User Preference and Accessibility in Transition Hubs

Samriddhi Agrawal[1], Ar. Neeta Mishra[2]
[1]*Undergraduate Student, Amity University Chhattisgarh*
[2]*Associate Professor, Amity University Chhattisgarh*

Abstract—Transition hubs, such as railway stations and transport interchanges, are important parts of urban infrastructure. They connect different modes of transportation while also serving as spaces for shopping, relaxation, and social activities. This paper explores how these hubs address user needs and accessibility challenges, using case studies of Denver Union Station in the United States and Rani Kamlapati Railway Station in India. By examining their features and shortcomings, this study identifies ways to make such spaces more inclusive and user-friendly. Recommendations focus on better design strategies and solutions to meet future demands.

Index Terms— Accessibility, user preference, transition hubs, railway stations.

I. INTRODUCTION

Transition hubs are essential in connecting people with transportation services. These spaces go beyond their basic function of moving people—they also support economic activities, social interactions, and environmental goals. As cities grow and become busier, there is a greater need to design these hubs in ways that meet the needs of everyone, including people with disabilities, families, and the elderly.

Many transition hubs today aim to combine functionality with user comfort. Features like ramps, elevators, and clear signboards help make these spaces accessible, while shops and seating areas cater to the comfort of users. However, challenges remain. For example, during busy hours, many stations become overcrowded, making it hard for people with special needs to use these facilities smoothly.

The purpose of this paper is to study how transition hubs can improve in terms of accessibility and user satisfaction. By focusing on two case studies—Denver Union Station and Rani Kamlapati Railway Station—this research explores what works well and where improvements are needed.

II. METHODOLOGY

This research is based on combination of primary and secondary data. Surveys were conducted to gather opinions from users of transition hubs, focusing on their experiences with accessibility and facilities. Case studies of Denver Union Station and Rani Kamlapati Railway Station were analyzed to compare their designs and services. The study also refers to published research from academic sources like ResearchGate, and MDPI to provide additional context and credibility.

III. LITERATURE STUDY

Transition hubs, which serve as vital connectors between different modes of transportation, are designed to cater to a variety of users. These spaces must combine functionality with inclusivity to ensure they serve all types of travelers effectively. Research into accessibility and user preferences has provided foundational knowledge for creating user-friendly and accessible hubs.

A. ACCESSIBILITY FEATURES IN TRANSITION HUBS

Transition hubs are designed to be easy for everyone to use, no matter their physical or mental abilities. They often follow universal design principles, which means they are built to work for all people without needing extra changes. Common features include ramps, tactile paving for visually impaired people, wide hallways for wheelchairs, and elevators with both sound and visual signals. These features help people, especially those with disabilities, move around more easily and independently.

For example, Denver Union Station in the U.S. is a great example of accessibility done right. It has tactile pathways, braille signs, and wheelchair-friendly platforms. Its elevators have both sound and visual signals, making it easier for people with hearing or vision challenges to use.

In India, Rani Kamlapati Railway Station has also included ramps, tactile flooring, and special seating for passengers with disabilities. However, problems like overcrowding and blocked paths often make these features less useful. Poor maintenance and

enforcement also make it harder to ensure smooth access for everyone.

B. USER PREFERENCE IN TRANSITION HUBS

What users want is very important when designing transition hubs. Studies show that people prefer clear signs, bright lighting, plenty of seating, and extra facilities like cafes, shops, and waiting areas. These features not only make the hub work better but also create a more comfortable and welcoming space.

Denver Union Station is a good example of meeting user needs. It has open layouts, large waiting areas, and shops that are easy to access. The station provides lots of seating and clear signs to help people find their way, making it practical and comfortable for both commuters and tourists.

On the other hand, Rani Kamlapati Railway Station offers modern facilities like air-conditioned lounges and escalators. But users often complain about unclear signs and not enough seating during busy times. These problems show that more focus on user-friendly design is needed to solve these challenges.

IV. CASE STUDY

A. DENVER UNION STATION, UNITED STATES

Denver Union Station is one of the best examples of a transition hub that combines accessibility, user-friendly design, and modern technology. The station connects multiple transportation services, including trains, buses, and light rail, in a way that is easy to use for all travellers. Accessibility is a strong point here, with features like tactile paving for visually impaired people, elevators with audio-visual systems, and ramps that are wheelchair-friendly. These features help ensure that people with different abilities can navigate the station comfortably.

source:

http://upload.wikimedia.org/wikipedia/commons/2/22/Denver_union_station.jpg

The station also provides a pleasant environment for users. It has spacious waiting areas, clear and visible signs, and plenty of seating. The addition of shops and cafes makes the station more than just a transit point—it becomes a place where users feel comfortable spending time. Technology plays a big role too. Digital boards provide real-time updates, while smart ticketing systems make purchasing tickets easy and efficient. These features, combined with sustainable lighting and energy-efficient operations, make Denver Union Station a model for future hubs.

B. RANI KAMLAPATI RAILWAY STATION, INDIA

Rani Kamlapati Railway Station, located in Bhopal, India, is a modernized hub that aims to provide world-class facilities for travellers. The station includes accessible features like ramps, elevators, and tactile paving to help people with disabilities. However, during busy hours, these features often become less effective. For example, tactile paths may be blocked by crowds or luggage, making it hard for visually impaired users to move around. Elevators also face frequent overcrowding, limiting access for wheelchair users.

source:
https://pbs.twimg.com/media/FiBSAPCacAA9dxq.jpg

The station has made efforts to improve the user experience by adding air-conditioned waiting areas, food courts, and retail shops. While these amenities are appreciated by many users, issues like insufficient seating and unclear navigation signs continue to cause frustration. Additionally, the station has adopted some digital systems, such as e-ticketing and digital information boards, but these systems sometimes fail to provide accurate or timely updates, which affects the experience of travellers.

C. SEA WOOD GRAND CENTRAL, INDIA

Sea Wood Grand Central in Navi Mumbai is a unique project that combines a railway station with shopping and office spaces under one roof. Accessibility features include wide pathways, ramps, and elevators to accommodate users with different needs. The station is well-connected to the Mumbai suburban railway network, making it easy for users to switch between transport modes. The integration of public and private spaces makes Sea Wood Grand Central more than a transport hub; it becomes a lifestyle destination where users can shop, work, and commute seamlessly (MDPI, 2021).

source:
https://www.lntrealty.com/wpcontent/uploads/2020/10/project-banner-1.jpg

However, challenges remain in terms of crowd management during peak hours. Although the design focuses on accessibility and comfort, maintenance of the facilities, such as clean pathways and functioning lifts, is an ongoing issue. Despite these challenges, Sea Wood Grand Central is an example of how multiple functions can coexist in one hub while meeting the needs of diverse users.

V. CONCLUSION

Transition hubs are vital for connecting people to transportation systems and supporting urban growth. This study highlights the importance of balancing user preferences and accessibility in hub design, focusing on examples like Denver Union Station and Rani Kamlapati Railway Station. While both hubs aim to provide inclusive and user-friendly environments, their effectiveness varies.

Denver Union Station excels with features like tactile pathways, clear signage, and smart technologies, creating a seamless and comfortable experience for all users. Its use of sustainable practices and advanced systems, such as real-time updates and energy-efficient designs, sets a strong example for modern transition hubs.

In contrast, Rani Kamlapati Railway Station, though equipped with modern infrastructure, faces challenges such as overcrowding, unclear navigation, and inconsistent technology use. These issues highlight the need for better maintenance, improved signage, and more reliable digital systems to enhance user satisfaction.

To make transition hubs more effective, future designs must prioritize accessibility through universal design principles, improve user facilities, and adopt advanced technology for smooth operations. Regular monitoring and updates will also ensure that hubs remain functional and inclusive. By addressing these needs, transition hubs can provide a better travel experience for diverse users and contribute to sustainable urban development.

VI. ACKNOWLEDGEMENT

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