



Moving Forward Together –

Gender-Integrative Approaches for Decarbonising Mobility in Asia

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Registered offices:

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Address GIZ in China:

Sunflower Tower, Room 1100 Maizidian St. 37, Chaoyang District,
100125 Beijing, PR China
T +86 1085275180
F +86 1085275185
E giz-china@giz.de
I giz.de

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Responsible:

XIA Yun, GIZ in China
yun.xia@giz.de

Authors:

Aakash Nanda Abraham
Julia Kratofil

Editor:

Carolin Bernhard, GIZ in China

Review by:

Chi Pham Linh, GIZ in Vietnam
Kuldeep Sharma, GIZ in India

Layout:

Julia Kratofil
Gerrit Manke, GIZ in China

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Abstract

In the context of a sustainable mobility transition and the ambition not to leave anybody behind on the road to sustainable development, this paper explores the role which women and gender-specific mobility behaviour play in the decarbonisation of the transport sector in Asia. Firstly, it will examine the key drivers behind transport preferences and behaviour based on gender and cultural influences. A special focus will be placed upon passenger transport in urban areas in China, Vietnam, and India, as these three countries face similar challenges in the process of greening their transport systems. After a detailed analysis of the obstacles which women come across in transportation and how including a gendered perspective in transportation planning is relevant for a reduction of CO2 emissions, the authors discuss best practice examples of both inclusive and green mobility. The study includes gender-sensitive, -responsive and -transformative approaches, concluding that differentiated, interdisciplinary and gender-transformative projects tend to show the best results. The paper will end with several concise recommendations for policymakers and stakeholders active in the sector.



**Image 1: Women travelling
on a scooter in Vietnam**
© Unsplash.com

Table of Contents

List of Graphs	5
List of Images	5
1. Introduction	6
a. China	11
b. India	13
c. Vietnam	14
3. Challenges and Potential Solutions for Gender-inclusive Sustainable Mobility	16
a. Safety and Comfort	16
i) Segregation	17
ii) Awareness and Training	19
iii) Urban Planning and Design	20
iv) Data Collection and Public Innovation	20
v) Reporting Mechanisms and Help Services	22
b. Affordability and Availability of Low-carbon Infrastructure	24
c. Gender-responsive Design of Vehicles and Infrastructure	26
d. Representation in the Transport Sector	30
e. Summary of Challenges and Potential Solutions for Gender-inclusive Sustainable Mobility	33
4. Recommendations for Policymakers and Further Stakeholders	34
5. Conclusions	37
List of References	38

List of Graphs

Graph 1: Gender Gap Index.....	9
Graph 2: Female Labour Force Participation Rate.....	10
Graph 3: Trip Purpose by Gender.....	12

List of Images

Image 1: Women travelling on a scooter in Vietnam.....	3
Image 2: Women's priority cabin in Shenzhen.....	18
Image 3: Safetipin App.....	22
Image 4: Practical vehicle design for multi-purpose usage.....	27
Image 5: Wheelchair-friendly stations in the London Tube.....	29



1. Introduction

Across many rapidly developing economies in Asia, there is a growing recognition of the significance of a gender-integrative approach to sustainable development and increasing awareness of the distinct gender needs and potentials in fostering more inclusive decarbonisation and climate action.

Driven by shifting social norms, economic growth and urbanisation, the socio-economic status of women in emerging nations is constantly evolving. However, current models of economic and social development tend to systematically ignore the economic cost of obstacles to women's empowerment. The inability of governments and executing agencies to account for gender barriers perpetuates gender inequality and constrains economic

growth as well as equal access to public services.¹ Above all, inadequate transport is still the biggest hurdle preventing the economic, political, and social participation of women in developing and emerging economies. The likelihood of women participating in the labour force in these parts of the world is decreased by 16,5 % because of insufficient and unsafe transport offers.²

Cities have historically been designed by and for men: The preferences of women, children, as well as elderly and people with disabilities are continuously neglected in the design and maintenance of transport systems in cities around the world. This leads to disadvantages for these groups in their daily lives, amounting to a form of indirect discrimination.³

¹ World Bank Group. (2016). *Assessment of gender impacts of ITS*. Open Knowledge. doi: 10.1596/25207

² Keyes, H. (2023, February 8). *Mind the (gender) gap: How cities are putting women at the heart of their transport strategies*. World Economic Forum. <https://www.weforum.org/agenda/2023/02/the-city-putting-women-at-the-heart-of-mobility/>

³ UN Habitat. (2012). *Gender issue guide: Urban planning and design*. United Nations Human Settlements Programme. <https://unhabitat.org/sites/default/files/download-manager-files/Gender%20Responsive%20Urban%20Planning%20and%20Design.pdf>

Mobility preferences and behaviour of women are distinct from that of men. Acknowledging this serves as a critical prerequisite in enabling women to achieve social and economic autonomy. Rather than linear travel patterns of getting from A to B, women's travel needs are complex and varied, shaped by a multitude of factors.^{4, 5} They often make numerous short trips and rely heavily on public and non-motorised transportation. By mainstreaming gender considerations into urban mobility planning, cities can design transportation systems that better meet the needs of all residents. Gender-mainstreaming is an approach in which the needs of women, children, and men are considered at every step in the decision- and policymaking process.⁶ The resulting policies and initiatives are gender-integrative, improving the access of all parts of the population to public infrastructure and services.

In addition to promoting social equity, gender mainstreaming particularly in urban mobility planning can also help advance the decarbonisation of the transport sector. By adjusting transport systems to make them equitable and sustainable, cities can create safe and accessible transportation options for segments of the population

whose needs were not originally considered. Efforts to reduce carbon emissions in the transport sector are often based on investments in public transport or cycling and walking, which are primarily chosen by women.⁷ Meanwhile, studies show that middle- and high-income women are more likely to find safer alternatives to public transportation by using private cars as soon as they can afford it.⁸ This demonstrates the importance of meeting women's needs in transportation planning, especially as women in developing and emerging economies gain empowerment.

The perception, for instance, that public transport is unsafe and inconvenient could be passed on to the next generations, both male and female, who might in turn avoid public transport modes and prefer using private cars or motorcycles.⁹ This is especially relevant in the Asian context, as motorcycles have become increasingly cheap and more accessible to wider parts of the population. Therefore, improving women's acceptance of green transport modes is an essential prerequisite for a sustainable transition towards a carbon neutral mobility sector to be achieved.

⁴ Regmi, M. & Yamamoto, J. (2021, March 4). *Gender mainstreaming in transport: A long route to transport equality*. Economic and Social Commission for Asia and the Pacific. <https://www.unescap.org/blog/gender-mainstreaming-transport-long-route-transport-equality>

⁵ Mahapatro, D. (2022). *Mobility solutions in India from a gender perspective*. Gesellschaft für Internationale Zusammenarbeit. <https://gender-works.giz.de/competitions2022/mobility-solutions-in-india-from-a-gender-perspective/>

⁶ Council of Europe. (n.d.). *What is gender mainstreaming?* <https://www.coe.int/en/web/genderequality/what-is-gender-mainstreaming>

⁷ Mariano, P. (n.d.) *Promoting gender equality in Asia*. Changing Transport. <https://changing-transport.org/promoting-gender-equality-in-asia/>

⁸ Lyu, Q. (2021). *Reasons and factors behind the gender gap of online ride-hailing: A case study in Wuhan, China*. [Master's thesis, Technical University of Munich]. Media TUM. <https://mediatum.ub.tum.de/doc/1637855/document.pdf>

⁹ Allen, H. (2018). *Approaches for gender responsive urban mobility: A sourcebook for policy-makers in developing cities*. Sustainable Urban Transport Project. https://womenmobilize.org/wp-content/uploads/2020/02/A_Sourcebook_Social-Issues-in-TransportGIZ_SUTP_SB7a_Gender_Responsive_Urban_Mobility_Nov18-min.pdf

Key terminology

Gender

- “Social attributes and opportunities” associated with the biological sex of a person¹⁰
- A spectrum of identities, as opposed to the binary biological sexes male and female¹¹
- Identities and roles assigned to different genders are socially constructed and “learned through socialisation processes”¹²
- Since the 1990s, gender inequalities have increasingly been addressed through integrative approaches¹³

Gender-integrative policy approaches

- *Gender-sensitive approaches* take the effects a project may have on different genders into account, aim to mitigate the symptoms and consequences of gender discrimination^{14,15}
- *Gender-responsive approaches* go a step further and actively consider the needs of different genders during project design and implementation¹⁶
- *Gender-transformative approaches* tend to yield the largest impact by “examining, challenging and transforming”¹⁷ the structural causes of gender discrimination and inequality as reinforced through social institutions and structures¹⁸

With the aim of identifying synergising policies which simultaneously address the issues of gender equality, green transportation, and climate action, this study delineates the key drivers behind transport preferences according to gender.

Based on the behavioural characteristics of women in transportation, the paper assesses which gender-integrative approaches - be it sensitive, responsive, or transformative - can be used to enhance infrastructure and services, and thereby facilitate the sustainable transition of the transport sector. This study is conducted in the context of three rapidly developing Asian economies that play a significant role in the fight against climate change and face similar issues in the transition towards a green economy – India, China, and Vietnam.

¹⁰ European Institute for Gender Equality. (2016). *Gender*. <https://eige.europa.eu/thesaurus/terms/1141>

¹¹ Newman, T. (2023, March 1). *Sex and gender: What is the difference?*

<https://www.medicalnewstoday.com/articles/232363>

¹² European Institute for Gender Equality. (2016). *Gender*. <https://eige.europa.eu/thesaurus/terms/1141>

¹³ IWRM Action Hub. (n.d). *Addressing gender inclusion*. <https://gwptoolbox.org/node/37/printable/print>

¹⁴ Food and Agriculture Organisation of the United Nations. (2023). *Joint programme on gender transformative approaches for food security and nutrition*. <https://www.fao.org/joint-programme-gender-transformative-approaches/overview/gender-transformative-approaches/en>

¹⁵ OECD. (2022, May 6). *Gender equality and the empowerment of women and girls: Guidance for development partners*. <https://www.oecd-ilibrary.org/sites/0bddfa8f-en/index.html?itemId=/content/publication/0bddfa8f-en>

¹⁶ IWRM Action Hub. (n.d). *Addressing gender inclusion*. <https://gwptoolbox.org/node/37/printable/print>

¹⁷ Food and Agriculture Organisation of the United Nations. (2023). *Joint programme on gender transformative approaches for food security and nutrition*. <https://www.fao.org/joint-programme-gender-transformative-approaches/overview/gender-transformative-approaches/en>

¹⁸ Ibid.

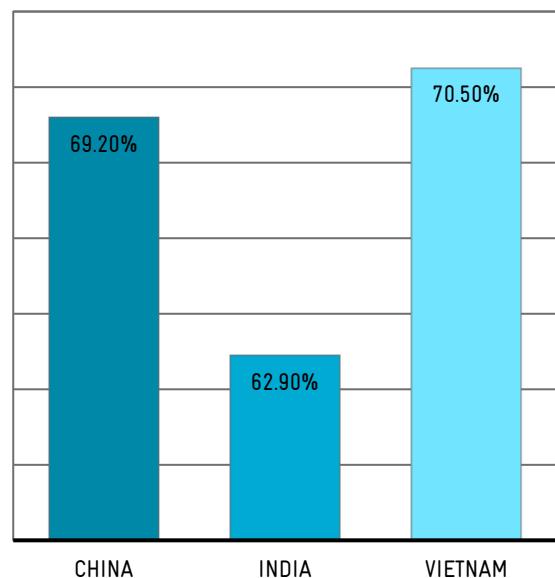


1. Travel Behaviour and Preferences by Gender in the Context of China, India, and Vietnam

The inclusion of women and their needs in the transport sector are strongly linked to the broader consideration of gender equality in historic, socio-political and economic contexts of any given country. It is essential to understand the position of women in society to comprehend their travel needs and preferences, as well as the challenges they face in accessing mobility offers. In many countries in the Asian region, societies are strongly attached to social and family traditions.¹⁹ Gender roles in India, China, and Vietnam have traditionally confined women to domestic responsibilities, which is also reflected in comparatively large gender gaps as portrayed in the World Economic Forum Global Gender Gap Index (see Graph 1).

Graph 1: Gender Gap Index²⁰

Gender Gap Index
in Percent



¹⁹ Attané, I. (2012). Being a woman in China today: A demography of gender. *China Perspectives*, 2012,(4), 5 – 15. <https://journals.openedition.org/chinaperspectives/6013?file=1>

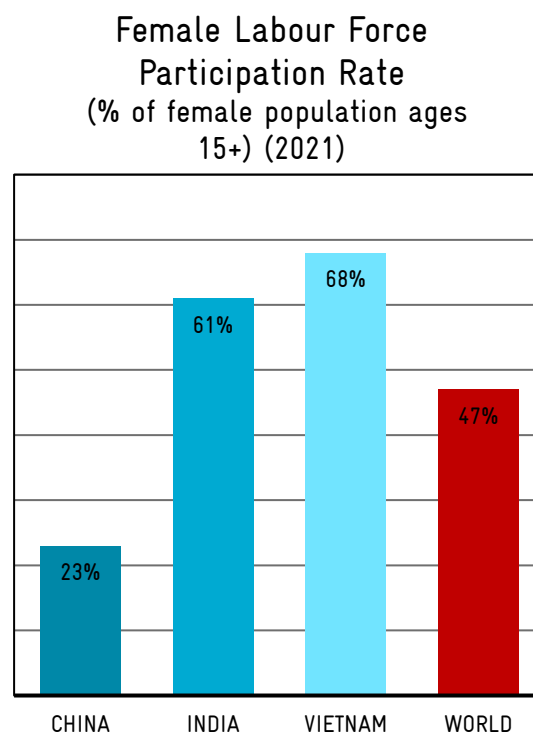
²⁰ World Economic Forum. (2022). *Global gender gap report 2022: Insight report*. Weforum. https://www3.weforum.org/docs/WEF_GGGR_2022.pdf?_gl=1*4az0kt*_up*MQ..&gclid=CjwKCAiA_6yfBhBNEiwAkmXy581Ay5t884UvgabheIXko9G8yymAaYm1qMvBLYTWAI7yVKYAJ_M7xBoCBjMQAvD_BwE#

In the World Economic Forum's Gender Gap Index 2022, Vietnam (rank 83 out of 146 countries) still ranks relatively well, with a score of 70,5 %.²¹ A score of 100 % would indicate a complete closure of the gender gap and thereby imply full gender parity, as measured across four dimensions of economic participation and opportunities, educational attainment, health and survival, and political empowerment. China (rank 102) and India (rank 135) maintain a larger gap with 68,2 % and 62,9 % respectively. Experts also point at the drastic negative effects of the COVID-19 pandemic on gender inequality, including a recurrence of traditional gender roles, heightened occurrence of gender-based domestic violence and larger share of women's burden in essential jobs and frontline work, particularly in the medical and service sectors.²² The dimension of economic participation as indicator for gender equality is further broken down in graph 2.

Given that these percentiles do not include unpaid domestic work or work in the informal sector, which is particularly relevant in the context of emerging and developing economies, the results bear limited accuracy in showing women's actual labour participation rate. In order to

provide a better understanding of women's emancipation and participation in public life, the following section will briefly analyse historical, social, and economic contexts of India, China and Vietnam, and how they influence gendered mobility preferences.

Graph 2: Female Labour Force Participation Rate²³



²¹ World Economic Forum. (2022). *Global gender gap report 2022: Insight report*.

²² Brussevich, M., Dabla-Norris, E. & Li, B. (2021). China's rebalancing and gender inequality. IMF Working Paper.

<https://www.imf.org/en/Publications/WP/Issues/2021/05/11/China-s-Rebalancing-and-Gender-Inequality-50250>

²³ World Bank Group. (2023, February 21). *Labour force participation rate, female*. <https://data.worldbank.org/indicator/SL.TLF.CACT.FE.ZS>

a. China

In the context of 21st century China, the elimination of gender inequalities has been on the political agenda since the 2000s, playing into the broader narrative of developing a “harmonious society”.²⁴ Meanwhile, sticky patriarchal norms and traditions, as well as an implementation gap of progressive laws impede women’s actual emancipation. Surveys show that wide parts of society still believe that men are “turned towards society, [whilst] women devote themselves to their family”²⁵.

Meanwhile, improvements in gender equality have been most striking in the realm of education. After the expansion of the higher education system in China, the proportion of women with higher education degrees has been growing steadily and reached over 50 % in 2009.²⁶ Even in STEM fields, 54.2 % of degree holders were female in 2017. Yet, this progress is not reflected on the job market: Female employment rates have been falling since the 1990s in the aftermath of privatisation, and the labour market still largely discriminates against women.²⁷ Continuous informal discrimination in hiring and male preference makes the entry into certain sectors, such as the transportation sector, very difficult.²⁸ Women are also

paid less for performing the same job, with the most recent data indicating a gender wage gap of around 35 % in 2013.²⁹ Women are equally not as involved in political processes and not found as often in decision-making positions, which explains gender blindness and the need for more representation in many policy areas, including the transportation sector.

Since more Chinese men than women have stable jobs and need to regularly commute, women tend to spend less money than men on transportation.³⁰ Men are more likely to use individual or private transportation like cars and ride hailing, or even high-speed trains.³¹ While they travel linearly from home to work, mostly concentrated in the mornings and evenings, women combine multiple purposes in their trips and travel throughout the day, resulting in complex travel routes.³² Only 39,67 % of women’s total trips in Beijing, for instance, are for commuting purposes, 10% less than for men.³³ This is due to their household and caregiving roles: 35 % of women’s travel in Beijing is for doing groceries, a figure 13 % higher than for men. 8,91 % of trips are for picking up people, which is 2 % higher than for men.³⁴ Combining multiple purposes in one journey often necessitates more than

²⁴ Attané, I. (2012). Being a woman in China today: A demography of gender. *China Perspectives*, 2012,(4), 5 – 15.

<https://journals.openedition.org/chinaperspectives/6013?file=1>

²⁵ Ibid.

²⁶ Lingyu, L., Wenqin, S. & Chao, L. (2021). The rise of women in STEM higher education in China: Achievements and challenges. In H. K. Ro, F. Fernandez & E. Ramon (Eds.), *Gender equity in STEM in higher education*. Routledge. doi: 10.4324/9781003053217

²⁷ Attané, I. (2012). Being a woman in China today: A demography of gender. *China Perspectives*, 2012,(4), 5 – 15.

<https://journals.openedition.org/chinaperspectives/6013?file=1>

²⁸ Ibid.

²⁹ Brussevich, M., Dabla-Norris, E. & Li, B. (2021). *China’s rebalancing and gender inequality*. IMF Working

Paper.

<https://www.imf.org/en/Publications/WP/Issues/2021/05/11/China-s-Rebalancing-and-Gender-Inequality-50250>

³⁰ Tran, H. & Schlyter, A. (2010). Gender and class in urban transport: The cases of Xian and Hanoi.

International Institute for Environment and Development, 22(1). 139 – 155. doi: 10.1177/0956247810363526

³¹ World Bank. (2016). *Assessment of gender impacts of ITS*. Open Knowledge.

<https://openknowledge.worldbank.org/bitstream/handle/10986/25207/108336.pdf?sequence=4&isAllowed=y>

³² Shen, K., Wang F. & Cai, Y. (2016). Patterns of inequalities in public transfers by gender in China. *J Econ Ageing*, 2016 Dec,(8). 76 – 84. doi: 10-1016/j.jeoa.2016.04.005

³³ World Bank. (2016). *Assessment of gender impacts of ITS*. Open Knowledge.

<https://openknowledge.worldbank.org/bitstream/handle/10986/25207/108336.pdf?sequence=4&isAllowed=y>

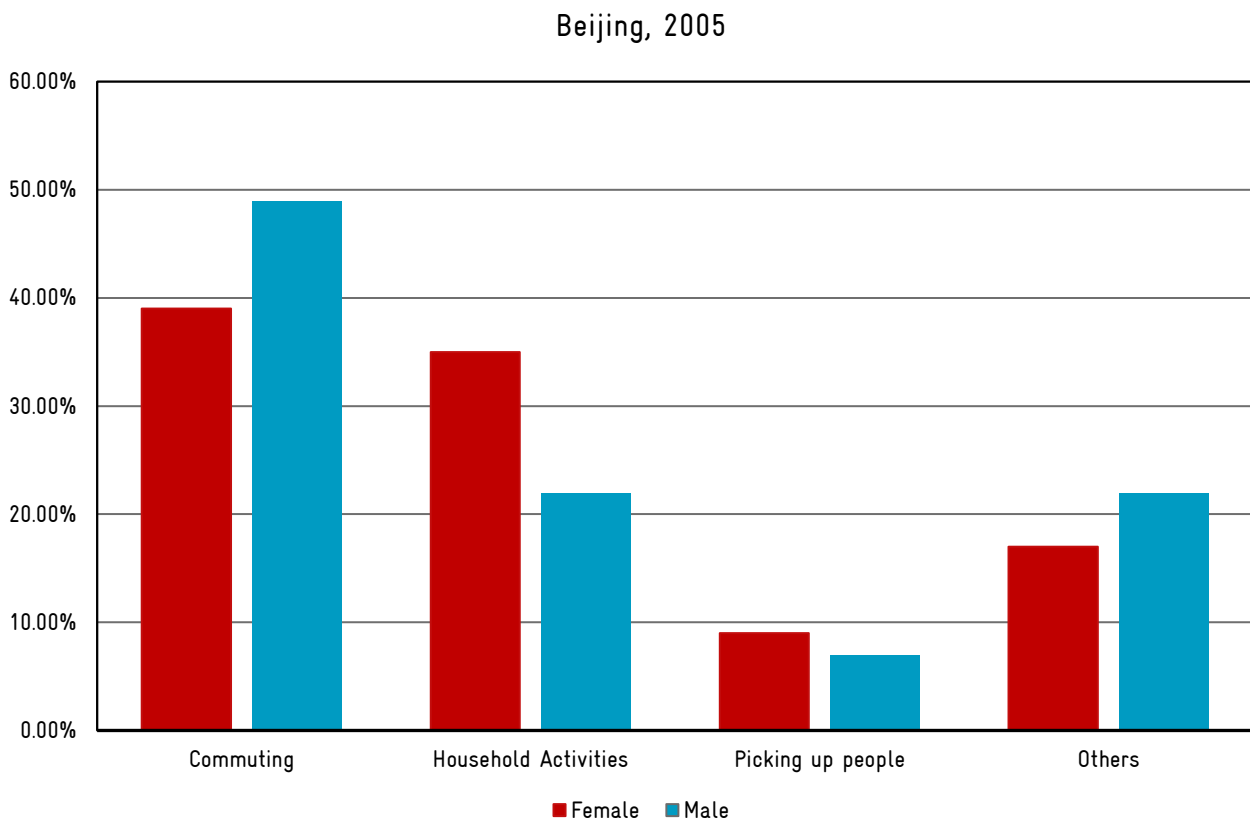
³⁴ Ibid.

one ticket. This, together with women's limited transportation budget is the reason why women in China tend to be more susceptible to affordability of travel modes than men. They hence choose cheaper modes of transportation, such as walking or public transport.³⁵ (See graph 3)

Besides cost efficiency, women place high importance on safety when choosing their mode of transportation.³⁶ A study conducted by the World Bank found a great difference in preferences between women and men in the two Chinese cities of

Wuhan and Urumqi: men prioritise cost efficiency and time-saving, while women would consider safety even over cost efficiency as their number one concern.³⁷ Surveys established that 70 % of Chinese women are afraid to pass through "less populated streets, underpasses, and remote bus stations"³⁸. This explains the preference of middle- and high-income women for private modes of transportation, which are perceived as safer than walking or public transport.

Graph 3: Trip Purpose by Gender³⁹



³⁵ Yang, Y. (2017, February 7). *Building gender equality into intelligent transport systems in China*. World Bank Blogs.

<https://blogs.worldbank.org/eastasiapacific/building-gender-equality-into-intelligent-transport-systems-in-china>

³⁶ World Bank. (2016). *Assessment of gender impacts of ITS*. Open Knowledge.

<https://openknowledge.worldbank.org/bitstream/handle/10986/25207/108336.pdf?sequence=4&isAllowed=y>

³⁷ Ibid.

³⁸ Yang, Y. (2017, February 7). *Building gender equality into intelligent transport systems in China*. World Bank Blogs.

<https://blogs.worldbank.org/eastasiapacific/building-gender-equality-into-intelligent-transport-systems-in-china>

³⁹ World Bank. (2016). *Assessment of gender impacts of ITS*. Open Knowledge.

<https://openknowledge.worldbank.org/bitstream/handle/10986/25207/108336.pdf?sequence=4&isAllowed=y>

b. India

Whilst the Indian Constitution prohibits discrimination against any sex, gender inequalities are still reflected in patriarchal family norms, restricted physical integrity and heightened sexual harassment, as well as limited access to financial resources.⁴⁰ Despite rapid economic growth in the country, empirical data suggests that women have not benefited from new opportunities as much as men have.⁴¹ This has resulted in a significant proportion of women being relegated to part-time jobs or informal employment, as mentioned above. According to a UNDP survey of women in four major Indian cities, Mumbai, Bangalore, Hyderabad, and the Delhi National Capital Region, almost half of the respondents reported that their desire to participate in the workforce is hindered by their domestic obligations and responsibilities.⁴² Consequently, women mostly contribute to family-owned production economy without receiving any income in return and lack adequate working conditions, favourable social protection, and formal work arrangements.⁴³

In addition to the significant role that traditional gender norms play in female workforce participation, there are other equally significant social factors at play. According to a study on female labour in urban Delhi, safety concern is one of the key factors influencing women's

participation in the labour market.⁴⁴ Safety and security concerns, particularly during commuting and in the workplace, present a significant barrier to women's aspirations to participate in the workforce. A recent study by *Women on the Move* discovered that a vast majority of women surveyed (88 %) rely on public transportation for commuting.⁴⁵ However, the research also highlighted that women experience a sense of insecurity while travelling, particularly when waiting at congested interchanges or utilising transport facilities that lack technological advancements for safety, such as app-based taxis. Additionally, shared riding, which requires close physical proximity to strangers, can also be a source of concern. These feelings of insecurity have had a significant impact on women's lives, as over half of those surveyed (52 %) reported declining education and employment opportunities as a result.

As women rely heavily on public transportation and have much to gain from its availability, the pricing and routing of the public transit system plays a crucial role as well. According to Alberts et al.'s (2016) investigation of urban peripheral communities in Chennai, India, the relocation of slum populations results in a disproportionate burden on women to adapt to the altered circumstances. With a lack of formal means of livelihood, women

⁴⁰ OECD (2023). *Social institutions and gender index*. <https://www.oecd.org/stories/gender/social-norms-and-gender-discrimination/sigi?country=IND>.

⁴¹ Chatterjee, E., Desai, S. & Vanneman, R. (2017). Indian paradox: Rising education, declining women's employment. *Demographic Research*, Vol 38(31), pp. 855 – 878. doi: 10.4054/DemRes.2018.38.31

⁴² UNDP. (2015). *Women's voices: Employment and entrepreneurship in India*. <https://www.undp.org/india/publications/womens-voices-employment-and-entrepreneurship-india>

⁴³ ESCAP (2021, November 16). *Transport and communications bulletin for Asia and the Pacific, no.91* :

gender and social dimensions of transport. <https://www.unescap.org/kp/2021/transport-and-communications-bulletin-asia-and-pacific-no91-gender-and-social-dimensions>

⁴⁴ Ratna, S. & Shryana, B. (2008). *Through the magnifying glass: Women's work and labour force participation in urban Delhi*. ILO. https://www.ilo.org/newdelhi/whatwedo/publications/WCMS_123539/lang--en/index.htm

⁴⁵ Ratho, A. & Jain, S. (2019). *Women on the move: The impact of safety concerns on women's mobility*. Observer Research Foundation.

could not afford more private modes of transportation. Owing to poor route connectivity of public transport in these regions, women resort to walking, which in turn exacerbates issues related to safety,

c. Vietnam

In recent decades, economic growth has led to rapid urbanisation and greater opportunities for Vietnamese women to participate in the workforce. As a result, women are increasingly entering the public sphere and participating in economic activities that require mobility, such as commuting to work and traveling for business. Although more men travel for the purpose of work than women, figures only differ marginally. For instance, in the city of Hanoi, 70 % of men travel for work in comparison to 65 % of women.⁴⁸

However, despite the notable progress made in promoting gender equality, Vietnam continues to grapple with obstacles in addressing long-standing gender stereotypes and a socio-economic structure that is shaped by gender norms. Following global gendered mobility patterns, statistical evidence for instance suggests that women in Vietnam tend to undertake more multi-purpose trips than their male counterparts, thereby necessitating additional stops during their

travels.⁴⁹ ⁵⁰ Owing to the unequal distribution of unpaid household labour, women's opportunities for leisurely travel are also significantly curtailed relative to those of men.⁵¹ Women earn substantially lower wages than their male counterparts as they typically devote a greater proportion of their time to unpaid domestic labour than men, resulting in fewer hours spent in paid employment and reduced financial resources for travel.⁵² This discrepancy in unpaid labour and wages, therefore, poses a significant obstacle to women's ability to travel, which is further compounded by issues related to access.

While women in Vietnam tend to commute shorter distances, they undertake a greater number of non-work-related trips. Similar to findings in China and India, they utilise public transportation and taxi services more frequently than men, and often travel in the company of children.⁵³ Moreover,

⁴⁶ Alberts, A., Pfeffer, K. & Baud, I. (2016). Rebuilding women's livelihoods strategies at the city fringe: Agency, spatial practices, and access to transportation from Semmencherry, Chennai. *Journal of Transport Geography*. Vol. 55. pp. 142-151

⁴⁷ World Bank (2022, January 1). *India: Toolkit for enabling gender responsive urban mobility and public spaces*. <https://openknowledge.worldbank.org/handle/10986/38199>

⁴⁸ General Statistics Office. (2010). *Report on labour force survey*. gso.gov.vn/wp-content/uploads/2019/03/Bao-cao.pdf

⁴⁹ Hoai Anh, T., & Schlyter, A. (2010). Gender and class in urban transport: the cases of Xian and Hanoi. *Environment and Urbanization*, 22(1), 139-155. doi:10.1177/0956247810363526

⁵⁰ Peters, D. (2013). *Gender and sustainable urban mobility*. UN Habitat. <http://www.unhabitat.org/grhs/2013>

⁵¹ Institute for Social Development Studies. (2016). *Social determinants of gender inequality in Vietnam*. <https://investinginwomen.asia/knowledge/social-determinants-gender-inequality-vietnam/>

⁵² World Bank. (2018). *Gender gap in earnings in Vietnam: Why do Vietnamese women work in lower paid occupations?* <https://investinginwomen.asia/knowledge/gender-gap-earnings-vietnam/>

⁵³ International Transport Forum. (2019). *Understanding urban travel behaviour by gender for efficient and equitable transport policies*. <https://www.itf-oecd.org/transport-connectivity-gender-perspective>

women walk longer distances than men.⁵⁴ The gender earnings gap may also explain why men in Vietnam have greater access to private motorised vehicles than women, particularly for longer distances.⁵⁵

Gender norms are not only reflected in travel behaviour and preferences, they are also evident in the proportion of women employed in the transport sector. For instance, a study conducted by GIZ in Vietnam found that only 8 % of on-site employees in road transportation are female and perform tasks such as driving

vehicles.⁵⁶ As these jobs require “technical skills and physical strength”⁵⁷, they are, according to conservative gender norms, better carried out by men, while women should perform manual work which “requires patience and soft skills”⁵⁸. The percentage of female employees in management and back-office positions is slightly larger, yet still under 10 %. The COVID-19 pandemic intensified this gender gap, since more women than men were affected by labour cuts in the sector.

In India, China and Vietnam, in line with global gendered mobility patterns, the dissimilarities between genders regarding transportation and mobility, ranging from the objectives of travel to the means of travel utilised, are intricately connected to gender norms and the segregation of gender roles in various domains, such as the allocation of tasks, household chores, and caregiving obligations. In order to holistically transform the mobility sector, the needs and preferences of women must be accounted for.

⁵⁴ UN Women (2019). *Gender responsive budgeting in Vietnam: Gender equality in transport*. <https://gender-financing.unwomen.org/en/resources/g/r/b/grb-in-vietnam---gender-equality-in-transport>

⁵⁵ Peters, D. (2013). *Gender and sustainable urban mobility*. UN Habitat. <http://www.unhabitat.org/grhs/2013>

⁵⁶ Hoa, D & Quyen, N. (2023, February 15). *Post-Covid-19 green recovery assessment of road transport: From a gender perspective*. Gesellschaft für Internationale

Zusammenarbeit. <https://changing-transport.org/publications/post-covid-19-assessment-of-transport/>

⁵⁷ Hoa, D & Quyen, N. (2023, February 15). *Post-Covid-19 green recovery assessment of road transport: From a gender perspective*. Gesellschaft für Internationale Zusammenarbeit. <https://changing-transport.org/publications/post-covid-19-assessment-of-transport/>

⁵⁸ Ibid.



3. Challenges and Potential Solutions for Gender-inclusive Sustainable Mobility

Green transport systems must be accessible and safe for all members of society for a holistic transition towards decarbonised transport to take place. This is especially relevant for public transport and last-and-first-mile mobility, which must be designed to meet the needs of

a. Safety and Comfort

As stated above, women in all three countries prioritise safety whenever affordable in choosing their mode of transportation. This is especially the case in urban areas, where major concern pertains to the safety on the way to and from public transportation stations or while awaiting transit.⁵⁹ In general, women are much more likely to be targets of violence and theft in public transportation. An

all genders. The following chapter describes hurdles to such a holistic transition to sustainable mobility and discusses best practice initiatives which are designed to overcome these challenges and incentivise more people, especially women, to use green modes of transportation.

example from China confirms this: In a survey conducted by the World Bank, 24,6 % of females in Wuhan and 19,3 % of females in Urumqi reported sexual harassment cases while using public transport, with estimations suggesting that the number of unreported cases lies much higher.⁶⁰ More than 50 % of women interviewed by the China Youth Daily Newspaper in 2015 experienced

⁵⁹ Transformative Urban Mobility Initiative. (2022, February 3). *Broadened horizons: How first and last mile connections can expand women's travel radius*. <https://www.transformative-mobility.org/news/broadened-horizons-how-first-and->

[last-mile-connections-can-expand-womens-travel-radius](#)

⁶⁰ World Bank Group. (2016). *Assessment of gender impacts of ITS*. Open Knowledge. doi: 10.1596/25207

“inappropriate touching” on public transport.⁶¹ Most incidents occurred inside the vehicle, when perpetrators take advantage of remaining unknown in overcrowded spaces.⁶² Some women were also attacked on the street or at the stations. A major study in Delhi, India, involving 1,387 men and women who availed public transport for transit found that 38 % of the women had been sexually harassed, while 79 % reported the same while waiting for a bus at a bus stop.⁶³ A similar picture paints itself in Vietnam: According to a recent study, 11 % of surveyed girls aged 16 to 18 years in Hanoi and Ho Chi Minh City reported experiencing sexual harassment while

using public transport.⁶⁴ Meanwhile, it is widely believed that the actual prevalence of sexual harassment against women and girls on public transportation is considerably higher than official reports suggest, owing to underreporting.⁶⁵ Regional and ethnic tensions could further exacerbate the safety concerns of passengers.⁶⁶ The following paragraphs will discuss best practice models from around the world which aim to improve safety for women and girls in transport systems. They can be broadly categorised into five main approaches: segregation, awareness and training, urban planning, data collection and reporting mechanisms and help service.

i) Segregation

An initiative to solve the issue through segregation comes from Tokyo and New Delhi, but is nowadays implemented in many countries around the world: Women-only subway carriages.⁶⁷ Besides India and Japan, the model is also used in Mexico, Brazil, Egypt, Russia, Dubai, and Iran.⁶⁸

In China, the model was first implemented in Guangzhou and Zhengzhou. The first and last wagon of metros was dedicated to women, a rule enforced by public transport personnel. In a survey on WeChat conducted by CGTN in 2019, 65 % of respondents supported the female-only carriages, of which 64 % were female.⁶⁹

⁶¹ Marchi, G. (2018, March 4). *China’s women-only subway cars, where men rush in*. New York Times. <https://www.nytimes.com/2018/03/04/business/china-women-only-subway-cars.html>

⁶² People’s Day Online. (2021, November 19). *Can female-only subway carriages provide safer commutes?* <http://en.people.cn/n3/2021/1119/c90000-9922002.html>

⁶³ Madan, M., & Nalla, M. K. (2016). Sexual Harassment in Public Spaces. *International criminal justice review*, 26(2), 80–97. <https://doi.org/10.1177/1057567716639093>

⁶⁴ ActionAid International Vietnam (2014, January 1). *Safe cities for women and girls: can dreams come true?*

<https://vietnam.actionaid.org/en/publications/2014/safe-cities-women-and-girls-can-dreams-come-true>

⁶⁵ Do, L. (2019, September 24). *Sexual harassment rife on public buses, law remains lethargic*. VNEPress International.

<https://e.vnexpress.net/news/life/trend/sexual-harassment-rife-on-public-buses-lawremains-lethargic-3986500.html>

⁶⁶ People’s Day Online. (2021, November 19). *Can female-only subway carriages provide safer commutes?* <http://en.people.cn/n3/2021/1119/c90000-9922002.html>

⁶⁷ Marchi, G. (2018, March 4). *China’s women-only subway cars, where men rush in*. New York Times. <https://www.nytimes.com/2018/03/04/business/china-women-only-subway-cars.html>

⁶⁸ Sur, P. (2015, January 16). *How to make transport safer for women*. World Economic Forum. <https://www.weforum.org/agenda/2015/01/how-to-make-transport-safer-for-women/>

⁶⁹ People’s Day Online. (2021, November 19). *Can female-only subway carriages provide safer commutes?* <http://en.people.cn/n3/2021/1119/c90000-9922002.html>



Image 2: Women's priority cabin in Shenzhen.
© Shuo LI

However, in cities where the model has been introduced, the effects remain ambiguous. Several problems link to correct usage and behavioural change: Women reported that there was not enough space on the carriages during rush hours, so they were forced to use the normal compartments. However, these were by then known as the “men’s-compartments” and women using these waggons were seen as putting themselves in danger on purpose and being “open to sexual advances”⁷⁰. They were targeted and harassed for not taking the designated women’s carriages.⁷¹ This phenomenon is confirmed by a study

conducted in Rio de Janeiro in Brazil by the World Bank.⁷² Reports from Guangzhou furthermore mentioned that men do oftentimes not respect the measures and would still use women’s waggons during rush hours, when all other compartments are full.⁷³ Women also complained about being segregated from the rest, insisting that this does not solve the problem and restricts them in their mobility.⁷⁴ On the contrary, as the World Bank states, the measures could possibly even reinforce social views and misogynist attitudes which contribute to violence against women.

⁷⁰ World Bank Group. (2020, February). *Violence against women and girls in public transport: Policy recommendations for Mexico City.*, p. 18
<https://openknowledge.worldbank.org/server/api/core/bitstreams/94769e92-d342-586f-a955-4abe33fc1395/content>

⁷¹ Kuo, L. (2015, January 29). *Memo to Beijing: Female-only subway cars don't make women safer from sexual harassment.* Quartz.
<https://qz.com/335560/memo-to-beijing-female-only-subway-cars-dont-make-women-safer-from-sexual-harassment>

⁷² World Bank Group. (2020, February). *Violence against women and girls in public transport: Policy*

recommendations for Mexico City.
<https://openknowledge.worldbank.org/server/api/core/bitstreams/94769e92-d342-586f-a955-4abe33fc1395/content>,

⁷³ Marchi, G. (2018, March 4). *China's women-only subway cars, where men rush in.* New York Times.
<https://www.nytimes.com/2018/03/04/business/china-women-only-subway-cars.html>

⁷⁴ World Bank Group. (2020, February). *Violence against women and girls in public transport: Policy recommendations for Mexico City.*
<https://openknowledge.worldbank.org/server/api/core/bitstreams/94769e92-d342-586f-a955-4abe33fc1395/content>

Many experts and respondents suggest that men and boys must be educated to help and respect women.⁷⁵ Measures of segregation should thus be complemented by trainings of patrol

ii) Awareness and Training

Effectively, the issue of safety cannot be eradicated without raising awareness amongst vehicle conductors and passengers in public transportation. Ideally, both target groups should be addressed. An initiative to that end with significant positive feedback comes from London. The *Report it to Stop it* Campaign instated “community support officers”⁷⁶ to patrol public transport vehicles and stations, wearing body cameras to capture acts of harassment and enable better reporting. The officers received special trainings on how to react to dismissive or violent behaviour and how to properly report incidents. Furthermore, the campaign raised awareness amongst the public and educated on how to be an active bystander. In France, a similar campaign raised awareness of the prevalence of sexual harassment on public transport and provided more information to victims and bystanders on the public and legal framework and mechanisms.⁷⁷ For example, a 24/7 alert hotline was installed in case of emergencies, with visible on-location call boxes in the transport systems. This not only increased visibility of the issue, it also

officers and the provision of emergency contact numbers to achieve long-lasting change.

improved information about and access to reporting possibilities. In addition, police officers and public transport staff were trained on how to work with victims.

An exceptional training programme with the aim of improving safety for women in buses was implemented by the non-profit organisation Akshara in Mumbai.⁷⁸ The starting point for the project was the notion that bus drivers and conductors can play a major role in making travel safer for female passengers by becoming effective bystanders. For example, they can enforce reserved seating for women, ask the harasser to get off the bus or drive him to the police office directly. The project therefore conducted trainings with bus drivers in cooperation with the bus authority Brihanmumbai Electric Supply and Transport Undertaking (BEST). Measures allocating more space and segregated space to women could also be enforced. This represents a great example for training programs which could be introduced also in Vietnam and China to ensure that rules and measures in public transportation are respected.

⁷⁵ People’s Day Online. (2021, November 19). *Can female-only subway carriages provide safer commutes?* <http://en.people.cn/n3/2021/1119/c90000-9922002.html>

⁷⁶ Ertel, G. (2022). *Safe commuting for all: How cities can tackle sexual harassment on public transport*. Women Mobilize Women. [\[cities-can-tackle-sexual-harassment-on-public-transport/\]\(https://www.womenmobilize.org/cities-can-tackle-sexual-harassment-on-public-transport/\)](https://womenmobilize.org/safe-commuting-for-all-how-</p></div><div data-bbox=)

⁷⁷ Ibid.

⁷⁸ Akshara. (2016). *Empowering women’s mobility: A program with transport systems*. <http://www.aksharacentre.org/wp-content/uploads/2017/01/Akshara-Transport-Report.pdf>

iii) Urban Planning and Design

Studies found that women's safety perception is greatly influenced by the architecture and usage of environment in their surroundings. Mixed usage of space typically strengthens the perception of safety of women, for example the vicinity of a park, micro-mobility hubs or shops.⁷⁹ While it is likely that commercially used areas attract crime, this is not directly reflected in a decline in women's sense of safety in these public areas. On the contrary, buildings hosting public administration and public services areas are also likely to be linked to theft and non-violent crime, but they have a positive effect on women's safety perception. Integrating public administration and service buildings as well as green spaces in areas where women's feeling of safety is low could improve their comfort in these areas. This knowledge can be used to

increase the feeling of safety for women at transportation hubs and stations. A relatively straightforward improvement is furthermore to ensure enough and constant lighting at stations, mobility points, and on pedestrian walks, for which Vienna is a prime example. The city was elected as the most liveable globally because of its well-built infrastructure system.⁸⁰

According to recent studies, the feeling of insecurity of women interviewed is most prevalent during peak hours, when public transport vehicles are congested.⁸¹ The most evident solution to this issue would therefore to engage in gender-sensitive planning, to increase the frequency of public transport vehicles during peak hours or to shorten the distances between stops.

iv) Data Collection and Public Innovation

According to the OECD, public authorities are often not aware of the issues women face in public transport and infrastructure.⁸² This problem may first and foremost be addressed by including more women in the decision-making process. Additionally, the collection of gender-disaggregated travel data and data on harassment in transport can highlight the deficiencies and form the

basis for a more effective intervention and gender-sensitive, if not gender-responsive transport planning. Increasing connectivity and planning possibilities, for example through apps, would make traffic more effective and safer for women, by decreasing the time spent waiting for transit.⁸³ This can be underpinned by an improved micro mobility offer targeted towards the needs of women, to cover the

⁷⁹ 常金为. (2019). 智慧城市背景下土地利用类型与女性安全感的关系研究. 长安大学.

<https://kns.cnki.net/kcms2/article/abstract?v=lu7GCbFnkC02nBtzVScFo-uQtyQmAWIEKHKUMBsVFbxG44hxA6aQ7HR9xjxEhtmbLngITdQiR2Y2XGnA0BpGGA9M9U4aJNqr2X94UtE92mtKVAHeaAIS7w==&uniplatform=NZKPT&language=CHS>

⁸⁰ EMABQ Network. (2017). *Vienna, Austria ranked as the smartest city*. Smartcitiesdive. <https://www.smartcitiesdive.com/ex/sustainablecitiescollecrive/vienna-austria-ranked-smartest-city/34914/>

⁸¹ Ratho, A. & Jain, S. (2019). *Women on the move: The impact of safety concerns on women's mobility*. Observer Research Foundation.

⁸² International Transport Forum. (2018). *Women's safety and security: A public transport priority*. OECD/ITF. https://www.itf-oecd.org/sites/default/files/docs/womens-safety-security_0.pdf

⁸³ Ertel, G. (2022). *Safe commuting for all: How cities can tackle sexual harassment on public transport*. Women Mobilize Women. <https://womenmobilize.org/safe-commuting-for-all-how-cities-can-tackle-sexual-harassment-on-public-transport/>

first and last mile, which simultaneously offer levers for more sustainable means of transport. Furthermore, real-time information on arrival times of public transport vehicles, which is for instance already available for a number of bus lines in first-tier cities such as Beijing, could be further expanded and made more accessible through apps.

Using ITS-systems or other apps for data collection might prove fruitful in rendering transport across the three Asian countries more women-friendly, as smartphone internet penetration steadily improves. China has the largest amount of internet users in the world and an internet penetration rate of 73,0 % as of December 2021.⁸⁴ The rate for female users was at 57 % and the density particularly in urban areas is constantly increasing.⁸⁵ In recent years, India has also witnessed a steady rise in smartphone internet penetration due to a substantial reduction in the cost of smartphones and internet services.⁸⁶ According to a survey carried out by the community social media platform LocalCircles, there has been a significant shift in the usage of smartphones and other gadgets among women in households. The survey reveals that 68 % of households where women were not utilising smartphones or other similar

devices a decade ago are currently doing so.⁸⁷ While there is no available data that categorises smartphone penetration in Vietnam based on gender, the country has witnessed a significant increase in the number of smartphone users. In fact, there are currently 93.5 million smartphone subscribers in Vietnam, which equates to 73.5 % of the country's adult population.⁸⁸

A project which underscores the pivotal role that digitisation can play in promoting gender equality in the transportation sector is Safetipin, a non-profit organisation active in 65 cities worldwide, mostly located in India, Mexico, and different parts of Africa and Latin America.⁸⁹ Through mobile apps, the organisation collects data on incidents of violence against women and girls and provides a safety score for locations across cities. This provides users with the possibility to better plan their journey. They can also audit their city and report issues, for instance the lack of lighting, a blocked footpath, or broken escalators. The data is then provided to government agencies for them to improve the infrastructure in the problem zones. This is a prime example that fills the gap of missing data and serves the population as well as the government.

⁸⁴ Global Times. (2022, February 25). *China has 1.032 billion internet users, 83,0% penetration rate*. <https://www.globaltimes.cn/page/202202/1253226.shtml>

⁸⁵ Go-Globe. (n.d.). *Smartphone usage in China: Statistics and trends*. <https://www.go-globe.com/smartphone-usage-in-china-statistics-and-trends-infographic/>

⁸⁶ Gupta, M., Mehta, D., Punj, A., & Thies, I. (2022, June 1). *Sophistication with limitation: Understanding smartphone usage by emergent users in India*. Microsoft. <https://www.microsoft.com/en-us/research/publication/sophistication-with-limitation-understanding-smartphone-usage-by-emergent-users-in-india/>

⁸⁷ Chadha, S. (2022, March 8). *Tech use by women in India up 5-fold in last decade: Now, 2 in 3 households have women using smartphones*. Times of India. <https://timesofindia.indiatimes.com/business/india-business/tech-use-by-women-in-india-up-5-fold-in-last-decade-now-2-in-3-households-have-women-using-smartphones/articleshow/90068940.cms>

⁸⁸ Ministry of Information and Communication of the Socialist Republic of Vietnam. (2022, April 18). *Vietnam targets 85% smartphone usage by end of 2022*.

<https://english.mic.gov.vn/Pages/TinTuc/tinchitiet.aspx?tintucid=153538#:~:text=The%20proportion%20of%20adults%20using,2025%20and%20the%202022%20plan.>

⁸⁹ Safetipin.com (n.d.). <https://safetipin.com/>



Image 3: Safetipin App. © Safetipin.com

A similar project was implemented in Cairo, Egypt: victims and bystanders can report incidents of sexual harassment and violence on an online platform.⁹⁰ The information is then integrated into a virtual map to provide users with an overview of safe and unsafe parts of the city. The organisation also uses the information for

campaigns and advocacy trainings and is currently exploring ways of how the crowdsourced data can be used for scientific studies. Whilst this format addresses the issue of data gaps, authorities still hold main responsibility to follow up and use the data to draft corresponding policy interventions.

v) Reporting Mechanisms and Help Services

Many countries, cities and even companies have tried to tackle the issue of safety by installing reporting mechanisms and helplines. India sets a great example in this regard. Uber India uses GPS tracking on all trips to record the exact time and location of a journey.⁹¹ This makes reporting and law enforcement after an attack easier and deters potential offenders. The company also has a helpline in place, operated by former law enforcement professionals, who are available 24/7 and can directly contact the police in case of an emergency call. This could be a starting

point to increase safety feelings for women but must also be combined with awareness raising and law enforcement action. A similar project to deal specifically with sexual harassment in public transportation was implemented in Delhi, India. The phone app Circle of 6 establishes a connection between potential victims or targets of harassment or sexual violence with a trustworthy person who can help them.⁹² The phone service can then directly connect the person to a 24-hour women hotline or the hotline of the women's rights NGO Jagori. Some mechanisms are also necessitated

⁹⁰ Harassmap.org. (n.d.). <https://harassmap.org/en>

⁹¹ International Transport Forum. (2018). *Women's safety and security: A public transport priority*. OECD/ITF. https://www.itf-oecd.org/sites/default/files/docs/womens-safety-security_0.pdf

⁹² Asian Development Bank. (2015). *Policy brief: A safe public transportation environment for women and girls*. <https://www.adb.org/sites/default/files/publication/179182/safe-public-transport-women-girls.pdf>

by the government: India adopted a directive for obligatory panic buttons in “non-mass transit public transportation”⁹³ like taxis. When pressed, the buttons would alarm the police and pass on the GPS data of the vehicle. In theory, this would discourage sexual harassment from occurring. However, there is no factual evidence of the effectiveness of the measure and passengers are sceptical as to its usage, noting that corruption and misuse make effective implementation of the measure difficult in local contexts of India.⁹⁴

At first sight, CCTV cameras depict yet another effective means of improving safety by making law enforcement easier. However, studies show that, while these installations can have an impact on the number of attacks and safety perception through the so-called “warning eye effect”, their effectiveness highly varies in different country contexts. In India, data on CCTV cameras can only be stored for up to 72 hours; poor video quality makes it difficult to identify faces.⁹⁵ In China, on the other hand, the extensive coverage of nearly 540 million high-resolution cameras enables face recognition nearly everywhere in the country.⁹⁶ Legal thresholds in China are not as high and make it possible to match the scanned faces with information on suspects in police databases.⁹⁷ This system offers a

lot more possibilities for crime solution and prevention.

Factoring out concerns of privacy and data protection, the comparison shows that if the legal framework and technological preconditions allow, CCTV cameras can be effective for prevention of crime and thereby improve the safety of passengers, also women, on public transportation.

One such project is the Hazme El Paro initiative developed in Mexico City, which consists of the establishment of reporting mechanisms through an app, the training of operators to become interveners as well as a social awareness campaign which involved the community.⁹⁸ Similarly, the project Captial Region Urban Transport in the Indian province of Odisha has taken a diversified approach to making the public transport system more gender-sensitive and increasing interconnectivity through smart travel.⁹⁹ A priority was given to safety: panic buttons

⁹³ World Bank Group. (2020, February). *Violence against women and girls in public transport: Policy recommendations for Mexico City*. <https://openknowledge.worldbank.org/server/api/core/bitstreams/94769e92-d342-586f-a955-4abe33fc1395/content>, p. 21

⁹⁴ Sarmmah, S. (2018, March 9). *Do panic buttons help? BMTC is not so sure*. Deccan Herald. <https://www.deccanherald.com/content/663760/do-panic-buttons-help-bmtc.html>

⁹⁵ International Transport Forum. (2018). *Women’s safety and security: A public transport priority*. OECD/ITF. https://www.itf-oecd.org/sites/default/files/docs/womens-safety-security_0.pdf

⁹⁶ Bischoff, P. (2022, July 11). *Surveillance camera statistics: Which cities have the most CCTV cameras?* Comparitech. [\[privacy/the-worlds-most-surveilled-cities/#:~:text=China%20leads%20the%20world%20in,or%20372.8%20per%201%2C000%20people\]\(https://www.comparitech.com/vpn-privacy/the-worlds-most-surveilled-cities/#:~:text=China%20leads%20the%20world%20in,or%20372.8%20per%201%2C000%20people\)](https://www.comparitech.com/vpn-</p></div><div data-bbox=)

⁹⁷ Keegan, M. (2019, December 2). *Big brother is watching: Chinese city with 2.6m cameras is world’s most heavily surveilled*. The Guardian. <https://www.theguardian.com/cities/2019/dec/02/big-brother-is-watching-chinese-city-with-26m-cameras-is-worlds-most-heavily-surveilled>

⁹⁸ Macrotrends. (2023). *Germany crime rate and statistics 1995 – 2023*.

⁹⁹ Baskin, A., Bruntlett, M., Cardona, S., Fischer, L., Remmers, J. & Weinmann, V. (Eds.) (2023). *Remarkable feminist voices in transport*. Gesellschaft für Internationale Zusammenarbeit. https://womenmobilize.org/wp-content/uploads/2023/03/WMW_Feminist-Voices-In-Transport-2023_Book.pdf

were installed in public transport vehicles, live tracking apps were developed, separate washrooms built at stations and CCTV surveillance and improved lighting at stations and in vehicles established a safer environment for women. At the same time, the project collects gender-disaggregated travel data through an automatic ticketing system. Furthermore, attention was given to ensuring a gender-diverse staff. This holistic approach is proven to show positive results as users indicated that they felt safer on public transport after the implementation of the initiative.¹⁰⁰

Most “standalone” initiatives in the area of safety and comfort focus on a single approach and oftentimes fail to achieve long-lasting change. Therefore, experts recommend integrated measures and multi-faceted approaches: Projects should simultaneously cover awareness raising, training, reporting and help mechanisms to effectively contribute to violence prevention. Significant impact can be achieved through gender-disaggregated data collection and tracking of sexual harassment incidents through technical approaches. Only when more information is available to decision-makers and service providers, solutions can be developed to tackle the specifics of the issue. These various measures must be combined into a broad initiative to be effective.

b. Affordability and Availability of Low-carbon Infrastructure

Since women in all three countries are often burdened with familial and domestic responsibilities, they are compelled to undertake more multi-purpose trips, which necessitate additional stops and obligations. Consequently, women in these countries end up incurring a "pink tax" or paying more for their daily travel expenses.

For instance, a study conducted in Delhi in 2019 revealed that even though women's trips were nearly 38 % shorter on average than those of their male counterparts, women's travel costs were

35 % higher than men's.¹⁰¹ In Hanoi, women engage in trip chaining more frequently than men.¹⁰² This necessitates that the fare costs and fare structure ought to be designed in a manner that is affordable for women who undertake frequent trips.

To address the challenge of fares, some cities have implemented measures such as discounts to individuals with part-time jobs or low income, such as the 50 % discount given in London. Additionally, in London, individuals over the age of 60 are

¹⁰⁰ Baskin, A., Bruntlett, M., Cardona, S., Fischer, L., Remmers, J. & Weinmann, V. (Eds.) (2023). *Remarkable feminist voices in transport*. Gesellschaft für Internationale Zusammenarbeit.

¹⁰¹ Acharya, S. (2019). *Planning for gender equality in urban mobility*. School of Planning and Architecture. <http://www.urbanmobilityindia.in/Upload/Conference/7af4d877-a58b-41c2-b03b-b87d7ae4903e.pdf>

¹⁰¹ Ibid.

¹⁰² International Transport Forum. (2019). *Understanding urban travel behaviour by gender for efficient and equitable transport policies*. <https://www.itf-oecd.org/transport-connectivity-gender-perspective>

entitled to free transportation.¹⁰³ In Sweden, approximately one-third of public transportation users are eligible for various discount tickets, with a higher proportion of women than men benefiting from discounted fares¹⁰⁴. Research also suggests a discounted fare for disadvantaged passengers for two-wheel options to be accepted throughout society.¹⁰⁵

It is evident that the income levels of most women in these regions have a crucial impact on their travel patterns. Gender-based disparities in labour force participation and earnings make certain individual modes of transportation, such as private motor vehicles and shared mobility options like e-scooters and car sharing, less affordable.¹⁰⁶ This results in “uneven access to rail transit for lower-income [...] users”¹⁰⁷. Aside from cost

efficiency, women also encounter a range of infrastructure-related challenges that hinder their mobility. For instance, individuals who choose to use public transportation in Vietnam, particularly buses, may spend a significant amount of time traveling as a result of infrastructure shortcomings. The land areas for bus terminals and taxi stations in urban centres has continuously shrunk due to increasing motorisation and private vehicle traffic, so that inner-city bus stops often lack safety provisions and accessibility. Whilst more than 80 % of Hanoi residents can reach a bus stop within a distance of less than 500 m, this number only holds for 30 % of residents in the suburbs.¹⁰⁸, ¹⁰⁹ Infrastructural deficiencies, aggravated by lacking shelter or seat offers, thus further exacerbate the time poverty women face in these countries.

The availability of affordable and accessible transportation options is of paramount importance, not only for the elimination of transport poverty, women’s socio-economic equality and access to the labour market, education, healthcare and other services, but equally for sustainable development and decarbonisation at large.

Given that women in India, China and Vietnam, following global mobility patterns, are more inclined to utilise public transportation and non-motorised modes of transportation, such as walking, than men, there exists a significant opportunity to achieve substantial environmental benefits by enhancing their provision. Improving the integration of sustainable transportation, which involves a combination of public transport enhancements, shared service incentives, and infrastructure investments that prioritise collective, shared, and active modes, can result in a substantial

¹⁰³ Golden, S. (2008, August 13). *Gender mainstreaming in transport for London*. Transport for London.

<https://medarbejder.kk.dk/sites/default/files/2021-02/mainstreaming%20%20i%20London.pdf>

¹⁰⁴ SIKA Statistics. (2007, October). *RES 2005 – 2006: The national travel survey*. Swedish Institute for Transport and Communications Analysis (SIKA). https://www.trafa.se/globalassets/sika/sika-statistik/ss_2007_19_eng.pdf

¹⁰⁵ Ji, Y., Fan, Y., Ermagun, A., Cao, X., Wang, W. & Das, K. (2017). Public bicycle as a feeder mode to rail transit in China: The role of gender, age, income, trip purpose, and bicycle theft experience. *International*

Journal of Sustainable Transportation, 11(4). 308 – 317. doi: 10.1080/155683182016.1253802

¹⁰⁶ Ibid.

¹⁰⁷ Ibid.

¹⁰⁸ Huu, D. & Ngoc, N. (2021, May 17). Analysis study of current transportation status in Vietnam’s urban traffic and the transition to electric two-wheelers mobility. *Sustainability* 2021, 13(10), 5577; <https://doi.org/10.3390/su13105577>

¹⁰⁹ International Transport Forum. (2019).

Understanding urban travel behaviour by gender for efficient and equitable transport policies.

<https://www.itf-oecd.org/transport-connectivity-gender-perspective>

reduction of carbon emissions.¹¹⁰ Investing in affordable and accessible public transport infrastructure can therefore encourage a modal shift from

carbon-intensive private cars and motorcycles towards low-carbon transport¹¹¹, not only amongst female travellers, but all passengers.

c. Gender-responsive Design of Vehicles and Infrastructure

Women's lived realities, comfort as well as the efficiency of their daily lives can be strongly improved by enhancing connectivity and integrating first and last mile sustainable on-demand-mobility options in transport systems. This development has already been taking place in China, where micro mobility offers have strongly increased during the past years, especially during the COVID-19 pandemic.¹¹² AI is used to monitor where bikes are needed, making the offer more tailored towards customer needs. However, usage rates of two-wheelers like shared bicycles on the first and last mile show that the usage is heavily dependent on gender and age.¹¹³ For instance, studies show that women, especially with a low-income background, are less likely to use public bikes to reach train or metro stations because they are inconvenient and uncomfortable for them in the completion of their daily tasks, such as doing groceries. Improvements can therefore be made in the design of these vehicles and their docking stations to make them more accessible and

convenient for women and thereby encourage their usage.

According to surveys, women have additional safety concerns when walking to and using bicycle docking stations, since they are often located in distant and unpopulated places surrounding the stations. Improving lighting in these locations and installing CCTV cameras as a "watching eye" can have positive effects on the safety perception of women and deter offenders.¹¹⁴ Furthermore, the process of borrowing micro mobility vehicles can be facilitated by integrating services into one single platform, generating a code for usage, so as to speed up the log-on process at the docking station.¹¹⁵ By connecting the vehicles to Intelligent Transport Systems (ITS), users can receive real-time information on the availability, location, and price of the vehicles and consequently plan their travels better and more in advance, thereby guaranteeing extra safety.¹¹⁶

¹¹⁰ International Transport Forum. (2023, March 7). *How improving public transport and shared mobility can reduce urban passenger emissions*. ITF/OECD. <https://www.itf-oecd.org/reduce-urban-passenger-emissions>

¹¹¹ Ibid.

¹¹² Winston, M. (2020, July 22). *Here are four major bike-sharing trends from China after lockdown*. World Economic Forum.

<https://www.weforum.org/agenda/2020/07/4-big-bike-sharing-trends-from-china-that-could-outlast-covid-19/>

¹¹³ Ji, Y., Fan, Y., Ermagun, A., Cao, X., Wang, W. & Das, K. (2017). Public bicycle as a feeder mode to rail transit in China: The role of gender, age, income, trip

purpose, and bicycle theft experience. *International Journal of Sustainable Transportation*, 11(4). 308 – 317. doi: 10.1080/155683182016.1253802

¹¹⁴ Fan, Y. (2018, February 28). *Why transit policy should consider riders' gender*. University of Minnesota. <https://genderpolicyreport.umn.edu/why-transit-policy-should-consider-riders-gender/>

¹¹⁵ Winston, M. (2020, July 22). *Here are four major bike-sharing trends from China after lockdown*. World Economic Forum.

<https://www.weforum.org/agenda/2020/07/4-big-bike-sharing-trends-from-china-that-could-outlast-covid-19/>

¹¹⁶ Ibid.

China sets a positive example in this regard: Many Chinese cities already use ITS services to manage micro mobility options and include them in Mobility-As-A-Service (MAAS) systems. A mixture of state-led and privately financed projects transformed the city infrastructure in Shanghai, Hangzhou, Shenzhen, Beijing and other mega cities into smart cities.¹¹⁷

They make planning journeys and ensuring safety a lot easier for all parts of society, thereby increasing connectivity. This is confirmed by high rates of acceptance and usage: According to studies conducted in Chinese cities, 73 % of respondents use micro mobility options in combination with public transportation modes, a higher rate than in any other country in the world.¹¹⁸



Image 4: Practical vehicle design for multi-usage. © Pexels

Concerning the issue of missing storage space needed to complete various household tasks, such as transporting groceries or picking up children, large improvements can be achieved by adding carrying capacities to the vehicles. This was already implemented in Japan in the

form of so-called ‘mama bicycles’ or ‘mamachari’.¹¹⁹ These are lightweight bikes with baskets and child seats to make the transport of groceries or children easier. The neglect of the fact that women often travel with children also illustrates a key issue in public transport design. Many

¹¹⁷ Lai, O. (2021, January 19). *Top ten smart cities in China in two thousand twenty-three*. Earth Org. <https://earth.org/smart-cities-in-china/>

¹¹⁸ Lang, N. & Hermmann, A. (2022). *Micromobility is clean and quiet: How can it be widely used?* World Economic Forum. <https://www.weforum.org/agenda/2022/07/micromobilit>

y-will-make-our-cities-clean-and-quiet-how-can-it-be-widely-used/

¹¹⁹ Remmi, S., Quang, T. (2021, November). *Hanoi mobility and gender: Rapid assessment*. Friedrich-Ebert-Stiftung. <https://library.fes.de/pdf-files/bueros/vietnam/19183.pdf>

stations, including examples from Western countries, do not possess elevators or escalators and must be made barrier free so that women with strollers and small children can use them better.¹²⁰ Vehicles should offer more space in compartments, for instance dedicated waggons with larger space in the aisles between seats or more space for parking strollers.¹²¹

Moreover, handrails and handlebars must be made less high to make them easier and more comfortable to reach for women.¹²² Another concern often mentioned is the cramped seating in vehicles. Through individual seats with barriers between them, physical contact between passengers is reduced, thereby decreasing the risk of uncomfortable touching or even harassment.

Another solution to combat safety concerns through infrastructural and service design is the creation of on-demand stops in between stations to allow users to exit public vehicles closer to their destination, thereby limiting the chances of harassment at the stations or on the way to their home or work. This initiative

was also implemented in Quebec, Canada. If women are travelling by themselves at night, they can ask the driver for a stop in between two stops on an individual basis, who will then determine whether “it is safe to bring the vehicle to a stop at the requested location”¹²³. Object to further analysis and local contexts, such practice could be similarly implemented in not-so-densely populated areas in the outskirts of cities in China, India, and Vietnam.

When it comes to environmental infrastructure such as walking paths, it is noticeable that sidewalks are often not broad enough for strollers and people to pass each other. In Hanoi, for instance, the state of the sidewalks is substandard at best, and they fail to adequately accommodate pedestrians in terms of both quality and consistency of quantity.

Additionally, certain sections of the sidewalks are unlawfully occupied for commercial or unauthorised purposes. Frequently, motorcycles are observed traversing along them.¹²⁴ A suggestion is therefore to enlarge them and set up bollards as protection from cars.¹²⁵

¹²⁰ Zhen, S. (2021, March 8). *Rethinking public transportation for women’s safety and security*. ICLEI. <https://sustainablemobility.iclei.org/rethinking-public-transportation-for-womens-safety-and-security/>

¹²¹ Allen, H. (2018). *Approaches for gender responsive urban mobility: A sourcebook for policy-makers in developing cities*. Sustainable Urban Transport Project. https://womenmobilize.org/wp-content/uploads/2020/02/A_Sourcebook_Social-Issues-in-TransportGIZ_SUTP_SB7a_Gender_Responsive_Urban_Mobility_Nov18-min.pdf

¹²² Kanwal, A. (2022, February 24). *Gender responsive urban mobility design strategies*. Urban Design Lab. <https://urbandedesignlab.in/gender-responsive-urban-mobility-design-strategies/>

¹²³ Singhai, A. & Singhai, K. (2021). Gender, inclusive transport and sustainable development goals: A legal perspective to transport policies. *Transport and Communication Bulletin for Asia and the Pacific*, 91.

https://www.unescap.org/sites/default/d8files/2021-11/Article%205_Gender%20Inclusive%20Transportation%20and%20SDGs-%20A%20Legal%20Perspective%20to%20Transport%20Policies_0.pdf

¹²⁴ Japan International Cooperation Agency (JICA). (2007). The comprehensive urban development programme in Hanoi capital city of the Socialist Republic of Vietnam (HAIDEP). *Master Plan Study, Vol 1*. https://openjicareport.jica.go.jp/pdf/11856101_01.pdf

¹²⁵ Allen, H. (2018). *Approaches for gender responsive urban mobility: A sourcebook for policy-makers in developing cities*. Sustainable Urban Transport Project. https://womenmobilize.org/wp-content/uploads/2020/02/A_Sourcebook_Social-Issues-in-TransportGIZ_SUTP_SB7a_Gender_Responsive_Urban_Mobility_Nov18-min.pdf

Furthermore, attention must be put on the availability of safe crossings. It must be assured that the distance between

pedestrian walk, and street is not too high for strollers or wheelchairs to overcome.



Image 5: Wheelchair-friendly stations in the London Tube. © Unsplash.com

A best practice example tackling this problem is an initiative from Transport for London (TfL). The organisation has set itself the goal to make public infrastructure in the city barrier-free.¹²⁶ By the end of 2021, 51 % of all stations in London were step free, including Tube, Overground, DLR, and TfL Rail stations. Today, all buses are wheelchair or stroller accessible through ramps. To facilitate trip planning for travellers, TfL publishes regularly updated maps with information

on step-free stations to plan a completely step free journey. While implementation of the strategy is rather slow because old stations and vehicles are only slowly phased out, all new trains are planned to minimise the step and gap between the platform and the trains.¹²⁷ Furthermore, TfL conducts regular consultations with London residents to evaluate the effects of the new measures and gather ideas on how to improve the system even further to make it more accessible especially to women and children.

Taking a closer look at infrastructure and vehicle design reveals the necessity of including women's needs and preferences in planning processes. Huge improvements can be made by small changes, such as improving accessibility of stations through escalators, elevators, and ramps and ensuring safe and walkable sidewalks. Regarding vehicle design, much can be done by providing space for children or groceries to be taken on a trip or allocating designated compartments for women with strollers.

¹²⁶ Talora, J. (2021, November 3). *More than half of London's transport network now step-free, says TfL.* Evening Standard. <https://www.standard.co.uk/news/transport/tfl-transport->

[accessibility-tube-buses-stations-step-free-b963838.html](https://www.standard.co.uk/news/transport/tfl-transport-accessibility-tube-buses-stations-step-free-b963838.html)

¹²⁷ Transport for London (n.d.) *Step-free access.* <https://tfl.gov.uk/travel-information/improvements-and-projects/step-free-access>

d. Representation in the Transport Sector

Women's participation in decision-making is a critical element in the design and implementation of policies that reflect diverse perspectives and prioritise the needs of all stakeholders, thereby simultaneously promoting economic development and environmental sustainability.¹²⁸ However, despite the global recognition of the importance of gender equality in achieving sustainable development, women's participation in the transport sector remains low: In the EU, for instance, only 22% of transport workers are female.¹²⁹ Despite the difficulties in obtaining gender-disaggregated data on workforce participation, recurring issues of lacking women's representation can also be observed in India, China and Vietnam.¹³⁰

While transportation encompasses significant social, cultural, and political implications, it is mostly viewed as a technical domain, requiring engineering, economic, and technological expertise, and solutions. This perspective is indicative of a technocratic ideology that prioritises technical concerns over social factors.¹³¹ Historically, the dominance of men in STEM (science, technology, engineering, mathematics, and economics) fields that are part of the technocratic paradigm has created obstacles for women who aim to

participate and lead in the transport sector. Often, there are stigmas preventing women from working in mobility, such as the belief that women are bad drivers and are technically not skilled enough for conducting a bus or metro.¹³² The initiative Ubizcabs and Ubizdelivery in the Democratic Republic of the Congo is aiming at slowly changing the gender expectations in society.¹³³ By solely employing women as taxi drivers and delivery workers, women are empowered specifically in the transport sector. The organisation also has a female-only driving academy which trains women to not only perform logistic and taxi services but also become leaders, mentors and broaden their financial knowledge to be able to independently move up the social ladder.

Despite the upward trend of women's enrolment and advancement in STEM fields in recent years, a corresponding increase in female representation within the transportation sector has yet to materialise. Women encounter several hurdles in obtaining specialised vocational training for jobs in the transportation sector. For instance, the upfront expenses linked with training programs may serve as a deterrent for women who lack the necessary financial resources. Furthermore, even when women possess

¹²⁸ UNDP. (2015, December 18). *Powerful synergies: Gender equality, economic development and environmental sustainability*. <https://www.undp.org/publications/powerful-synergies-gender-equality-economic-development-and-environmental-sustainability>

¹²⁹ European Commission. (n.d.). *Women in transport*. https://transport.ec.europa.eu/transport-themes/social-issues-equality-and-attractiveness-transport-sector/equality/women-transport_en

¹³⁰ Turnbull, P. (2013, December 20). *Promoting the employment of women in the transport sector: Obstacles and policy options*. https://www.ilo.org/sector/Resources/publications/WCM_S_234880/lang--en/index.htm

¹³¹ Women4Climate. (2019.). *Report: Gender inclusive climate action in cities*. <https://w4c.org/full-study/women4climate-report-gender-inclusive-climate-action-cities>

¹³² Baskin, A., Bruntlett, M., Cardona, S., Fischer, L., Remmers, J. & Weinmann, V. (Eds.) (2023). *Remarkable feminist voices in transport*. Gesellschaft für Internationale Zusammenarbeit. https://womenmobilize.org/wp-content/uploads/2023/03/WMW_Feminist-Voices-In-Transport-2023_Book.pdf

¹³³ Gemeinsam für Afrika. (n.d.). *Pinke Taxen in Kinshasa: Frauen auf dem Fahrersitz*. <https://www.gemeinsam-fuer-afrika.de/pinke-taxen-in-kinshasa-frauen-auf-dem-fahrersitz/>

the necessary qualifications for these jobs, a pervasive gender-bias regarding their aptitude for such work hinder their entry into the transportation sector.¹³⁴ In addition, gender-based discrimination and cultural attitudes that prioritise men's roles perpetuate gender inequality at different levels of the transport sector. Harassment and threats from both commuters and colleagues, as well as the absence of public toilet facilities, pose significant obstacles for women in the transportation sector.¹³⁵

Tackling the barriers to women's participation in decision-making in the transport sector thereby requires comprehensive solutions that address both the structural and cultural aspects of gender inequality. Gender-transformative approaches which tackle the root causes of discrimination and gender-stereotypes should be promoted. Furthermore, changing cultural attitudes and biases regarding women's roles in decision-making is crucial in creating a more inclusive and diverse transport sector.

One approach to create a positive environment that promotes women in the transport sector is revising recruitment standards, including the introduction of gender quotas. For example, the Maharashtra State Road Transport Corporation (MSRTC) in India introduced a 30 % quota for women in their driver recruitment process back in 2017. Unfortunately, they did not manage to employ any female drivers at the time due

to strict height and experience requirements. However, in 2019, MSRTC revised their recruitment criteria, becoming the first and only state to do so. They lowered the minimum height requirement for female applicants from 160 cm to 153 cm and reduced the LMV (light motor vehicle) experience requirement to just one year. This change in criteria enabled MSRTC to successfully enrol 163 women for HMV training in 2020.¹³⁶ Meanwhile, it is important to note that the effectiveness of gender quotas in increasing women's representation may depend on the design of the quota system.¹³⁷

Another approach to improve women's representation in the transport sector is the creation of women's social networks and industry alliances. Indeed, networks are an important prerequisite for women to reach higher positions in management.¹³⁸ In China, these networks, pertaining to the cultural notion of "guanxi" as "relationship, connection, or network between two individuals, which can manifest in both formal and informal forms"¹³⁹, are of intrinsic importance in the business world. Building characteristic relationships between women would be one path of increasing female representation whilst facilitating the path to leading positions in the mobility sector.

A similar concept was used for the establishment of Mujeres en Movimiento in Chile. The movement was started by former transport ministers and vice

¹³⁴ Azad Foundation. (2014) *Opportunities and constraints in integrating women as employees in the public transport sector of delhi*. <http://azadfoundation.com/wp-content/uploads/2015/12/Gendered-constraints-in-employment-in-public-transport-A-Report.pdf>

¹³⁵ Institute for Transportation and Development Policy (2018, January 18). *Women and transport in Indian cities*. <https://www.itdp.org/publication/women-transport-indian-cities/>

¹³⁶ Azad Foundation. (2022). *Claiming spaces for women in public transport*. [http://azadfoundation.com/wp-](http://azadfoundation.com/wp-content/uploads/2022/03/Claiming-Spaces-for-Women-in-Public-Transport-Advocacy-Brief-March-2022.pdf)

[content/uploads/2022/03/Claiming-Spaces-for-Women-in-Public-Transport-Advocacy-Brief-March-2022.pdf](http://azadfoundation.com/wp-content/uploads/2022/03/Claiming-Spaces-for-Women-in-Public-Transport-Advocacy-Brief-March-2022.pdf)

¹³⁷ The Abdul Latif Jameel Poverty Action Lab. (2018, April 1). *Improving women's representation in politics through gender quotas*.

<https://www.povertyactionlab.org/policy-insight/improving-womens-representation-politics-through-gender-quotas>

¹³⁸ Sung, S. (2022). *The economics of gender in China: Women, work and the glass ceiling* (1st ed.).

Routledge. <https://doi.org/10.4324/9781003307563>

¹³⁹ Ibid.

ministers of the Latin American region during the Women Mobilize Women Conference organised by TUMI in 2018 in Germany.¹⁴⁰

The goal of the initiative is to build a network of women spanning the continent to mutually support each other in reaching leadership positions within the transport sector and at the same time raise awareness of gender issues in transportation.¹⁴¹ In addition, the project organises a leadership programme for women around the world where topics

such as sustainable mobility, gender in mobility, effective project management and execution are discussed. The platform furthermore offers a space to share research results and publications around city topics through a gender lens. In Asia, the Women on the Move Network, founded in summer 2021 as part of the regional NDC-Transport Initiative for Asia, has a similar goal of connecting women from different backgrounds in the transport sector, hosting events and offering a mentorship programme.¹⁴²

In conclusion, increasing women's participation in decision-making positions related to the decarbonisation of transport, but also in the workforce at large, is essential to achieve both the sustainable development goals and promote gender equality in the transport sector. Particularly as countries use the current windows of opportunity and invest in new mobility solutions, including renewable energy vehicles and automated driving, it is vital to incorporate gender perspectives and ensure women's representation in shaping sustainable mobility systems of the future.

¹⁴⁰ Women Mobilize Women. (n.d.) *About mujeres en movimiento*. <https://womenmobilize.org/mujeres-en-movimiento/>

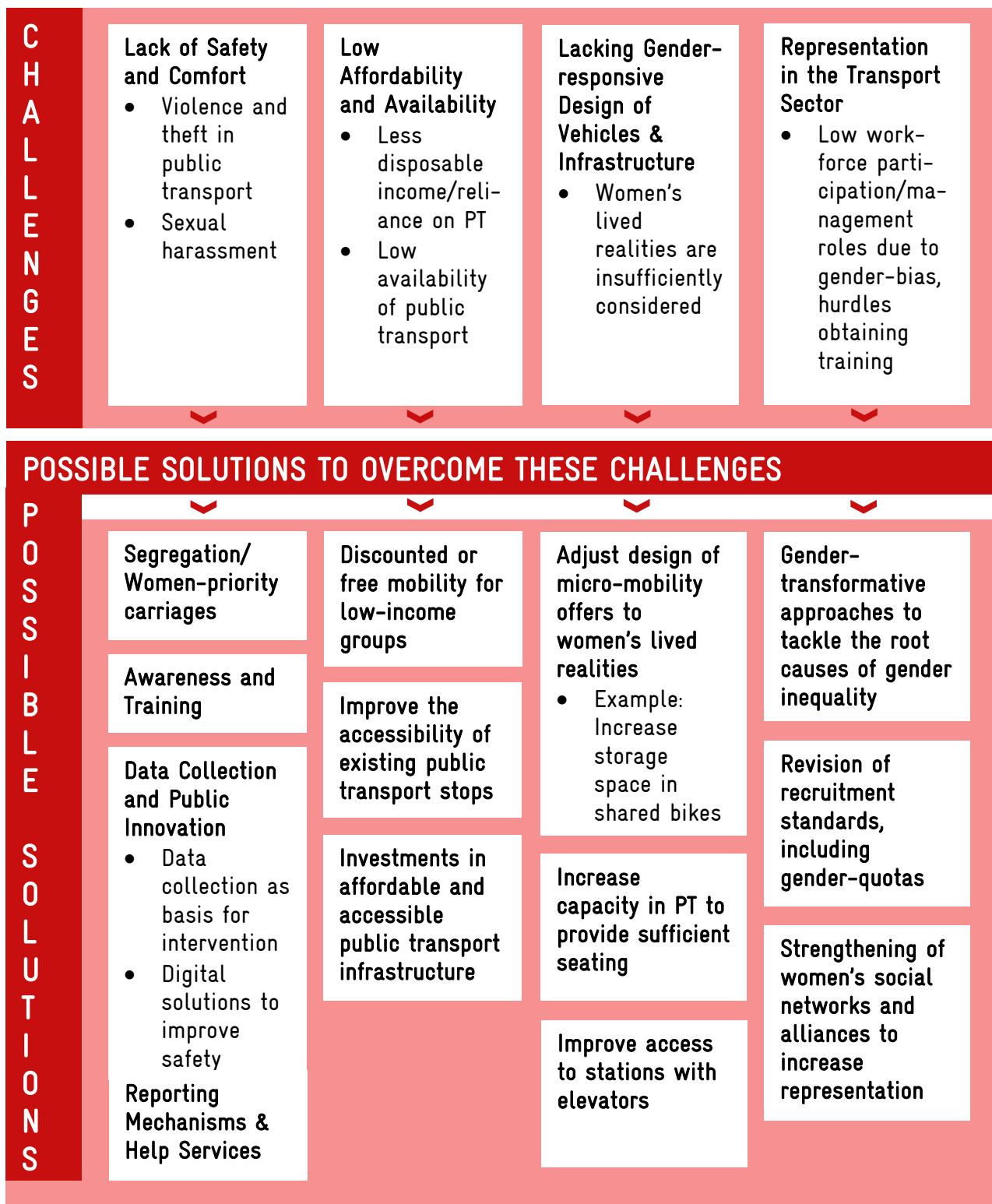
¹⁴¹ Mujeres En Movimiento (n.d.). *Objetivos*. <https://www.mujeresenmovimiento.net/quines-somos>

¹⁴² Women on the Move Network (2022). *Woman on the Move Network is promoting gender equality in Asia*. <https://www.ndctransportinitiativeforasia.org/news/peer-network-for-women-on-the-move-transport-asia>

e. Summary of Challenges and Potential Solutions for Gender-inclusive Sustainable Mobility

The following overview is giving a broad summary of the presented challenges causing gender inequality in the transport sector and is further outlining the

featured solutions to overcome these challenges, in order to strengthen low-carbon and inclusive mobility.





4. Recommendations for Policymakers and Further Stakeholders

The above discussion of best practices allows for the conclusion that multi-faceted and interdisciplinary initiatives are most successful in their attempt to create a more gender-inclusive environment in the transport sector. Gender-transformative approaches, which aim to tackle the structural inequalities perpetuated through socialisation processes which are still very present in the context of developing and emerging economies such as India, China, and Vietnam, can have the biggest and most long-lasting effects. Consequently, a number of recommendations for policymakers and further stakeholders can be given to better incorporate gender perspectives in transport and mobility planning and policy design.

Gender Disaggregated Data

Gender-disaggregated data plays a critical role in understanding the distinctive requirements of diverse genders and ensuring that transport policies and programs are tailored accordingly. It depicts a valuable tool that can assist in identifying the different needs of various groups in a population and reveal the way they experience interacting inequalities, thereby informing

public spending decisions. Conducting gender-disaggregated modal split analyses appears as a crucial first step. In addition, gender analyses and gender-disaggregated data that include the mapping of routes utilised by women, specific usage patterns, as well as identifying reasons for safety concerns and the availability of amenities surrounding modes of transport, are vital for informed policy decisions. This can result in a more equitable allocation of transport resources and promote gender parity in access to education, employment, and healthcare.

Route Planning

To enhance efficiency of traveling for women and decrease the time they spend on transportation, a more gender-inclusive approach must be used for planning the transportation networks. As the mobility patterns of female passengers show, women are traveling not only for work but to a large part also for care and household reasons.^{143,144} A major difference can therefore be made by improving the accessibility of grocery stores and day-care centres through public transportation. Traffic stops should be closer to these locations and routes should provide a direct and fast

¹⁴³ World Bank Group. (2016). *Assessment of gender impacts of ITS*. Open Knowledge. doi: 10.1596/25207

¹⁴⁴ Ibid.

connection to the nearest train station, from where caretakers, regardless of their gender, can switch to quicker transportation modes.

Technological Innovations and Intelligent Transport Systems

Technology can be a facet to the solution of many problems raised in this paper, as it is also strongly connected with the proposed solutions and recommendations shared above. For instance, smart technology such as apps or CCTV cameras with facial recognition can help collect disaggregated travel data or data on harassment and unsafe spaces in public infrastructure. This is especially the case in China, where coverage of high-resolution cameras is high and face scanning technologies are inserted. ITS make the continuous collection of travel data easy and thereby help decision-makers enhance transportation networks with targeted interventions, such as increasing the vehicle frequency on a certain route during specific times of the day. Real-time traffic information can be supplied to passengers, thereby making route planning easier and allowing women to manage their time more effectively. It also shortens waiting times at less populated stations and thereby improves safety. Micro-mobility options should be integrated into these services for better connectivity, thereby making them more accessible.

Representation: Gender Audits and Accessibility Audits

Gender audits can majorly improve gender equality within organisations and initiatives, as well as providing a better comprehension of the status quo of public infrastructure.¹⁴⁵ One form of gender auditing is directly evaluating public infrastructure, in order to identify the locations and reasons where and why women feel unsafe on streets or in public transport.¹⁴⁶ Thereby, a group of women, preferably from different social, ethnic, and demographic backgrounds, discuss the issues they face when using public transport or infrastructure. They audit the spaces that make them feel uncomfortable and give recommendations to the local government and other strategic stakeholders on how to improve the situation. Through this process, women's needs and experiences, including those of excluded communities, are included in the sector, while also considering the local particularities.

A second form of gender audits takes place within organisations. Institutions, companies and other units may introduce this measure to determine what patterns and aspects of their organisational culture perpetuate gender stereotypes and discrimination.¹⁴⁷ This method also allows for a review of progress made over time, if conducted in regular intervals. There is no one standard procedure on how to conduct such a gender audit, though there are two main approaches. Firstly, the participatory gender audit as introduced by the International Labour Organisation¹⁴⁸ aims to analyse whether gender mainstreaming methods are implemented effectively within the organisation.

¹⁴⁵ European Institute for Gender Equality. (n.d.)

Gender audit. <https://eige.europa.eu/gender-mainstreaming/methods-tools/gender-audit>

¹⁴⁶ UN Habitat. (2012) *Gender issue guide: Urban planning and design*. United Nations Human Settlements Programme.

[https://unhabitat.org/sites/default/files/download-](https://unhabitat.org/sites/default/files/download-manager-)

[files/Gender%20Responsive%20Urban%20Planning%20and%20Design.pdf](https://www.ilo.org/wcmsp5/groups/public/---dgreports/-gender/documents/publication/wcms_101030.pdf)

¹⁴⁷ European Institute for Gender Equality. (n.d.)

Gender audit. <https://eige.europa.eu/gender-mainstreaming/methods-tools/gender-audit>

¹⁴⁸ International Labour Office. (n.d.). *ILO participatory gender audit*.

https://www.ilo.org/wcmsp5/groups/public/---dgreports/-gender/documents/publication/wcms_101030.pdf

Secondly, the gender integration framework¹⁴⁹, developed by InterAction, aims to introduce gender considerations through four stages: inducing “political will and leadership”¹⁵⁰ (1), improving technical knowledge on gender equality and gender mainstreaming (2), enhancing effectivity of accountability mechanisms (3), and transforming norms within the organisation which might hinder gender equality (4).

Gender audits can be performed either by internal staff such as gender and diversity commissioners, or with the assistance of external professionals. Both approaches use qualitative measures to evaluate the organisations measures for achieving gender equality.¹⁵¹ While the consultation of an external expert can add an unbiased external perspective. However, an overreliance on external evaluators might be counterproductive, as they cannot react to immediate developments in the context within which the organisation is acting and are not as well acquainted with the structure of the institution.

A different approach to increase representation of women especially in the transport sector is the creation of networks between women, as discussed above. One such example is the Women Mobilize Women initiative organised by GIZ.¹⁵²

Gender Responsive Budgeting

The distribution of public resources and funding can have varying effects on different demographic groups. To achieve

a more equitable distribution of public resources, gender-responsive budgeting aims to identify the gendered impacts of public spending decisions. This approach can assist in directing resources towards improving safety and security for women and girls, including measures such as well-lit walkways, women-only transportation services, and public restrooms. Additionally, gender-responsive budgeting can facilitate efforts to enhance women's access to transportation services by subsidizing fares, improving public transportation schedules, and expanding transportation networks to underserved areas.

Safety Initiatives

Initiatives to improve safety and comfort must be multi-faceted and take broad approaches instead of focusing on a singular aspect. Awareness raising, training, urban planning, reporting mechanisms, law enforcement and possibly even data collection should go hand in hand to maximise results and obtain a long-lasting improvement of the situation. Priorities lie in improving lighting, increasing the presence of police personnel, conducting trainings for the general public and transportation staff to increase awareness and be able to react specifically to gender-based violence on public transportation.¹⁵³ Reporting an incident must be made simple and easy and immediate assistance must be provided to targets of harassment.

¹⁴⁹ InterAction. (2010). The gender audit handbook: A tool for organisational self-assessment and transformation. <https://www.rcrc-resilience-southeastasia.org/document/the-gender-audit-handbook-a-tool-for-organisational-self-assessment-and-transformation-2010/>

¹⁵⁰ European Institute for Gender Equality. (n.d.) *Gender audit*. <https://eige.europa.eu/gender-mainstreaming/methods-tools/gender-audit>

¹⁵¹ Clancy, J. & Mohlakoana, N. (2019). Gender audits: An approach to engendering energy policy in Nepal,

Kenya and Senegal. *Energy Research and Social Science*, 62(2020). University of Twente. doi: 10.1016/j.erss.2019.101378

¹⁵² Women Mobilize Women. <https://womenmobilize.org/>

¹⁵³ International Transport Forum. (2018). *Women's safety and security: A public transport priority*. OECD/ITF. https://www.itf-oecd.org/sites/default/files/docs/womens-safety-security_0.pdf



5. Conclusions

This paper aimed to highlight the current shortcomings of transport systems in accounting for gender-based travel needs and preferences with a specific focus on China, India, and Vietnam. The lack of gender-mainstreaming in the transport sector is an obstacle to achieving more sustainable transport choices and decarbonisation in many countries worldwide. Since the transport sector accounts for 7.7 Gt CO₂ emissions¹⁵⁴, which constitutes about 21,5 % of the total CO₂ emissions globally¹⁵⁵, the lack of progress in greening the sector prevents the transition to a sustainable society.

The main challenges found in the transport sector of the selected countries can be categorised into affordability, safety, infrastructure design, and lastly but very importantly representation. Without being exhaustive, the paper discussed a number of best practice initiatives and assessed their practicability in the cultural

and societal contexts of China, India, and Vietnam.

The findings and recommendations of this study must be seen in light of a number of limitations. Most relevantly, the lack of disaggregated data makes assessing the challenges and furthermore the impact of potential solutions rather difficult. Providing a broad overview, this study purely relied on data and insights from the existing literature. It thus serves as a starting point for future research in the area of gender interventions, raises awareness for the gender-discrimination in transport systems and gives valuable recommendations for policymakers and people active in the sector. Furthermore, it once again demonstrates the positive aspects of increasing transnational exchange between transportation experts and policymakers to find the best solutions according to cultural and local specifics.

¹⁵⁴ International Energy Agency. (n.d.) *Transport: Improving the sustainability of passenger and freight transport*. <https://www.iea.org/topics/transport>

¹⁵⁵ International Energy Agency. (2022, March). *Global CO₂ emissions rebounded to their highest level in*

history in 2021. <https://www.iea.org/news/global-co2-emissions-rebounded-to-their-highest-level-in-history-in-2021>

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Deutsche Gesellschaft für
Internationale Zusammenarbeit (GIZ) GmbH

Sitz der Gesellschaft
Bonn und Eschborn

Friedrich-Ebert-Allee 32 + 36
53113 Bonn, Deutschland
T +49 228 44 60-0
F +49 228 44 60-17 66

Dag-Hammarskjöld-Weg 1-5
65760 Eschborn, Deutschland
T +49 61 96 79-0
F +49 61 96 79-11 15

E info@giz.de
I www.giz.de