



Exploring Mode Choice Behaviour and Preferences of Transport Users in Small Cities in South Africa: The Case Study of Bloemfontein

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ABSTRACT: This study investigates mode choice behaviour and transport preferences in Bloemfontein, South Africa, a medium-sized metropolitan area facing distinct transportation challenges related to accessibility, affordability, and limited modal integration. While urban mobility research in South Africa has largely focused on major metropolitan regions, smaller cities such as Bloemfontein require tailored, context-sensitive strategies to address their specific economic, spatial, and social dynamics. Adopting a pragmatic research paradigm and guided by the Theory of Planned Behaviour (TPB), this study employs a structured quantitative research design and an Ordinal Logistic Regression Model to examine the factors shaping user preferences across private vehicle (PV), public transport (PT), and non-motorized transport (NMT) modes. Key predictors evaluated include accessibility, reliability, affordability, flexibility, and perceived health benefits. Data were collected through a structured survey targeting regular commuters across different demographic groups. Initial descriptive analysis revealed that demographic variables, particularly gender, age, and employment status, significantly influence transport choices. Women tended to prioritize safety and personal security, while men placed greater emphasis on reliability and on-road performance. Full-time employees showed stronger preferences for PV and PT, whereas part-time workers and unemployed

respondents relied more heavily on NMT, reflecting differences in income levels, travel constraints, and daily activity patterns. Subsequent regression analysis confirmed that accessibility (ease of accessing a service) is the most significant predictor of mode choice, followed by service reliability and affordability. While safety concerns remain relevant, their influence was comparatively weaker than service quality and convenience factors. The findings further indicate a substantial willingness among PV users to shift to PT if improvements in reliability, flexible operating hours, and transparency of service information are implemented. The integration of NMT infrastructure, including pedestrian-friendly environments, bike-sharing programmes, and park-and-ride facilities, is identified as essential for strengthening first- and last-mile connectivity. Overall, the study provides empirically grounded, user-focused insights to inform transport policy and planning in smaller cities. By linking behavioural theory with quantitative evidence, the findings support targeted interventions aimed at enhancing PT accessibility, affordability, and reliability, thereby contributing to more inclusive, sustainable, and equitable urban transport systems.

KEYWORDS: Accessibility; user preferences; safety; reliability; mode choice.

1. INTRODUCTION

Urban transportation planning in South Africa has historically prioritised private vehicle (PV) infrastructure, reinforcing spatial inequality and constraining mobility for low-income and vulnerable populations (Abdulrazzaq et al., 2020; Ma et al., 2018). Despite national policy commitments to public transport (PT) and non-motorised transport (NMT), many cities continue to experience fragmented systems, rising travel costs, and unsafe commuting environments. These challenges are particularly pronounced in small to medium-sized cities, where institutional capacity and infrastructure investment are often limited. National Household Travel Survey data indicate that nearly 40% of South Africans rely on walking as their primary mode of transport, largely due to the unaffordability of alternatives (Statistics South Africa, 2021). While research has largely focused on major metropolitan areas such as Johannesburg and Cape Town, comparatively little attention has been given to medium-sized cities such as Bloemfontein, which face similar structural constraints but receive less policy and planning focus. This study addresses this gap by examining the behavioural and structural factors influencing mode choice in Bloemfontein, a city characterised by limited PT coverage, high poverty levels, and dispersed settlement patterns. The analysis focuses on five key variables namely accessibility (ease of accessing a service), reliability,

affordability, flexibility, and perceived health benefits which were identified as consistent determinants of travel behaviour in global and African urban mobility research (van der Werf, 2019; Adom-Asamoah et al., 2021; Shaaban & Maher, 2020). These variables capture central dimensions of service quality and user perception in resource-constrained settings and enable an integrated assessment of how service-level attributes interact with socio-demographic characteristics to shape commuter preferences. As argued by Montoya-Robledo and Escovar-Alvarez (2020), effective and equitable transport systems must respond to a broad range of user needs rather than focusing solely on cost-efficiency. Accordingly, this study adopts a user-centred analytical perspective.

Mode choice behaviour is shaped by the interaction of multiple factors rather than by any single determinant. While demographic characteristics such as age, gender, and employment status influence transport decisions (Mahmoud et al., 2012; Danesh et al., 2019; Alizadeh & Sharifi, 2023; Zhou et al., 2005), these factors intersect with economic conditions and service characteristics. To capture this complexity, the study employs the Theory of Planned Behaviour (TPB) as a conceptual framework. TPB has been widely applied in transport research to explain mode choice and behavioural change by examining the roles of attitudes, social norms, and perceived behavioural control (PBC) (Ajzen, 1991; Shaaban & Maher, 2020; Jing et al., 2019; Moeinaddini & Habibian, 2025). The

framework provides a structured lens for analysing how individual beliefs, social expectations, and perceived accessibility jointly influence travel decisions. Bloemfontein was selected as the case study due to its role as a growing medium-sized city with important judicial and educational functions, yet it has persistent mobility and governance challenges (Das, 2020). Unlike larger metropolitan areas, it lacks fully integrated PT networks, but continues to face similar issues of affordability, safety, and access. Its socio-spatial structure means that transport choices are often shaped by constraint rather than preference, making it a valuable context for examining everyday mobility decisions in smaller South African cities. By combining behavioural theory with empirical analysis, this study contributes to the understanding of sustainable and inclusive urban mobility in under-researched city contexts and offers policy-relevant insights for improving equity, accessibility, and modal integration.

2. LITERATURE REVIEW

2.1 Modes of Public Transportation

In South Africa, passenger transport is primarily composed of PV, PT, and NMT, with the minibus taxi industry forming the backbone of the PT system, followed by bus services and a declining passenger rail network (Statistics South Africa, 2022). Despite its central role, the PT sector faces persistent challenges, particularly for vulnerable users such as women, children, older persons, and people with disabilities, who often experience limited mobility, inflexible services, and safety risks (Van der Schuren et al., 2022; Jones et al., 2016; Moghayedi et al., 2023). Concerns related to personal security, inadequate safety measures, and unsafe operating conditions continue to undermine PT usability and user confidence (McKay et al., 2024). The integration of PT modes, including minibus taxis, buses, and Bus Rapid Transit (BRT) systems, is a key requirement for effective urban mobility. However, the rollout of Integrated Public Transport Networks (IPTNs) in South African cities has been slow and uneven, hindered by institutional fragmentation, skills shortages, and financial constraints (Manana, 2024). As a result, many cities, including Bloemfontein, continue to operate fragmented systems that disadvantage users. Standardisation of service quality, safety, and reliability across modes remains critical for building cohesive and accessible PT networks (Bubeck et al., 2014). In Bloemfontein, long walking distances to stops, poor route coverage, and weak first- and last-mile connectivity restrict usability, particularly for those with limited mobility (Bashingi et al., 2018). Information asymmetries in hybrid systems that combine scheduled and unscheduled services further constrain trip planning and system efficiency (Ryseck, 2024). Addressing these challenges through improved accessibility, better information provision, and inclusive design is essential to ensure that PT systems serve users with limited transport alternatives, including people with disabilities who remain systematically underprovided for (South African Government Gazette, 2022).

2.2 Sustainable Transportation Development

In South Africa, progress toward Sustainable Development Goal (SDG) 11 is constrained by persistent spatial inequalities rooted in the Apartheid urban form, which continues to impose long travel distances on economically disadvantaged populations (Marais, 2021). Although national urban development and transport policies align with SDG 11 through objectives related to density, spatial integration, and mobility reform, implementation has been uneven and outcomes limited (Du Plessis, 2016; Walters, 2008). Advancing inclusive urban mobility therefore requires transport systems that respond to the needs of all users, including women, chil-

dren, and persons with disabilities, while addressing the interconnected social, economic, and spatial dimensions of sustainability (Musango et al., 2020; Tiwari & Phillip, 2021). Previous research on Bloemfontein highlights the fragility of PT sustainability in smaller cities. Burger (2019) identifies affordability, accessibility, and financial constraints as key factors undermining long-term system viability, underscoring the need for integrated and cost-effective mobility solutions. Similar challenges are reflected in the limited provision for NMT, particularly in the central business district, which remains largely oriented toward PV use (Das, 2019). Reducing dependence on private vehicles through improved PT and NMT infrastructure is therefore central to achieving sustainable passenger transport in this context. Evidence suggests that PT attractiveness and usage are strongly influenced by network design and service characteristics. The proximity and density of stops reduce walking distances and promote active commuting, while frequent and reliable services lower waiting times and improve overall satisfaction (Djurhuus et al., 2014; Hansen et al., 2014). These spatial and operational factors are critical in supporting accessibility and encouraging modal shift. In parallel, affordability remains a decisive determinant of sustainability since fare structures and service investments must align with the socio-economic profiles of the areas they serve to avoid reinforcing exclusion (Burger, 2019; Park & Choi, 2020). Consequently, scholars argue for context-sensitive restructuring of urban transport networks to better serve low-income communities and enhance mobility equity (Özkazanç & Özdemir Sönmez, 2017; Bueno Rezende de Castro et al., 2022).

2.3 Transport Exclusion

Social exclusion is frequently conflated with poverty in policy discourse, despite representing a broader condition defined by limited access to essential services and opportunities (Busco et al., 2023). In the Mangaung Metropolitan Municipality (MMM), which includes Bloemfontein, socio-economic vulnerability remains pronounced, with 36.6% of residents living in poverty and an unemployment rate of 25.3% (Department of Cooperative Governance and Traditional Affairs, 2020). In this context, the availability and quality of transportation play a critical role in shaping access to employment, healthcare, education, and social participation (Özkazanç & Özdemir Sönmez, 2017). PT is particularly important for individuals without access to PVs, including lower-income households, older adults, and people with disabilities. Numerous studies demonstrate a strong association between transport disadvantage and social exclusion among these groups (Ward & Walsh, 2023; Jahangir et al., 2024). Spatial accessibility remains a central determinant of inclusion. Walking distance to PT stops varies significantly across urban areas, with neighbourhoods characterised by fewer or poorly located stops exhibiting lower PT usage and higher levels of exclusion (Özkazanç & Özdemir Sönmez, 2017; Ribeiro et al., 2021). When PT access is inadequate, individuals may be forced to rely on walking or withdraw from travel altogether, with implications for physical activity, mental well-being, and labour market participation (Bueno Rezende de Castro et al., 2022; Ward & Walsh, 2023). Pricing and service design also shape transport-related exclusion. Income-sensitive fare policies and simplified pricing structures, such as flat-rate systems, have been shown to reduce barriers for lower-income users and enhance social welfare (Rahman et al., 2022; Gu et al., 2023). In parallel, modernised fare collection systems can improve convenience and reduce transaction costs, supporting PT uptake (Anders et al., 2013). Complementary interventions, including walkable neighbourhoods and pedestrian infrastructure, may further enhance connectivity where trip distances are feasible (Honiball et al., 2024), while dispersed

land-use patterns underscore the need for integrated and context-sensitive mobility strategies (Haseeb & Mitra, 2023; Ma et al., 2018).

2.4 Mode Choice Behaviour and Transport User Preferences

Travel behaviour and mode choice are shaped by social context, individual preferences, and structural constraints (Karash et al., 2008). Users consistently prioritise travel time and efficiency, with distance and duration playing central roles in decision-making (Nur et al., 2018). Numerous studies show that mode choice varies significantly across demographic groups, particularly by gender, age, income, and employment status (Mahmoud et al., 2012; Danesh et al., 2019; Alizadeh & harifi, 2023). Safety, personal security, and fare affordability are key determinants of travel decisions, especially in contexts characterised by high crime rates and economic inequality (Danesh et al., 2019; Department of Cooperative Governance and Traditional Affairs, 2020). In smaller cities, these factors are amplified by constrained service provision and strong competition from PV. Evidence from the city of Bloemfontein confirms that affordability remains a decisive influence on daily travel choices, reflecting broader economic constraints (Burger, 2019). Higher-income users tend to favour flexible and convenience-oriented options, while women and other vulnerable groups place greater emphasis on safety and accessibility (Danesh et al., 2019; Zhou et al., 2005). Increases in PT fares without corresponding improvements in service coverage and reliability can reinforce PV dependence in smaller cities, contributing to congestion and car-oriented travel patterns (Skartland, 2021; Adom-Asamoah et al., 2021). Despite ongoing efforts to improve PT quality, entrenched PV preferences often persist, as service enhancements alone do not necessarily translate into behavioural change (Nur et al., 2018). Understanding these dynamics is therefore essential for designing effective policies to support sustainable urban mobility. Transport research has traditionally relied on discrete choice models grounded in random utility theory to analyse such decisions, accounting for factors such as cost, time, comfort, and safety (Baltas, 2007; Iraganaboina & Eluru, 2021). However, these models have been criticised for limited sensitivity to cognitive biases and habitual behaviour (Nerhagen, 2000). More recent approaches address these limitations by incorporating psychological dimensions through latent variable models and alternative frameworks, including random regret minimisation and ordered response models, which offer improved explanatory power for understanding transport preferences (Galdames et al., 2011; Iraganaboina & Eluru, 2021).

2.5 Theory of Planned Behaviour (TPB)

The TPB is widely used to explain and predict PT use by linking behavioural intention to attitudes, subjective norms, and PBC (Heath & Gifford, 2002; Zhao et al., 2011). Empirical studies consistently demonstrate that these core components significantly influence intention to use PT, while extensions to the framework, including descriptive norms and interactions between intention and PBC, further enhance its explanatory power (Heath & Gifford, 2002). Attitudes toward PT are shaped by perceived service attributes such as speed, convenience, and flexibility, which influence users' evaluations of travel options (Zhao et al., 2011). Evidence also indicates that the relative influence of TPB constructs varies across contexts. For example, research in Northern Cyprus found that subjective norms and PBC significantly influenced behavioural intention, while attitude played a weaker role (Angin et al., 2024). In the African context, Sam (2025) demonstrated the applicability of TPB in transport-related behaviour analysis, highlighting the framework's flexibility across diverse mobility settings. These findings emphasise that cultural, infrastructural, and policy environments shape

how TPB variables interact. Policy interventions, such as universal bus pass programmes, further illustrate how institutional measures can strengthen positive attitudes and increase PT use (Heath & Gifford, 2002). Collectively, the literature supports TPB as a robust conceptual framework for understanding PT use and informing strategies to enhance its competitiveness and sustainability in smaller cities such as Bloemfontein.

3. MATERIALS AND METHODS

3.1 Study Setting

Bloemfontein, the primary urban center within the MMM, serves as the study area for this research. As shown in Figure 1, MMM includes Bloemfontein and its surrounding areas, and has the smallest population and the lowest population density among all metropolitan municipalities in South Africa (Statistics South Africa, 2012). In 2019, the population of Bloemfontein was estimated at 546,568 (Mangaung Metropolitan Municipality, 2022). PT in Bloemfontein primarily consists of minibus taxis and buses operated by a private company under government subsidy (i.e., Interstate Bus Lines) (Bashingi et al., 2023).

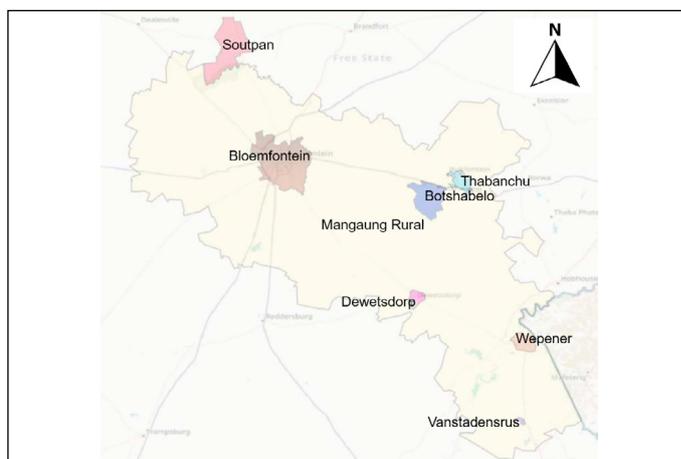


Figure 1: Mangaung Metropolitan Municipality (Mangaung Metropolitan Municipality, 2023)

After years of IPTN planning and implementation issues, an inner-city distribution service was launched in Bloemfontein on 14 July 2024 (Mangaung Metropolitan Municipality, 2024), following the completion of this study. The current transportation system in Bloemfontein plays a critical role in addressing poverty and unemployment challenges. To counter these issues, the city is committed to fostering human settlement, environmental management, and boosting economic activities through a comprehensive spatial development framework (Mangaung Metropolitan Municipality, 2018). This study will focus on the city of Bloemfontein to provide insights on user preferences which could assist in developing customised solutions integral to the envisioned IPTN for the city.

3.2 Research design

This study adopts a pragmatic research paradigm, which is well suited to generating practical and policy-relevant insights in applied transport research. Pragmatism prioritises the research question and supports the use of methods best suited to addressing real-world problems (Creswell, 2017). Accordingly, a structured quantitative approach was employed to capture transport users' preferences and analyse patterns and relationships using statistical techniques. This approach aligns with the pragmatic emphasis on producing actionable findings that respond to the complexity of urban

mobility challenges. Although the study is quantitative in design, the pragmatic paradigm allows for flexibility in acknowledging contextual factors and individual variation in travel behaviour. This is particularly relevant for analysing mode choice, where decisions are shaped by both measurable service attributes and situational constraints. By grounding the survey-based analysis within a pragmatic framework, the study ensures methodological rigour while maintaining relevance to the urban transport context of Bloemfontein (Palinkas, 2014; Almalki, 2016).

3.3 Method

This study employed a structured quantitative research design to examine user preferences and factors influencing transport mode choice in Bloemfontein. The target population comprised regular commuters using PV, PT, and NMT, including walking and cycling. To capture a broad range of commuter experiences, respondents were selected with consideration of key demographic variables, namely age, gender, employment status, and predominant travel mode. Data were collected using a self-administered questionnaire consisting primarily of closed-ended questions, supplemented by limited open-ended items to capture contextual insights (Beretta, 2021). Respondents were asked to rate the importance of 18 mode choice factors using a Likert scale ranging from Unimportant (1) to Very important (5). These factors reflected core service attributes such as accessibility, reliability, safety, cost, and comfort and were linked to nominal and ordinal demographic variables. Individuals under 18 years of age were excluded due to dependence on guardians for travel decisions, while those over 65 were excluded to avoid distortion related to retirement-related travel patterns. A pilot survey was conducted to ensure clarity, relevance, and alignment with the study objectives. A total of 500 questionnaires were distributed, yielding 447 valid responses from a population of 546 568 residents. Some respondents elected not to disclose demographic information, with five omitting age and twenty-four omitting employment status, in accordance with ethical principles of voluntary disclosure. Based on Yamane's (1967) sample size formula, the achieved sample exceeds the minimum required to ensure a 95% confidence level with a 5% margin of error. Purposive and snowball sampling techniques were employed to access diverse commuter groups, including those typically under-represented in transport surveys (Naderifar et al., 2017). Purposive sampling targeted PV users in commercial and higher-income residential areas, while snowball sampling facilitated access to PT and NMT users in informal and peripheral settlements where logistical and safety constraints limited on-site data collection. Together, these approaches supported the inclusion of hard-to-reach populations and ensured that the dataset reflected real-world travel behaviour within Bloemfontein's spatially fragmented urban context.

3.4 Limitations of Study

Every study has inherent limitations that must be acknowledged. The following limitations could affect the generalizability and accuracy of the findings, namely the sample representation which consisted of a specific geographical area and excluded certain groups (i.e. people with disabilities and the elderly), subjective responses during data collection (for instance, self-reported perceptions of PT reliability versus using GPS and real-time transport tracking to monitor reliability) and the timeframe of the study which presents more a snapshot in time rather than tracking transport behaviour over multiple months or years.

3.5 Data Analysis

Quantitative data were analysed using descriptive statistics and standard deviation measures to identify patterns and

variability within the dataset. An Ordinal Logistic Regression Model was employed to examine relationships between Likert-scale responses, which were treated as ordered categories. This modelling approach is appropriate for ordinal outcome variables and enables estimation of the probability of observed responses based on selected predictors. Perceived affordability of PT, measured on a five-point Likert scale, was specified as the dependent variable, where lower values indicate lower affordability perception and higher values indicate greater perceived affordability. Affordability was selected as the outcome variable due to its central role in influencing PT adoption in financially constrained urban contexts. Independent variables included accessibility, reliability, perceived health benefits and flexibility, which are commonly identified as key determinants of transport behaviour. Model parameters (β coefficients) were estimated using Maximum Likelihood Estimation (MLE), with optimisation achieved through the Broyden-Fletcher-Goldfarb-Shanno (BFGS) algorithm to ensure efficient convergence. The Ordinal Logistic Regression formulation used to estimate outcome probabilities is presented in Formula 1. All statistical analyses were conducted using IBM SPSS Statistics, which was used to compute regression coefficients, odds ratios, and significance levels for each explanatory variable.

Formula 1:

$$P(Y \leq j) = \frac{1}{1 + e^{-(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3)}}$$

$P(Y \leq j)$: Probability that the response falls in category j

X_1, X_2, X_3 : Predictor values

$\beta_0, \beta_1, \beta_2, \beta_3$: Coefficients estimated by the model

The probability indicates the strength of the relationship between variables and user preferences, with values closer to zero reflecting a stronger correlation. It must be noted that only coefficients with high values were utilised, as they indicate a stronger influence and those with coefficients of lower significance were excluded due to their weak or minimal impact.

3.6 Ethical Considerations

This study was conducted in accordance with established ethical research guidelines to protect participants' rights, privacy, and well-being. Ethical clearance was obtained prior to data collection, and participants provided informed consent, ensuring voluntary participation and the right to withdraw at any stage. Anonymity and confidentiality were maintained throughout the process, with all data securely stored.

4. RESULTS

This section explores the interplay between demographics, transportation preferences, and urban mobility derived from the survey. Initially, we assess demographic influences and mode choices to understand travel behaviour and preferences. Each segment of this study builds toward understanding how to effectively attract and retain commuters within sustainable transport systems, ultimately aiming to enhance urban mobility solutions within the study area.

4.1 Demographic

The demographic profile of respondents shows a balanced gender distribution, with 47% male and 53% female participants. Age information was provided by 442 respondents, with the majority falling within the economically active population groups: 19% were aged 18-25 years, 35% were 26-35 years, 22% were 36-45 years, 15% were 46-55 years, and 8%

were 56-65 years. Respondents over 65 years of age accounted for 1% of the sample and were excluded from the analysis in line with the study design. Employment status was reported by 423 respondents, of whom 60% were employed full-time, 21% part-time, and 19% unemployed. Figure 2 presents the demographic distribution by age group and gender, illustrating the predominance of younger adults, particularly those aged 26-35 years, which constitute the largest segment of the sample.

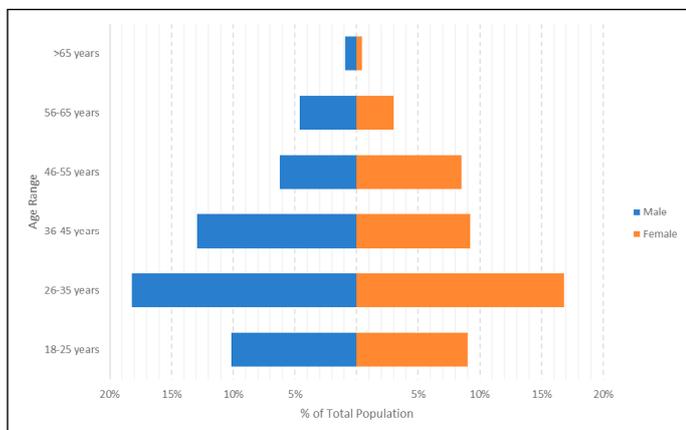


Figure 2: Demographic Distribution of Respondents

4.2 Mode Choice

In this study, distinct preferences for modes of transportation were observed among participants. PT was the preferred mode for 49% of respondents, while 28% opted for private PV and 23% utilised NMT, shown in Figure 3. Employment status also influenced transportation choices, with full-time employees more likely to use both PT and PV, while unemployed and part-time workers favoured NMT. The data suggests that there is a generational divide in Bloemfontein transportation preferences which might be influenced by mobility needs and lifestyle choices. PT usage showed varying trends across different age groups, for example it was most prevalent among the younger 18-35 year grouping. NMT usage peaked among middle-aged and older adults, specifically those aged 46-65 which might be associated with an active lifestyle, the need to reduce transportation costs or dependence on NMT due to necessity rather than preference. Whereas, PV usage showed a distinct pattern, being highest among the older respondents.

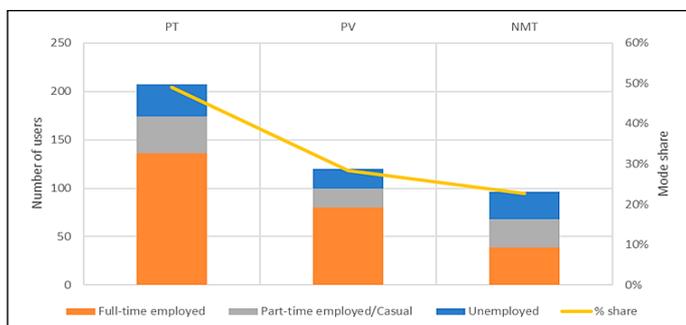


Figure 3: Modal split per employment status and mode share

4.3 Transport Preferences

Survey results indicated that safety, both road safety and general personal safety, emerged as the most important determinant of mode choice. Gendered differences in priority setting were also evident. Age also shaped preferences, with younger commuters valuing reliability and travel distance after safety, while older commuters placed greater importance

on flexibility and affordability. In summary, safety concerns (encompassing both road safety and general safety) emerge as paramount in the transportation mode choices of Bloemfontein commuters, as clearly demonstrated in Figure 4. These concerns overshadow other factors across different demographics, highlighting the critical role of safety in urban mobility decisions.

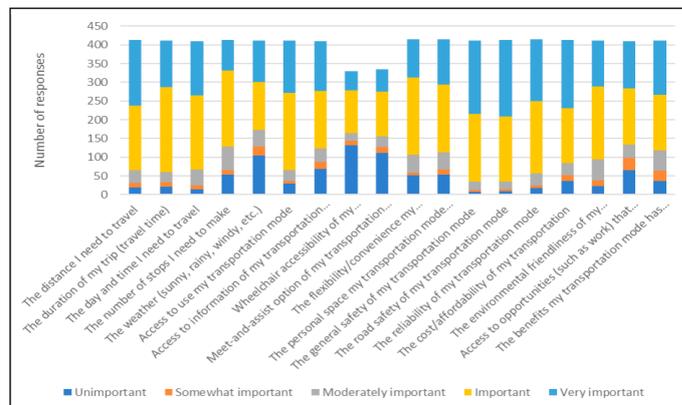


Figure 4: User preferences influencing mode of transportation

4.4 Attracting Users to Public Transportation

A substantial 76% of respondents indicated that their residential areas offered easy access to PT, with 68% confirming stops within walking distance. The five most important improvements cited for attracting more PT users are reliability, flexible operating hours, cheaper fares, transparent service information, and expanded route coverage.

4.4.1 User Preferences of Public Transportation

The survey results indicate that the most important factors influencing PT attractiveness shown in Figure 5, in order of importance, are: (1) reliability, (2) flexible service times and operating hours, (3) affordable fares, (4) transparent service information, and (5) route coverage. Nearly half of respondents (47%) indicated a willingness to relocate to improve access to PT. Age-based analysis shows that increased reliability would most strongly encourage PT use among respondents aged 18-25 and 46-55 years, while flexible operating hours were prioritised by those aged 26-45 years. Cheaper fares were most influential for respondents aged 56-65 years, whereas expanded route coverage was particularly important for commuters aged 26-35 and 46-55 years.

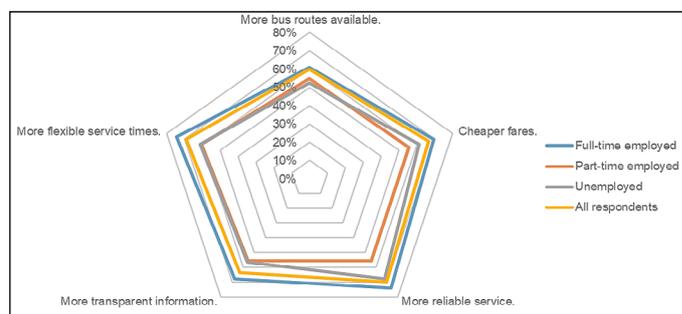


Figure 5: Attractiveness to PT

4.4.2 Modal Shift to Public Transportation

Among PV users, 40% indicated a willingness to shift to PT if service quality improved, particularly in terms of reliability and transparent service information. Although 21.3% of PV users reported always driving alone, a substantial proportion demonstrated openness to alternative modes under improved

conditions. More than half of PV users (55%) reported awareness of the environmental and social implications of their transport choices, suggesting latent support for modal shift where viable alternatives exist. NMT users displayed an even stronger potential for PT adoption. Half of NMT users indicated that they would use PT if it became a viable and accessible option. While 72% identified walking or cycling as their most convenient mode, cost considerations were a dominant motivator, with 64.3% citing reduced transport expenses as the primary reason for NMT use. Additionally, 56.6% reported having no access to alternative transport modes, indicating that NMT reliance is often driven by necessity rather than preference.

4.5 Facilities Attractiveness

The integration of infrastructure with PT is a decisive factor in improving user experience. A large majority of respondents (94.3%) indicated that proximity to stops was crucial in deciding whether to use PT, confirming the importance of spatial accessibility. Many participants also commented on the overall condition of the facilities, noting differences between the central and peripheral routes. Where stops were well maintained and clearly marked, satisfaction levels were higher, suggesting that basic accessibility and upkeep remain key to improving overall service perception.

4.6 Determinants of Perceptions in Public Transportation: A Multivariate Analysis

The regression analysis identified accessibility, service reliability, flexibility, affordability, and health benefits as statistically significant predictors, as seen in Table 1.

Predictor	Beta (β)	P-value
Accessibility	0.5106	0.000
Flexibility/Convenience	0.2064	0.013
Cost/Affordability	0.3152	0.025
Health Benefits	0.2418	0.045
Service Reliability	0.3984	0.007

Table 1: Coefficient Estimates (β) and P-values

The Ordinal Logistic Regression results indicate that accessibility ($p < 0.001$), service reliability ($p = 0.007$), flexibility/convenience ($p = 0.013$), cost/affordability ($p = 0.025$), and perceived health benefits ($p = 0.045$) are statistically significant predictors of public transport use. Accessibility emerged as the strongest predictor, followed by service reliability, flexibility/convenience, cost/affordability, and health benefits, underscoring the multi-dimensional nature of user preferences. General safety was not statistically significant ($p = 0.099$) and was therefore excluded from the final model.

5. DISCUSSION

The empirical findings of the study utilise the TPB (Ajzen, 1991) to explain how beliefs, social influences, and perceived control shape PT choices in Bloemfontein. The discussion links statistical results with behavioural insights to show how accessibility, reliability, affordability, and safety influence users' intentions and decisions. By aligning observed travel behaviour with TPB constructs, the analysis clarifies why certain factors, particularly accessibility and flexibility, are more influential in determining mode choice. Each subsection explores a specific aspect of behaviour, leading to a synthesis of theoretical implications and practical recommendations for enhancing PT in small South African cities.

5.1 Interpreting the Findings through the Theory of Planned Behaviour

Accessibility emerged as the strongest determinant of PT evaluation in Bloemfontein, followed by reliability, affordability, flexibility, and perceived health benefits. Interpreted through the TPB (Ajzen, 1991), these findings indicate that travel decisions are shaped by beliefs about expected outcomes, social expectations, and PBC. Positive perceptions of PT reliability, affordability, and safety strengthen willingness to use the system, reinforcing evidence that service quality and cost are decisive influences on travel behaviour in small and medium-sized cities (Mahmoud et al., 2012; Danesh et al., 2019; Shaaban & Maher, 2020). In financially constrained contexts, everyday service experiences rather than abstract sustainability ideals tend to dominate evaluations of PT. Social norms also influence travel intentions. More than half of PV users reported awareness of the environmental or civic implications of their transport choices, suggesting increasing sensitivity to collective benefits in smaller South African cities. Similar trends have been observed in other contexts, where emerging sustainability-oriented social identities shape mobility preferences (Adom-Asamoah et al., 2021; Honiball et al., 2024). However, as noted by Sam (2025), such awareness seldom translates into behavioural change when practical barriers persist. PBC proved particularly influential in this regard. Limited route coverage, infrequent services, and weak first- and last-mile connectivity constrain users' ability to act on positive intentions, even when attitudes and social norms are favourable. Evidence from comparable middle-income contexts confirms that without adequate accessibility, motivation alone is insufficient to drive sustained modal shift (Shaaban & Maher, 2020; Moeinaddini & Habibian, 2025). The Bloemfontein findings therefore highlight the primacy of addressing structural constraints before attitudinal or normative interventions can meaningfully alter everyday travel behaviour.

5.2 Attitudinal Influences on Mode Choice

Attitudes toward PT in Bloemfontein are primarily shaped by perceptions of reliability, affordability, safety, and comfort, which together constitute the evaluative belief component of the TPB. Regression results indicate that respondents who perceive PT as reliable and cost-efficient express a stronger preference for its use, confirming that favourable beliefs about service outcomes translate into positive attitudes. This finding is consistent with earlier studies showing that perceived service quality and fare fairness are the most influential determinants of pro-PT attitudes (Mahmoud et al., 2012; Danesh et al., 2019). In contexts such as Bloemfontein, where household incomes are constrained and network performance uneven, these beliefs carry greater weight than abstract environmental considerations. Safety and comfort further reinforce attitudinal responses. Women and older travellers, in particular, associate service reliability and personal security with trust and satisfaction, echoing findings reported by Adom-Asamoah et al. (2021) and Honiball et al. (2024). These results suggest that positive attitudes are driven less by promotional efforts and more by consistent experiences of predictable, safe, and affordable journeys. As emphasised by Ajzen (1991), strong behavioural beliefs underpin stable attitudes that, when supported by favourable norms and adequate perceived control, form the cognitive basis for behavioural intention. Strengthening these belief-based service attributes is therefore a necessary condition for reinforcing the attitudinal pathway toward increased PT use.

5.3 Subjective Norms and Social Responsibility

Subjective norms reflect perceived social expectations that influence individual transport behaviour. In Bloemfontein,

more than half of PV users reported awareness of the environmental and social implications of their travel choices, indicating the emergence of both injunctive norms (what individuals believe they should do) and descriptive norms (what they perceive others to be doing) around responsible mobility. Similar patterns have been observed in other African contexts, where increasing environmental awareness and civic identity shape travel preferences (Adom-Asamoah et al., 2021; Honiball et al., 2024). However, normative influence alone is unlikely to produce behavioural change when structural barriers persist. As noted by Sam (2025), limited accessibility and unreliable services constrain individuals' ability to act on pro-social intentions. The Bloemfontein findings therefore support Ajzen's (1991) proposition that subjective norms interact with PBC while norms may strengthen intention, their influence on behaviour materialises only when individuals feel capable of using PT in practice.

5.4 Perceived Behavioural Control (PBC) and Accessibility

Among all TPB constructs, perceived behavioural control (PBC) had the greatest impact in Bloemfontein. Accessibility and flexibility, capturing spatial reach, service frequency, and schedule compatibility, emerged as decisive predictors of user satisfaction and willingness to use public transport. This finding supports Ajzen's (1991) view that when external conditions constrain a behaviour, control beliefs dominate intention formation. Respondents repeatedly associated limited routes, infrequent services, and inadequate first- and last-mile connections with feelings of helplessness, reducing the likelihood of mode switching even among those holding positive attitudes. Comparable outcomes were reported by Shaaban and Maher (2020) in Qatar and by Moeinaddini and Habibian (2025) in Tehran, where perceived behavioural control, rather than attitude, was more strongly associated with actual mode use. In small urban systems such as Bloemfontein, improving network accessibility, information clarity, and schedule reliability therefore enhances not only physical mobility but also psychological readiness to choose public transport. As Sam (2025) argues, perceived control is the "gateway variable" enabling attitudes and norms to translate into behaviour.

5.5 Integration of Theory of Planned Behaviour Constructs and Behavioural Implications

Integrating the findings within the TPB reveals a clear hierarchy of influences shaping transport decisions in small South African cities. In Bloemfontein, PBC emerged as the dominant factor, indicating that accessibility and flexibility determine whether favourable attitudes and supportive social norms translate into actual behaviour. While attitudes informed by affordability, reliability, and safety remain important, they are insufficient in the absence of enabling conditions. Subjective norms contribute motivational value through growing civic and environmental awareness, but their influence is similarly constrained by structural limitations. This pattern supports Ajzen's (1991) assertion that volitional control moderates the conversion of intention into action. For transport planning, the findings imply that behavioural change strategies must prioritise the removal of control barriers, enabling attitudinal and normative mechanisms to operate effectively. Improvements in accessibility can therefore create the conditions under which service quality enhancements and normative messaging reinforce sustained shifts toward PT use.

5.6 Policy and Planning Implications for Small Cities

The behavioural interpretation of the Bloemfontein findings has clear implications for transport policy and planning in small and medium-sized South African cities. Given that PBC

emerged as the strongest determinant of PT use, interventions should prioritise the removal of structural barriers. Expanding route coverage, improving service reliability, and strengthening first- and last-mile connectivity would enhance users' sense of control and make PT a feasible option for daily travel. Improved accessibility therefore forms the foundation upon which attitudinal and normative change can occur. Complementary improvements in service affordability, reliability, and safety are necessary to reinforce positive attitudes and build trust in the PT system. These supply-side measures can be supported by social-norm interventions, including awareness campaigns that emphasise collective benefits and institutional incentives that encourage sustainable travel behaviour. Consistent with Ajzen (1991) and Shaaban and Maher (2020), behavioural change is most effective when policy simultaneously addresses perceived control, attitudes, and social norms. In cities such as Bloemfontein, an integrated strategy combining infrastructure investment, service quality management, and targeted public engagement is therefore essential to support equitable, sustainable, and inclusive urban mobility.

6. IMPLICATIONS FOR SIMILAR CITIES FROM RESEARCH INSIGHTS

Targeted regulatory and operational interventions are necessary to improve PT performance in small metropolitan cities such as Bloemfontein. Enhanced monitoring and on-road enforcement, together with improved regulation of the informal PT sector, particularly minibuses taxis, can significantly strengthen safety and service quality, which are consistently identified as critical concerns among users (Van der Schuren et al., 2022; Jones et al., 2016; McKay et al., 2024). Complementary training initiatives for operators focusing on safe driving practices and speed compliance would further support these objectives. Technological interventions, including real-time service information and improved safety at PT stops through better lighting and CCTV surveillance, have also been shown to enhance user confidence and system usability (Bashingi et al., 2023). Broader mobility strategies should integrate NMT and flexible services to address first- and last-mile challenges. Improved cycling infrastructure, bike-sharing schemes linked to PT networks, and pedestrian-friendly environments can enhance accessibility and reduce dependence on PVs. Flexible transport services, such as on-demand shuttles or ridesourcing options, may further complement conventional PT systems by accommodating diverse commuter needs (Montoya-Robledo & Escovar-Alvarez, 2020; Park & Choi, 2020). Figure 6 illustrates the relationship between retaining existing PT users and attracting new ones. Retention typically requires fewer resources, as existing users often have limited alternatives, whereas attracting new users, particularly PV users, demands stronger incentives and service improvements to overcome switching barriers. While the economic and environmental benefits of PT, including reduced travel costs, congestion, and emissions, may motivate potential users (Adom-Asamoah et al., 2021; SLOCAT, 2023), sustained modal shift depends on addressing practical constraints related to accessibility, reliability, and convenience.

Interpreted through the TPB, the findings demonstrate that positive attitudes toward PT develop when services are perceived as safe, reliable, and affordable, while social norms reinforce motivation where PT use is viewed as socially responsible. However, PBC remains decisive. Accessibility, service frequency, route coverage, and first- and last-mile connectivity shape whether favourable attitudes and norms translate into actual behaviour. The Ordinal Logistic Regression results reinforce this hierarchy, indicating that interven-

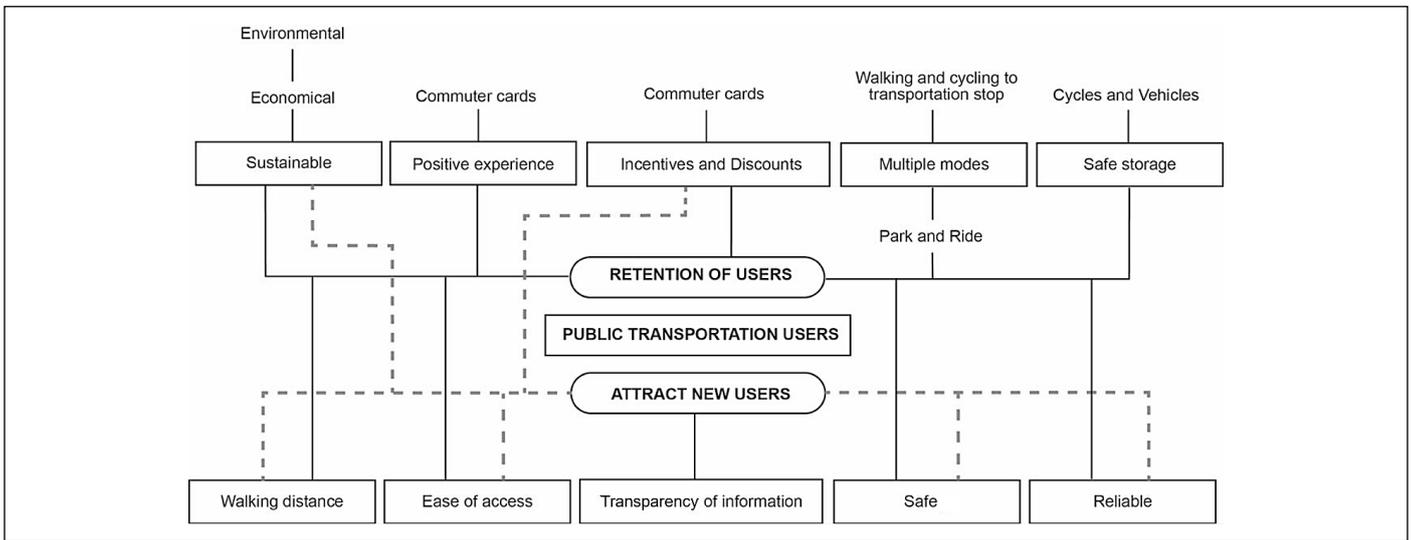


Figure 6: Framework to retain and attract PT users

tions prioritising accessibility, reliability, and affordability are essential for both retaining existing users and attracting new ones. Strengthening these structural conditions can enhance perceived control and position PT as a viable alternative to PV use in small South African cities.

7. CONCLUSION

This study examined mode choice behaviour and transport preferences in Bloemfontein, a medium-sized South African city characterised by limited modal integration and a strong reliance on PT and walking. Drawing on the TPB and applying an Ordinal Logistic Regression Model, the analysis demonstrated that perceived accessibility, reliability, affordability, flexibility, and health benefits significantly influence commuter decision-making. These factors correspond primarily to the attitudinal and PBC components of TPB, offering insight into mobility behaviour in resource-constrained urban contexts. The findings confirm that accessibility and reliability are the strongest predictors of mode choice, particularly in areas with fragmented service coverage. Affordability also plays a critical role in shaping daily travel decisions, while flexibility and perceived health benefits exert moderate but meaningful effects. Demographic characteristics, including age, gender, employment status, and travel distance, further mediate these relationships, underscoring the complexity of commuter behaviour in smaller cities. From a policy and planning perspective, the results highlight the need for sustainable, inclusive, and equitable transport strategies tailored to small and medium-sized cities. Measures aimed at retaining existing users and attracting new ones should prioritise improved multimodal integration, investment in NMT infrastructure, and user-centred service enhancements such as flexible schedules, real-time information, enhanced safety, and affordable fare structures. Collectively, the study reinforces the value of TPB as a robust framework for interpreting transport behaviour and extends its application to under-researched small-city contexts. By integrating behavioural theory with empirical analysis, this research contributes practical guidance for designing context-sensitive interventions that support equitable and sustainable urban mobility. Future research should examine the impacts of quality bus services on user satisfaction and modal shift, explore income-sensitive fare structures, and further investigate safety perceptions, vehicle maintenance, and enforcement practices to strengthen public trust in PT systems.

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