Received: 14 Mar. 2025; Revised: 25 July 2025; Accepted: 08 Feb. 2026
https://doi.org/10.22306/atec.v12i1.275

Modelling the influence of transport accessibility, safety and affordability on mobility patterns among domestic workers in the City of Johannesburg

Charles Tsikada
Middle East College, Department of Management Studies, Muscat, Al, B. No. 79, Knowledge Oasis Muscat P, Rusayl 124, Oman, tsikadac@mail.com
Reason Masengu
Middle East College, Department of Management Studies, Muscat, Al, B. No. 79, Knowledge Oasis Muscat P, Rusayl 124, Oman, masengu@mec.edu.om (corresponding author)

Keywords: transportation equity, domestic workers, urban transport challenges, transport accessibility and social exclusion.
Abstract: Household workers face transportation challenges, including limited access to safe, affordable, and reliable public transport, which constrains their mobility and promotes socio-economic exclusion. This study investigated the effects of transport accessibility, affordability, and perceptions of safety on live-out domestic workers' mobility in the City of Johannesburg, South Africa. With a 233-participant cross-sectional survey and Partial Least Squares Structural Equation Modelling (PLS-SEM), the study analyses both direct and mediated relationships between mobility patterns, affordability, perceptions of safety, and transport accessibility. The results reveal that perceptions of safety and transport accessibility have a direct effect on mobility patterns with less direct impact by affordability. Results demonstrate how safety perceptions operate as the intermediary between transport accessibility and mobility activities that signifies the importance of secure transit settings to adopt this low-income, female-dominated workforce. The study developed and tested a model of transport access and mobility to investigate how transport accessibility, safety perceptions, and cost influence commuting behaviours in this low-income, predominantly female workforce. Future research can use this model to examine similar factors in other locations. The study highlights the need for inclusive transport policy that integrates human flow management and material flow optimization within urban logistics systems.

1 Introduction

Domestic workers constitute an important and yet "invisible" segment of the informal labor force, making possible essential care for households and economic development more broadly [1]. As laborers hired to perform domestic tasks such as cleaning, cooking, childcare, elderly care, and other household services, domestic workers hold households together, enabling employers to seek activities outside the home [2]. In the United States alone, there are an estimated 2.2 million domestic workers, who are primarily women and immigrants and offer essential household services [3]. Spain, France, and Italy have some of the largest national workforces in Europe, with Spain alone accounting for an estimated 700,000 domestic workers, about 30% of whom are immigrants [4]. In the Middle East, particularly Oman and Kuwait, demand for domestic workers has risen steeply with economic development, urbanization, and a dependence on migrant labour. In Oman, there are over 158,537 migrant domestic workers, a significant number of whom are of South and Southeast Asian origin [5]. In Kuwait, domestic workers make up a sizeable number of the foreign workforce, with an estimated 660,000 employed in Kuwaiti households, comprising around 16% of the total population [6]. The 2021 Australian Census reported 258,000 people employed in residential aged care services in Austrialia [7]. According to Statistics South Africa, in the third quarter of 2024, approximately 854,000 domestic work jobs were recorded just below pre-pandemic peaks. These workers are predominantly female, constituting an estimated 80% of the global domestic worker base, again highlighting the highly gendered nature of this sector of work. Domestic work can either be paid or unpaid work, and paid domestic workers are typically hired and paid by households, while unpaid domestic work is most often performed by household members without receiving direct payment. Despite their making enormous contributions to both household functioning and the economy, domestic workers are typically underappreciated, some of this being due to social attitudes which frame domestic work as women's natural role [8]. With patterns like urbanization, expanding populaces, and maturing populations, the interest for domestic laborers continues to increase globally. Asia, and China in particular, has witnessed significant growth in the domestic work sector, powered by rising family income and an aging populace.

Domestic workers in South Africa are divided into two groups: "live-in" and "live-out" (Ally, 2010). This research focuses on "live-out" domestic workers, who travel daily to their employers' residences in urban locations. These workers face unique transport challenges, as their work opportunities and mobility are greatly influenced by the accessibility,

affordability, and safety of available transport. Commuter transportation is necessary to support the livelihoods of such workers, moving from townships and informal settlements into urban centres such as the City of Johannesburg. However, the existing transport infrastructure does not generally cater to the needs of low-income commuters, and most domestic workers are forced to depend on minibus taxis and other informal transport systems, which are usually characterized by unstructured schedules and minimal safety features. These commuting challenges reflect disruptions in the flow of human capital, which is a critical element in urban logistics planning and labour mobility systems.

Despite increasing attention to urban mobility and gendered access to transport, there is limited empirical research exploring how transportation systems in African urban contexts influence the commuting experiences of low-income female workers. In particular, the literature lacks data-driven models that address the interrelated effects of accessibility, affordability, and safety on domestic workers' mobility patterns. Prior research has tended to treat these factors in isolation, without modelling their combined influence or capturing the lived realities of informally employed women in post-apartheid urban South Africa. This study addresses that gap by applying a structural equation modelling (SEM) approach to analyse the direct and mediated effects of these variables. The findings are expected to inform transport and labour policies that are more inclusive, equitable, and reflective of the needs of vulnerable populations in the global South.

Domestic workers are prone to "transport poverty," with high costs, low availability, and security concerns limiting their mobility, limiting access to secure work and essential services [9]. The female dominance in domestic work is subjected to higher risks, especially when travelling during early morning or late evening hours, putting them at higher risk of crime and harassment [10]. Dependence on informal transit systems continues to sustain a cycle of social and economic marginalization, thus the call for participatory transport policy that addresses the needs of such a workforce.

This study therefore aims to develop a model of transport access and mobility to address the transport issues and needs of live-out domestic workers in the City of Johannesburg, South Africa. The model also emphasizes the need for more responsive transport policies that are inclusive and better meet the needs of low-income, female-dominant workforces like domestic workers. Even though the finding of this research draws on the specific context of South Africa, the existence of domestic worker lives in other developing nations is not dissimilar, particularly regarding access to transport and transport-related safety issues. With this research, it aims to contribute voices that can support transport and policy-making interventions not just in South Africa but in other comparable city settings where informally working marginalized workers have challenges in accessing safe, accessible, and affordable transportation vehicles. These research objectives were answered by this research:

1. To examine the relationship between transport accessibility and safety perceptions among domestic workers in the City of Johannesburg, South Africa.
2. To analyze the effect of transport accessibility and affordability on mobility patterns of domestic workers in the City of Johannesburg, South Africa.
3. To analyze the effect of transport accessibility and safety perceptions on mobility patterns of domestic workers in the City of Johannesburg, South Africa.
4. To analyse how safety perceptions and affordability influence the interaction between transport accessibility and mobility patterns in the City of Johannesburg, South Africa.

This paper begins with a description of problems and objectives in an introduction, then literature review setting the key terms and related studies. Conceptual framework and hypothesis development offers theoretical bases, and research methods provide quantitative approach, sampling, and analysis techniques. Measurement and structural model tests test model reliability and validity and go on to hypotheses testing and results discussion. The conclusion summarizes contributions, implications for policy, and avenues for future research, with a theoretical framework provided in the next section.

2 Literature review

2.1 Theory grounding the study

Transportation equity theory offers a useful framework for understanding transportation issues in South Africa, a nation where apartheid-related spatial inequalities persist in affecting transport access and economic opportunities. This theory argues that fair access to transport is essential for socio-economic inclusion, stating that everyone, irrespective of income, gender, or type of employment, should be able to access affordable, safe, and reliable transport to engage fully in economic, social, and civic life [11]. When transport systems fail to provide such access, marginalized groups such as low-income, female, and informal sector workers are at risk of "transport poverty," the condition where limited transport options constrain access to desired services and entrench social and economic inequalities. Transportation equity theory identifies three critical components: affordability, accessibility, and safety. Affordability is making transport fares

accessible to low-income communities, making it possible to remove cost barriers to employment, health, and education services [12]. Accessibility is offering transport services at accessible locations, frequencies adequate to connect people to important destinations [13]. Safety is especially important for vulnerable groups, such as female domestic workers who are more likely to be subjected to harassment or violence, particularly when they travel late at night using minimal security measures [14]. South African poor workers, including domestic workers, also prefer to live in townships and informal settlements outside major cities, far from those places of work. Such physical isolation and limited public transport system carries a substantial time and cost burden, ensuring continued poverty and social isolation. Higher than affordable transport costs up to 20% of a monthly wage for some highlight the need for affordable transport [15]. Limited-service coverage and schedules ensure most destinations are under-serve, resulting in increased "transport poverty" and constricting opportunities to employment and services. Safety is also a concern, with high crime rates, lighting, and surveillance shortages in transport environments further discouraging public transport use and limiting mobility options, particularly for female workers. Transportation equity theory is applied within this study to advocate for transport policies that are inclusive to all in South Africa by lowering affordability, accessibility, and safety obstacles. Enhancing subsidies, increasing the coverage of services, and improving provision of safety would assist significantly in enabling equal access to transport among domestic workers and other vulnerable individuals, enhancing narrowed socio-economic disparities and increased social inclusion. The following section addresses the effect of transport accessibility on perceptions of safety.

2.2 Transport accessibility and safety perceptions

Transport safety and perceptions of accessibility are closely related and jointly determine the overall perception of public transport accessibility, with consequences for commuter experience and travel behavior. From a logistics management perspective, transport accessibility can be understood as a function of how efficiently information and human flows are coordinated across transport nodes [16]. This is influenced by factors like service frequency, reliability, and proximity to stops. Accessible public transport is vital for social inclusion, enabling individuals to engage fully in work, leisure, and social activities [17]. Excellent service quality, especially functionality (e.g., dependable schedules, high frequency of service, and accessible stop points), significantly contributes to perceived accessibility, rendering public transport a viable and desirable alternative for a greater number of people [18]. Nevertheless, frequent users of public transport experience lower perceived accessibility after prolonged exposure to constraints or dissatisfaction with the services, showing that perceptions of quality and safety are needed to align in the direction of a preferred commuter experience. Safety perceptions encompassing physical security and personal safety are necessary to make accessibility possible. These emotions include a variety of concerns, such as fear of crashes, crime, or disease threats. Those who feel unsafe are more likely to avoid public transport or limit their travel habits, especially in certain locations or times. Olsson, Friman and Lättman [19] explained that perceived safety is directly related to perceived accessibility. A safe environment enhances the comfort and likelihood of frequent use of public transport by the traveler. Key factors that develop a positive safety mentality are well-established infrastructure, seen security measures, and open communication during delays, which collectively act to increase transport system confidence. The link between transport access and safety impression is thus cross-dependent and symbiotic. While accessibility attributes, such as good service and closeness encourage frequent usage, a sense of safety reinforces this accessibility, facilitating increased commuter trust and promoting accessible, sustainable public transport systems. Therefore, both accessibility and safety play a very positive role in enhancing the perceived accessibility of public transport and thus making it more appealing as a substitute for private cars, especially in cities.

2.3 Transport accessibility and affordability

Transport accessibility affects affordability by influencing the efficiency of material and human flows across the urban transport logistics network. Live-out domestic workers in cities like Centurion in South Africa face high transport costs, long commutes, limited access to affordable modes (e.g., no rail), and safety concerns during non-standard hours [20]. Serebrisky, Gómez-Lobo, Estupiñán and Muñoz-Raskin [21] find that most current policies, especially supply-side subsidies given to operators, are either neutral or regressive and do not significantly benefit the poorest. The study recommends shifting toward demand-side subsidies targeted at users and integrating transport subsidies with broader poverty alleviation strategies such as cash transfers or access to essential services. They continue that fare subsidies, as well as the expansion of Metro and bus networks, render transport more accessible to these groups, allowing greater mobility and accessibility to social services. Guzman, Oviedo and Rivera [22] concentrate on Bogotá's pro-poor subsidy program and emphasize that subsidies eliminate the "time poverty" that economically disadvantaged groups face when transport provision is either absent or costly. Their finding aligns with Brown [23], who note that fare subsidies negate socioeconomic imbalances by allowing low-income commuters to avoid costly trips by other transport modes.

The study concludes that not only do these policies enhance affordability, but also that they offer support for job accessibility, creating equitable transport environments. Dewita, Burke and Yen [24] highlight in their study of Indonesia that both accessibility and affordability matter to sustainable urban growth because transport spending often represents a

significant share of household spending. They promote that targeted subsidies, fare reduction, and enhanced accessibility can ensure low-income populations still could travel without incurring financial burdens. Similarly, Obudho, Otengah and Shivachi [25] examine how motorcycle taxis in rural Kenya serve as a low-cost, accessible transport mode, addressing the mobility needs of underserved populations. Although based in a rural context, their findings reinforce the idea that informal transport solutions can play a vital role in improving transport equity and affordability for vulnerable communities. Kębłowski [26] demonstrated that subsidization of public transport specifically for vulnerable or low-income populations improves overall urban equity by reducing the cost burden of transit. Thus, augmenting spatial accessibility in conjunction with fare affordability measures can achieve greater transport equity by reducing both the direct and indirect costs of commuting for disadvantaged groups, as studies in different world city contexts have shown.

2.4 Affordability and mobility patterns

Continuing with the importance of affordability and its impact on mobility behavior, research demonstrates how unaffordable transport diminishes low-income household access to essential services to a significant degree. For instance, Venter [27] demonstrates how issues of affordability compel most South Africans to spend excessively high proportions of their travel costs, with the poor spending as much as 21% of the household expenditure on travel. This expense is likely to lead to restrained mobility, where individuals limit their travel to necessary trips only, and this has a negative impact on their job and access to social services. Perrotta [28] explains that the fare expense is an essential factor determining public transport affordability among low-income passengers since excessive fares reduce access to employment, healthcare, and education. This impact, magnified in urban contexts with spatial imbalances like Cape Town, has prompted targeted subsidies to raise transport affordability. Effective subsidy initiatives are critical to improving the affordability of transport among the poor, promoting greater mobility and access to economic opportunities. Vitale Brovarone [29] support a shift from mobility-oriented planning to accessibility-based policies. He believes that upgrading low-cost transportation modes, such as transit-oriented development (TOD) and low-cost housing near job centers, can reduce the overall cost of transportation for poor households. This kind of planning based on accessibility not only makes transport more affordable but also promotes economic and social inclusion by minimizing far-reaching commutes. Porter [30] determined that transport affordability directly impacts livelihood outcomes in low-income urban environments in developing nations. They add that fare increases have the potential to discourage poor people from traveling, thereby containing them further within poverty circles. According to their study, fare control and strategic subsidy can prove to be an effective catalyst to promote accessible and affordable modes of transportation in economically mixed cities. These findings emphasize the role of logistics elements such as flow coordination and transport cost efficiency in determining sustainable commuting behaviour.

2.5 Safety perceptions on mobility patterns

Safety perceptions have a strong effect on mobility behavior, typically overriding concrete safety measures in the formation of travel patterns. Studies observe that safety perceived, mediated by ambient conditions, feelings, and neighborhood structure, decides on the willingness of individuals to adopt varied mobility modes. For example, whereas walkability of a neighborhood is bound to encourage active travel, it will also heighten collision risk, creating a trade-off in which people limit mobility if a place is not considered safe. Design elements like mixed land use and controlled traffic speed are found to boost safety perception, while Lee, Zegras and Ben-Joseph [31] say excessive traffic flow and weak surveillance will deter walking and public transport use. Ceccato, Gaudelet and Graf [32] add that facilities such as lighting, cleanliness, and surveillance, following Crime Prevention Through Environmental Design (CPTED) principles, enhance perceptions of safety, particularly in the context of public transportation areas. Meanwhile, Oxley and Whelan [33] find that also affecting mobility limitations is the area perception of safety, where unsafety in the environment restricts spontaneous mobility and participation in physical activity, especially in vulnerable populations. Enhancing perceived safety through thoughtful urban design and maintenance can promote more flexible, frequent mobility choices in many communities.

2.6 Transport accessibility on mobility patterns

Transport accessibility also has a significant impact on influencing individuals' mobility patterns by informing choices on mode of travel, frequency, and destination. Literature is more likely to emphasize the link between accessible transport and enhanced mobility, particularly in urban areas with varying degrees of accessibility based on distance to public transport, connectivity, and service frequency [34]. Behavioral studies argue that if transport choice exists, individuals will engage in activities requiring travel, developing customary mobility habits and a broad range of travel routines. Travel frequency and implications of travel destinations demonstrate how access opens or limits individual and economic mobility, especially in urban or socio-economically diverse locations. Urban planning has a great impact on transport accessibility. Areas of high density with well-integrated transport have more stable mobility because the residents have easy access to various modes of transit. Such urban accessibility fosters normal commuting behavior, impacting social and career opportunities. Obstacles in accessibility are likely to be linked with reduced social mobility since the resident's

face obstacles in job accessibility, educational exposure, and social interaction. Limited access can further widen socio-economic cleavages by constraining mobility for the poor, thereby influencing urban policy and planning. Optimising passenger flow and information systems in urban settings improves accessibility and commuting efficiency.

2.7 Mediation effect of safety perceptions on the relationship between transport accessibility and mobility patterns

Transport accessibility, perceptions of safety, and mobility patterns are integrated in a dynamic system in which each variable influences people's commuting decisions. Transport accessibility has a direct influence on mobility in that it dictates the range of travel options, with higher accessibility generally stimulating varied mobility patterns by being convenient and flexible [35]. Safety perceptions, however, act as an important filter, modifying the way in which accessibility is converted into actual travel behaviour. Available transport options, when perceived to be insecure due to issues like poor infrastructure or crime problems, are likely to be avoided, particularly by vulnerable groups like the elderly and females [14]. This leads to selective mobility patterns, with people adapting by choosing modes of transportation or routes that are aligned with their comfort zones for safety, such as not traveling late or taking private forms of transportation even where public transportation is available [36]. As such, feelings of safety tend to mediate the relationship between accessibility and mobility, particularly in urban regions where safe but inaccessible transit lines are underutilized. This is supported by empirical studies, where travellers tend to prioritise security over accessibility in unsafe environments, influencing underutilization patterns and selective route choice [37]. These results suggest that transport policies aimed at improving accessibility also address safety through secure infrastructure and public safety measures, encouraging more equitable and widespread utilization of accessible transport facilities [38].

2.8 Mediation effect of affordability on the relationship between transport accessibility and mobility patterns

The mediating impact of affordability within the relationship between transport accessibility and mobility behaviour highlights that money limits travel decision-making even when there is accessible transport. Good transport accessibility would otherwise enable flexible and diverse mobility behaviour by making convenient means of transport accessible, yet without affordability, these accessible means of transport remain out of reach [39]. Affordability acts as an economic filter, determining which transport modes are viable among those that exist, especially for low-income earners who will walk, carpool, or take informal transit modes when they are too costly [40]. Research on low-income and rural communities indicates that even where public transport exists, affordability limitations result in underuse of available modes, further demonstrating affordability's influence on mobility behaviour [41]. Consequently, effective transport policies must include affordability through subsidized fares, reduced-cost travel cards, and affordable and accessible transport like shared bikes or ride-sharing programs, ensuring that accessibility translates into stable and efficient mobility behaviours. This conflict between affordability and accessibility highlights the need for inclusive transportation policy permitting accessible alternatives to foster diverse and equitable mobility trends among socio-economic communities.

3 Conceptual framework

The current study is based on transport access and mobility model that tests the influence of transport accessibility on mobility patterns through safety perceptions and affordability by domestic workers in the City of Johannesburg, South Africa, as outlined in Figure 1. The model establishes four constructs of central importance: Transport Accessibility (TA), Safety Perceptions (SP), Affordability (AF), and Mobility Patterns (MP). The model has direct and indirect associations, consisting of seven hypotheses overall. Specifically, it supposes that the connection between Transport Accessibility (TA) and Mobility Patterns (MP) is intermediated by Safety Perceptions (SP) and Affordability (AF). Five direct connections between these variables are obviously revealed through the conceptual model. Hypotheses Transport Accessibility (TA), Safety Perceptions (SP), Affordability (AF), and Mobility Patterns (MP) are indicated in Figure 1.

This study sought to test empirically seven hypotheses using the proposed model, namely:

Hypothesis 1: Transport accessibility influences safety perceptions among domestic workers in the City of Johannesburg, South Africa.

Hypothesis 2: Transport accessibility influences affordability among domestic workers in the City of Johannesburg, South Africa.

Hypothesis 3: Affordability influences mobility patterns among domestic workers in the City of Johannesburg, South Africa.

Hypothesis 4: Safety perceptions influence mobility patterns among domestic workers in the City of Johannesburg, South Africa.

Hypothesis 5: Transport accessibility influences mobility patterns among domestic workers in the City of Johannesburg, South Africa.

Hypothesis 6: The effect of transport accessibility on mobility patterns is mediated by safety perceptions among domestic workers in the City of Johannesburg, South Africa.

Hypothesis 7: The effect of transport accessibility on mobility patterns is mediated by affordability, among domestic workers in the City of Johannesburg, South Africa.

The next section provides the methodology used in this study to collect data from the respondents.

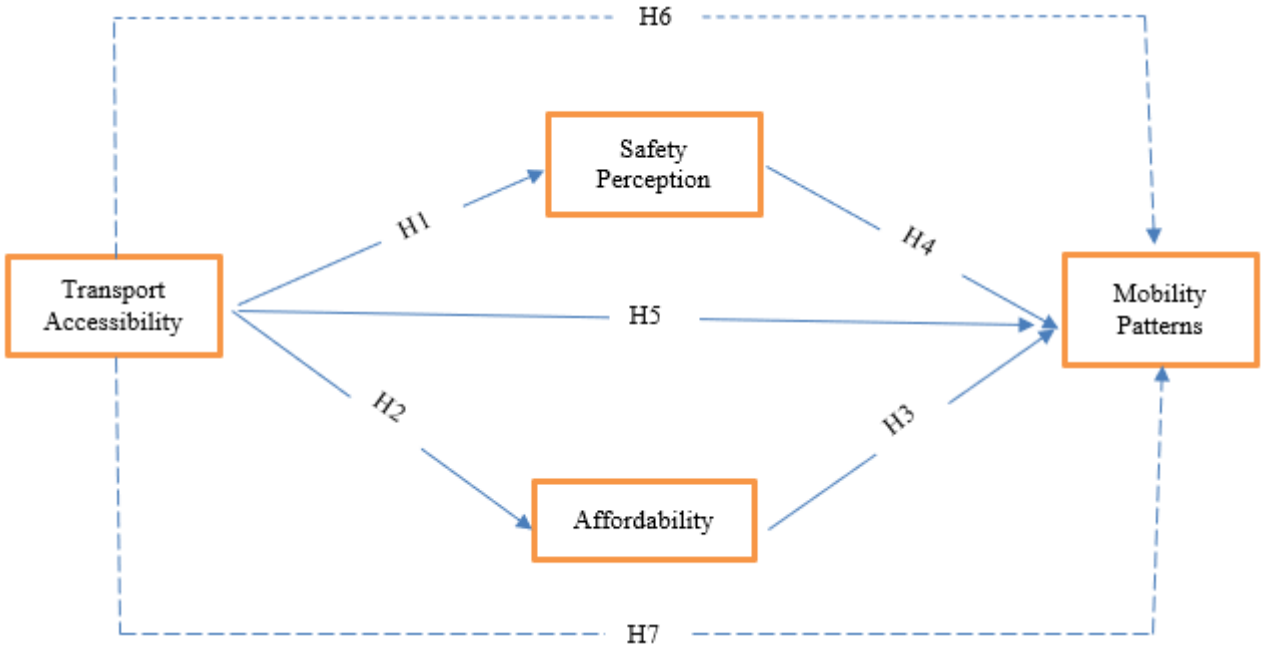

Figure 1 Transport access and mobility model for domestic workers in South Africa

Source: author (2024)

4 Research methods

The present study employed cross-sectional survey design under the quantitative study design framework guided by a positivist worldview to explore how access to transport, safety perceptions, and affordability influence the mobility patterns of domestic workers in Centurion, City of Johannesburg. Using structural equation modelling (SEM) to estimate direct as well as indirect relationships, 233 domestic workers were randomly chosen using purposive sampling. A standardized questionnaire, from validated scales, was employed to measure demographics, transport accessibility, safety perceptions, affordability, and mobility behaviours, with each area specifically crafted to determine domestic workers' special commuting challenges (Refers to Table 1). A pilot interview of 10 domestic workers enabled the calibration of the questionnaire to be simple and consistent. Data were gathered over four weeks in paper and digital forms, reaching the respondents through association meetings and community centres. Partial least squares structural equation modelling (PLS-SEM) was applied to analyze data to evaluate the measurement model using Cronbach's alpha, composite reliability, average variance extracted (AVE), and HTMT ratio for reliability and validity and the structural model in which bootstrapping tested path coefficients and mediation effects. Standardised root mean square residual (SRMR) was used to test model fit. The methodological approach is a comprehensive and precise examination of commuting experience variables among domestic workers that provide insight into their mobility and socio-economic constraints they are exposed to Table 1 presents the measurement scales and sources.

Age distribution of the 233 respondents in this research reveals that most of the domestic workers were aged 46-55 years (33.9%), and secondly, they were between the ages of 36-45 years (20.6%). Most of the respondents were unmarried (67.8%), and 32.2% were married. This one majority reflects socio-economic determinants that may affect the composition of the home-based workforce, where singleness is likely to be aligned with the needs or availability of this occupation. The earnings information reveals that 49.8% of the respondents earn between R4100 and R4500, and 30.0% earn more than R4600. The 20.2% earn between R3600-4000. No respondent's income was in the lowest category (R250-R3500), reflecting a clustering of incomes at moderate but not lowest levels. This income distribution is typical of the comparative low-wage foundation of the industry. Most respondents, 62.2%, make use of R400-R600 in monthly transport costs. The next substantial group, 21.9%, spend R700-R900, and 15.9% spend a further R1000 a month. These transport expenses reflect a significant percentage of their own monthly earnings spent on commutes, highlighting the economic burden these workers are under with their low income. The following section provided the findings of the SEM conducted for this research.

Table 1 Measurement scales and their sources

Construct	Measuring Items	Sources
Transport Accessibility (TA)	1. TA1: The distance from my residence to the nearest public transport stop is convenient. 2. TA2: The frequency of public transport services is adequate for my needs. 3. TA3: Public transport services are reliable and operate on time. 4. TA4: The location of transport stops/stations is convenient. 5. TA5: I have access to different modes of transport for commuting.	Friman, Lättman and Olsson [42], Olsson, Friman and Lättman [43]
Safety Perceptions (SP)	1. SP1: I feel safe waiting at public transport stops. 2. SP2: Public transport vehicles are safe from accidents or crime. 3. SP3: There are visible security measures at stops. 4. SP4: Lighting is adequate at public transport stops and on my route. 5. SP5: Public transport services prioritize passenger safety.	Abenoza, Cats and Susilo [44], Ceccato and Paz [14]
Affordability (AF)	1. AF1: The cost of public transport is affordable based on my income. 2. AF2: I can use public transport regularly without financial strain. 3. AF3: Public transport offers good value for money. 4. AF4: I can access different transport options that fit within my budget. 5. AF5: Financial subsidies or discounts are available for users.	Dewita, Burke and Yen [45], Guzman, Oviedo and Rivera [22]
Mobility Patterns (MP)	1. MP1: I use public transport frequently for commuting. 2. MP2: I adjust my commuting patterns based on safety concerns. 3. MP3: I select my commuting routes based on affordability and accessibility. 4. MP4: The time I spend commuting is reasonable. 5. MP5: I avoid certain times or routes to ensure a safer commute.	Zegras, Lee and Ben-Joseph [46]

Source: author (2024)

4.1 Measurement model assessment

Partial Least Squares Structural Equation Modelling (PLS-SEM) was utilized to examine the relationships between latent constructs (e.g., affordability, mobility patterns, safety perception, and transport accessibility) and their respective manifest variables. PLS-SEM was chosen because of its ability to handle complex models with multiple constructs and indicators, and for being suitable when the research aim is more focused on prediction and theory development rather than simple theory confirmation [47]. The constructs were modelled reflectively, a decision founded on theoretical assumptions that latent variables manifest themselves in observable indicators. Reflective measurement models assume that change in the latent construct leads to change in the corresponding indicators [48]. This aligns with the nature of constructs in this study that were envisioned as underlying constructs with observable indicators to portray them. Table 2 provides a summary of measurement model evaluation results.

The internal consistency of every construct was established in Table 2 through composite reliability (CR) and Cronbach's alpha. The results, from Table 2, were that CR and Cronbach's alpha values were both over the acceptable cut-off of 0.7 at 0.887 to 0.898 for CR and 0.878 to 0.895 for Cronbach's alpha, confirming reliable measurement of all constructs. The convergent validity was checked by means of the Average Variance Extracted (AVE), which represents variance extracted by a construct in comparison to error measurement (Farrell, 2010). Table 2 shows that all the constructs possessed a sufficient convergent validity with AVE values more than 0.5, i.e., each construct extracts over 50% variance in its measures [49]. Reliability of the indicators was validated by verifying the loadings of every indicator on its respective latent construct, and it is generally expected that suitable loadings are greater than 0.7 [50]. All the indicators in Table 2 were greater than this level, therefore validating that each indicator is measuring its respective construct accurately. High indicator reliability ensures the contribution of each indicator towards a proper indication of its respective construct. The next section provides the findings of discriminant validity of the research.

Table 2 Measurement model assessment

Latent construct	Indicators	Indicator reliability	CR	AVE	Cronbach's alpha
Affordability	A1	0.782	0.890	0.672	0.878
	A2	0.853			
	A3	0.858			
	A4	0.793			
	A5	0.809			
Mobility Patterns	MP1	0.803	0.898	0.697	0.891

	MP2	0.798			
	MP3	0.884			
	MP4	0.886			
	MP5	0.798			
Safety Perception	SP1	0.755	0.887	0.686	0.885
	SP2	0.854			
	SP3	0.855			
	SP4	0.823			
	SP5	0.851			
Transport Accessibility	TA1	0.742	0.896	0.710	0.895
	TA2	0.742			
	TA3	0.905			
	TA4	0.904			
	TA5	0.900			

Source: Author (2024)

4.2 Discriminant validity

The discriminant validity in the model was checked both using Fornell-Larcker criterion and the Heterotrait-Monotrait (HTMT) ratio such that each construct should be different conceptually from others. The Fornell-Larcker criterion is to contrast the square root of the Average Variance Extracted (AVE) for every construct with its correlation with other constructs, with higher diagonal values than any inter-construct correlations indicating discriminant validity. Results in Table 3 indicate that affordability (√AVE = 0.820), mobility patterns (√AVE = 0.835), safety perception (√AVE = 0.828), and transport accessibility (√AVE = 0.842) all surpass their correlations with other constructs, establishing that each construct has more variance in common with its indicators than with any other construct. The results of Fornell-Larcker criteria are shown in Table 3.

Table 3 Fornell-Larcker criterion

Constructs	Affordability	Mobility Patterns	Safety Perception	Transport Accessibility
Affordability	0.820			
Mobility Patterns	0.217	0.835		
Safety Perception	0.415	0.618	0.828	
Transport Accessibility	0.263	0.541	0.600	0.842

Source: author (2024)

Table 3 using the HTMT ratio, a conservative discriminant validity measure, also supports the finding because all values of construct pairs are below the 0.85 threshold (e.g., affordability and mobility patterns: 0.239; mobility patterns and safety perception: 0.689), fulfilling discriminant validity standards. Table 4 presents discriminant validity using the HTMT criterion.

Table 4 results based on both Fornell-Larcker criterion and Heterotrait-Monotrait (HTMT) ratio ensure that all constructs are unique and measure different concepts in the presented model, hence validating the outer measurement model for subsequent structural analysis. This study employed both the Fornell-Larcker criterion and the Heterotrait-Monotrait (HTMT) ratio to ensure a robust assessment of discriminant validity. The use of these two methods provides complementary insights in this study: the Fornell-Larcker criterion is a traditional but widely accepted approach that compares the square root of AVE to inter-construct correlations, while the HTMT ratio, as a more recent and conservative technique, assesses whether constructs are truly distinct by evaluating the average correlations across items of different constructs. Applying both tests enhances the reliability of discriminant validity assessment, aligning with best practices in Partial Least Squares Structural Equation Modelling (PLS-SEM). This dual approach ensures that the latent constructs used in the model are conceptually and statistically distinct, which is a prerequisite for valid structural path analysis. The results of structural model assessment are presented in the next section.

Table 4 Heterotrait-monotrait ratio (HTMT)

Constructs	Affordability	Mobility Patterns	Safety Perception
Affordability			
Mobility Patterns	0.239		
Safety Perception	0.470	0.689	
Transport Accessibility	0.293	0.601	0.675

Source: author (2024)

4.3 Structural model assessment

Structural model fit tests examine the association between latent constructs in terms of effect size and prediction accuracy, namely, adjusted R-square, effect size (f-square), and Variance Inflation Factor (VIF). These tests tell us about the strength of prediction of the model and the strength of associations between constructs [51]. R-square is the proportion of explained variance by the model for every endogenous construct that present evidence on the predictive ability of the model [52]. R-square results are presented in Table 5.

Table 5 R-square

Constructs	R-square
Affordability	0.069
Mobility Patterns	0.429
Safety Perception	0.359

Source: author (2024)

As is evident from Table 5, the R-square (R^2) assesses the predictive validity of the model for predicting each endogenous construct as a percentage of variance explained. Affordability's R^2 value is 0.069, which means that 6.9% of its variance is explained by the model, which suggests low predictive validity. Mobility patterns, however, are represented by an R^2 value of 0.429, which means that 42.9% of its variance is explained by the predictors, suggesting moderate predictive validity. Safety perception has an R^2 of 0.359, explaining 35.9% of the variance, and thus having moderate predictive accuracy too. These R^2 results suggest that while the model explains a moderate proportion of variance in mobility patterns and safety perception, its predictability for affordability is very low.

The f-square value provides an estimate of the effect size of a predictor on an endogenous construct, where 0.02, 0.15, and 0.35 represent small, medium, and large effects, respectively (Cohen, 1988). f-square (f^2) values estimate the effect size of each predictor on an endogenous construct in Table 6. The route affordability → mobility patterns have an f^2 value of 0.004, indicating a zero effect, i.e., there is no substantial effect of affordability on mobility patterns. Safety perception → mobility patterns have an f^2 value of 0.230, representing a medium effect size, and it suggests that safety perception is significantly related to mobility patterns. In Table 6, transport Accessibility → Affordability has an f^2 of 0.074, which is a small effect size, and transport accessibility thus has a moderate impact on affordability. Transport accessibility→ mobility patterns have a small effect size with an f^2 of 0.080, and hence a modest effect of transport accessibility on mobility patterns. Yet, transport accessibility → safety perception has a large effect size with an f^2 of 0.561, indicating that transport accessibility has a considerable influence on safety perception. These f-square values represent various effect strengths, and the largest one is found between transport accessibility and safety perception. Table 6 lists the f-square values for every predictor variable, which represent effect size and VIF values in this model.

Table 6 F-square and VIF values

	VIF F	f-square
Affordability -> Mobility Patterns	1.208	0.004
Safety Perception -> Mobility Patterns	1.756	0.230
Transport Accessibility -> Affordability	1.000	0.074
Transport Accessibility -> Mobility Patterns	1.562	0.080
Transport Accessibility -> Safety Perception	1.000	0.561

Source: author (2024)

The VIF values check for multicollinearity between the predictor variables, with VIF values below 5 establishing low multicollinearity and, therefore, reliable estimates. All the VIF values in Table 6 are below 2, which represents very low multicollinearity between predictors and ensuring that multicollinearity was not an issue for this model. Results of model-fit statistics for this study are given in the subsequent section.

4.4 Model-fit statistics

Model-fit statistics assess the degree of the data-fitting suggested model, providing a measure of the general model adequacy. Among the common employed model-fit indices were the Standardized Root Mean Square Residual (SRMR), d_ULS (unweighted least squares discrepancy), d_G (geodesic discrepancy), Chi-square, and the Normed Fit Index (NFI). The results of the model-fit statistics are presented in Table 7.

Table 7 Model fit indices

Model fit indices	Estimated model
SRMR	0.122
d_ULS	3.140
d_G	9.733
Chi-square	6262.704
NFI	0.344

Source: author (2024)

In Table 7, the SRMR of the estimated model is 0.122, which is greater than the widely accepted threshold of 0.08 for a good fit. This suggests a large difference between predicted and observed correlations, indicating that there could be scope for model fit improvement. d_ULS is 3.140, one of the fit measures that compares discrepancies in the least squares sense. Though lower is better in terms of fit in general, the value suggests moderate discrepancies and where the model can be worked on. At a value of 9.733, d_G (Geodesic Discrepancy) quantifies discrepancies in geodesic distance terms. Although there is no formal cutoff for d_G, lower is preferred. The value here suggests that the model is not grossly misaligned but leaves some room for improvement. The Chi-square for the estimated model is 6262.704, testing the difference between observed and model-implied covariance matrices. High Chi-square values typically indicate poor fit, as the estimated model does not exactly capture the relationships observed in the data. The NFI (Normed Fit Index) of the estimated model is 0.344, with higher values near 1 indicating better model fit compared to a baseline model. An estimate of 0.344 suggests that the model is not well-fitted compared to the baseline and that structural change is required.

Figure 2 shows a structural equation model of relationships between latent constructs: transport accessibility, safety perception, affordability, and mobility patterns. The blue circles are each of the latent constructs, with figures inside them indicating the R-square (R^2) value, which is the proportion of variance explained by the predictors for the construct. According to the model, transport accessibility has a high impact on safety perception and a moderate impact on affordability and mobility patterns. Safety perception, on the other hand, exerts a very strong positive influence on mobility patterns, the focal outcome variable in the model. affordability does not have a significant influence on mobility patterns. High indicator loadings between constructs are an assurance of the measures' reliability, and the model explains a moderate variance for mobility patterns and safety perception, but very little variance for affordability. Figure 2 is the result of the direct path analysis.

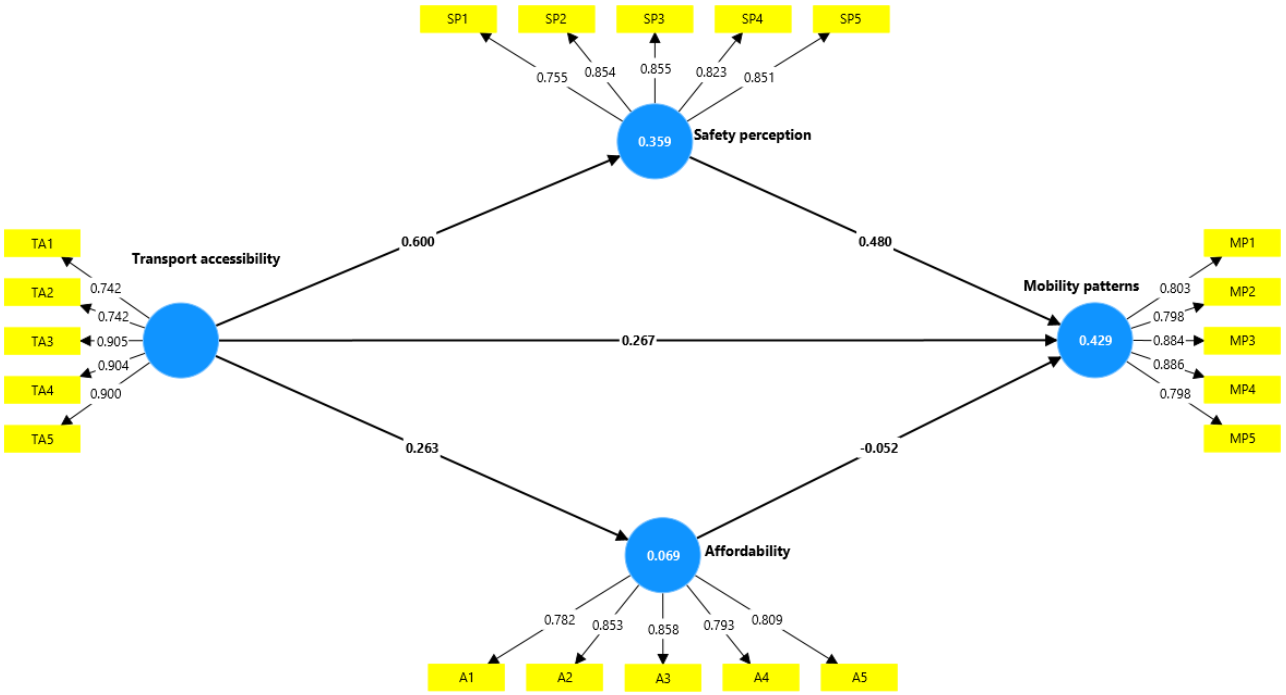

Figure 2 Transport access and mobility model for domestic workers in South Africa

Source: author (2024)
TA, transport accessibility, SP, safety perception, A, affordability, and MP, mobility patterns
* Significant at p <0.001
* Significant at t>1.96

The next section focuses on hypothesis testing.

4.5 Hypothesis testing

The study employed SEM in testing hypothesized structural relationships. Adopting Wong (2013), a threshold of more than 0.20 for standardized path coefficient was applied as significance, albeit in the model. Path coefficient significance was tested through bootstrapping with 5,000 iterations, with t-values higher than 1.96 at the 95% confidence level indicating significance. This method borrows from Hair et al. (2014), who propose using t-statistics and p-values obtained through bootstrapping to determine path significance with accuracy. The 0.20 threshold for standardized path coefficients is a standard measure in most research fields. Table 8 presents the path coefficient results estimated at a 95% confidence level.

Table 8 Results of direct path analysis

Paths	H	Path coefficient (β value)	T Values	p Values	Decision
Transport Accessibility -> Safety Perception	H1	0.600	12.639	0.000	Supported
Transport Accessibility -> Affordability	H2	0.263	4.428	0.000	Supported
Affordability -> Mobility Patterns	H3	-0.052	0.932	0.352	Not Supported
Safety perception -> Mobility Patterns	H4	0.480	6.063	0.000	Supported
Transport Accessibility -> Mobility Patterns	H5	0.267	3.745	0.000	Supported
TA, Transport Accessibility, SP, Safety Perception, A, Affordability, and MP, Mobility Patterns * Significant at p <0.001. *Significant at T>1.96.					

Source: author (2024)

Table 8 hypothesis testing results indicate that transport accessibility has a significant effect on safety perception (β = 0.600, t = 12.639, p = 0.000), affordability (β = 0.263, t = 4.428, p = 0.000), and mobility behaviour (β = 0.267, t = 3.745, p = 0.000), confirming these associations. Outcomes reveal that perception of safety positively impacts mobility patterns (β = 0.480, t = 6.063, p = 0.000) with high influence on the outcome variable. The impact of affordability on mobility patterns (β = -0.052, t = 0.932, p = 0.352) is not statistically significant, indicating that affordability has no significant impact on mobility patterns. Overall, findings in Table 8 indicated the effects of transport accessibility and perceived safety as the significant predictors of mobility patterns, while affordability is less so. The subsequent section indicates the indirect path analysis of this study.

4.6 Mediation effect analysis

Mediation effect analysis is used to determine whether the impact of an independent variable (predicator) on a dependent variable (outcome) is mediated by a third variable, known as a mediator [53]. It is this concept, which was originally formulated by Baron and Kenny [54], establishing a causal theory of mediation to explain how an intermediary explains the mechanism or process through which one variable affects another. Mediation analysis answers the "how" and "why" behind relationships in several complicated models to increase theoretical knowledge as well as improve practical applications. More recently, for example, scholars such as Preacher and Hayes [55] have added to and further refined the process with a greater focus on bootstrapping methods in indirect effect estimation, offering increased robustness and better mediation assessment, especially where small samples are being dealt with, or distributions are non-normal. Mediation is considered significant when the indirect effect (the product of the relations between the predictor and the mediator, and the mediator and the outcome) is statistically distinct from zero, indicating that the mediator is significantly influencing the relationship [55]. Mediation analysis is commonly used when it is theorized by a researcher that the effect of one variable on another is mediated by an intervening construct [53]. For example, in this study, mediation effect analysis helps in understanding whether constructs such as safety perception and affordability transfer the effect of transport accessibility to mobility patterns. This approach not only strengthens theoretical models by illuminating back-end processes but also follows suggestions of researchers such as Hayes [56] and MacKinnon [53], who suggest reporting both direct and indirect effects to reveal the integrated architecture of relationships in a model. Indirect path analysis findings are presented in Table 9.

Table 9 Results of indirect path analysis

Paths	Hypothesis	Path coefficient (β value)	T Values	p Values	Decision
Transport accessibility -> Safety perception -> Mobility patterns	H6	0.287	5.643	0.000	Supported
Transport accessibility -> Affordability -> Mobility patterns	H7	-0.014	0.872	0.383	Not Supported
TA, Transport Accessibility, SP, Safety Perception, A, Affordability, and MP, Mobility Patterns * Significant at p <0.001. *Significant at T>1.96.					

Source: author (2024)

In Table 9, the mediation effect analysis reveals that safety perception effectively mediates the relationship between transport accessibility and mobility patterns with a path coefficient of 0.287, t-value of 5.643, and p-value of 0.000, which is a strong and statistically significant indirect effect. Conversely, in Table 9, results show that affordability does not play the role of a mediator to any considerable level, as corroborated by a path coefficient of -0.014, a t-value of 0.872, and a p-value of 0.383, showing that affordability has no significant impact as a mediator in this context. The discussion of the current study is provided below.

5 Discussion

The study analyzed the way transport accessibility, safety perceptions, and price influence mobility among the domestic workers of the City of Johannesburg, South Africa. Utilizing SEM, the study tested direct and indirect relationships that affirmed significant findings on how these factors are interlinked in influencing commuting decision and pattern. The primary research objective was to analyze the connection between transport accessibility and safety perceptions in Johannesburg City domestic workers, South Africa. In hypothesis one, the work postulated there is a direct positive connection between transport accessibility and perceptions of safety ($\beta = 0.600$, $p < 0.001$) and that displays how accessible public transport systems have enhanced perceived security. This aligns with the idea that well-connected, accessible transit modes provide a feeling of security and mastery over travel choices, with reduced vulnerability to risky alternatives. This conclusion places integrated, secure transit modes at the forefront of planning accessible transport systems, supporting conclusions made by Ceccato & Paz (2017) about safety as a priority in public transport environments.

The second research question examined the effect of transport affordability and accessibility on the mobility behavior of domestic workers in the City of Johannesburg, South Africa (Hypotheses 2 and 3). Results indicate that transport accessibility significantly affects mobility behaviour ($\beta = 0.267$, $p < 0.001$), whereas affordability does not significantly affect ($\beta = -0.052$, $p = 0.352$). This reveals the logistical importance of human flow management and access coordination in urban transport planning. This also means that while accessibility is a direct determinant of mobility patterns, affordability may not be limited, possibly due to the low-income nature of domestic work, if limited options necessitate reliance on available transport modes. This corroborates studies finding that where affordable alternatives are unavailable, commuters may prefer accessibility to affordability, as noted in areas with poorly served transit routes [27]. Consequently, in areas of the city where affordable transit options are not an option, domestic workers might restrict their travel to necessity only, restricting their participation in social or leisure activities, which can lead to isolation and social exclusion by not allowing full integration into urban life.

The third research aim examined the influence of transport safety perceptions and transport accessibility on mobility behaviour among domestic workers in the City of Johannesburg, South Africa (Hypothesis 4). Results indicate that safety perceptions positively affect mobility behaviour ($\beta = 0.480$, $p < 0.001$), with an observation that perceived safety is critical in shaping commuter behaviour. This finding is in tandem with studies proving that safety concerns could alter modes of transport, especially for women and other marginalized groups [57]. For domestic labourers, enhanced safety perceptions could enable frequent travel despite barriers, emphasizing the need for policies to raise transit security interventions.

The fourth research objective examined the extent to which safety and affordability perceptions mediate between accessibility of transport and mobility behavior in the City of Johannesburg, South Africa (Hypotheses 6 and 7). Evidence supported that perceptions of safety mediate this relationship ($\beta = 0.287$, $p < 0.001$), but affordability does not exert a significant mediating effect ($\beta = -0.014$, $p = 0.383$). This suggests that affordable transport is not enough but relies on how perceived safety impacts on commuters. The limited bearing of affordability states that financial limits could be secondary within a setting where safety and convenience of transport matter. In the case of housemaids, transportation might exist, but it won't effectively work if security doesn't exist. Safety concerns, such as exposure to crime or harassment, have a direct bearing on how often they can commute, demonstrating the importance of safe transit zones for these kinds of workers.

6 Conclusion

This study emphasizes the critical role of transport accessibility, safety perceptions, and affordability in the mobility behaviour of domestic workers in the City of Johannesburg, South Africa. The results show that transport accessibility and safety perceptions significantly influence mobility behaviour, but affordability has a less direct influence, which can be explained by the lack of transport options resulting in the utilization of available modes regardless of financial difficulties. In South Africa, improved transport accessibility can enhance commuting and reduce "transport poverty" among domestic workers, particularly in conjunction with proper safety interventions. To fix the transport predicament of South African domestic workers, solutions should focus on enhancing accessibility, security, and affordability, particularly among the vulnerable group like women. Public education campaigns on secure travel, alongside the training of conductors and drivers in safety, can impose a safety-culture of vigilance, challenging the transportation impediments faced by low-income domestic workers and other urban commuters in South Africa. The theoretical contribution of this research to the logistics management practice is provided below.

6.1 Theoretical contributions

This study offers a theoretical contribution to research on logistics managementby framing mobility patterns within the logistics flows of people, information, and cost-effective resources across urban networks. This study focused on domestic workers, an underrepresented yet central subject group in the case of urban transport studies. This study widened the application of transport equity theory in examining how equitable access to transport can minimize "transport poverty" and enable socio-economic integration. The study puts forward a model that positions perceived safety and affordability as mediators between mobility behavior and transport accessibility. This extends logistics theory by bringing to the limelight the aspect that perceived safety is not only a consequence but also a crucial mediator mediating mobility decisions and transport access, particularly for vulnerable individuals. This study contributes to the sustainable urban logistics literature by presenting the problem of "transport poverty" and defining it in terms of accessibility, affordability, and social inclusion. It echoes the findings of Tsikada, Luke and Mageto [58], who emphasise that sustainable value networks must address not only operational performance but also environmental and social dimensions, especially when designing logistics systems for vulnerable populations. It emphasized the significance of inclusive transport policy and low-cost transit measures in creating accessible, equitable logistics systems. This study explored these interdependencies that broaden theoretical discussion in logistics management to include social equity and welfare, supporting logistics models that consider the interests of marginal workers in cities. This contribution is significant in rethinking urban planning policy and operations towards both attaining economic efficiency and social impacts, hence further enhancing logistics' place as a field of study that can directly influence societal well-being and inclusivity. The applicatory ramifications of the research are discussed in the subsequent section.

6.2 Practical contributions and implications for stakeholders

This study provides recommendations for various stakeholders interested in urban transport, logistics planning, and policymaking. The results are that government regulation and public purchasing play a fundamental role in ensuring transport affordability and accessibility. Amorim, de Abreu e Silva and Gonçalves [59] investigate how public transport subsidies are distributed among different income groups and transport modes, using data from Oslo. The study shows that while high-income users (e.g. rail commuters) often receive larger passenger subsidies, the overall effect is moderately progressive since lower-income individuals rely more on buses and metro services. This urges the government and urban planners to implement policies that ensure low-income commuters, particularly domestic workers in South Africa who are heavily dependent on public transport, have affordable, accessible, and safe means of transport. Urban transport can reduce "transport poverty" and enhance greater social inclusion through the provision of targeted subsidies, increasing transit network coverage to low-density townships, and transit zone safety enhancement. Low-cost housing near centres of employment will cut travel time and enhance domestic workers' lifestyles. These findings also support a logistics-centric view where technical elements of logistics, such as transport scheduling, routing, and flow management, are critical to reducing inefficiencies in human mobility and urban service delivery. The study highlighted the role of public transport operators to upgrade reliability and safety to enhance female passengers' service perception. Initiatives such as increased vigilance and women-only compartments on public transport during peak risk hours can reduce safety concerns, making public transport a more viable and appealing means of travel. Transport operators can also turn to technological measures, such as real-time transit information via apps and SMS, to allow domestic workers to plan safer and more efficient travel. Private sector employers who depend on in-home workers can apply this research to learn about the transportation issues of their employees and help them support safe transportation plans. These can be through transport allowances, flexible working hours for coordination with public transport schedules or even providing pooled transport facilities that help maintain workers' wellness and performance. These can be applied to urban transport planning, where transport services are organized to cater to the interests of marginalized groups, including domestic workers. The last part presents the research limitations and agenda for future studies.

6.3 Limitations and future research

This study, despite its contribution regarding transportation accessibility, affordability, and safety for local workers, also has several limitations that create a research agenda to be pursued in the future. This study on domestic workers within the City of Johannesburg constrained generalisability to other urban South African cities. Hence, future research might proceed to explore commuting problems among low-paid workers across different geographical and urban-rural contexts to make comparisons to detect transport requirements in different situations. The cross-sectional data constraint the ability to follow changes over time in the patterns of commuting, possibly in response to economic or transport policy developments. Longitudinal studies would illuminate whether mobility behaviour and transport experience evolve over time because of policy or economic factors. Self-reported data from surveys include such possible response biases or recall errors for transport experience. Widening the choice of methodologies to include mixed methods, combining qualitative description with quantitative observation, would facilitate deeper exploration of individual, social, and economic factors behind transportation decision-making by domestic workers. The analysis is only considering the mediating effects of affordability and safety, but not other determinants influencing mobility choices, such as social support systems, alternative modes of transport, or economic determinants on a bigger scale like employment conditions and labour policies. Future studies could thus also consider other mediating variables to provide a broader perspective on how factors influence mobility choices. Investigating the implications of emerging transport technologies or shared mobility modes for access and safety among poor workers could inform more creative, more just, and more responsive transport planning, in service to a broader vision of social equity in urban mobility.

References

[1] PETERSON, E.: The invisible carers: Framing domestic work (ers) in gender equality policies in Spain, *European Journal of Women's Studies*, Vol. 14, No. 3, pp. 265-280, 2007. https://doi.org/10.1177/1350506807079014

[2] SEEDAT-KHAN, M., DAWOOD, Q., RAMNUND-MANSINGH, A.: *Intersections of the mental, social, economic, and physical burdens of COVID-19 on women in academia*, In: Upasana Gitanjali Singh, Chenicheri Sid Nair, Craig Blewett, Timothy Shea, Academic Voices, pp. 375-389, Chandos Publishing, 2022. https://doi.org/10.1016/B978-0-323-91185-6.00037-9

[3] National Domestic Workers Alliance (NDWA), Families First mobilizations announcement, [Online], Available: https://www.domesticworkers.org [25 Jul 2025], 2025.

[4] GALLOTTI, M.: *Migrant Domestic Workers Across the World: Global and Regional Estimates,* Geneva: International Labour Organization, Labour Migration Branch, 2016.

[5] The Arab Weekly, *Report raises new concerns over abuse of migrant workers in Oman,* [Online], Available: https://thearabweekly.com/report-raises-new-concerns-over-abuse-migrant-workers-oman [10 Mar 2025], 2022.

[6] TOUMI, H.: *New entry rules set for domestic workers,* Gulf News, [Online], Available: http://gulfnews.com/news/gulf/kuwait/new-entry-rules-set-for-domestic-workers-1.578029 [10 Mar 2025], 2010.

[7] *Australian Institute of Health and Welfare* (AIHW), Aged care workforce, Canberra, AIHW, 2024.

[8] CHEN, M.A.: Recognizing domestic workers, regulating domestic work: Conceptual, measurement, and regulatory challenges, *Canadian Journal of Women and the Law*, Vol. 23, No. 1, pp. 167-184, 2011.

[9] SIL, A., CHOWDHURY, S., THOREAU, R.: Moving towards an inclusive public transport system for women in the South and Southeast Asian region, *Transport reviews*, Vol. 43, No. 6, pp. 1144-1164, 2023. https://doi.org/10.1080/01441647.2023.2200983

[10] ERMAN, T., KARA, H.: Female domestic workers strategizing via commuting long distance: New challenges and negotiations in neoliberalizing Turkey, *Women's Studies International Forum,* Vol. 67, pp. 45-52, 2018. https://doi.org/10.1016/j.wsif.2018.01.002

[11] PEREIRA, R.H., SCHWANEN, T., BANISTER, D.: Distributive justice and equity in transportation, *Transport reviews*, Vol. 37, No. 2, pp. 170-191, 2017. https://doi.org/10.1080/01441647.2016.1257660

[12] GUZMAN, L.A., OVIEDO, D.: Accessibility, affordability and equity: Assessing 'pro-poor'public transport subsidies in Bogotá, *Transport Policy*, Vol. 68, pp. 37-51, 2018. https://doi.org/10.1016/j.tranpol.2018.04.012

[13] DELBOSC, A., CURRIE, G.: The spatial context of transport disadvantage, social exclusion and well-being, *Journal of Transport Geography*, Vol. 19, No. 6, pp. 1130-1137, 2011. https://doi.org/10.1016/j.jtrangeo.2011.04.005

[14] CECCATO, V., PAZ, Y.: Crime in São Paulo's metro system: Sexual crimes against women, *Crime prevention and community safety*, Vol. 19, No. 3, pp. 211-226, 2017.

[15] EL-GENEIDY, A., LEVINSON, D., DIAB, E., BOISJOLY, G., VERBICH, D., LOONG, C.: The cost of equity: Assessing transit accessibility and social disparity using total travel cost, *Transportation Research Part A: Policy and Practice*, Vol. 91, pp. 302-316, 2016. https://doi.org/10.1016/j.tra.2016.07.003

[16] REIS, V., MACEDO, P.: Mapping and evaluating the complexity of information flows in freight transport chains, *Transportation Planning and Technology*, Vol. 42, No. 8, pp. 757-776, 2019.https://doi.org/10.1080/03081060.2019.1675312

[17] LÄTTMAN, K., FRIMAN, M., OLSSON, L.E.: Perceived accessibility of public transport as a potential indicator of social inclusion, *Social inclusion*, Vol. 4, No. 3, pp. 36-45, 2016. https://doi.org/10.17645/si.v4i3.481
[18] FRIMAN, M., LÄTTMAN, K., OLSSON, L.E.: Public transport quality, safety, and perceived accessibility, *Sustainability*, Vol. 12, No. 9, 3563, pp. 1-14, 2020. https://doi.org/10.3390/su12093563
[19] OLSSON, L.E., FRIMAN, M., LÄTTMAN, K.: Accessibility barriers and perceived accessibility: Implications for public transport, *Urban Science*, Vol. 5, No. 3, 63, pp. 1-14, 2021. https://doi.org/10.3390/urbansci5030063
[20] DURI, B.: Invisible Journeys: Understanding the Transport Mobility Challenges of Urban Domestic Workers, *Social Sciences*, Vol. 14, No. 4, 224, pp. 1-17, 2025. https://doi.org/10.3390/socsci14040224
[21] SEREBRISKY, T., GÓMEZ-LOBO, A., ESTUPIÑÁN, N., MUÑOZ-RASKIN, R.: Affordability and subsidies in public urban transport: what do we mean, what can be done? *Transport reviews*, Vol. 29, No. 6, pp. 715-739, 2009. https://doi.org/10.1080/01441640902786415
[22] GUZMAN, L.A., OVIEDO, D., RIVERA, C.: Assessing equity in transport accessibility to work and study: The Bogotá region, *Journal of Transport Geography*, Vol. 58, pp. 236-246, 2017. https://doi.org/10.1016/j.jtrangeo.2016.12.016
[23] BROWN, A.: From aspiration to operation: ensuring equity in transportation, *Transport Reviews*, Vol. 42, No. 4, pp. 409-414, 2022. https://doi.org/10.1080/01441647.2022.2064527
[24] DEWITA, Y., BURKE, M., YEN, B.T.: The relationship between transport, housing and urban form: Affordability of transport and housing in Indonesia, *Case studies on transport policy*, Vol. 8, No. 1, pp. 252-262, 2020. https://doi.org/10.1016/j.cstp.2019.01.004
[25] OBUDHO, S.M., OTENGAH, W.A., SHIVACHI, T.I.: Motorcycle taxi in addressing the rural transport conundrum, *Acta logistica*, Vol. 7, No. 2, pp. 73-84, 2020. https://doi.org/10.22306/al.v7i2.156
[26] KĘBŁOWSKI, W.: Degrowth is coming to town: What can it learn from critical perspectives on urban transport? *Urban Studies*, Vol. 60, No. 7, pp. 1249-1265, 2023. https://doi.org/10.1177/00420980221149825
[27] VENTER, C.: Transport expenditure and affordability: The cost of being mobile, *Development Southern Africa*, Vol. 28, No. 1, pp. 121-140, 2011. https://doi.org/10.1080/0376835X.2011.545174
[28] PERROTTA, A.F.: Transit fare affordability: Findings from a qualitative study, *Public Works Management & Policy*, Vol. 22, No. 3, pp. 226-252, 2017. https://doi.org/10.1177/1087724X16650201
[29] BROVARONE, E.V.: Accessibility and mobility in peripheral areas: a national place-based policy, *European Planning Studies*, Vol. 30, No. 8, pp. 1444-1463, 2022. https://doi.org/10.1080/09654313.2021.1894098
[30] PORTER, G.: Transport services and their impact on poverty and growth in rural sub-Saharan Africa: A review of recent research and future research needs, *Transport reviews*, Vol. 34, No. 1, pp. 25-45, 2014. https://doi.org/10.1080/01441647.2013.865148
[31] LEE, J.S., ZEGRAS, P.C., BEN-JOSEPH, E.: Safely active mobility for urban baby boomers: The role of neighborhood design, *Accident Analysis & Prevention*, Vol. 61, pp. 153-166, 2013. https://doi.org/10.1016/j.aap.2013.05.008
[32] CECCATO, V., GAUDELET, N., GRAF, G.: Crime and safety in transit environments: a systematic review of the English and the French literature, 1970–2020, *Public Transport*, Vol. 14, No. 1, pp. 105-153, 2022. https://doi.org/10.1007/s12469-021-00265-1
[33] OXLEY, J., WHELAN, M.: It cannot be all about safety: the benefits of prolonged mobility, *Traffic injury prevention*, Vol. 9, No. 4, pp. 367-378, 2008. https://doi.org/10.1080/15389580801895285
[34] CHENG, Y.-H., CHEN, S.-Y.: Perceived accessibility, mobility, and connectivity of public transportation systems, *Transportation Research Part A: Policy and Practice*, Vol. 77, pp. 386-403, 2015. https://doi.org/10.1016/j.tra.2015.05.003
[35] KENYON, S., LYONS, G., RAFFERTY, J.: Transport and social exclusion: investigating the possibility of promoting inclusion through virtual mobility, *Journal of Transport Geography*, Vol. 10, No. 3, pp. 207-219, 2002. https://doi.org/10.1016/S0966-6923(02)00012-1
[36] VOULGARIS, C.T., TAYLOR, B.D., BLUMENBERG, E., BROWN, A., RALPH, K.: Synergistic neighborhood relationships with travel behavior: An analysis of travel in 30,000 US neighborhoods, *Journal of Transport and Land Use*, Vol. 10, No. 1, pp. 437-461, 2017. https://doi.org/10.5198/jtlu.2016.840
[37] ZHOU, R., CHEN, H., CHEN, H., LAU, A.: Public preference and acceptability of the travel reservation strategy in Xi'an, China, *Travel Behaviour and Society*, Vol. 35, No. April, 100753, 2024. https://doi.org/10.1016/j.tbs.2024.100753
[38] LIN, D., CUI, J.: Transport and mobility needs for an ageing society from a policy perspective: Review and implications, *international journal of environmental research and public health*, Vol. 18, No. 22, 11802, 2021. https://doi.org/10.3390/ijerph182211802
[39] ALLEN, J., FARBER, S.: Sizing up transport poverty: A national scale accounting of low-income households suffering from inaccessibility in Canada, and what to do about it, *Transport policy*, Vol. 74, pp. 214-223, 2019. https://doi.org/10.1016/j.tranpol.2018.11.018

[40] GOLUB, A., MARTENS, K.: Using principles of justice to assess the modal equity of regional transportation plans, *Journal of Transport Geography*, Vol. 41, pp. 10-20, 2014. https://doi.org/10.1016/j.jtrangeo.2014.07.014
[41] KETT, M., COLE, E., TURNER, J.: Disability, mobility and transport in low- and middle-income countries: A thematic review, *Sustainability*, Vol. 12, No. 2, Vol. 2, 589, pp. 1-18, 2020. https://doi.org/10.3390/su12020589
[42] FRIMAN, M., LÄTTMAN, K., OLSSON, L.E.: Public transport quality, safety, and perceived accessibility, *Sustainability*, Vol. 12, No. 9, 3563, pp. 1-14, 2020. https://doi.org/10.3390/su12093563
[43] OLSSON, L.E., FRIMAN, M., LÄTTMAN, K.: Accessibility barriers and perceived accessibility: Implications for public transport, *Urban Science*, Vol. 5, No. 3, 63, pp. 1-14, 2021. https://doi.org/10.3390/urbansci5030063
[44] ABENOZA, R., CATS, O., SUSILO, Y.: Investigating the nature of Public Transport service attributes, *Transportation Science*, 2018.
[45] DEWITA, Y., BURKE, M., YEN, B.T.H.: The relationship between transport, housing, and urban form: Affordability of transport and housing in Indonesia, *Case Studies on Transport Policy*, Vol. 8, No. 1, pp. 252-262, 2020. https://doi.org/10.1016/j.cstp.2019.01.004
[46] ZEGRAS, P.C., LEE, J.S., BEN-JOSEPH, E.: Safely active mobility for urban baby boomers: The role of neighborhood design, *Accident Analysis & Prevention*, Vol. 61, pp. 153-166, 2013. https://doi.org/10.1016/j.aap.2013.05.008
[47] HAIR, J.F. JR., HULT, G.T.M., RINGLE, C.M., SARSTEDT, M., DANKS, N.P., RAY, S.: *Partial least squares structural equation modeling (PLS-SEM) using R: A workbook*, Springer Nature, 2021. https://doi.org/10.1007/978-3-030-80519-7
[48] COLTMAN, T., DEVINNEY, T.M., MIDGLEY, D.F., VENAIK, S.: Formative versus reflective measurement models: Two applications of formative measurement, *Journal of Business Research*, Vol. 61, No. 12, pp. 1250-1262, 2008. https://doi.org/10.1016/j.jbusres.2008.01.013
[49] HAIR, J.F. JR., HULT, G.T.M., RINGLE, C.M., SARSTEDT, M., DANKS, N.P., RAY, S.: Evaluation of reflective measurement models, In *Partial least squares structural equation modeling (PLS-SEM) using R: A workbook*, Cham, Springer International Publishing, pp. 75-90, 2021. https://doi.org/10.1007/978-3-030-80519-7_5
[50] CHEUNG, G.W., COOPER-THOMAS, H.D., LAU, R.S., WANG, L.C.: Reporting reliability, convergent and discriminant validity with structural equation modelling: A review and best-practice recommendations, *Asia Pacific Journal of Management*, Vol. 41, No. 2, pp. 745-783, 2024. https://doi.org/10.1007/s10490-023-09871-y
[51] GÖTZ, O., LIEHR-GOBBERS, K., KRAFFT, M.: *Evaluation of structural equation models using the partial least squares (PLS) approach*, In: Esposito Vinzi, V., Chin, W., Henseler, J., Wang, H. (eds) Handbook of Partial Least Squares. Springer Handbooks of Computational Statistics. Springer, Berlin, Heidelberg., pp. 691-711, 2009. https://doi.org/10.1007/978-3-540-32827-8_30
[52] AMOFAH, K., SALADRIGUES SOLÉ, R.: Going down memory lane in the application of Ajzen's theory of planned behaviour model to measure entrepreneurial intention: An SEM-PLS approach, *International Review of Management and Marketing*, Vol. 10, No. 3, pp. 110-121, 2020. https://doi.org/10.32479/irmm.9814
[53] MACKINNON, D.: *Introduction to statistical mediation analysis*, New York, Routledge, 2012. https://doi.org/10.4324/9780203809556
[54] BARON, R.M., KENNY, D.A.: The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations, *Journal of Personality and Social Psychology*, Vol. 51, No. 6, pp. 1173-1182, 1986. https://doi.org/10.1037/0022-3514.51.6.1173
[55] PREACHER, K.J., HAYES, A.F.: SPSS and SAS procedures for estimating indirect effects in simple mediation models, *Behavior Research Methods, Instruments, & Computers*, Vol. 36, No. 4, pp. 717-731, 2004. https://doi.org/10.3758/BF03206553
[56] HAYES, J.R.: *The complete problem solver*, New York, Routledge, 2013. https://doi.org/10.4324/9780203062715
[57] KACHARO, D.K., TESHOME, E., WOLTAMO, T.: Safety and security of women and girls in public transport, *Urban, Planning and Transport Research*, Vol. 10, No. 1, pp. 1-19, 2022. https://doi.org/10.1080/21650020.2022.2027268
[58] TSIKADA, C., LUKE, R., MAGETO, J.: Sustainable value networks: A focus on operational, environmental, and social performance, *Journal of Infrastructure, Policy and Development*, Vol. 9, No. 2, 9695, pp. 1-32, 2025. https://doi.org/10.24294/jipd9695
[59] AMORIM, J.D.M., DE ABREU E SILVA, J., GONÇALVES, J.M.: Equity and spatial justice perspectives in transportation, *Urban Science*, Vol. 9, No. 5, 163, pp. 1-20, 2025. https://doi.org/10.3390/urbansci9050163

Review process
Single-blind peer review process.