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Access audit of orange line metro train

For barrier free mobility of persons with Disabilities (PWD's) using universal Design principles (UDP)

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Abstract: Persons with Disabilities (PWD's) in Pakistan face significant mobility barriers that exclude them from participating as equal citizens. This exclusion increases their vulnerability, making them dependent and trapping them in a vicious cycle of poverty, keeping them marginalized in society. Hence, an accessible environment is important for an inclusive society. To improve accessibility to services, accessible transportation is necessary. Accessible transport services increase accessibility to essential facilities for everyone, including PWD's. The research aims to improve accessibility for PWD's by utilizing Universal Design Principles (UDP). The study used a questionnaire to assess existing features and recommend areas for improvement. Ten Orange Line Metro Train (OLMT) stations were selected as case studies. The results revealed issues such as street vendor encroachment, insufficient ramp slopes, poor public restroom maintenance, inaccessible ticket counters, and unreliable emergency evacuation systems. Recommendations include awareness campaigns, implementing programs for stakeholders, relocating street vendors, providing accessible ramps, lowering ticket counter heights, and adopting bottom-up approach for policy implementation.

Keywords: Persons with Disabilities, Orange Line Metro Train, Stations, Universal Design Principles, Accessibility, Mobility

1. Introduction

According to the Disability Details from the National Database and Registration Authority (NADRA), there are an estimated 724,767 Persons with Disabilities (PWD's) in Pakistan (Pakistan Bureau of Statistics, 2025). Accessibility in public transportation is not just a matter of convenience but a key aspect of social inclusion and equity. Accessibility of the built environment is also mentioned in Sustainable Development Goal (SDG) Goal 11, which is "*to make cities and human settlements inclusive, safe, resilient and sustainable*", which includes improving road safety through expanding public transit and giving particular attention to vulnerable populations like women, children, the elderly, and PWD's.

In the context of Lahore, Pakistan, no planning considerations for PWD's have been done in the past while planning for new towns and cities. Even the Integrated Master Plan - 2021 of Lahore Division has not yet included any provision for PWD's of Pakistan (Hameed & Nadeem, 2008).Lack of accessibility in the transport system can result in marginalization, limiting opportunities for PWD's and hindering their full participation in society. It restrains their ability to fully explore their potential and avail opportunities (Hotor, 2024). Recognizing this, there is an increasing focus on development of a more inclusive transportation system, designed with all users in mind. The Orange Line Metro Train (OLMT) is one such projects and has improved urban transportation and enhanced connectivity. To ensure that a site, building, or facility can be easily reached, navigated, and used by PWD's, accessibility is an essential feature that requires it to be developed in line with established codes and standards. This covers not only the utilization of these services but also their accessibility and approach. It also includes the ability of people to leave the building without assistance unless there is an emergency (Accessibility Code of Pakistan, 2006).

In 1985, architect Ronald Mace introduced the Universal Design Principles (UDP). He was associated with architectural community; Fellow of the American Institute of Architects (FAIA) (UNICEF Disability Team, 2022). He provided this concept to improve the conditions for PWD's. In 1989, Raleigh's North Carolina University established the Centre for Universal Design with the goal of spreading this concept globally. The following are the Universal Design Principles: 1. Equitable Use, 2. Flexibility in Use, 3. Simple and Intuitive Use, 4. Perceptible Information, 5. Tolerance for Error, 6. Low Physical Effort, 7. Size and Space for approach and use-

There is a need to integrate UDP, as the accessibility of public transportation systems directly affects the access to education, employment, healthcare, and social activities. PWD's are significant minority group, starved of service and equal opportunities. There is a vicious cycle of poverty caused by a lack of opportunities, which leads to a poor quality of life (The Department for International Development, 2000).Inclusive Planning is required under UDP and SDG Goal 11 especially within the transportation sector, this involves development or improvement of facilities that benefit PWD's (Vanderschuren & Nnene, 2021).By enhancing accessibility to transport systems, we can increase the degree of self-reliance and independence of PWD's (Pocuc et al., 2021). As seen in sociocultural norms, people place higher value on self-independence than on being dependent on others (Simon & Burke, 2018). Despite the existence of laws and organizations related to disability rights and accessibility, there are limited policies for PWD's within the transportation sector. To assess the OLMT facility, services and infrastructure and make sure they fulfil the various needs of all users, an access audit mechanism is necessary. Previous studies on mobility consist of a wide range of approaches that reflect the intersection of built environment and socio-cultural aspects. They emphasized barriers such as physical, psychological, or technical. They provide perspective and a need for a more inclusive environment. Recent digital transport innovations such as Mobility as a Service (MaaS), offer a more seamless mobility experience and new opportunities to increase accessibility. MaaS combines various modes of transportation into a single digital platform (Hoess et al., 2025). It offers flexible, tailored mobility services such as car sharing, bike sharing and ride hailing that accommodates diverse user needs (An & Shen, 2025). MaaS can reduce the risk of social exclusion of PWD's. (Dadashzadeh et al., 2024). It can facilitate progress towards accessible transportation, especially for the elderly and people with physical and cognitive impairments. It should also be taken into account that PWD's are consumers who are capable of decision making, weighing their options and requesting customer service when interacting with transport service providers further emphasizing the need for society to recognize that transportation is a vital link to improve their social welfare (Mogaji et al., 2023)

2. Literature Review

In recent years, there has been research on the utilization of public transport by PWD's with a focus on the barriers and challenges they face. While advancing research efforts aim to address these issues and maximize the accessibility and inclusivity of public transportation for PWD's, additional efforts are required to fully address these challenges and achieve greater inclusivity in public transportation for PWD's.

In developed countries such as Germany, the German Disability Discrimination law established in 2000-2002 aims to prevent unfair treatment of PWD's by ensuring equal opportunities and easy access to public services. The Law obliges the Federal Government and its authorities to ensure a large degree of barrier-free mobility (Kock, 2004). The General Equal Treatment Act of 2006 aimed to ensure equal treatment for all individuals. It provided allowances, tax deductions, and subsidies for workers with qualifying disabilities to enhance their mobility. The European Parliament and Council reached a preliminary agreement on the European Accessibility Act in 2018. Barrier-free environments are essential for PWD's to live without external assistance. New government buildings and public transportation must be made accessible for everyone, with tax relief and special parking spots provided for PWD's. The Carriage of Passengers Act ensures PWD's can use public transportation. Usually, individual states oversee planning and provision of local public transportation. Therefore, it is important to find a solution that makes sense and considers the unique circumstances of each case.

The accessibility of public spaces, public transportation, and the difficulties faced by PWD's in arriving, boarding, and utilizing are still under researched (Unsworth et al., 2021). PWD's often face inconvenience because of transportation infrastructure inaccessibility which may influence their decision to use public transportation because of insecurity and doubt regarding freedom of movement (Mun et al., 2019). A 2012 study conducted in Malaysia, on the Kelana Jaya Line LRT stations for blind people found that platform design, including island and side platforms, can affect their navigation. The Access Audit was conducted at Light Rail Transit (LRT) Stations. The evaluation was based on site observation and interview research. Accessibility for PWD's to public buildings was standardized using a checklist drawn from the Malaysian Standards Code of Practice. Blind people typically depend on their prior knowledge and experience to navigate the built environment (Passini & Proulx, 1988). A study found that a person's self-assurance during navigating a human-centred built environment is consequently enhanced by their record of successful travel. It was found that clues in the built environment can affect blind people's navigation, which is relevant to this topic. Materials, sensory signals, and spatial layout are all part of it (Finkel, 1999). Although Malaysia has gazette laws mandating accessible public spaces, the enforcement of these regulations remains a question.

In Great Britain, the Disability Discrimination Act of 1995 made it illegal to mistreat PWD's. Starting in October 1999, service providers were required to change discriminatory rules and aid PWD's, such as providing information in accessible formats such as audio tapes or signboards. New policies were implemented on October 1st to improve accessibility for PWD's on new buses, with bus drivers responsible for assistance. Guidance was published to comply with Disability Discrimination Act requirements to remove "*physical barriers*" to access the pedestrian environment and transport infrastructure (rail and bus stations, etc.). By 2004, service providers must make changes to help PWD's use their services more efficiently, such as removing barriers and providing permanent loops at work. Over 10% of people in Britain have a disability that makes it difficult for them to take the bus, and about 20% of bus riders are older than retirement age.

To improve bus services, UK should make its disability discrimination laws stronger by including rules that stop transportation companies from mistreating PWD's.

In Pakistan, the current situation of accessibility of stations for PWD's in transportation systems requires closer examination. As a result of increased awareness, barriers to mobility have been recognized to some extent (Cengiz, 2016). Restricted mobility is a major barrier for development that is inclusive of PWD's (Nahar, 2019). Further research and assessment are needed to determine the progress in implementing accessibility measures and addressing the barriers. Following Table 1 shows a brief history of Pakistan accessibility legislative framework.

Table 1:Accessibility Legislative Framework in Pakistan

Year	Legislative Framework	Development
1947	-	Pakistan became an independent Nation and was underdeveloped. Buildings and transportation available in this period are mostly not accessible.
1950 -1970	-	The government was still focusing on developing the country in various fields in urban and rural areas.
1981	Disabled Persons (Employment and Rehabilitation) Ordinance	Provided employment and rehabilitation services for PWD's in Pakistan.
2002	National Policy for Disabilities	Introduced the "Accessibility Code of Pakistan 2006".
2006	Accessibility Code of Pakistan	Outlined the accessibility standards for inclusive environments.
2006	National Plan of Action	Outlines strategies to implement National Policy for Persons with Disabilities. Aims to ensure equal opportunities, protection of rights.
2008	UN Convention on the Rights of Persons with Disabilities	Emphasized Equal rights for everyone and promoted full inclusion of PWD's in all aspects of life.
2008-2019	-	Marks a period of Localized interventions at local levels.
2020	ICT Rights of Persons with Disabilities Act	Affirms the rights of PWD's in Islamabad focusing on accessibility, equality, and empowerment

Source: Disability Framework in Pakistan

In 2006, the Islamabad Declaration on Accessibility for PWD's was organized by Special Talent Exchange Program in collaboration with Sight Savers International, Handicap International, and the Ministry of Social Welfare and Special Education. It was two-day seminar that called on the government, architects, and town planners to ensure new developments meet accessibility standards (Special Talent Exchange Program & Sightsavers). It is the social duty of local government representatives to ensure inclusion by eliminating barriers to mobility in road infrastructure and built environment (Nwachi et al., 2023). While Architectural Design considers a range of factors including aesthetics, functionality, durability, privacy, and security, it is only in

recent years that significance of inclusivity has been recognized (Sulman, 2023). It is also important to note that barriers may be experienced differently when using public transportation by PWD's depending on their type of disability e.g. physical, intellectual, cognitive, sensory (Mwaka et al., 2024). Further research and assessment are needed to determine how to implement accessibility measures and ensure comprehensive facilities and services for PWD's in Pakistan.

3. Methodology

Physical surveys of selected stations of Orange Line Metro Train (OLMT) were carried out using the Access Audit Checklist. After the survey, data was collected according to the given standard criteria. This study uses pictures to highlight the significant problems related to physical accessibility for Persons with Disabilities (PWD's) within the selected stations.

Milestone organization was consulted to become familiar with mobility barriers faced by PWD's in their day-to-day lives. In depth discussions were held with PWD's to understand mobility challenges they encounter. Milestone facilitated a training session for the authors on comprehensive access audit procedures, ensuring that the audit process was grounded in both professional expertise and lived experiences of PWD's, resulting in more relevant and effective accessibility assessments. A toolkit was designed that consisted of a set of questions designed to collect data from OLMT. This toolkit was considered a questionnaire for access audit, and it was based on technical information about the provision of an internal and external built environment following universal design principles.

The questions written in the toolkit were developed utilizing the Accessibility Code of Pakistan 2006 and ADA Standards 2010, which are based on Universal Design Principles (UDP). It consisted of open and close-ended questions and the degree of action required to improve that feature. The communication section of the questionnaire was developed by authors following standards and UDP. The following indicators and sub-indicators were selected based on the Accessibility Code of Pakistan 2006 and accessibility requirement of transportation terminals.

1. Alighting Point of Stations

- Alighting Points
- Accessible Path
- Ramp

2. Internal Environment
    - Staircase
    - Escalator
    - Handrail
    - Lobby/Corridor
3. Ticketing Area
    - Accessible Counter
    - Signage
    - Ticketing Vending Machine
4. Public Toilet
5. Rail Platform
    - Lift
    - Platform

- Rail Carriages

6. Communication
7. Emergency Evacuation

3.1. Case Study

The Orange line Metro Train (OLMT) is 27.1km long and runs along Multan Road from Dera Gujran to Ali Town on GT Road. There are twenty-six stations along the line including 24 elevated and 2 underground stations. Chinese standards were used in the overall technical plan. Chinese standard Type B train with 5-car formation is used. Headway in rush hour is designed as 2 minutes in the long term (CR-Norinco, 2016). Out of 26 stations in the OLMT, a sample of 10 stations was selected for the access audit as illustrated in Figure 1 : *Ali Town Station, Thokar Niaz Baig Station, Salahudin Road Station, Band Road Station, Chauburji Station, Anarkali Station, G.P.O Station, Railway Station, UET Station and Shalamar Garden Station.*

This study categorized stations by station layout. Type A is an elevated station with two access points, type B is an elevated station with four access points, type C and D are underground stations as shown in Figure 2. The selection of stations was based on factors such as crowded ridership, diversity of station type (e.g., underground, elevated), geographical distribution, etc. The fewer access points there are, the higher the demand on each to be fully equipped with accessibility features such as elevators, ramps, and tactile paving.

With more access points, it is important to ensure that accessibility features (e.g. ramps, and elevators) are evenly distributed and easily reachable. Any failure or inadequacy may affect impact the station's overall accessibility. Regardless the number of access points, it is important that each access point provides a consistent level of accessibility. Regular maintenance is essential to keep all the points operational and safe.

All elevated stations have a width of 22.5 metres, and are 102 metres in length. In contrast underground stations vary in size. The length of G.P.O station is 161.6 metres whereas the width of station is 49.5 metres. The length of Anarkali station is 121.5 metres and the width is 16 metres (NESPAK, May 2015).

Figure 1.Route Map of Orange Line Metro Train

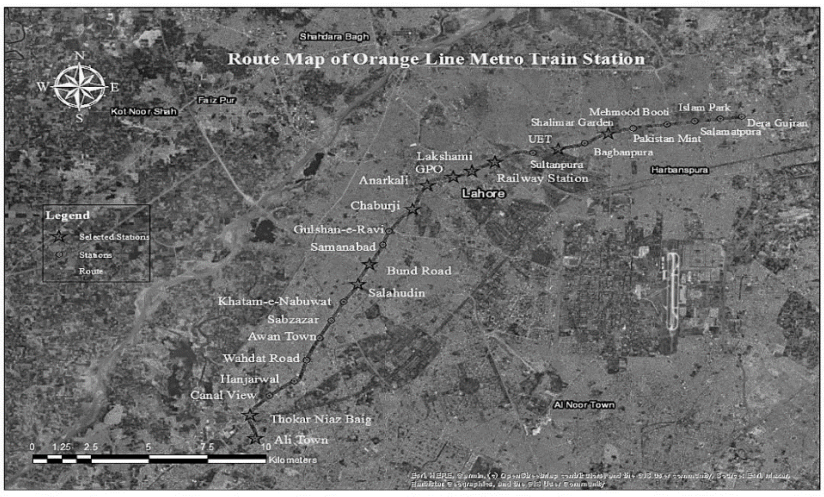

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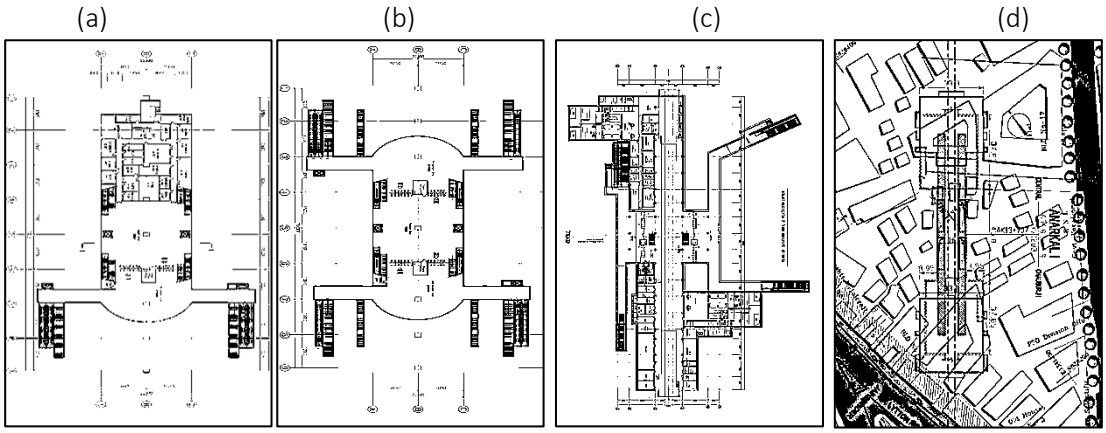
Figure 2. Station Types: (a) Elevated Station, Type A, (b) Elevated Station, Type B, (c) Underground Station, Type C, (d) Underground Station, Type D



Source: (CR-Norinco, 2016)

4. Analysis and Findings

The access audit checks the building and surroundings with the help of a checklist to see what needs to be changed to make it easier for people to get in and out (National Disability Authority, 2005). The access audit involves observational assessments and surveys. An on-site assessment of each selected station was done according to the toolkit: access audit checklist. As mentioned earlier, observations were made regarding the physical infrastructure against each indicator. The combination of walk, talk and design appraisal audit is used to conduct access audit. It involves walking and talking about the area and checking the planned design of a building to see its accessibility. The Key findings of observational analysis are mentioned below in Table 2.

Table 2.Key Findings

No	Station Type	OLMT Stations	Key Findings
1	Type A	Ali Town Station	Replacement required for colour contrasting strip at platform, restroom was poorly maintained, gap between the train door and platform is not as per standard.
2	Type B	Thokar Niaz Baig Station	Entrance to lift was not properly maintained, inaccessible pathway, inaccessible ticketing counter.
3	Type A	Salahuddin Road Station	Missing elements on accessible path, gap between the train door and platform is not as per standard.
4	Type A	Bund Road Station	Lift was poorly maintained, protruding object in lobby, inadequate ramp.
5	Type A	Chauburji Station	Uneven accessible path, inadequate ramp, inaccessible ticketing counter.
6	Type C	Anarkali Station	Inaccessible counter height, external handrails have a dark colour that absorbs more heat, external staircase has no tactile warnings.

No	Station Type	OLMT Stations	Key Findings
7	Type D	G.P.O Station	Restroom facility for disabled unavailable, complex layout, tactile guidance is not provided along pathway.
8	Type B	Railway Station	Access point was encroached, inadequate ramp, gap between the train door and the platform is not as per standard
9	Type A	U.E.T Station	Alighting point is not levelled, inaccessible ticketing counter, public restroom is not maintained
10	Type A	Shalamar Garden Station	Missing elements on accessible path, inaccessible ticketing counter

4.1. Observational Analysis

Visual surveys in Orange Line Metro Train (OLMT) station showed that the infrastructure provides adequate amenities for Persons with Disabilities (PWD's). The planning specifically addressed their needs. However, maintenance was required e.g. replacement of colour contrasting strip at Ali town station, control panels of lift at Bund Road, change of external handrail colour at Anarkali to meet their requirements fully. The alighting point of all stations were levelled and out of the traffic lane with no parking sign as shown in Figure 3. The accessible path provided was well connected with the entrance gate and other amenities like lift and escalator.

Figure 1. Alighting Points of Stations: (a) Alighting Point (Anarkali), (b) Accessible Path (Anarkali), (c) Accessible Path (Bund Road)

(a) (b) (c)

The surface of the ramp was in satisfactory condition at most stations except at Thokar Niaz Baig making it inaccessible as shown in Figure 4. Direct access of PWD's to OLMT was blocked by street vendors, particularly at the Railway Station.

Figure 2.. Ramp Condition: (a) Inaccessible Ramp (Thokar Niaz Baig), (b) Ramp (Shalimar Garden), (c) Surface of Ramp (Bund Road)

(a) (b) (c)

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As illustrated in Figure 5, all stations had handrails provided on both sides of the stairs. The dimensions of the staircase and escalator were as per standards. The corridors were well-illuminated, and their width was adequate. They were marked with tactile plates and free from protruding objects except at Bund Road, where a sliding gate protruded 215 mm within the corridor. Handrails were slip-resistant and turned downwards at the ends.

Figure 3.Internal Environment: (a) Entrance Staircase (Ali Town), (b) Protruding Object (Bund Road), (c) Handrail (Anarkali)

(a) (b) (c)

Station reception counters were identifiable from the entrance. A queue was specified for old age people and PWD's. A visual system was provided to convey ticket details, and staff was available to assist PWD's in buying tickets, but staff members did not know how to communicate in sign language. The height of the ticketing counter was 1.1 m, which was not accessible to a wheelchair user without aid as shown in Figure 6. A separate ticket vending machine is available for PWD's. It is located adjacent to adequate clear floor space. It is designed in a way that does not require significant effort but minimal force to operate.

Figure 4.Ticketing Area: (a) Inaccessible Ticket Counter (Anarkali), (b) Ticket Vending Machine (Anarkali), (c) Ticket Information (GPO)

(a) (b) (c)

One Unisex toilet restroom was available within every station for PWD's except at G.P.O Station. Additionally, due to complex structure and layout, no area for erecting accessible toilets could be identified. As illustrated in Figure 7, directional signs were provided and the restrooms were poorly maintained, there was water leakage as well.

Figure 5.Public Restroom: (a) Directional Signage (Anarkali), b) Public Restroom (Anarkali), (c) Public Restroom (Chauburji)

(a) (b) (c)

As shown in Figure 8, lifts were maintained according to standards except at Bund Road Station where lift controls were found missing and at Thokar where one of the lifts had missing front tile.

Figure 6..Lift: (a) Accessible Lift (Shalamar), (b) Accessible Lift (UET), (c) Missing Controls on Lift (Bund Road)

(a) (b) (c)

The railway carriage and the platform are at the same level and the gap between the train door and the platform is as per standard except at Thokar Niaz Baig Station. All edges of the Platform and other places of hazard were marked with the tactile warning as shown below in Figure 9. Colour contrasting strip needs replacement especially at Ali Town Station. At every station waiting areas were without proper seating arrangements. Public Display of Information was available at every station.

Figure 7.Rail Platform: (a) Colour Contrasting Strip (Ali Town),
(b) Tactile Plates Missing (Anarkali), (c) Public Display Information (Anarkali)

(a) (b) (c)

As shown in Figure 10, rail carriages were accessible by wheelchair users, priority seats are available for PWD's, and wheelchair spaces are easily identified. The route and destination signs are provided within train. The directional signage was provided throughout station. The signage is directed to various building facilities at the reception. The loop hearing system is only provided at the platform and on the train but not at the reception ticketing counter. Audio orientation tools and public display information are provided within the station to inform passengers about the arrival and departure of the train. The emergency evacuation system in OLMT is unreliable for wheelchair users despite the presence of alarm systems, visual alarms, and fire hydrants because a wheelchair user can only exit through a lift. During a discussion with staff members, OLMT experienced no power outage during an electricity shortfall.

Figure 8.Accessibility: (a) Accessible Rail Carriage,
(b) Emergency Evacuation (Chauburji), (c) Secondary Access Point (GPO)

(a) (b) (c)

In Summary, alighting points were present at all surveyed stations with no parking signs however, street vendors blocked PWD's direct access to OLMT, particularly at the railway station. Staircases were accessible, and dimensions were according to standards. The entire pathway length had tactile warning blocks in satisfactory condition from the entrance to the ticketing counter. Tactile warning was provided along the shortest route within the train station, leading to accessible rail carriage but was missing on the rear side of station. Colour contrasting strips were available on rail platforms near doorways to access the train and keep a safe distance between the train and passengers. The ramps of elevated stations were not smooth and had uneven surfaces. The ticketing counter was readily identifiable from the entrance, with separate queues for the elderly and PWD's. A visual system and a rate list were displayed for information. The height of the ticketing counter was inaccessible. Thokar Niaz Baig station is one of the busiest stations in OLMT and required thoughtful consideration regarding maintenance, as tactile warnings were missing at the platform and even at the stairs. The landing in front of the lift from the entrance side required maintenance. At Bund Road station, the lift required maintenance. The elevator control button and audio orientation system from the entrance were absent. The only alternative for wheelchair users to evacuate in an emergency was a lift, which was unreliable. The alerting system is provided, which is visual and audible.

The following Table 3 provides the systematic evaluation of internal and external environment of the surveyed stations. It presents qualitative findings drawn from visual surveys, assessing the existing level of accessibility of internal and external environment of each station. The external environment assessment focuses on alighting point, ramp, and accessible path. The internal environment assessment focuses on ticketing area, public toilet, rail platform, communication, and emergency evacuation. Observations are systematically categorised to illustrate the degree of accessibility noted during on-ground inspection.

Table 3: Qualitative Assessment of Each Station

Station	Existing Level of Accessibility	a	b	c	d	e	f	g	h
Ali Town	Is not provided								
	Is present but not accessible				☒				
	Is present but not maintained					☒			
	Is present in satisfactory condition	☒	☒	☒			☒		☒
	Is present in good condition							☒	
Thokar Niaz Baig	Is not provided								
	Is present but not accessible				☒				
	Is present but not maintained		☒	☒		☒	☒		
	Is present in satisfactory condition	☒							☒
	Is present in good condition							☒	
Salahuddin	Is not provided								
	Is present but not accessible			☒	☒				
	Is present but not maintained					☒			
	Is present in satisfactory condition	☒	☒				☒		☒

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Station	Existing Level of Accessibility	a	b	c	d	e	f	g	h
	Is present in good condition							☒	
Bund Road	Is not provided								
	Is present but not accessible				☒				
	Is present but not maintained					☒			
	Is present in satisfactory condition	☒	☒	☒			☒		☒
	Is present in good condition							☒	
Chauburji	Is not provided								
	Is present but not accessible				☒				
	Is present but not maintained		☒	☒		☒			
	Is present in satisfactory condition	☒					☒		☒
	Is present in good condition							☒	
Anarkali	Is not provided								
	Is present but not accessible				☒	☒			
	Is present but not maintained								
	Is present in satisfactory condition	☒	☒	☒			☒		☒
	Is present in good condition							☒	
GPO	Is not provided					☒			
	Is present but not accessible	☒			☒				
Station	**Existing Level of Accessibility**								
	Is present but not maintained								
	Is present in satisfactory condition		☒	☒			☒		☒
	Is present in good condition							☒	
Railway	Is not provided								
	Is present but not accessible	☒			☒				
	Is present but not maintained					☒			
	Is present in satisfactory condition		☒	☒			☒		☒
	Is present in good condition							☒	
UET	Is not provided								
	Is present but not accessible	☒			☒				
	Is present but not maintained					☒			
	Is present in satisfactory condition		☒	☒			☒		☒
	Is present in good condition							☒	
Shalamar	Is not provided								
	Is present but not accessible				☒				

Station	Existing Level of Accessibility	a	b	c	d	e	f	g	h
	Is present but not maintained			☒		☒			
	Is present in satisfactory condition	☒	☒				☒		☒
	Is present in good condition							☒	

Note: (a) Alighting Point; (b) Ramp; (c) Accessible Path; (d) Ticketing Area; (e) Public Toilet; (f) Rail Platform. (g) Communication;(h) Emergency Evacuation

5. Conclusion

Orange Line Metro Train (OLMT) has transformed the urban mobility landscape of Lahore. It has provided people with dependable and cost-effective way to commute hence it is important to ensure that the benefits are accessible to all community members, including PWD's. Even though there is enough legal groundwork to support them there is little implementation. For example, legislation such as ICT Rights of Persons with Disabilities Act, 2020 creates geographical discrepancies i.e. implementation will only be conducted in specific zones rather than whole which results in imbalanced developmental works for PWD's especially in rural areas. These findings show that nationwide approach is required to ensure uniform standards are applied throughout urban and rural areas. Within transportation sector limited regulations are available for PWD's. According to the results of this study, investments have been made in more comprehensive accessibility features to ensure social inclusion of PWD's. This includes providing features such as ramps, tactile paving, audio orientation tools and public display of information also making sure that signage is clear and easy to understand however, there is a need to develop a reliable emergency evacuation option for PWD's, alternative to lift. Incorporating Universal Design Principles (UDP) is necessary to build more inclusive transport systems that enable PWD's to travel independently. It is also important to note that mobility of PWD's vary according to their disability type and the financial resources as well as support of family members at their disposal.

6. Recommendation

Until now efforts have been made to make public buildings such as restaurants and schools accessible, but it is also to be noted that access should be barrier-free so that PWD's can move independently. Although this study provides important findings, further studies are required to comprehensively examine mobility issues faced by PWD's within built environment to ensure access to their basic rights i.e. education, employment opportunities as well as recreational activities. To address psychological barriers, programs should be implemented to sensitize public to meet the needs of Persons with Disabilities (PWD's), promoting a more inclusive and supportive environment. Beyond awareness campaigns, direct involvement of PWD's is necessary to address psychological barriers. Further research can be directed towards accessibility of bus stops, origin-destination study, behavioural pattern or examining systematic gaps in legislative works and enforcement mechanisms for PWD's related to different subject areas such as housing, schools, transportation, and public buildings. As providers of public service, transport staff play a vital role. Training sessions must be conducted for staff of Orange Line Metro Train Station (OLMT) assisting PWD's, especially in the case of sign language. The height of the ticketing counter needs to be lowered so that it can be accessible to the physically challenged. Street vendors need to be relocated, especially at Railway Station. Regular accessibility audits need to be conducted to ensure that all access points, facilities, and paths within and outside of the station meet the required standards and are free of obstacles. They should be made mandatory by the

government, with strict penalties for non-compliance. Authorities should establish regular feedback mechanism with PWD's to ensure that facilities provided meet their needs. Gathering feedback from PWD's can identify practical challenges and areas for improvement. Bottom- up approach should be adopted for policy implementation (Park & Chowdhury, 2021). Policies should be created to ensure that future projects such as Blue Line and Purple Line are more accessible. Policymakers should create a plan that involves PWD's as co-designers and evaluators in planning and development of public transportation to remove barriers and improve services as well as transit experiences.

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During the writing of this article, the authors used Grammarly to improve the language and grammar of the manuscript. After using this tool, the authors reviewed and edited the content as needed and assume full responsibility for the publication's content.

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