Improving Bus Stop Design to Enhance Communication

RESEARCH REPORT

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Executive Summary

This report investigates how Brisbane's bus stop system accommodates tourist travel. Although Brisbane has made investments in projects like Cross River Rail and Brisbane Metro, background study revealed that bus stops are still dispersed and mostly dependent on cellphones for up-to-date information (Phillips, 2022). Thus, tourists are at a disadvantage because they might not have access to data or speak English well. Using surveys of international students as a stand-in for tourist behaviour, primary research was carried out through observations at suburban, central business district, and hub stops. This highlighted the main issues, which were insufficient comfort or safety at stops, English-only signage, and inconsistent real-time passenger information. Brisbane was benchmarked against global systems like Jurong Station, Singapore's Smart Bus, Seoul's Smart Shelters, and New York's LinkNYC. These case studies demonstrated excellent practices in inclusive design, consistent digital signage, and multilingual communication. Three design requirements are established by the findings for enhancing bus stops in Brisbane: improved comfort, universal accessibility, and consistent real-time communication. These standards offer a structure for creative design that will guarantee Brisbane's preparedness for the Olympic and Paralympic Games in 2032.

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SECTION ONE

INTRODUCTION
BACKGROUND
BENCHMARKING

Introduction

Using public transportation in Brisbane presents difficulties for foreign visitors since bus stops frequently lack inclusive infrastructure and appropriate communication. Although buses are the mainstay of Brisbane's public transportation system, bus stops' layout as points of entrance is frequently disregarded. Problems include unreliable real-time information, signage in English only, and limited comfort make first-time users feel less confident and more stressed when they wait for travel. Through increased comfort, universal accessibility, and clearer real-time communication, this study aims to investigate how Brisbane's bus stop infrastructure might be improved to accommodate tourists. This emphasis is particularly pertinent as Brisbane gets ready to host the Olympic and Paralympic Games in 2032, which will result in a large influx of tourists from abroad.

Field observations of Brisbane bus stops, surveys of overseas students (who serve as a stand-in for tourists), and an examination of design guidelines like the Public Transport Infrastructure Manual (PTIM) are all incorporated into this research. To highlight gaps and potential, these results are then contrasted with international case studies from Seoul, Singapore, and New York. To guarantee that Brisbane's transport system is both internationally competitive and inclusive of all users, the research lays the groundwork for design criteria that can direct creative, inclusive, and scalable solutions.

Figure 1: foreign Users

Background

The infrastructure of public transportation is essential to urban movement, but accessibility, clarity, and dependability are frequently issues for visitors and first-time users. According to an increasing amount of research, real-time passenger information (RTI) greatly enhances overall satisfaction, comfort, safety, dependability, and perceived service quality(González et al., 2012). According to studies, RTI can boost bus riding by 2% to 3%, especially for visitors who are not familiar with local networks and infrequent users (Currie & Delbosc, 2011; Kashfi et al., 2016; Tang & Thakuriah, 2012). Dynamic information, such countdown screens or digital notifications, helps vulnerable individuals make better decisions at the bus stop by lowering anxiety and boosting confidence.

Clear, consistent, and highly contrasted signage lowers boarding errors and helps users who are unfamiliar with the language or culture (*Bus Stops - Papercast*, 2020). This is especially crucial for visitors because static paper timetables and small-font pole signage might be challenging to understand if one is unfamiliar with the network. Accessibility for non-native speakers and foreign visitors has been found to be enhanced using universal symbols, bilingual signage, and consistent design (Kashfi et al., 2016).

The Public Transport Infrastructure Manual (PTIM) (TransLink, 2020) establishes minimum standards for bus stop design throughout the state of Queensland. Accessibility features including Disability Standards compliance, suitable kerb heights, and tactile ground surface indications are required by these standards. Although PTIM offers a foundation for safety and physical accessibility, there is a lot of room for creativity because it is less restrictive when it comes to digital integration and multilingual support. As a result, visitors without data access or app familiarity are at a disadvantage because Brisbane's present bus stop network frequently depends significantly on users' smartphones to obtain real-time information (TransLink, 2020).

The necessity of filling these gaps is further highlighted by the 2032 Olympic and Paralympic Games in Brisbane. To handle the expected surge of foreign tourists, the Queensland government's transport policy places a strong emphasis on inclusive, sustainable, and digitally linked infrastructure (Queensland Government, 2023). It is anticipated that major initiatives like Brisbane Metro, Cross River Rail, and regional bus priority corridors would increase both capacity and frequency (“Brisbane Olympics Transportation,” n.d.) (“Report Finds 2032 Games Could Generate $70 Billion in Economic Opportunities,” 2025). However, the street-level static interfaces might continue to be a major navigational weakness for tourists unless there are significant enhancements made to bus stop communication systems.

All these results indicate to a glaring research gap: despite significant investments in digital services and transportation growth, bus stops as initial points of contact for visitors are still irregular, unchanging, and frequently inhospitable. This disparity draws attention to a chance for design innovation that incorporates multilingual navigation, universal design principles, and real-time digital communication into scalable bus stop solutions.

Benchmarking

The present flaws in TransLink's strategy are exposed by comparing Brisbane's bus stop infrastructure to both regional projects and global case studies. Although digital services like Near Field Communication (NFC) tags and e-paper prototypes have been implemented in Brisbane, they are still erratic, only available in English, and mostly dependent on smartphone access. International precedents, in contrast, show how a variety of solutions, from inexpensive inclusive technologies to highly sophisticated integrated shelters, can improve public transportation's dependability, accessibility, and clarity for visitors and first-time passengers.

TransLink has started implementing NFC-enabled service information at over 15,000 stops in Brisbane, enabling passengers to tap their devices to obtain real-time bus data (Phillips, 2022). As a sustainable alternative to static signs, e-paper timetable displays have been tested in South-East Queensland from 2019 to support this programme (Bus Stops - Papercast, 2020; Qld's TransLink to Pilot NFC Tags, e-Ink Tech at Bus Stops, n.d.)

Figure 2: Translink NFC

At several busways and hubs, there are additionally Passenger Information Displays (PIDs) that show the current times in arriving services. Though their limited and unequal distribution leaves many suburban stops dependent on paper timetables, which disadvantages non-local users, these developments demonstrate an ambition to integrate digital communication into the network.

Figure 3: E-Paper Product

Singapore's Smart Bus system, on the other hand, offers a more reliable and approachable model. In addition to smart sensors for passenger counting and LED signs, these stops provide real-time passenger information in numerous formats using transparent OLED and e-paper displays inside and outside buses (Out, 2019). By emphasising redundancy and clarity, travellers with accessibility needs, senior citizens, and tourists are guaranteed to receive accurate information without depending on their own equipment. Like Singapore's deployment, TransLink's e-paper experiments can be viewed as a first step in this direction, but they are currently smaller and less inclusive.

Figure 4: Singapore's Smart Bus

Innovative techniques at both ends of the technical spectrum are also demonstrated by international comparisons. By combining free Wi-Fi with real-time bus arrival displays within a 0.3-mile radius, New York's LinkNYC kiosks eliminate the need for individual cellphones and provide impromptu, app-free connectivity in busy places (MTA Bus Times Will Display on LinkNYC Kiosks | amNewYork, 2018).

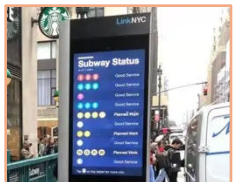

Figure 5: LinkNYC Kiosks

The Bus Aunty project in Singapore, on the other hand, demonstrates how basic e-ink displays can offer real-time information in both workplace and home settings (Bus Aunty – Real-Time Bus Arrival Display for Singapore Homes, n.d.). This low-cost model demonstrates that scalable, reasonably priced solutions can nevertheless lower barriers for visitors and first-time users, demonstrating that accessibility does not always require sophisticated infrastructure.

Figure 6: Bus aunty e-link display

The Coachsound Bus Stop Announcer, which uses GPS to trigger in-car audio notifications of impending stops, is another example of how accessibility is addressed in Australia (Bus & Coach Audio Systems - Coachsound Bus Stop Announcer, n.d.). This system demonstrates how audio solutions can be used in conjunction with visual upgrades to create more inclusive networks, supporting passengers who are visually handicapped or who are not familiar with written English. Because Brisbane's current infrastructure lacks these elements, visitors who do not speak English well are at a distinct disadvantage.

Figure 7: Coach sound Bus stop announcer

The possibility for incorporating bus stops into larger urban and cultural systems is demonstrated by higher-level case studies. The Jurong Smart Bus Station in Singapore is positioned as a civic place and a hub for transportation by fusing digital services like Wi-Fi and smart boards with recreational and cultural elements like swings, vegetation, and public art (Ltd, 2016). In the meantime, the Smart Shelters in Seoul set the standard for high-tech inclusion. These shelters have advanced safety features like UV curtains and emergency warnings, climate management, solar energy, multilingual digital displays, and AI-driven IoT systems (“Seoul to Launch Futuristic Central Bus Stop ‘Smart Shelter’ -,” 2021). These illustrations demonstrate how bus stops might evolve beyond their utilitarian purpose to become inclusive, safe, and forward-thinking public areas.

Figure 8: Jurong Smart Bus station

Figure 9: Smart Shelter Seoul

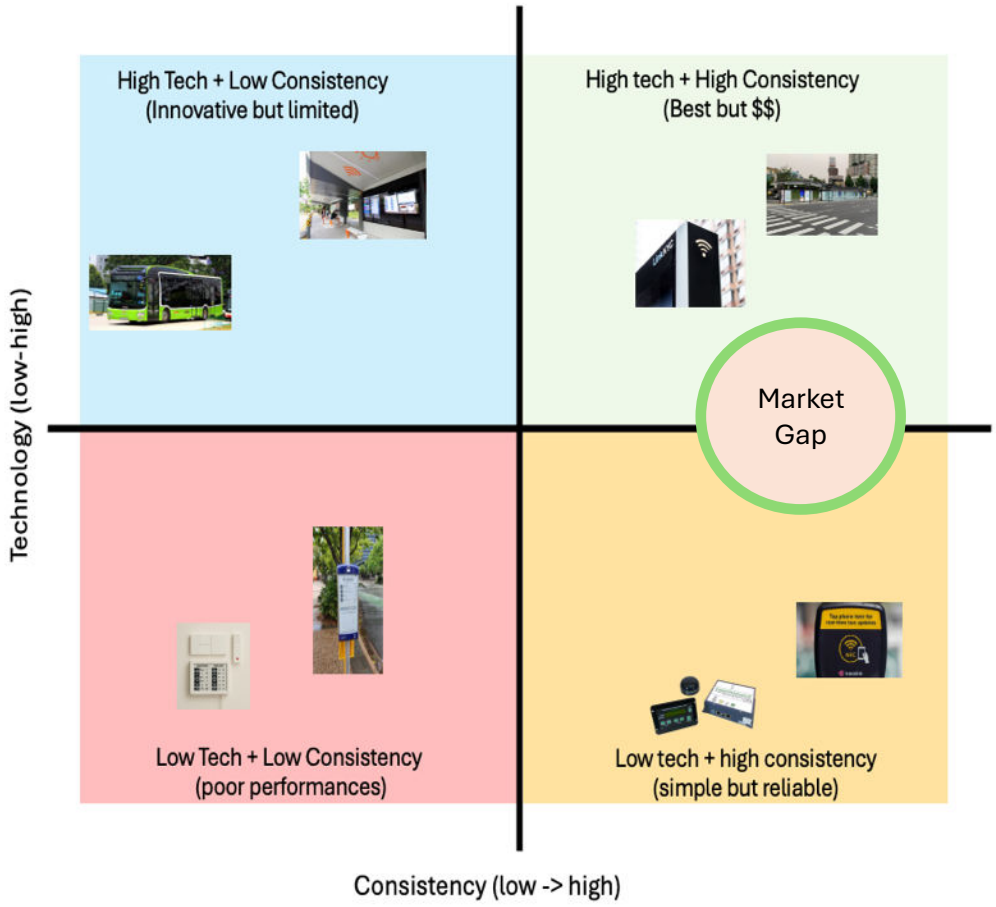

Figure 10: Product Evaluation Matrix

Benchmarking shows a wide range of technological possibilities and consistency. High-tech systems that are nevertheless erratic, like Brisbane's e-paper display testing, fall into the high-tech/low-consistency quadrant. NFC tags and audio-based systems like Coachsound and Bus Aunty are examples of low-tech but incredibly dependable, easy-to-use, and accessible solutions. On the opposite end of the range, the LinkNYC kiosks in New York and the Smart Shelters in Seoul are examples of high-tech, high-consistency infrastructure that offers a great user experience but is expensive. Static timetables, on the other hand, are in the low-tech/low-consistency quadrant, functioning badly and providing little assistance to travellers. Visitors to Brisbane are currently largely dependent on mobile apps because the city's network is more in line with the low-tech/low-consistency quadrant. The city must give consistent, scalable solutions that increase accessibility top priority if it hopes to advance. This calls for reliable, inclusive systems that provide transparency at every turn, but it doesn't necessarily require the priciest technology. Prior to the 2032 Olympics, Brisbane's most advantageous position is in the market gap: medium-to-high technology combined with good consistency, which guarantees both scalability and inclusivity for foreign tourists.

SECTION TWO

RESEARCH ANALYSIS & FINDINGS

Research

To find out how Brisbane's bus stop infrastructure aids visitors' and first-time users' experiences, this study used a mixed-methods approach. Tourists were selected as the subject because they are a demographic that frequently has challenges with dependability, accessibility, and clarity when utilising public transportation systems in new locations. However, international students were enlisted as a stand-in group because it was challenging to regularly reach visitors during the study season. Like tourists, they come from a variety of language and cultural backgrounds, rely largely on public transit for daily travel, and are not familiar with Brisbane's transport system. As a result, their experiences were seen as typical of the difficulties that tourists may encounter in the future, including those coming to Brisbane for the 2032 Olympic and Paralympic Games.

In addition to surveys and observational studies, the research design also used secondary data from worldwide case studies and design guidelines. Six important bus stop locations were chosen to represent various contexts within the network: two CBD stops (George Street near Alice and the Alice Street cluster at Gardens Point), a major suburban hub (Chermside Westfield), a university-oriented stop (Kelvin Grove Road), and suburban stops (Maundrell Tce at St Gerards and Craigslea). Environmental factors, passenger behaviour, and physical infrastructure data were documented at each location. Aspects including seats, real-time passenger information, shelter, signs, and crowd control were all taken into consideration. This approach shed light on the behavioural and physical aspects of using bus stops.

Simultaneously, a survey was sent to international students to gather firsthand accounts of their bus-catching experiences in Brisbane. First impressions, navigation difficulties, dependency on cell phones, trust in bus dependability, and the perceived clarity of signage and timetables were all covered in the poll, which had both multiple-choice and open-ended items. This offered a useful quantitative layer of information to support the fieldwork's qualitative discoveries.

A review of secondary sources was conducted to contextualise these findings. To determine the minimum requirements for bus stop design in Queensland, including accessibility, safety, and adherence to Disability Standards, the Public Transport Infrastructure Manual (PTIM) was examined. To compare Brisbane with global best practices, like Singapore's Jurong Smart Bus Station, Seoul's Smart Shelters, and New York's LinkNYC kiosks, benchmarking research was also carried out. Using a comparative lens, these case studies demonstrated how inclusive infrastructure, consistent digital information, and multilingual communication have been successfully included in other places.

The research used a triangulation technique by integrating these three strands—observations, surveys, and standards/benchmarking—to make sure the results were cross-validated from several sources. This resulted in a thorough dataset that connected lived experience to institutional flaws, emphasising recurrent themes including an excessive dependence on mobile devices, erratic real-time information, a dearth of multilingual support, and physical discomfort at bus stops. This approach made sure that the study was based on international antecedents as well as Brisbane's setting, which provided a strong basis for analysis and the design recommendations that followed.

Observations

Six bus stop locations in Brisbane were used for fieldwork, representing hubs, university, suburban, and central business district settings. These findings showed persistent problems that have a big impact on users.
The only amenities at Maundrell Tce (St Gerards, Stops 45/46) were a pole, a schedule, and a bench. Users were left completely exposed to the elements because there was no cover, lights, or real-time information available. Although it still lacked digital communication, a nearby stop at Maundrell Tce (Craigslea, Stop 44) provided marginally better facilities with a small shelter and lighting. Both locations have NFC scanning abilities allowing passengers to use smartphones to verify arrivals and bus schedules.

Figure 11: St Gerads Stop 45/46

Figure 12: Timetable + NFC Scanner

Figure 13: Craiglslea stop 44

Things were a little better at Kelvin Grove Road (Stop 12). More comfort was offered with a solar-powered Passenger Information Display (PID), modern shelter, and covered seating. However, when buses arrived, riders had to hurry forward due to a six- to eight-meter space between the seating and the kerb. Phones were still widely used, even if some passengers used the PID, and there were no bilingual or symbolic signs to accommodate non-native English speakers.

Figure 14: McCaskie Park stop 12

Figure 15: Solar Passenger Information Display

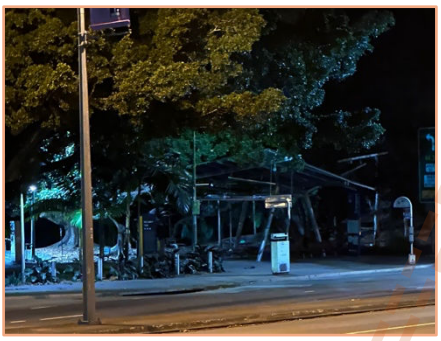

Figure 16: Stop 12 at Night

It was especially difficult at stops in the central business district. There were no seats or cover available at George Street (Stop 114), just a pole, stop ID, and schedule. During peak hours, groups of 15 to 25 passengers would regularly pack the kerb, crashing into walkers on the tiny sidewalk. More problems were caused by the Alice Street cluster (Stops 101/102). First-time passengers were confused since station 101, a QUT shuttle-only station, had any seating or shelter. During university class transitions, Stop 102 got extremely congested, with 20–30 passengers jammed up against the fence of the Botanic Gardens. Users leant against barricades or nervously checked apps because there was no real-time information available, creating a congested atmosphere.

Figure 17: Alice Street Stop 102

Figure 18: Seating area stop 102

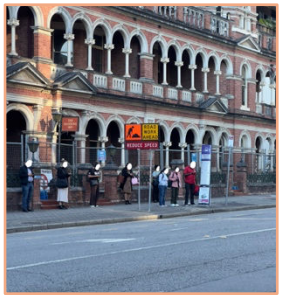

Figure 19: Goerge Street Stop 114

Lastly, the infrastructure at the Chermside Westfield Hub was heavily facilitated however slightly sophisticated for new users, featuring digital timetable boards, benches, tactile paving, and shelters. Nevertheless, accessibility was compromised by crowding and complexity. Because the hub's multi-bay arrangement intimidated new users and the information was only in English, users were seen going across bays and looking at their phones to figure out which is their stop.

Figure 20: Chermside Westfield Hub

Figure 21: Chermside stop bays

Common themes showed up in all six locations: even the hub, however prepared, remained intimidating, university and central business district stations were crowded and confusing, and suburban stops lacked even the most basic comfort. When taken as a whole, these findings show a disjointed and uneven network that does not offer visitors and new users clarity, inclusion, or confidence.

Surveys

A survey approximately lasting less than 8 mins was sent out to international students, who served as a proxy for tourists, confirming the shortcomings in public bus transport (Figure 14). Various questions were asked regarding their experience with their transport in public buses. The data shows that most respondents (80%) had used public transportation often before coming to Australia, indicating that challenges faced in Brisbane were not the result of inexperience (figure 15).

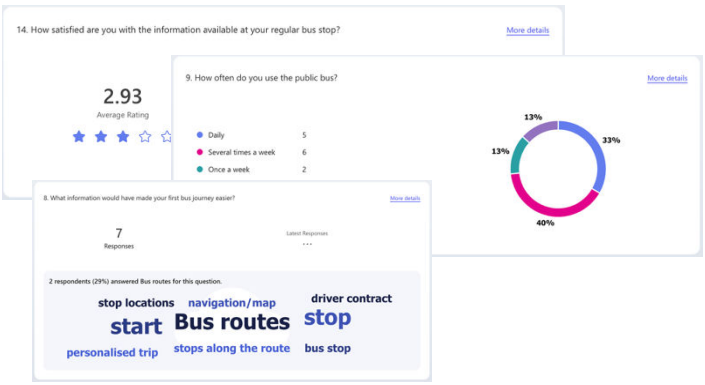

Figure 22: Survey Example Questions

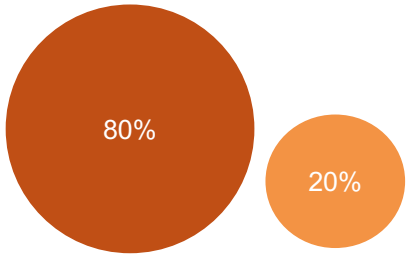

Figure 23: Users using buses prior

Just 27% of respondents said their first trip on Brisbane's bus system was easy, compared to an equal number who said it was neutral or difficult and one who said it was very difficult. Finding the right stop (12 out of 15 respondents), comprehending timetables (11 respondents), and figuring out the correct bus number (seven respondents) were the most mentioned difficulties (figure 16).

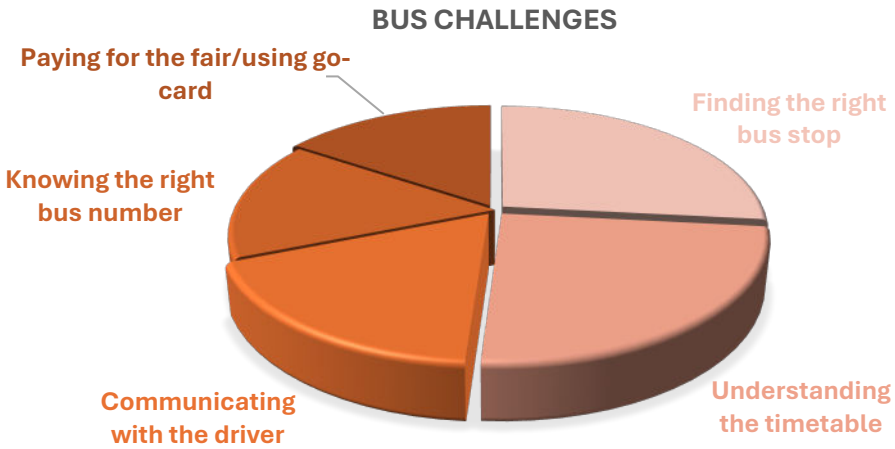

Figure 24: Challenges User face when Catching the Bus

The complete dependence on mobile phones was an eye-opening discovery. All respondents said they navigated their first trip using apps like Apple Maps, Google Maps, or TransLink. Just 20% of respondents indicated they could travel without a phone, compared to 40% who said they couldn't and 40% who weren't sure (figure 17). Only a third of respondents thought buses would stop at the right location, and only 7% were very confident in their ability to forecast arrival times, indicating a lack of confidence in the system (figure 18).

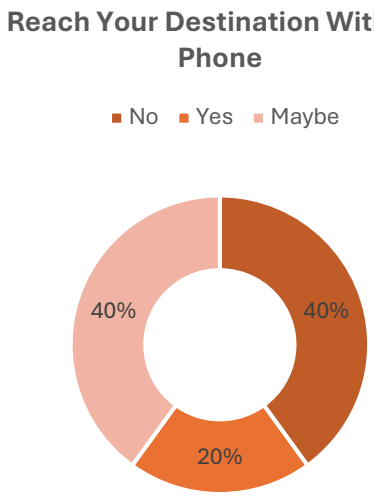

Figure 25: Users using their phones

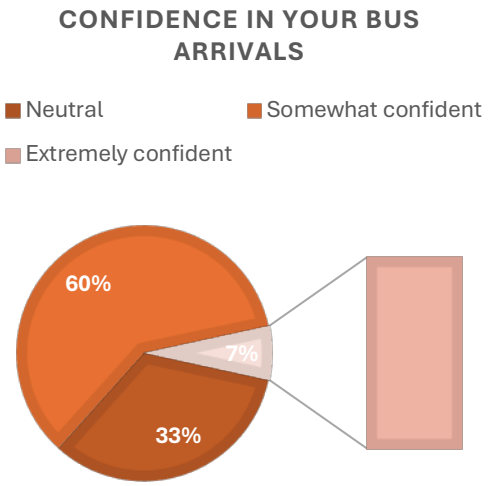

Figure 26: Users Confidence on Bus Arrivals

Despite these obstacles, many respondents now frequently take buses, with 40% doing so multiple times per week and 33% doing so every day (Figure 19). Nonetheless, the dependence on cell phones, challenges deciphering English-only schedules, and scepticism over bus dependability suggest that the system is still not adequately accommodating for new or foreign users.

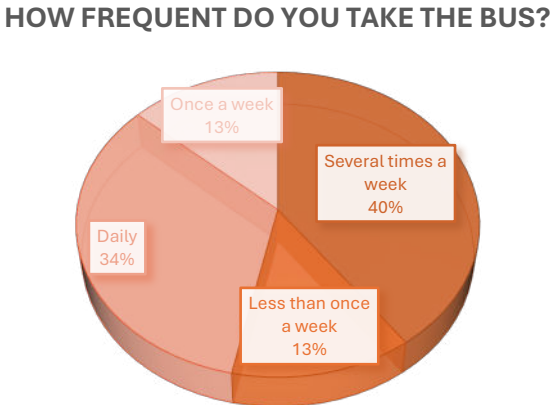

Figure 27: Bus Frequency

The findings of the poll and the observations taken together support the idea that visitors and first-time users are disadvantaged by Brisbane's bus stop infrastructure. Physical drawbacks were noted, including inadequate shelter, crowded, erratic real-time information, and subpar layouts. These problems were reaffirmed by the survey results, which showed a complete dependence on cell phones, trouble comprehending schedules, and a lack of faith in signage and system dependability. Although the system works for everyday commuters, it is nonetheless erratic, inaccessible, and hostile to new users. These results underline the urgent need for architectural innovation to prepare for the 2032 Olympic and Paralympic Games, as well as the gap between Brisbane's current infrastructure and the expectations of foreign tourists.

SECTION THREE

DISCUSSION
DESIGN IMPLICATIONS
CONCLUSION

Discussion

The study's conclusions show that although Brisbane's bus stop system works well for everyday commuters, it falls short in providing sufficient assistance for tourist and first-time passengers. Field observations and survey data support the notion that hurdles for tourists are caused by an excessive dependence on mobile phones, erratic digital infrastructure, a lack of multilingual communication, and physical discomfort. According to Tang and Thakuriah (2012) and Currie and Delbosc (2011), these results are in direct agreement with the literature examined in the Background, which highlighted the importance of inclusive design, real-time passenger information (RTI), and clear signage in enhancing rider happiness and ridership.

One of the most startling findings was the survey participants' complete dependence on mobile phones, which was also seen at every bus stop under investigation. This dependence supports the claim made by Schweiger (2011) that RTI is especially important for infrequent users, who feel less anxious and more confident when information is available at the stop. However, Brisbane's RTI service is sporadic and uneven, in contrast to global best practices. For instance, Singapore's Jurong Smart Bus Station and Seoul's Smart Shelters combine real-time updates with bilingual user interfaces and physical comfort features to provide fair access for both residents and tourists. Travellers who were unfamiliar with data or apps were at a disadvantage because Brisbane's stops, especially those at Alice Street and Maundrell Tce, lacked even the most basic real-time signage.

Another recurrent theme was the absence of inclusion. According to survey results, the second-most common challenge (11 out of 15 respondents) was comprehending timetables, underscoring the restrictive impact of communicating solely in English (Figure 16). This supports the findings of Aldrich (2020) regarding the advantages of universal symbols and bilingual signage for non-native speakers. Global cities have previously implemented these strategies to increase accessibility, according to benchmarking. Brisbane runs the danger of offending visitors who don't know English or local bus etiquette if equivalent steps aren't taken.

Safety and physical comfort also surfaced as recurring issues. Overcrowding, pedestrian weaving, and a lack of shelter were seen at Alice Street and George Street. These observations are consistent with González et al. (2012)'s research, which links dwell-time issues to subpar stop design. Confusion and congestion hampered usability even at the Chermside hub, which had digital infrastructure and shelters available. This suggests that infrastructure alone is insufficient without clear, consistent information design.

In summary, the conversation highlights a stark discrepancy between Brisbane's existing infrastructure and global best practices. Even though Brisbane has made investments in initiatives like Cross River Rail and Brisbane Metro to increase transportation capacity, the network's street-level interfaces are nevertheless erratic, inaccessible, and occasionally unwelcoming to new users. This study illustrates how systemic faults cause worry, confusion, and discomfort for those without established routines by understanding overseas students as a proxy group. As Brisbane gets ready to host a sizable inflow of foreign tourists for the 2032 Olympic and Paralympic Games, these findings underscore the urgent need for scalable, user-centered upgrades that bring the city's network into compliance with international standards.

Design Implications

The study identifies several shortcomings in Brisbane's bus stop system that can be immediately converted into chances for creative design. The most notable problem was the inconsistent delivery of real-time passenger data. While certain hubs, like Chermside, have digital displays, most suburban and central business district stops only had static timetables. As evidenced by survey data indicating 100% phone dependence, this discrepancy caused anxiety and increased dependency on phones among tourists and new users. Therefore, a crucial aspect is the requirement for low-cost, scalable technologies that enable knowledge to be accessible to everyone. Passengers would not need to rely on mobile data to get countdown times and service details thanks to app-free solutions like solar-powered e-paper displays, QR codes, or NFC tags. All stops, not just the central hubs, should have consistent information designs to lower uncertainty and boost system confidence.

The necessity of enhancing inclusivity via multilingual and global communication is the second implication. According to the survey, one of the most frequent difficulties faced by international students was comprehending timetables, which is a disadvantage that non-English speaking visitors would also experience. Timetables with small letter sizes and English-only signs alienate a large percentage of users and cause needless stress. To adhere to universal design principles, future bus stop designs should include multilingual digital displays, symbolic wayfinding, and colour coding. This would simplify navigation, lower language barriers, and increase international visitors' access to Brisbane's transit system both during and after the 2032 Olympics.

Safety and physical comfort also need careful consideration. Many stops lacked seating, shelter, or lighting, according to observations made at Maundrell Tce, Alice Street, and George Street (Figure 5 & 9). Additionally, riders were forced to manoeuvre dangerously past pedestrians at busy central business districts. These problems emphasise how crucial it is to consider bus stops as settings that influence user confidence in addition to being useful waiting areas. Design solutions that would actively promote comfort and safety include clear queue areas, sufficient seating, weatherproof shelters, and better lighting. In crowded urban settings, visual identities and landmarks may also aid travellers in rapidly identifying stations.

The wider conclusion is that bus stops in Brisbane need to be reframed as inclusive communication centres rather than as basic infrastructure. Spending money on scalable, user-centered, and future-ready technologies is necessary to get ready for the 2032 Olympic and Paralympic Games. Brisbane can guarantee that its transportation system satisfies international standards by incorporating reliable real-time information, multilingual communication, and enhanced physical comfort. These upgrades would assist commuters, international students, and the city at large in addition to improving the experience of tourists.

Conclusion

The purpose of this study was to investigate how Brisbane's bus stop infrastructure either helps or hinders tourists and first-time users' experiences. The study painted a comprehensive picture of the difficulties encountered when utilising the city's public transportation system for the first time by integrating surveys of international students as a proxy group with observations at six sample locations. The results showed that while the system works well for everyday commuters, it poses serious obstacles for new users.

Several themes surfaced in both surveys and fieldwork. The most notable was the over-reliance on smartphones, as all poll participants (100%) stated that they needed a phone to finish their first trip. This reliance was exacerbated by passengers' uneasiness and uncertainty due to inconsistent availability to real-time information at suburban and central business district stations. Physical flaws such a lack of seating, shelter, or secure waiting places damaged comfort and confidence, while issues with English-only schedules and signage emphasised the lack of bilingual or global design elements. When taken as a whole, these problems demonstrate a glaring discrepancy between the actual bus stop usage situation in Brisbane and the minimal requirements established by PTIM.

This disparity is much more noticeable when measured against global standards. To increase accessibility globally, case studies from Seoul, Singapore, and New York show how multilingual communication, consistent digital information, and inclusive infrastructure are currently being used. Brisbane, on the other hand, is still disjointed and erratic.

Brisbane needs to adopt scalable, user-centered innovations and go beyond minimal compliance. Bus stops can be redesigned as welcoming entryways that serve both locals and tourists from other countries by including dependable real-time systems, multilingual communication, and improved physical comfort. In addition to being necessary for the network's daily functionality, these steps are also vital for Brisbane's preparation to host the Olympic and Paralympic Games in 2032.

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