as significant financial burdens. Transport costs are also highlighted as a major expense, with the lack of adequate public transport options adding to the financial strain. Also, the absence of nearby malls forces residents to rely on local tuck shops, which charge higher prices for groceries. This lack of accessibility to affordable shopping options further increases the cost of living. The high unemployment rate exacerbates the financial difficulties, as many residents struggle to cover even the basic costs of living.

The findings unpack the challenges faced by residents of Cornubia mixed-income housing, specifically focusing on factors that contribute to the perceived expenses of living in this community. This encompasses various aspects of living costs, including housing, utilities, and daily necessities. Williams (2016) posits that research into specific cost-related concerns can help policymakers and urban planners identify areas where interventions might be most effective in making living in Cornubia more affordable for residents. The acknowledgment that living in Cornubia is expensive is evident, with 62% of participants highlighting the financial burdens experienced by a substantial portion of the community. This recognition is crucial as it validates residents' concerns and emphasizes the need for practical solutions to alleviate financial strain. Knowing that their collective sentiment is echoed by a significant percentage of respondents will empower residents to advocate for change and engage with local authorities to address the underlying issues contributing to the perceived high costs (Aule, Jusan, and Ayoosu 2019; Mathabe 1999).

By addressing specific concerns related to perceived high expenses by residents' experiences, designers can contribute to the creation of a more affordable, sustainable, and liveable low-cost housing neighbourhood in Cornubia. This requires a comprehensive approach that considers not only physical infrastructure but also the overall well-being and daily experiences of residents, ensuring that future development projects are responsive to the unique challenges and opportunities within the community. Enhancing sustainable development, affordable housing solutions, implementing energy-efficient technologies, and promoting economic opportunities that reduce costs are crucial in Cornubia.

4.2.2. Affordable and manageable living in Cornubia

Despite the challenges noted above, 38% of the participants find Cornubia to be affordable or reasonable in terms of cost, especially when compared to other places. They mention that the cost of living is not high, with some describing it as 'really affordable' and 'not expensive at all.' The provision of free housing to some participants and the availability of cheap rental options contribute to this perception. Some participants highlight that everything is cheap, even for those who are renting. Some responses of participants are captured below:

Living in Cornubia is affordable for me. The rent is reasonable, and I find that I can manage my expenses well here. It is not expensive at all; everything is cheap compared to other places I have lived. I can easily afford my daily needs. I do not waste resources such as water and electricity, so my utility bills are reasonable. While others are complaining about the cost of public transport, I do not have any issue with that since my workplace is easily accessible from this place (P202).

As a homeowner in Cornubia, I find everything to be quite affordable. I cannot speak for those who are renting, but owning my place makes a big difference. Having a free house is a huge advantage. I live a simple life that does not require me to spend beyond my means, which helps keep things manageable. The affordability here is crucial for me; otherwise, it would be challenging to sustain myself and my family. (P29).

The above accounts echo some participants' opinions of the affordability of Cornubia. They highlight that the place is reasonable, and daily expenses are manageable. Some participants find everything to be cheap compared to other places they have lived, making it easy to afford their daily

needs. Easy accessibility to malls and essential services also contributes to this perception of affordability. Additionally, those who rent find the costs to be low, further supporting the view that Cornubia is not expensive. Despite acknowledging that utilities like electricity and water can be on the high side if not properly managed, these participants feel that the overall cost of living in Cornubia is balanced and reasonable, allowing them to live comfortably within their means.

The results present a nuanced view of affordability in Cornubia. While 62% of participants perceive the cost of living as high due to utilities, transport, and basic services, 38% find it affordable, citing free housing, cheap rentals, and manageable expenses. Homeowners benefit from not paying rent, renters highlight the affordability of Cornubia, while those who manage resources well find utility bills reasonable. Proximity to workplaces and essential services enhances affordability, for some participants. Further critical investigation into how these challenges affect overall living conditions is crucial for identifying areas requiring improvement and for tailoring sustainable interventions. This finding aligns with Govender and Naidoo (2019) observation that diverse resident experiences are key to understanding the socio-economic dynamics of mixed-income housing.

4.3. Factors Contributing to the High Cost of Living in Cornubia

The 254 interview participants were further asked about things that make living in the Cornubia neighbourhood expensive. Participants' responses provide valuable insights into factors contributing to the high cost of living in the Cornubia mixed-income neighbourhood.

4.3.1. Electricity

Electricity emerges as a prominent concern, with 54% of participants expressing it as a constraint. This finding highlights the significant impact of electricity costs on overall living expenses. Verbatim quotes from participants reveal dissatisfaction among Cornubia residents with electricity rates. For instance, Participant 12 (P12) stated:

Yes, it is expensive for me to live here, most especially the electricity bill. When I was employed, a good percentage of my earnings were spent on paying rates and charges. To aggravate the situation now that I am unemployed, living here is very expensive, I must confess.

The participant (P12) explains that even when he was employed, a significant portion of his income was spent on paying rates and charges. Now that he is unemployed, the situation has worsened, making it very expensive to live in Cornubia. The participant's confession emphasizes the increased financial strain and the challenge of managing living expenses without a steady income. This reflects the broader issue of affordability and the impact of high utility costs on residents' financial stability.

Similarly, Participant 55 (P55) corroborated this sentiment, saying:

Yes, electricity here is very expensive; a large proportion of our income is spent on electricity. Our livelihood will be improved and sustainable if this issue can be timeously addressed.

The participant (P55) posits that a large portion of their income is consumed by electricity bills, which impacts their overall financial stability. He expresses hope that addressing this issue promptly could improve and sustain their livelihood. There is an urgent need for solutions to reduce electricity costs, which would alleviate financial stress and enhance the quality of life for residents.

This finding underscores the importance of energy access in the context of housing constraints, highlighting issues related to affordability, reliability, and environmental considerations. Consistent with the realities of many developing countries (Nowzari, Armitage, and Maghsoodi Tilaki 2023), potential challenges with energy costs or consumption patterns are evident. Further investigation into high electricity-related expenses could reveal opportunities for energy efficiency programmes or interventions aimed at reducing the financial burden on residents. This information can empower residents to make informed decisions about their resource usage, seek energy-efficient

alternatives, or explore community-led initiatives to reduce costs (Irfeey et al. 2023; Nowzari, Armitage, and Maghsoodi Tilaki 2023).

Moreover, the finding serves as a basis for community-driven conversations, allowing residents to collectively address shared challenges and explore collaborative solutions. Policymakers can explore strategies to improve energy efficiency, invest in renewable energy sources, or implement subsidy programmes to reduce electricity expenses for residents (Bodhi 2016; Nowzari, Armitage, and Maghsoodi Tilaki 2023). These strategies align with broader sustainability goals, contributing to a more environmentally friendly and cost-effective energy infrastructure that will shape the overall quality of life. Integrating energy-efficient technologies into housing design, incorporating renewable energy sources, and collaborating with energy providers can directly impact residents' expenses. Urban designers can integrate smart infrastructure and energy-efficient lighting solutions, promoting sustainable energy use and creating a more livable and resilient community.

Future research can investigate high electricity expenses, analyzing consumption patterns, infrastructure challenges, and potential disparities in energy access. This could lead to valuable insights for designing energy-efficient solutions, advocating for policy changes, or developing targeted interventions to alleviate the financial burden associated with electricity for low-income residents. Scholars can delve into the socio-cultural aspects of electricity use, examining how access to reliable power influences daily routines, social interactions, and community cohesion, contributing to a deeper understanding of the relationship between infrastructure, energy access, and residents' well-being in low-cost housing communities.

Cornubia mixed-income housing can implement several energy-efficient solutions to enhance sustainability and reduce costs. Installing smart metres provides real-time feedback on energy usage, helping residents monitor and reduce consumption, while home automation systems and smart technologies such as smart lighting and smart plugs efficiently control lighting, heating, and cooling. Enhancing insulation in buildings minimizes heat loss and gain, reducing heating and cooling needs. Upgrading to high-efficiency HVAC systems and maintaining regular maintenance schedules ensures these systems operate at peak efficiency, further lowering energy costs. The integration of passive design strategies for natural lighting and ventilation will also be beneficial. Residents benefit from lower energy bills due to effective insulation and energy-saving features. Furthermore, energy conservation policies promote sustainable practices within Cornubia housing.

4.3.2. Water

Water, mentioned by 32% of the participants, stands out as another crucial aspect of housing constraints. This raises concerns about the affordability or perceived expense of water-related services. In this regard, Participant 17 (P17) noted:

Water is quite expensive here, especially for the four of us that live here. The water bills every month is something that scares us. We cannot continue like this since we have limited financial capability at the moment

Additionally, Participant 88 (P88) emphasized:

Since we are unemployed, paying for utilities, especially water, is challenging. Sometimes, we have to manage our water usage because we do not have the resources to pay outrageous bills.

These comments illustrate the challenges faced by residents in meeting up with affordability in Cornubia. Unemployed residents find paying for utilities, especially water, to be a major challenge due to their lack of income. They often have to carefully manage their water usage to avoid incurring high bills that they cannot afford. Similarly, households with multiple residents, experience substantial financial strain from high monthly water bills, which they find daunting given their limited financial resources. These call for an urgent need for more affordable utility solutions to support low-income earners.

As noted above water costs are a notable concern in Cornubia, with 32% of participants identifying water expenses as a factor making the community to be expensive (Irfeey et al. 2023). This

points to potential challenges in water infrastructure, pricing structures, or conservation practices. Measures to address water quality, accessibility, and affordability can contribute to a more positive living experience, as advocated by Irfeey et al. (2023). Addressing these issues could lead to more affordable water services, improving overall living conditions.

Practical measures include government interventions like subsidy programmes, improved infrastructure, and policy adjustments to alleviate financial burdens on residents (Bodhi 2016). Enhancing water infrastructure, implementing fair pricing models, and introducing conservation initiatives can ensure affordable and accessible water services, thereby enhancing residents' well-being (Irfeey et al. 2023). Urban designers and developers can also play a role by integrating sustainable water management practices, water-efficient housing designs, and water-saving technologies to lower water expenses. Practices such as rainwater harvesting, efficient water use technologies, and community education programmes can address water-related challenges. Sustainable development initiatives can ensure equitable access to clean water while promoting conservation and resilience. To improve water efficiency, affordability, and access, strategies include installing low-flow fixtures, smart water management systems, regular inspections, and smart leak detectors. Implementing greywater recycling and rainwater harvesting systems can enhance water reuse. Investing in advanced water treatment facilities ensures reliable and safe water access. Community engagement through education programmes and participatory planning can promote water-saving behaviours. Interventions like water use audits, conservation incentives, and policy measures such as water restrictions and rebate programmes can further encourage efficient water use.

4.3.3. Transport

Transport, mentioned by 9% of participants, highlights the role of transportation costs in the overall cost of living. According to Participant 8 (P8):

Here it is expensive for me to live: bus fare is expensive. I spend much money moving around. The fact that I travel from one place to another to get things done is very expensive. There would not have been any need for me to travel if everything I need is in Cornubia. Unfortunately, the reality is that it is what it is.

Likewise, Participant 16 (P16) shared:

Yes, transportation in Cornubia is expensive. The cost of commuting to my place of work daily is high. I spent a lot on transportation, and it is draining my income.

The participants (P8) and (P16) note that the expensive bus fares and the cost of travelling to complete daily tasks significantly strain their budgets. If all necessary amenities were available locally, these travel expenses could be avoided. The daily commute to work also adds to the financial strain, depleting their income considerably.

This finding is a concern for 10% of participants in Cornubia, indicating challenges with commuting and expenses. This stems from inadequate public transportation options, limited affordability, or infrastructure issues. Improving public transportation, exploring subsidized programmes, and enhancing neighbourhood connectivity can improve residents' lives (Sharma, Vinayak, and Marwaha 2015). Sustainable improvements involve enhancing public transportation options, creating walkable neighbourhoods, or implementing policies that reduce residents' reliance on expensive private transport, in line with modern urban design principles (Shand 2018). Urban planners can prioritize public transportation, pedestrian infrastructure, and reducing reliance on vehicular transportation for financial and environmental benefits. Government intervention is needed to create an accessible and affordable transportation system in Cornubia. Practical steps could involve improving pedestrian infrastructure, enhancing road safety, and fostering a more walkable environment. Additionally, bringing employment opportunities closer to Cornubia through mixed-use developments can reduce commuting distances and costs. Urban design strategies, such as transit-oriented development (TOD), can integrate

5. Summary, implications and conclusions

The exploration of challenges and opportunities within the Cornubia mixed-income housing development provides a critical understanding of the multifaceted experiences faced by its residents. The study employs a proactive approach to bridge the gap between theoretical discussions and tangible, real-world solutions.

5.1. Summary of key findings

The study explores the challenges faced by Cornubia low-income residents through a rigorous methodology rooted in a relativist perspective within the qualitative paradigm. Semi-structured interviews, strategically formulated questions, and local collaborators ensure a culturally sensitive and linguistically accurate exploration of participants' perceptions of affordability. Three prominent concerns emerge namely, electricity, water, and transport. These factors collectively constitute a substantial portion of participants' worries, highlighting their direct impact on the community. The significance of these findings lies not just in statistical percentages but in the narratives and insights shared by residents, portraying a community grappling with the high cost of living, electricity challenges, water accessibility concerns, and transportation issues.

5.2. Implications for stakeholders

The study empowers the residents of Cornubia to voice their specific needs and challenges, fostering a more participatory approach to sustainable development. This is crucial for developing targeted and effective interventions that directly address their concerns and contribute to an improved quality of life. Government and urban planners can utilize the findings as a roadmap for informed decision-making. Themes like 'Water' and 'Electricity' underscore the need for policies addressing housing and utility affordability, while the mention of 'Transport' highlights the importance of comprehensive urban planning for improved transportation infrastructure. Researchers can build on these findings for in-depth investigations into specific challenges and potential solutions. These offer rich avenues for further exploration, contributing valuable knowledge to the field of urban studies. In the context of sustainable development, the study illuminates key areas for lasting impact.

5.3. Conclusion

In conclusion, this study highlights affordability challenges faced by residents of the Cornubia mixed-income housing development in South Africa, particularly high living costs, linked primarily to electricity, water, and transport. While the findings provide valuable insights, limitations include the focus of the research on the low-income component of Cornubia Housing, and potential bias associated with qualitative methodologies. Broader challenges, such as contextual generalization and evolving community dynamics, also persist. Future research should expand to comparative studies across mixed-income developments and explore sustainable policy frameworks. By addressing these challenges, stakeholders can foster more inclusive, equitable urban housing models, contributing to global conversations on affordable and sustainable housing solutions.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Data availability statement

Shared upon reasonable request.

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