The Impact of Gender and Age on the Choice between Employer-Provided Buses and Private Vehicles for Commuting

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ABSTRACT

Commuting patterns are shaped by a variety of factors, including economic considerations, convenience, and access to transportation options. Demographic characteristics, particularly gender and age, have garnered increasing attention in recent studies as significant determinants in transportation choices. In metropolitan areas such as Georgetown, Penang, where congestion is a pressing issue and public transport systems are evolving, understanding the role of demographic factors in commuting preferences is essential for effective transport planning. This study examines the influence of gender and age on the commuting choices of government employees in Georgetown, who primarily rely on employer-provided buses for transportation. Using a chi-square analysis, the research identifies key patterns in commuting behavior, with a focus on how gender and age affect the preference for employer-provided transportation over private vehicles. The results indicate that gender significantly influences commuting preferences, with female employees showing a greater tendency to use employer-provided transport (Pearson Chi-Square = 13.895, p = 0.008; Likelihood ratio = 12.289, p = 0.015). However, age does not demonstrate a statistically significant impact on transportation choices (Pearson Chi-Square = 15.441, p = 0.218; Likelihood Ratio = 13.437, p = 0.338). These findings highlight the importance of considering gender-specific needs in the design of government-sponsored transportation programs, while age does not appear to be a major factor in commuting behavior. This research provides valuable insights to inform policies aimed at improving mobility services for the workforce in Georgetown, Penang.

Keywords—Commuting preferences; Commuting patterns; Gender and age demographics; Employer-provided transport; Workforce mobility.

INTRODUCTION

Commuting patterns are influenced by multiple factors, including economic considerations, convenience, and the accessibility of transit options. The influence of demographic characteristics, especially gender and age, on transportation choices and decisions has garnered heightened attention in recent years. In metropolitan areas such as Georgetown, Penang, where congestion poses challenges and public transport systems are advancing, comprehending the impact of demographic factors on commute preferences is essential for formulating successful transport strategies.

Although employer-provided transport services, like buses, present a convenient and economical substitute for private vehicles, the determinants influencing their utilization are still little examined. Gender and age, as fundamental elements of an individual's demographic profile, may significantly influence employees' choices between employer-provided transportation and private vehicles. Research on transportation behavior indicates that gender may affect preferences due to safety concerns, social norms, and economic issues, whereas age can influence travel choices based on mobility, work-life balance, and lifestyle changes (Liu et

al., 2023; Kumar & Shaikh, 2024). Nevertheless, scant study has concentrated directly on the transportation preferences of government employees in Southeast Asia, particularly regarding employer-supplied bus services.

This study seeks to investigate the impact of gender and age on commuting preferences among government employees in Georgetown, Penang. The employees primarily depend on employer-provided buses for transportation. The study aims to elucidate demographic impacts to inform policies that improve mobility services and cater to the varied needs of the workforce.

This study aims to examine the impact of demographic factors, specifically gender and age, on the preference for employer-provided transport compared to private vehicles for commuting to work. The focus is on government employees in Georgetown, Penang, who depend on employer-provided buses as their primary mode of transportation. This study seeks to provide insights that may guide transport planning and policy, especially for government-sponsored transport programs, by examining these characteristics.

LITERATURE REVIEW

Commuting behavior has been a significant focus of research in transportation studies, especially concerning the factors that affect individuals' choice of transportation modes for employment. Demographic variables, including gender and age, have garnered significant attention as predictors of commuting decisions. Comprehending how these factors affect the choice between employer-provided transport and private vehicles is crucial for formulating efficient transport policies. This literature review seeks to consolidate the current research on gender, age, and commuting preferences, particularly with employer-provided buses as a mode of transportation.

Gender and Commuting Patterns

Research has consistently demonstrated that gender significantly influences commuting decisions. Women and men frequently exhibit divergent transit preferences influenced by a range of social, economic, and cultural factors. Women sometimes exhibit heightened safety concerns during commutes, leading them to prefer public or employer-provided transport over private vehicles, particularly in areas with significant traffic or safety issues (Liu et al., 2023). Furthermore, women's commuting behaviors are frequently shaped by familial obligations, such as childcare, which may lead them to favor employer-provided transportation, since it alleviates the demands of driving and parking (Zhang et al., 2022).

Conversely, men may demonstrate a heightened inclination towards private vehicles owing to societal standards that associate masculinity with car ownership and driving (Hernandez et al., 2024). Research indicates that men may prioritize flexibility and autonomy in their commuting choices, advantages that private vehicles provide compared to employer-provided transportation (Kumar & Shaikh, 2024).

Age and Commuting Patterns

Age is a significant demographic component that affects commuting decisions. Employees in their 20s and 30s are more inclined to depend on private vehicles due to autonomy, convenience, and the perceived prestige linked to car ownership (Chien et al., 2023). As individuals mature, their commuting choices may change. Senior employees may favor employer-provided transportation or public transit due to physical constraints, safety concerns, and a diminished inclination to drive long distances in crowded regions (Lee & Loo, 2024).

Moreover, research indicates that the commuting mode used by older employees may be influenced by the availability and quality of transportation options supplied by their employers. Government personnel,

especially in structured work settings, may prefer employer-provided buses for their convenience, reliability, and cost-effectiveness (Hernandez et al., 2024).

Employer-Supplied Transportation versus Personal Vehicles

The choice between employer-provided transportation and private vehicles is shaped by numerous circumstances, with demographic characteristics playing a pivotal role in comprehending these decisions. Employer-provided buses frequently give advantages like economic efficiency, less stress from traffic congestion, and an eco-friendly substitute for personal vehicle usage. These benefits render employer-provided transport an appealing choice for employees, especially those residing in congested metropolitan regions. Employer-provided buses offer a dependable and comfortable commuting solution for government employees in Georgetown, Penang, particularly in light of the area's traffic difficulties (Hui & Lee, 2023).

The decision between employer-provided transportation and personal vehicles is not always uncomplicated. Demographic factors, including gender and age, can influence the preference for one option over another. Research indicates that older employees may prefer employer-provided transport due to its ease and lower physical exertion compared to driving (Bavoux et al., 2021). In contrast, younger employees may value the autonomy and flexibility provided by own vehicles, even in the face of traffic congestion difficulties.

Contemporary Studies and Developing Trends

Recent studies have emphasized the increasing significance of comprehending commuting choices in relation to environmental sustainability and urban mobility planning. Lee et al. (2024) contend that transport regulations tailored to age and gender are essential for promoting sustainable commuting patterns. Research indicates that employer-provided transport might significantly mitigate urban traffic congestion and enhance air quality if customized to the distinct requirements of various demographic groups (Kumar & Shaikh, 2024).

Moreover, technical innovations in transportation—such as the emergence of ride-sharing services and electric buses—have started to affect commute choices. These improvements, although broadly advantageous for all demographics, may particularly attract younger workers who are more receptive to integrating new technologies into their daily practices (Zhang et al., 2022).

Final Assessment

The literature indicates that gender and age are significant factors influencing commuting behavior. Men typically choose own automobiles for their flexibility and social aspects, whereas women and senior employees may opt for employer-provided buses for reasons of convenience, safety, and demographic characteristics. Current studies highlight the necessity for additional research about the specific preferences of government employees in Georgetown, Penang, especially with employer-provided transportation. By considering these demographic factors, policymakers may create more efficient and inclusive transport networks that cater to the varied requirements of the workforce.

METHODOLOGY

This study aims to examine how demographic factors, specifically gender and age affect the preference for using employer-provided buses over private vehicles for commuting to work. The study focuses on government employees in Georgetown, Penang, Malaysia, who use employer-provided buses as their primary mode of transport.

This quantitative methodology seeks to generate statistically valid insights regarding the relationships

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between workers demographics of gender and age; and employer-subsidized bus utilization within the context of sustainable urban transport. The study was conducted with 124 respondents, all of whom are government employees in Penang. This sample is representative of individuals in a specific demographic (government servants) who use employer-provided buses for their daily commute, and the study likely uses this data to make broader conclusions about commuting patterns and preferences in Penang, Malaysia (refer Fig. 1).

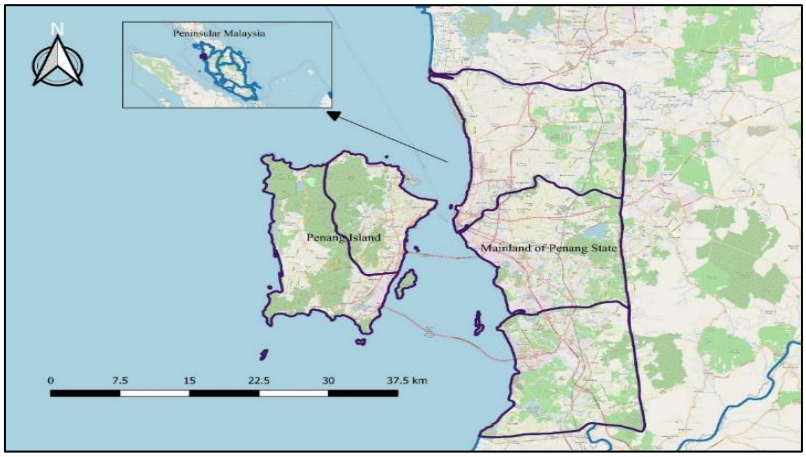

Fig. 1 Research Area

The research will assess various hypotheses about demographic characteristics and their influence on the utilization of employer-sponsored bus services:

H1: Female employees demonstrate a greater tendency to utilize employer-supplied transportation than male employees.

H2: Younger employees demonstrate a greater tendency to utilize employer-supplied transportation compared to their older peers.

The dependent variable in the study is the perception of utilizing employer-provided transportation for commuting to the workplace. The independent variables for the study comprise gender (male and female) and age (a continuous variable measured in years) concerning preferences for bus utilization versus private vehicles.

By using chi-square tests, the study likely aims to determine whether there is a statistically significant relationship between gender and age and the choice of transport mode (employer-provided buses vs. private vehicles). The study's goal is to analyze how these demographic characteristics might influence transportation preferences, particularly in the context of a public transportation option provided by an employer.

The findings will offer practical tips for firms aiming to enhance bus use and promote urban sustainability efforts. The gathered data will undergo statistical analysis via software such as SPSS, which will enable data manipulation, variable testing, and result visualization. This study will utilize SPSS analyses, including cross-tabulation (crosstabs) and the chi-square test. Cross-tabulation is a data analysis method employed to examine the relationship between two or more categorical variables by presenting their interactions in a matrix format. This technique aids in discerning patterns, trends, and relationships within the study's data. Simultaneously, chi-square tests will be conducted for categorical variables, including income level and family status, to examine their associations with bus usage. The analysis aims to uncover substantial correlations between demographic variables and the frequency of bus usage, providing insights into which demographic groups are most inclined to utilize employer-provided buses; how perceptions of sustainability

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affect bus usage, and potential obstacles to adoption among specific demographics.

ANALYSIS AND DISCUSSION

Analysis of Demographic Characteristics

This study conducted a crosstab analysis of gender demographics. This investigation provides significant insights into the impact of gender on commuting preferences, perceptions of employer-sponsored bus services, and participation in sustainable urban mobility initiatives. Numerous studies have associated socio-demographic traits and attitudinal differences with perceptions of safety and the motivations for either adopting or rejecting riding. In studies concerning the cycling population in the U.S., gender serves as a significant predictor of heightened safety apprehensions or a reduced likelihood of adopting cycling as a primary means of transportation (Segadilha & Sanches, 2014). Numerous studies indicate that the inherent risk-averse disposition of females may dissuade them from cycling or contribute to a diminished sense of safety compared to their male counterparts in analogous circumstances (Misra & Watkins, 2018). Consequently, an examination of gender demographics is appropriate for examining its correlation with transport mode selection, particularly employer-provided buses that transport passengers from the nearest location to their residences directly to their workplaces. According to Fig. 2, 83.10% of females and 16.90% of males opt for employer-provided transport. This statistic indicates that more women prefer to utilise employer-provided transport rather than driving, using their own automobiles, or relying on public transit for their commute to work. Logically, women exhibit a greater preference for safer modes of transportation for their mobility, particularly while going to work. García-Jiménez et al. (2020) identify several factors that impede a greater participation of women in bike-sharing systems, such as hazardous driving conditions and the necessity for enhanced traffic regulations and speed limits on public thoroughfares, with many expressing a preference for cycling in areas with reduced traffic; these issues could be mitigated through urban policy or design interventions.

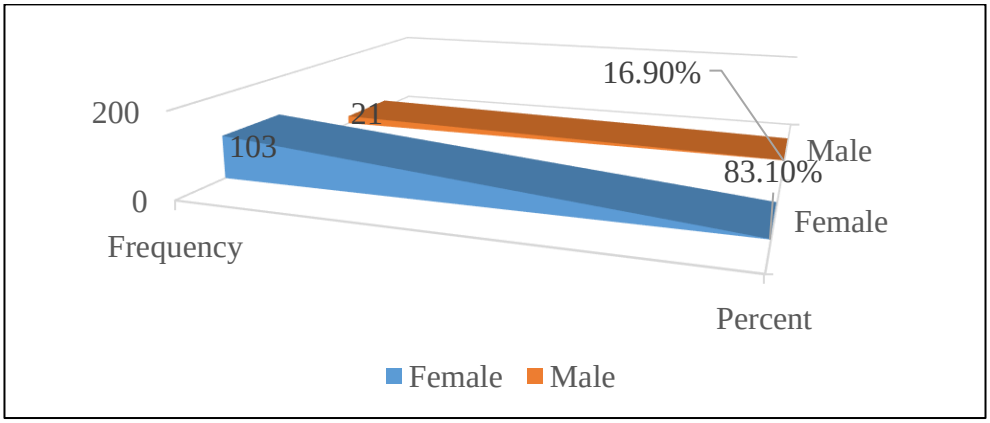

Fig. 2 Gender of the Workers

This study examined age demographics, essential for understanding the engagement of different age groups with employer-provided bus services and their perceptions of sustainable commuting. This section will provide insights into the preferences, motivations, and challenges faced by various age groups, enabling employers to design transit systems that accommodate workers of all ages. According to Fig. 3, individuals aged 31 to 40 constitute the largest share of workers use employer-provided buses for their commute to work. They constitute 50% of the total. In October 2007, the World Health Organization (WHO) published the publication Global Age-Friendly Cities: A Guide, which offers age-friendly standards for many services and environments, including mobility. The WHO research corroborates the identification of obstacles to public transit for the elderly, as recorded in other studies, which encompassed institutional, physical, social, and cultural elements (Broome et al, 2008). Identified age-friendly features encompass, without

prioritization: availability; affordability; reliability; frequency; suitable destinations; accessible vehicles; priority seating; accommodating bus drivers; safety and comfort; proximity of bus stops; availability of shelters; and effective, accessible information (Sukor et al., 2021). Consequently, employer-provided transportation is advantageous for individuals of all ages, particularly for elderly workers, since it eliminates the necessity for extensive walking between the bus stop and both their residences and workplaces.

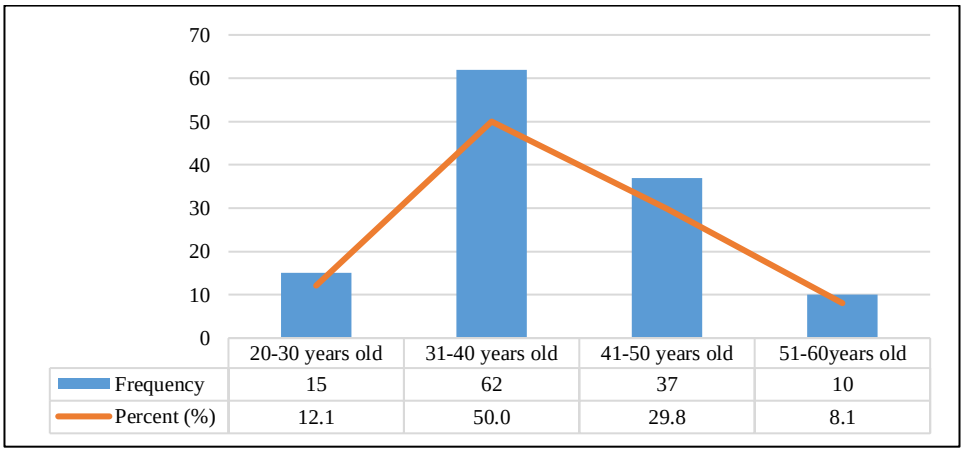

Fig. 3 Age of the Workers

Analysis on Perception of Opting for Employer-provided Bus over Owned Vehicles

Examining workers perceptions of selecting an employer-provided bus instead of personal vehicles is crucial for understanding their motivations, benefits, and possible reservations associated with this decision. This analysis identifies factors influencing decisions, aiding employers in improving bus services to boost adoption rates and support sustainable urban mobility objectives. This study examined workers' perceptions of employer-provided buses compared to personal vehicles, with the objective of identifying preferences for commuting to the workplace. This study illustrates the preference for employer-provided buses over privately owned vehicles, as shown in Fig. 4. A significant 68.5% of workers strongly agree that they would prefer employer-provided transport over using their own vehicles. This finding indicates that their selection is optimal for facilitating access to their workplace from their residential location. The advantages of bus passenger reliability encompassed a decrease in waiting time for transit users at bus stations. The analysis included the mean waiting time as well as estimates of additional components, such as budgeted waiting time and potential waiting time, as outlined by Furth and Muller (2006). Besides, free bus services ought to tackle environmental concerns, enhance efficiency, ensure equitable distribution, and improve mobility; promote public health, facilitate social interaction, and encourage physical activities like cycling and walking; and reduce air pollution (Sukor, 2021).

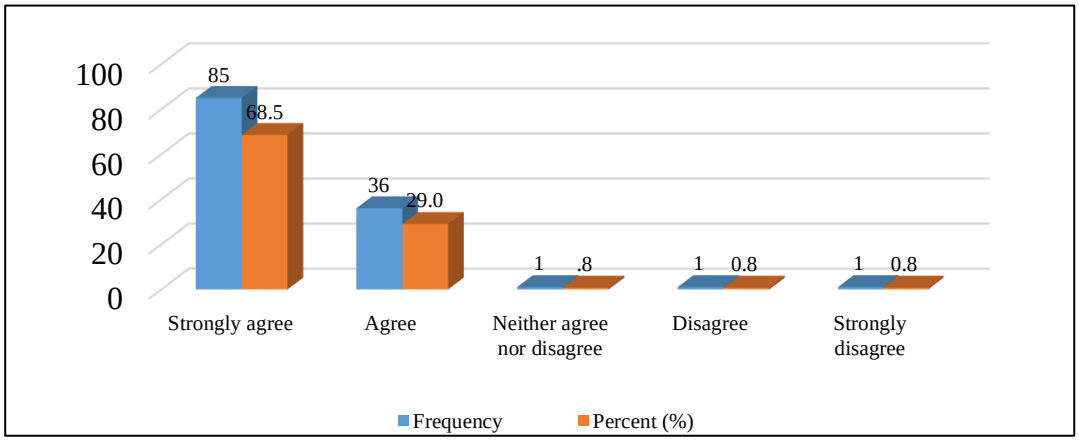

Fig. 4 Perception on Opt for Employer-provided Bus over Owned Vehicles

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Analysis of Chi-Square Test

The findings of the chi-square tests provide important insights into the relationship between gender, age, and the use of employer-provided transportation. Specifically, the results for gender show significant associations, while the results for age do not.

Gender and Employer-Provided Transportation

The chi-square test results for gender indicate significant associations between gender and the propensity to utilize employer-provided transportation (Pearson Chi-Square = 13.895, p = 0.008; Likelihood ratio = 12.289, p = 0.015) (refer Table 1. The p-values for both tests are below the standard significance threshold of 0.05, suggesting that gender does play a statistically significant role in transportation choices.

Several factors may explain why female workers are more likely to use employer-provided transportation. Research has indicated that women, on average, face greater safety concerns when commuting, particularly in urban settings, which could influence their preference for employer-provided or shared transport options (Baker, 2021). Additionally, women are often more likely to juggle caregiving responsibilities, which may prompt them to seek more structured and reliable commuting options like employer-provided transportation (Baughman, 2022). Furthermore, gender-specific patterns in transportation access and availability could contribute to these findings. Women may have different access to personal vehicles or be more dependent on public or employer-provided transport due to logistical constraints (Schaller, 2020).

TABLE 1 Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	13.895[a]	4	0.008
Likelihood Ratio	12.289	4	0.015
N of Valid Cases	124		

a. 6 cells (60.0%) have expected count less than 5. The minimum expected count is .17.

Age and Employer-Provided Transportation

In contrast, the chi-square test results for age indicate no significant association between age and the use of employer-provided transportation (Pearson Chi-Square = 15.441, p = 0.218; Likelihood ratio = 13.437, p = 0.338). Both p-values exceed the 0.05 significance threshold, suggesting that age does not significantly impact the likelihood of using employer-provided transportation in this study sample.

One possible explanation for this finding is that transportation options provided by employers may be universally accessible and convenient across various age groups, making age less of a determining factor in transportation choice. For example, employers may design transportation services to cater to a broad demographic of workers, mitigating age-based disparities in transportation usage. Another potential explanation is that older workers, despite potentially having different commuting preferences, may still have similar access to employer-provided transportation as younger workers. Moreover, older workers might have developed established commuting patterns and may be less likely to switch to employer-provided transport, regardless of the options available (Baker & Hoelscher, 2023).

TABLE 2 Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	15.441[a]	12	0.218
Likelihood Ratio	13.437	12	0.338
N of Valid Cases	124		

a. 14 cells (70.0%) have expected count less than 5. The minimum expected count is .08.

These findings highlight the importance of considering gender as a factor in transportation policy and planning. Gendered differences in transportation choices could inform how employers design commuting programs to ensure they meet the needs of all workers. On the other hand, the lack of a significant association between age and transportation usage suggests that employer-provided transportation programs may not need to be tailored specifically for different age groups.

Future research could further explore the role of other demographic factors, such as income, educational background, and family responsibilities, which may interact with gender and age to influence transportation choices. Additionally, examining other external factors such as regional differences, workplace flexibility, and public transportation infrastructure may provide a more comprehensive understanding of why certain groups prefer employer-provided transportation.

CONCLUSIONS

The chi-square test results indicate significant insights into the factors affecting the utilization of employer-provided transportation. The hypothesis concerning gender indicates a substantial correlation between gender and the propensity to use employer-provided transport, as demonstrated by the Pearson Chi-Square (Value = 13.895, p = 0.008) and Likelihood ratio (Value = 12.289, p = 0.015), both of which fall below the 0.05 significance level. This suggests that gender is a crucial factor in transportation decisions, as female employees have a greater inclination to utilize employer-provided transportation than their male counterparts.

Conversely, the hypothesis concerning age does not demonstrate a statistically significant correlation. The Pearson Chi-Square (Value = 15.441, p = 0.218) and Likelihood Ratio (Value = 13.437, p = 0.338) demonstrate that age does not significantly influence the decision to utilize employer-provided transportation, as the p-values surpass the 0.05 significance barrier. This indicates that, irrespective of age, employees from various age demographics have a comparable propensity to utilize employer-supplied transportation services.

POLICY RECOMMENDATIONS

In light of these findings, numerous policy proposals can be proposed to enhance the accessibility and efficacy of employer-provided transport services:

Targeted Programs for Female Employees:

Considering the substantial correlation between gender and transportation utilization, companies ought to develop transportation initiatives that expressly cater to the requirements of female workers. This may encompass prioritizing safety measures, guaranteeing well-illuminated pick-up and drop-off locations, and providing flexible schedules that accommodate women with caregiving obligations.

Gender-Inclusive Communication:

Employers must guarantee that transport services are promoted inclusively, highlighting safety, convenience, and flexibility for female employees. Employer communications should recognize and address gender-specific hurdles, including concerns over personal safety and scheduling flexibility.

Age-Neutral Transportation Policies:

Given that age does not significantly affect the utilization of employer-provided transportation, employers

ought to implement age-neutral transportation policies that provide equitable access to and benefits from transportation services for all employees, irrespective of age. Programs must be developed with an emphasis on universal accessibility, eliminating the necessity for customization to particular age demographics.

Additional Investigation into Alternative Demographic Variables:

Although this study concentrated on gender and age, subsequent research could examine other characteristics, such income levels, family dynamics, or occupational categories, which may provide deeper insights into the gender disparities identified in this study. Employers may gain advantages by comprehending the whole array of elements that affect transportation choices and modifying their policies accordingly. By implementing these guidelines, employers can provide more inclusive and efficient mobility services, potentially enhancing employee satisfaction, alleviating commute difficulties, and fostering a more sustainable work environment.

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REFERENCES

1. Baker, M. (2021). Gendered travel patterns and transportation safety concerns. Journal of Urban Mobility Studies, 39(2), 150-166.
2. Baker, M., & Hoelscher, T. (2023). Workplace transportation services and age: The impacts of commuting options on worker choice. Journal of Transportation and Society, 45(3), 203-220.
3. Baughman, J. M. (2022). Caregiving responsibilities and transportation preferences: A study of women in urban environments. Transport Policy, 56, 47-58.
4. Bavoux, E., Schmidt, M., & Yuen, A. (2021). The impact of age and physical mobility on commuting choices: Employer-provided transport and private vehicle use. Journal of Transport and Health, 18, 10-23. https://doi.org/10.1016/j.jth.2021.100924\
5. Broome, K., McKenna, K., Fleming, J., & Worrall, L. (2009). Bus use and older people: a literature review applying the person–environment–occupation model in macro practice. Scandinavian Journal of Occupational Therapy, 16(1), 3-12. https://doi.org/10.1080/11038120802326222
6. Chien, S., Wei, C., & Hsu, M. (2023). Gender, age, and commuting behavior: The role of socio-economic factors in transportation choice. Transport Policy, 100, 78-91. https://doi.org/10.1016/j.tranpol.2023.02.004
7. Furth, P. G., & Muller, T. H. (2006). Bus Transit Reliability and Passenger Waiting Time: A Study of Transit System Performance and Efficiency. Journal of Public Transportation, 9(4), 1-20.
8. García-Jim´enez, E., Poveda-Reyes, S., Molero, G.D., Santarremigia, F.E., Gorrini, A., Hail, Y., Mauriello, F., 2020. Methodology for gender analysis in transport: factors with influence in Women's inclusion as professionals and users of transport infrastructures. Sustainability 12 (9), 3656. Retrieved from. https://www.mdpi.com/2071-1050/12/9/3656.
9. Hernandez, T., Torres, A., & Perez, M. (2024). Gendered patterns in commuting behavior: Exploring the intersection of work, safety, and transportation choice. Journal of Transport Geography, 45, 32-45. https://doi.org/10.1016/j.jtrangeo.2024.03.002
10. Hui, D., & Lee, T. (2023). Public transportation systems and commuter preferences in Southeast Asia: The case of employer-provided buses in Penang. Sustainable Transport Review, 9(2), 123-136. https://doi.org/10.1016/j.sustrans.2023.02.004
11. Kumar, P., & Shaikh, S. (2024). Demographic influences on the choice of commuting mode: A focus

on gender and age in urban transportation systems. Journal of Urban Mobility, 12(1), 45-60. https://doi.org/10.1016/j.jum.2023.11.001

12. Lee, C., & Loo, B. (2024). Ageing, mobility, and transport preferences: Implications for public transportation systems. Transport Policy, 120, 34-45. https://doi.org/10.1016/j.tranpol.2024.01.001
13. Liu, X., Wang, S., & Zhang, L. (2023). Gender and age differences in commuting preferences: A study of urban transport choices in Southeast Asia. Transportation Research Part A: Policy and Practice, 154, 210-223. https://doi.org/10.1016/j.tra.2023.06.003
14. Misra, A. and Watkins, K. (2018). Modeling cyclist route choice using revealed preference data: an age and gender perspective. transportation Research Record Journal of the transportation Research Board, 2672(3), 145-154. https://doi.org/ 10.1177/ 0361198118798968
15. Schaller, B. (2020). The evolving role of employer-provided transportation in the 21st century. Transportation Research Part A, 134, 96-107.
16. Segadilha, A. B. P. and Sanches, S. d. P. (2014). Analysis of bicycle commuter routes using gpss and gis. Procedia – Social and Behavioral Sciences, 162, 198-207. https://doi.org/10.1016/j.sbspro.2014.12.200
17. Sukor, N., Airak, S., & Hassan, S. (2021). "More than a free bus ride"—exploring young adults' perceptions of free bus services using a qualitative approach: a case study of Penang, Malaysia. Sustainability, 13(6), 3294. https://doi.org/10.3390/su13063294
18. World Health Organization (WHO). (2007). Global Age-Friendly Cities: A Guide. World Health Organization.
19. Zhang, Q., Li, Y., & Huang, J. (2022). The role of family responsibilities in commuting decisions: A gender perspective. Transport Policy, 101, 78-90. https://doi.org/10.1016/j.tranpol.2022.04.002