the active citizenship labs

finding our way to public transport
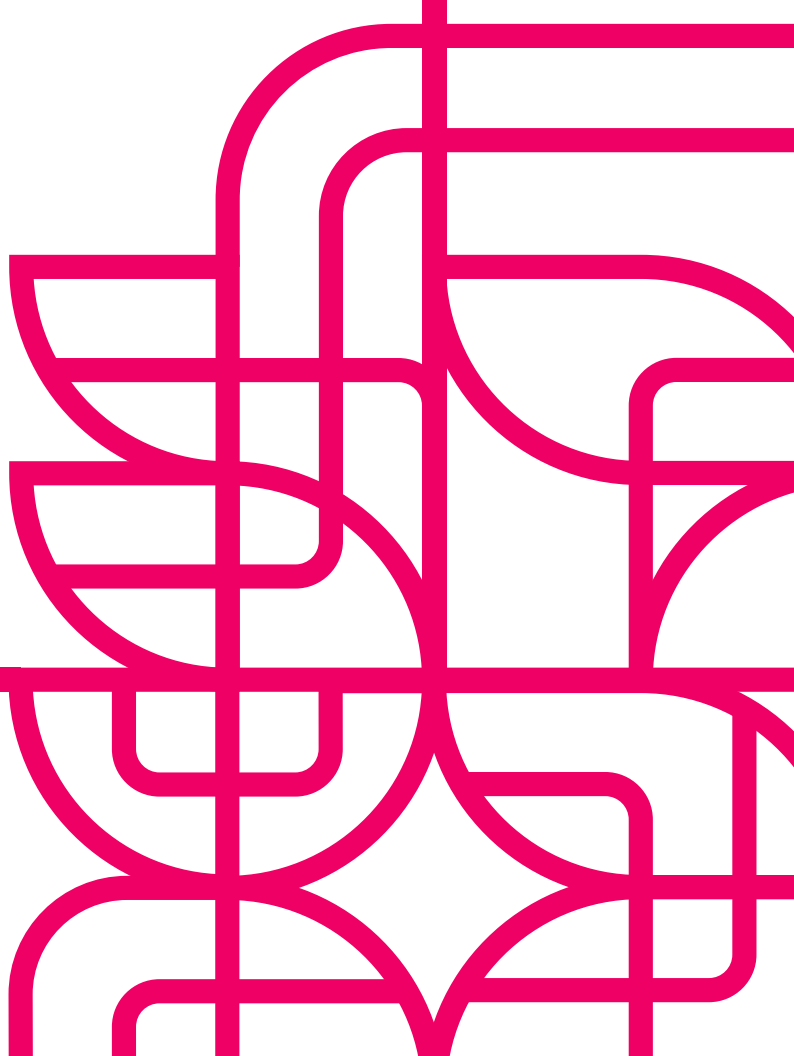
#Bengaluru
moving

YLAC

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executive summary

Wayfinding solutions equip citizens with accurate information on routes, timings, service disruptions, etc., to plan more their trips more efficiently. The recommendations laid out in this document are focused on the following key aspects:

- **Inclusivity:** Signage information has to be co-created with the community to include the needs of everyday commuters, local businesses, persons with disabilities as well as people of different vernacular backgrounds.

- **Accessibility:** Information related to use of public/ non-motorised transport including which bus to take from the nearest bus stop, directions to the nearest bus stop, modes and connectivity to other stations and places of importance etc. must be easily available offline/ online.

- **Reliability:** Passengers require reliable information on current location, estimated travel time and frequency of buses, fares and seat availability to reduce uncertainty and enhance ease of travel.

- **Responsiveness:** The public transport should gain the confidence of the local community by ensuring safety of passengers and addressing grievances in a transparent and timely manner. Raising awareness around measures taken during the COVID crisis would further increase trust.

introduction

Bengaluru saw an exponential increase[1] in its population from 1991 to 2011, owing to the IT boom. This increased demand for public transport and the city roads proved insufficient to handle the acute growth in the number of vehicles.

According to a 2019 report by TomTom,[2] the Netherlands-based global provider of navigation, traffic and map products, Bengaluru earned the title of the 'world's most traffic congested city' beating 415 other cities across 57 countries. This is an outcome of unfettered growth of motor vehicles in the city.

According to the Comprehensive Mobility Plan for Bengaluru (2019),[3] there are 76.2L registered vehicles in Bengaluru, with cars and 2-wheelers growing at 10.4% and 11.2% annually respectively. On the contrary, the bus fleet catering to the city has not increased substantially in proportion to the rapidly growing population with 4% of public transport and IPT accounting for 54% of all trips.

BMTC buses per lakh[4]			
Year	Population (in lakhs)	BMTC bus fleet size	Buses/lakh population
2001	61.9	2658	43
2011	90.44	5949	66
2018	122.98	6143	50

The above figure shows that recently, the number of buses has not kept pace with the growing population and the buses per lakh population now stand at 50. Further while bus utilization has been reducing, the city is witnessing an ever-increasing preference towards private vehicles leading to increased traffic congestion.

significance of information dissemination in promoting the use of public transit and non-motorized transport

According to the SmartNet Report[5], one of the reasons for declining mode share of buses in Indian cities is that passengers do not have enough information on bus operations such as bus routes, stops and the expected arrival time. This makes the system unreliable forcing passengers to use private modes of transport. To retain and increase the mode share of buses, it is essential that bus users are provided with real-time, accurate and reliable information on bus operations.

As per the 2018 Ease of Moving Index survey[6], only 15% Bengaluru citizens prefer using public transport. A variety of reasons deter their adoption despite efforts from the government. 51% of the respondents do not use public transport perceiving it to be unsafe and inconvenient, and 24% do not find it readily available. Having real time and reliable information on status, connectivity and availability of public transport as well as first and last mile connectivity would go a long way in changing this perception. For a city with a growing population of non-native speakers, information availability at bus stops or on apps/web in English as well as Kannada also becomes increasingly important.

While increasing bus fleets and expanding the metro network, both cost intensive measures are much needed, this brief attempts to tackle reasons for low preference towards public transport by providing recommendations to equip citizens with adequate information leading to a seamless experience.
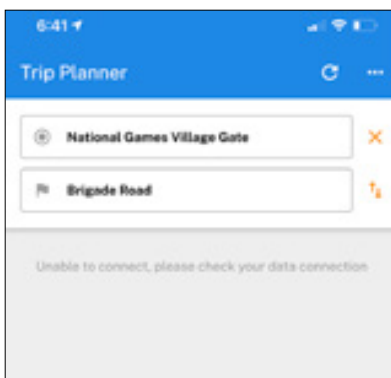
This is in accordance with the World Bank's Transport and ICT connections notes[7] that recognize how accurate information on actual departure and arrival times and service disruptions enables passengers to plan more-efficient trips. Such public information systems can also create an extra incentive for the transit agencies to maintain or improve performance, and thereby increase their ridership.

current status of wayfinding information in bengaluru

Currently, in the absence of well-defined guidelines by Bruhat Bengaluru Mahanagara Palike (BBMP) or Bangalore Metropolitan Transport Corporation (BMTC) around citizen-focused signage or a well-defined data-sharing policy, there is non-uniform implementation of various systems. BMTC has implemented Passenger Information System (PIS) projects with limited success[8] in the past with many buses not being tracked in the last two years and is currently tendering similar components again.

While providing dynamic information requires significant technological interventions and cost investments, the city's basic static signage system is plagued with significant issues, as shown below.

1. BMTC app search interface struggling with server issues

Online
The BMTC app and website is only accessed by the digitally literate.

- The app is user-friendly with route maps and search options for bus stops available in English and Kannada.

- However, the app and website has very limited/information on the various buses on the routes.

- Further, real time tracking is missing for a few buses.

2. Faulty destination LED board inside a BMTC volvo

Offline
- **Static signage:** Most neighborhoods in the city do not have signage stands/posters with adequate and updated information. Most signage is currently outdated, damaged and covered by flyers severely impacting their relevance. A list of important information is given as part of the recommendations section.

- More specifically under BMTC's ambit, LED boards outside and inside buses are functional in most Vajra buses but in the General non-AC buses, these may not always be functional. Information on fares are present only in Vajra buses, but their less-than-ideal

3. Route map from Kempegowda
   Station at a Bellandur bus stand
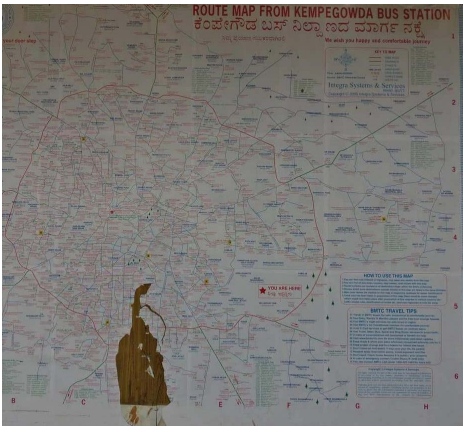
location means that most users rely on the fare prescribed by the conductor

- Most stops do not have maps, the few that do, show the current location with relation to the rest of the city which may not be useful.

- A major issue with platform boards at depots is that the communication design for this display type is far from convenient as the names are not arranged in any useful order (alphabetic, region-wise, etc.) but are instead arranged by route number— which requires some prior knowledge to quickly search for the exact bus.

- Information desks are available only at depots and staff may often be responsive only in Kannada, which may pose a problem to non-native speakers.

kinds of wayfinding information—static and dynamic

The primary objective of this policy brief is to recommend widespread implementation of wayfinding information throughout the city. The idea behind such information- dynamic or static, is to equip citizens at any major juncture in the city, with enough information to make navigation through public transit or non-motorized transport (NMT) a seamless experience.

While there is a brief mention of the need for data sharing and guiding principles for the 'city mobility stack', the Draft Comprehensive Mobility Policy, 2019,[3] has very little focus on information sharing through signage or through online platforms. In addition to the high cost involved in executing Smart Transportation projects, making such data available requires a well-defined data sharing framework which incentivizes all stakeholders while keeping easy access of information for citizens at the crux of it. This would require a considerable amount of work and co-ordination between the multiple stakeholders before moving to the implementation phase of an elaborate dynamic system. Therefore, this brief advocates focusing on providing static information to citizens through signage and posters which can be accessible to a greater section of the population before moving to the dynamic or open-data information.

Static wayfinding solutions

Static wayfinding solutions provide information that does not change frequently and largely remains constant over time. This includes all the necessary information required for navigating any neighborhood and includes resources such as maps, information about nearby bus stations and the routes served, tax/auto stands, NMT hubs, nearby points of interest, fare details among others. While static information involves low upfront investment and implementation efforts, it's still limited in terms of the kind of insights it can provide citizens which makes dynamic signage crucial.

Dynamic wayfinding solutions

Dynamic Information goes beyond information about locations and how to get there and provides real-time and accurate information from multiple sources such as CCTV cameras, automatic traffic counters, map services, and data from various public and private transportation service providers.

Case studies: examples of cities with successful implementation of static wayfinding information

The Successful Story of TfL

Transport for London (TfL) introduced the famed Oyster card—a contactless smart card in 2003. Good signage has assisted commuters in navigating the extremely complex multi-modal transport system that the city has to offer.

Impact: TfL considers signage to be extremely crucial in increasing ridership of its buses and considered an overhaul of the information provided to passengers to make it easier to understand where buses are headed to and how frequently. The budget in 2017 accounted for this transformation showing how crucial it is to attract riders.

TfL has a standard color-coding and lettering mechanism based on extensive research to understand which colour-combinations and sizing catch one's eye. The minimum sizes are determined based on an average person's eyesight.

Symbols and pictograms[9] are used at stations to convey different types of information, such as an airport route, parking, cycle availability, etc.
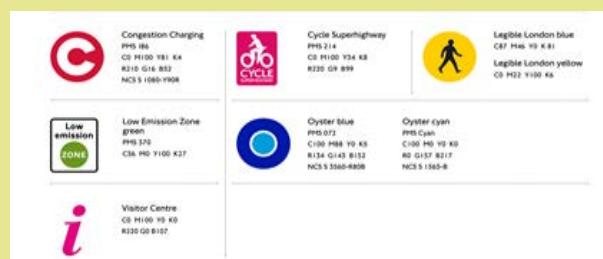
Each bus-stop is well defined with its name clearly shown on the signage board along with the routes served by the particular stop. General wayfinding information is also clearly available at all major points/junctions on a street showing a hyperlocal map and prominent locations that are at a walkable distance with the estimated time to walk to these places.

Examples from Namma Bengaluru

Within Namma Bengaluru itself, a successful example is the navigation and signage project in Cubbon Park[10] designed in 2018 based on inputs from the public. It includes:

- Maps of the 195-acre park including monuments and a 5km mini-marathon route supplemented by markers on the pavement to help runners identify the route

- Bloom cycle board with names and locations of trees, and blooming season as well as fauna information

Another project within the city, is the "You Are Here"[11] wayfinding signage project that was undertaken by the Residents Welfare Association in Indiranagar. A set of 5 signage boards were placed in the vicinity of the metro station and aimed at helping residents and others navigate the locality. The map contained layers of information including parking zones, cultural landmarks, transit hubs, etc.

Both these case studies are based on the work done by Sensing Local, Bengaluru.

recommendations

Improvement of pedestrian infrastructure

Signage and pathfinding systems that are built using leading design principles and a citizen centric approach encourage and enable people to walk/use public transport more often and to more destinations.

The following set of design recommendations aim to guide policymakers on how to go about building a consistent, citizen centric and integrated pathfinding system for the city.

Critical information for a leading pathfinding system

Heads-up map: A focused/heads-up map displaying the citizen's current location as well as all the major roads, bus stops, auto/taxi stands, metro, sub-urban rail stations, NMT hubs, etc. nearby.

Information on nearby points of interest: List, location and walkability of nearby points of interest and the various routes to these points of interest.

Public transport information: For the nearest points of interest on the focus map, the estimates trip duration with each possible mode of transport (for e.g. walking, metro, bus, etc.).

Fare and route details: For each available mode of transport, the fare, route and other details such as bus no., metro line, etc.

BMTC-specific details: For pathfinding systems located at bus stops, list of bus numbers serviced by the bus stop, their routes and schedules must also be present.

Transit-hub-specific information: For pathfinding systems located near major transit hubs, a mini metro/bus/sub-urban rail map for the citizen to navigate different cross-platform interchange points should be set up.

NMT-infrastructure-related information: Infrastructure elements such as pedestrian network, cycle tracks, safe crossings, skywalks, etc., as and when built, should also be highlighted through the maps.

Emergency service details: Emergency contact details for women and child safety, road safety, ambulance, fire and police services, etc., should be present.

Nearby amenities: Apart from information around nearby points of interest, other relevant information such as location and distance of nearest restrooms, public bench, WIFI zones, Indira canteens, hospitals, etc. should also be included.

Neighbourhood signage inspired by Sensing Local's Indiranagar*
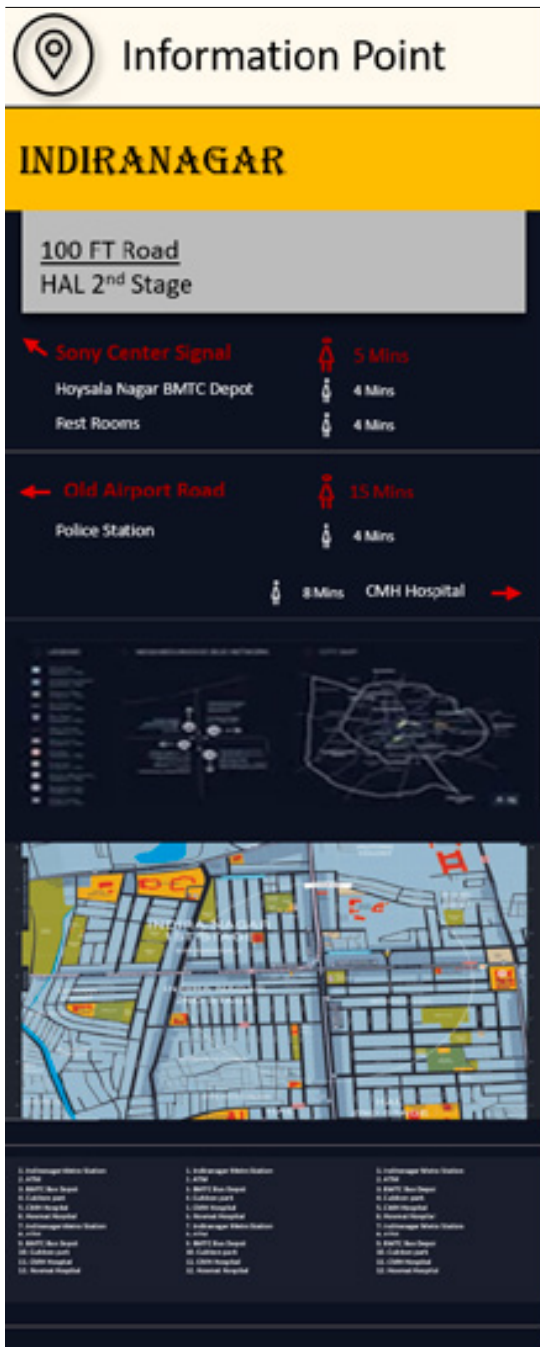
Bus stop signage

*Mock-up inspired by Sensing Local's Indiranagar prototype

Design principles for a efficient pathfinding system

In our audit of the existing pathfinding infrastructure, we found that while certain neighborhoods in the city do have an existing Pedestrian Signage System in place, more often than not it lacks essential information, consistency, up-to-date information and is often vandalized to the point where its use and relevance is severely limited.

In order to prevent this from happening to the new infrastructure that is proposed in this document, the following design principles may be followed:

1. **Accessibility:** The pathfinding system should be multi-lingual. Further, the pathfinding stand should be well illuminated and easily readable at night.

2. **Intelligently positioned:** Pathfinding stands must be installed ensuring that they have clear visibility and line of sight, with no obstructions. Further enough space should also be available around the signage for citizens to stop and access the information without obstructing the movement of others.

3. **Disabled-friendly:** Important pathfinding information must be present in Braille as well. Further, the pathfinding stand must be placed such that it is accessible by wheelchair users.

4. **Intuitively designed:** Overall content presentation should be as visual as possible to make the pathfinding system intuitive, immersive and easy to understand. Icon size images of tourist attractions, visually depicted topography, lakes, etc. Clear visual cues illustrating how walkable major points of interest are from a particular point further encourages citizens to walk or use non-motorized transport.

5. **Updated information:** Constant effort must be taken to ensure that the pathfinding stands are kept up-to-date with nearby infrastructure changes. (Updating the focus map with cycling infrastructure as it gets built)

6. **Citizen-centric approach:** It is important to take citizens into confidence during the entire process, so that they see such infrastructure as their own and take onus of protecting it. To identify ideal locations and content for each pathfinding stand, focused surveys should be conducted with residents of such neighborhoods.

7. **Consistency and integration:** Strict control measures must be undertaken to ensure that all pathfinding systems in the city are consistent, clear and follow the same design principles. Different legends, color coding, etc. lead to confusion and build resistance among citizens to use such information. Further all the pathfinding infrastructure needs to be integrated and talking to one-another for facilitating the citizen in his end-to-end journey and promoting intermodality.

A well-illuminated pathfinding system

Visual cues in pathfinding system to depict walkability

Well-spaced pathfinding system with enough space for citizens to stop and access*

Consider these[12] while designing a citizen centric pathfinding information system:

- What information will the citizen need at key decision points in his/her journey?

- Can children and elderly see and understand the information?

- Is the most basic information conveyed in a way that reduces or eliminates language and literacy barriers?

- Can the information be updated in a timely and efficient manner if the routes or systems change?

- Is the information conveyed in accessible ways for people with disabilities?

- Do users need information in multiple languages?

*Mock-up inspired by Sensing Local's Indiranagar prototype

# scaling up: moving towards dynamic pathfinding information

A static information system is a great starting point for any city, as it increases citizen autonomy, promotes walking and use of public/non-motorized transport and makes navigation throughout the city a seamless experience.

However, as mentioned before, a static public information system suffers from some limitations. This is where the importance of eventually scaling up to a dynamic signage system becomes imperative, despite the high cost and initial integration effort involved in its implementation.

A dynamic information system encourages the use of public transport by providing the following information to the citizens.

- Real-time schedule status/ETA of buses, metros/sub-urban rail networks: While small bus stops/minor metro/suburban rail stations can have information only pertaining to their mode of transport, integrated multi-modal data needs to be available on major transit hubs and landmarks throughout the city.

- Information around availability of different last mile connectivity alternatives at any given transit point and the fare and ease of availability of each, dynamically updated.

- Crucial information around breakdown in metro/suburban rail services, traffic blockages, accidents, etc.

- Simple solutions, such as count of passengers on a bus displayed on an LED screen at the front of the bus, would go a long way in encouraging use of public transport. This leads to more informed decision-making, and especially relevant in times marred by COVID-19, where physical distancing is a requisite.
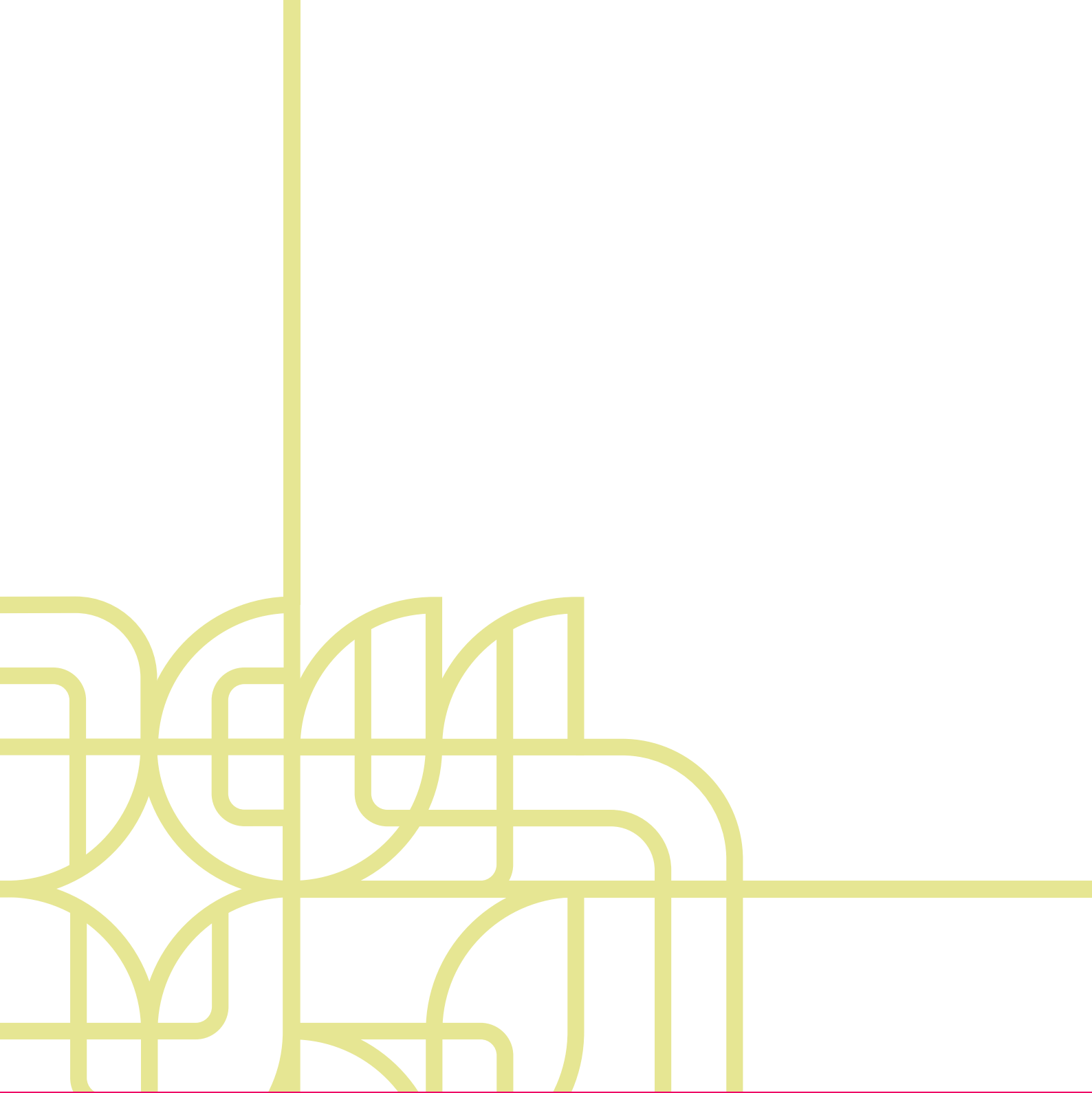
conclusion
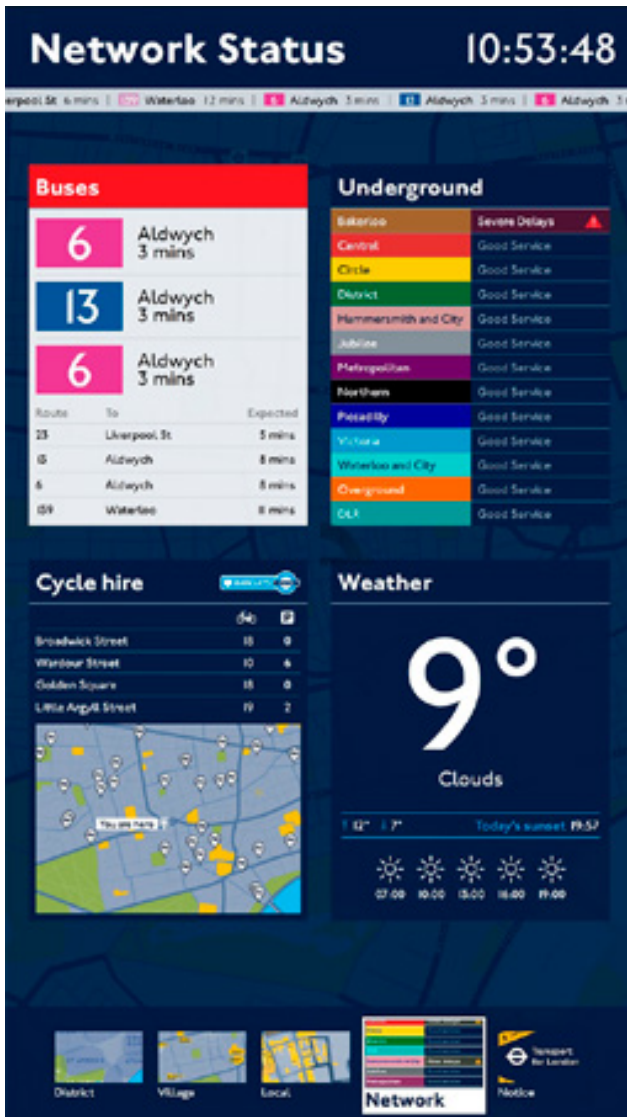
An example of a dynamic, integrated and multi-modal facilitating pathfinding system

By creating integrated, consistent and intelligently built pathfinding systems that ultimately contain information that is well integrated into the context of the citizens, public/non-motorized transport can be developed as a real alternative to private transport. An increased use of public transport can reduce congestion and local climate issues. By providing integrated information, intermodality can also be supported.

With the support of state urban planning bodies and zealous citizens, we can together help Namma Bengaluru find its way to public transport!

endnotes

1. "Tracing five decades through Bengaluru's mobility " (The Hindu, June 21, 2020)

2. Tom Tom Traffic Index: Global Traffic Congestion Up as Bengaluru takes crown of 'World's Most Traffic Congested City' (Jan 29,2020)

3. Comprehensive Mobility Plan for Bengaluru (2019)

4. Table 2-6, Comprehensive Mobility Plan for Bengaluru (2019)

5. Innovative Public Transport Information Systems (2016)

6. Ease of Moving Index- India Report, Ola Mobility Institute (2018)

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8. "BMTC set to receive full tech support" (Bangalore Mirror, June 22, 2020)

9. Color Standards, Issue 4, Transport for London (http://content.tfl.gov.uk/tfl-colour-standards-issue04.pdf)

10. "Lost in Cubbon Park? These Maps will guide you" (Times of India, June 14, 2018)

11. 'You are Here', Wayfinding Signage in Indiranagar , Sensing Local (Projects)

12. From Here to There, A creative guide to making public transport the way to go, Embarq Report by Eric Weber