



ADVANCING
PUBLIC
TRANSPORT



▶ REPORT

HOW TO MAKE STATIONS LIVELY HUBS FOR CITIZENS AND PUBLIC TRANSPORT USERS: SOLUTIONS

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INTRODUCTION

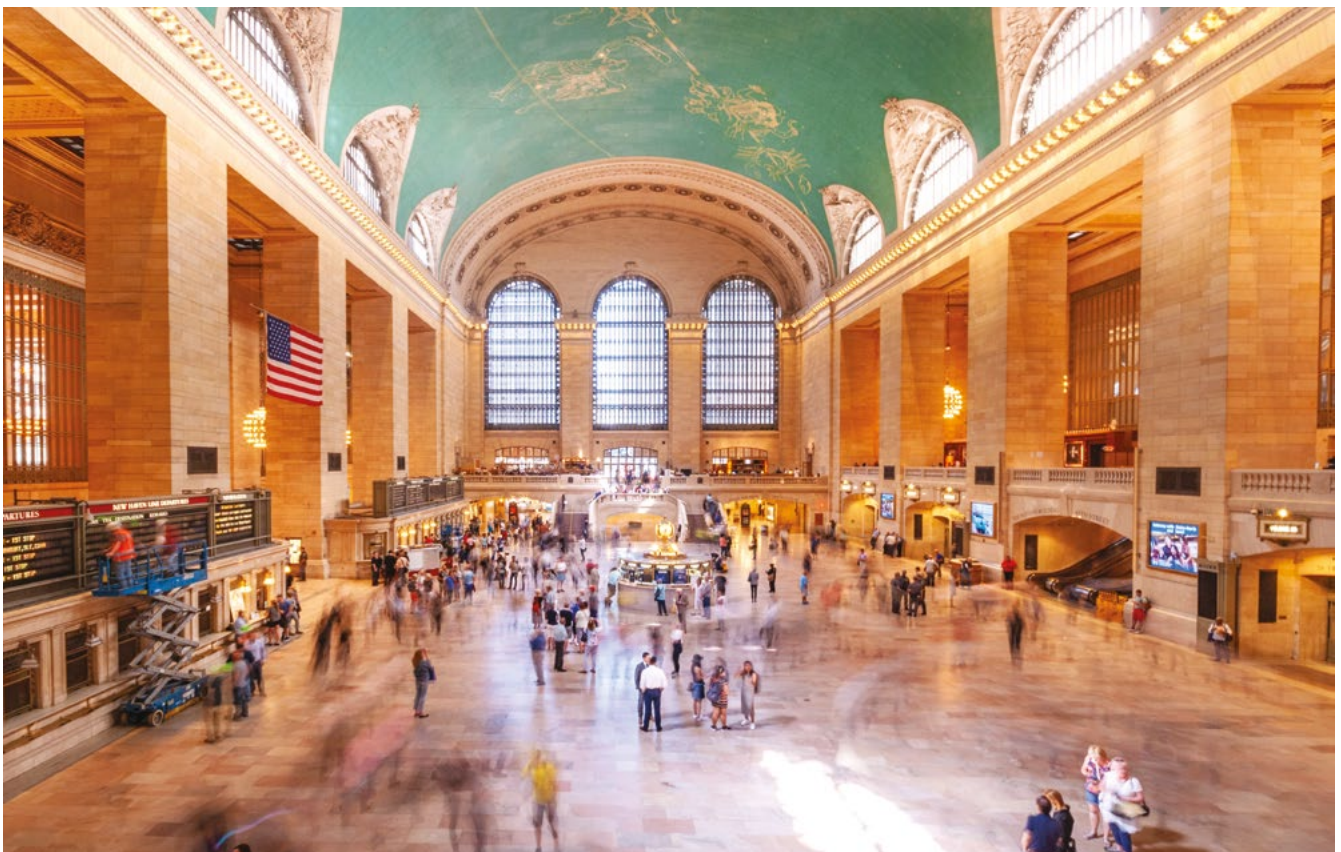
The role of stations in our cities is evolving, and it is important to ensure that they are designed and developed to meet the changing needs of society. With this in mind, the International Association of Public Transport (UITP) has partnered with KONE, a global leader in the elevator and escalator industry, to launch the ‘Stations of the Future’ project.

By sharing knowledge and insights, the project aims to understand what - from a station user’s perspective - is needed, and how to attract more users to stations and to public transport. The project focuses on analysing what can be improved at various touchpoints within the user journey throughout the station. In addition, it seeks to draw attention to the importance of stations in the public transport ecosystem, and to inspire operators and industry with ideas for solutions.

Building on the first report, which highlighted those societal, economic and technological observations

and trends that may impact the role and functions of stations,¹ this edition offers potential solutions for stations to meet the growing needs of its users. It examines stations from two perspectives; that of the user and that of the sector. It identifies various solutions associated with each stage of a user’s journey through the station, which address to one or more of the challenges facing station operators. In this report, the solutions - both for already-existing stations and for new projects - have been collected from the workshops, as detailed in the methodology below. The report has also collected best practices and use-cases from around the world, demonstrating the most effective approaches to station development and enhancement.

The stations of the future will be improved versions of those of today and tomorrow, and this report will be of interest to anyone interested in public transport, station development and the future of our cities.



¹ <https://www.uitp.org/news/how-to-make-stations-lively-hubs-for-passengers-stations-of-the-future-project-publishes-first-study/>

METHODOLOGY/CONTEXT

The aim of this study was to identify the needs and expectations of distinct groups of passengers, and to explore how stations can be made more welcoming and inclusive for all. The study used journey mapping to understand the main stages of the passenger experience at the station and to identify essential touchpoints for improvement. To extract requirements, two demographic groups were chosen; Generation Z and representatives of the Silver Economy. These groups were selected in recognition of the changing expectations of users over time and to highlight the importance of catering to different, yet significant, customer segments. The analysis identified four significant differences in needs, as well as common needs important for all categories of passengers. Key challenges identified included the following:

- Speed of movement: Passengers move at different speeds through public transport systems. Some passengers prioritise a fast journey at every touch point, while others require more time for their journey and value convenience more than speed.
- Digital proficiency and autonomy: passengers have differing levels of digital proficiency. This affects their autonomy in travelling. Some passengers feel comfortable using their mobile phone to plan and navigate, and prefer self-service solutions and others prefer human contact for information and assistance.
- Integration of station and city: Stations are a steppingstone in a journey and a landmark within a city. In order to suitably reflect on this function, stations should be better integrated into the urban fabric and transport services available be better connected with the options that take you further.

Workshops and brainstorming sessions were held in various locations, including Singapore, Jacksonville, Delhi and online, gathering input and solutions from transportation industry experts and stakeholders. The data collected was supplemented through desk research, best practices and observations. The study timeline included desk research in the summer of 2022, and active work and organisation of workshops from September 2022 to March 2023.

To address the needs of station users, we identified several key challenges that operators face. We provided solutions in response to these challenges, which are organised according to the user journey flow. These cover essential areas of the station, such as the entrance, concourse (including the ticket hall), ticket gate area, corridors/stairs/elevators/escalators, platform and exit. The solutions are also labelled by type; technology, infrastructure or management.

The study's limitations include the lack of direct involvement of passengers or station users and the need for further research on the governance and management of aging stations, which can be an opportunity for future exploration.

As part of the project, we issued a call for best practices; these can be found in an Annex to this report.



² <https://internationalserviceandinstitute.com/the-story-of-the-journey-map-the-most-used-service-esign>

³ 'Generation Z' refers to those born between 1996-2012, shaped by the digital age, climate anxiety and COVID-19. Termed 'digital natives' due to their reliance on mobiles, internet and social media, they prefer self-service options over personal assistance.

⁴ The 'Silver economy' refers to well-off and mobile travellers aged 60 and above with active lifestyles. They'll have a growing impact on global spending power, growth and jobs. They prefer smooth, pleasant travel and appreciate staff assistance while using public transport.

CHALLENGES AND SOLUTIONS

CHALLENGES

To enhance the user experience of the station and attract more people, transport station operators must address several key challenges that we identified through our research and workshops:

1. Managing people flows

As the number of users in transport stations continues to grow, the careful planning of station operations and management is increasingly important to ensure a smooth and enjoyable experience. One of the primary challenges that operators face here is managing the diverging people flows with people moving at different speeds.

2. Improving connectivity with the surrounding urban environment

Another challenge for operators is to improve the connectivity between stations and the surrounding urban environment. Seamless integration with the city and other modes of transportation can simplify door-to-door travel for commuters and attract more citizens and public transport users.

3. Enhancing station amenities for greater user well-being

In today's fast-paced world, transport stations are no longer just places to wait for trains or buses but are becoming social and economic hubs where people can shop, dine, relax and enjoy various types of entertainment. This presents a unique opportunity for operators to create spaces that cater to passenger needs while also appealing to the wider community as well as investors.

In response to these challenges, the solutions presented in this report follow the station user's journey flow. This covers key areas of the station, including the entrance, concourse, ticket hall, ticket gate area, corridors, stairs, elevators, escalators, platform and exit.

JOURNEY MAP

In order to organise the themes in an understandable form, this report uses a journey map, following the path of a station user as they move through a station. The following section identifies user requirements and discuss solutions along the steps of the map.

Defined solutions are defined in three categories:



Technology



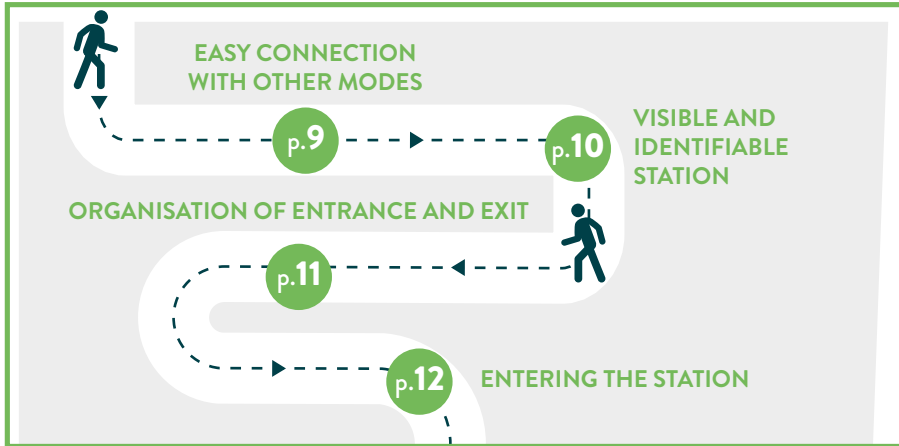
Infrastructure



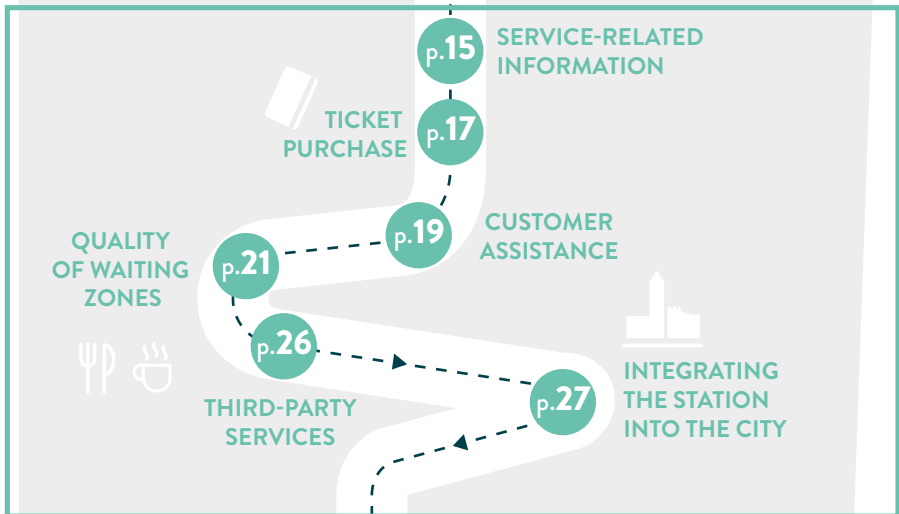
Management



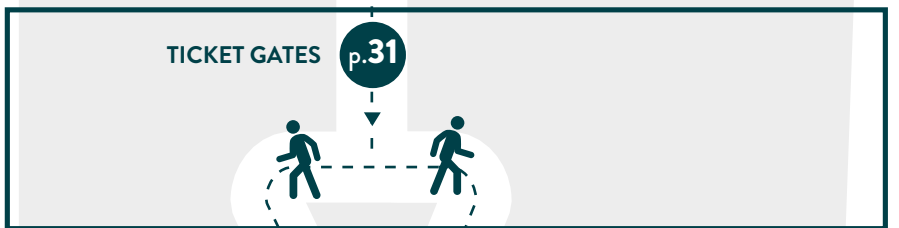
ENTRANCE



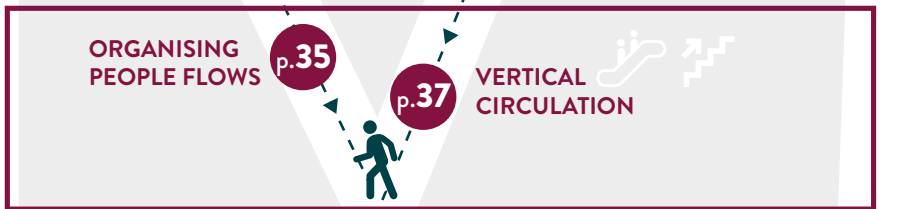
CONCOURSE/
TICKET HALL



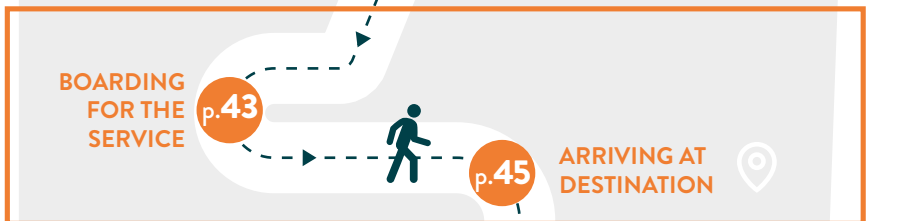
TICKET GATES



CORRIDORS
STAIRS
ELEVATORS
ESCALATORS



PLATFORM



EXIT





ENTRANCE

ARRIVING AND FINDING YOUR WAY

Entrances of stations are gateways into the public transport network. As a key touchpoint for those using the station, entrances should attract and be welcoming to users.

EASY CONNECTION WITH OTHER MODES

SOLUTION NAME:

DEDICATED DROP OFF AREAS FOR SHARED MOBILITY



Improving connectivity with the surrounding urban environment – ‘Intermodality’

➤ WHY

People may arrive at the station via other transport means, needing to park or drop off vehicles to continue their journey.

➤ WHAT

Dedicated drop off zones should be provided for the shared vehicle services available in the area. In order to promote sustainable mobility and to make efficient use of the available urban space, environmentally friendly transport modes and shared services should be prioritised.

➤ UITP POLICY BRIEF – MOBILITY HUBS STEERING THE SHIFT TOWARDS INTEGRATED SUSTAINABLE MOBILITY

While not all mobility hubs are stations, all stations are mobility hubs. This UITP Policy Brief provides advice and Best Practices for Mobility Hubs.

SOLUTION NAME:

SIGNAGE FOR PARKING AND DROP OFF POINTS FOR TRANSPORT ALTERNATIVES.



Improving connectivity with the surrounding urban environment – ‘Information’

➤ WHY

Certain stations may not be within the reach of other modes, and users will need to travel by car. Information should be provided on topics such as the number of spaces, opening hours and prices.

➤ WHAT

Information about parking should be made available either online or clearly on the road before arriving at the station; it should also be well signposted in the station. Real-time information can be provided by small inset screens on road signs.

The same information should also be provided for alternative modes. Information for modes such as car sharing, ride hailing, scooter/bicycle charging points or demand responsive transit can be provided inside stations, where these options exist.

⁵ The UITP Policy brief on Mobility hubs can be read here: <https://www.uitp.org/news/mobility-hubs-steering-the-shift-towards-integrated-sustainable-mobility>

VISIBLE AND IDENTIFIABLE STATION

SOLUTION NAME:

ICONIC STATION IDENTIFIER



Improving connectivity with the surrounding urban environment – ‘Wayfinding’

➤ WHY

Station users need to be able to easily identify the entrance into a network. Some may be confused by the various signs due to information noise, particularly if there are several for a single station. This is especially important for those less users familiar with the area.

➤ WHAT

A single identifier, common to all stations in the area, will help indicate the station entrance. This identifier needs to be recognisable from a distance and should be unified throughout the entire public transport system. This can also be useful for avoiding promoting one operator over another, and can be used in marketing to make the system even more identifiable.

➤ TfL – ROUNDEL

Station identifiers come in all shapes and sizes; one of the most identifiable is the TfL roundel, which retains its shape for all modes and can be easily recognised.



ORGANISATION ENTRANCE AND EXIT

SOLUTION NAME:

BIKE ENTRANCE



Improving connectivity with the surrounding urban environment – ‘Intermodality & People Flow’

➤ WHY

Station users should be aware of the suitable entrances and paths when moving through the station with a bike.

➤ WHAT

Providing a dedicated entrance from a bike-parking area can encourage more cyclists to use the station, while also reducing conflict points between users at entrances.

SOLUTION NAME:

ACCESSIBLE ENTRANCES (PRM)



Improving connectivity with the surrounding urban environment – ‘Accessibility’

➤ WHY

People with reduced mobility should be able to access the station via at least one entrance, preferably via all. These entrances should also be kept in good condition, particularly where there are no alternative accessible entrances.

➤ WHAT

Ideally, PT systems should be fully accessible and adapted to all people, including those with reduced mobility. In addition to being fully accessible, stations should also be cleaned and maintained regularly to ensure a pleasant travel experience for all users, free of any unpleasant smells or discomfort.

As this is not always the case, any entrance dedicated for people with reduced mobility should be identified indicating the path to the platform and vehicle with any details on blocked routes shared with users in advance. Multiples of each equipment should be available.

➤ METRO DE MADRID – ACCESSIBILITY AND INCLUSION PLAN

Metro de Madrid launched its accessibility and Inclusion Plan in 2016 to enable full autonomy for those with reduced mobility and/or sensory/cognitive difficulties by installing elevators and improving complementary measures. More information can be found in the Rail Success Stories report.

➤ KAYSERI ULASIM - UNHINDERED ACCESS PROJECT

Working with university students, Kayseri Ulasim provides assistance, particularly in boarding and alighting. In addition, the project provides part-time paid employment for university students. More information can be found in the Rail Success Stories report.

SOLUTION NAME:

DEDICATED ENTRANCE AND EXIT



Improving connectivity with the surrounding urban environment – ‘People Flow’

WHY

- Station users need to be able to enter the station without encountering any obstacles, including conflicting flows of people that might create congestion.

WHAT

A solution to avoid congestion is to separate people flows by having clearly identifiable, dedicated entrances and exits. This can help to reduce the number of conflict points in the people flow, particularly during peak hours.

Clear demarcation of entrances and exits, using lights or small barriers that change in real time, can manage people flows dynamically.

ENTERING THE STATION

SOLUTION NAME:

LIGHT ACCLIMATISATION AT STATION ENTRANCES



Enhancing station amenities for better user well-being – ‘Comfort’

WHY

Station users need to feel comfortable moving from one area to the next, particularly when moving from a bright to a dark location.

WHAT

Light should change as gradually as possible to make the station more attractive as a location, and so that people are not discouraged from entering the station. Entering a dark station can be uncomfortable, but if the change is gradual, the user will feel safer and at greater ease.

The lighting should also change dynamically, in line with the brightness levels outside. This creates a more unified space and creates less of a barrier to those entering the station.

SOLUTION NAME:

SHELTER TO CREATE WEATHERPROOF ZONE



Enhancing station amenities for better user well-being – ‘Comfort’

➤ WHY

Station users should be protected from the weather when entering and exiting the station.

➤ WHAT

Station exits and entrances should have a shelter extending out from the building for those entering or maybe waiting for a connecting mode of transport. Depending on the climate, this can be a simple awning structure as protection from the rain to a more substantial structure protecting users from high temperatures or heavy rainfall.

SOLUTION NAME:

AWARENESS OF OUT-OF-ORDER EQUIPMENT



Enhancing station amenities for better user well-being – ‘Information, Accessibility & Reducing Frustration’

➤ WHY

In advance of their arrival at the station, users should be made aware of the status of facilities that may have an impact on their visit, particularly those linked to accessibility.

➤ WHAT

Before arrival at the station, information should be available online as to the status of essential facilities such as elevators or toilets and alternative arrangements where needed. This allows users to feel more in control of their journey and to feel supported knowing that alternatives are available.

Real-time information could be shared within the app and taken into account in travel planners to provide a personalised journey.

➤ With increasing numbers of digital tools becoming available, the ‘digital concourse’ is now available in the pockets of many station users. Travel companions can support users with information on routes in real time, providing alternatives and directing station users to routes with functioning equipment as per their preferences / requirements. More on this can be read in the final section of the report.

An example of real-time information of the availability of elevators and escalators can be found on the websites of RATP (Paris)⁶ and WMATA (Washington DC).⁷

⁶ <https://www.ratp.fr/services/etat-equipement>

⁷ <https://www.wmata.com/service/elevators-escalators/Elevator-Escalator-Service-Status.cfm>



CONCOURSE / TICKET HALL

SPENDING TIME

Stations as well as their concourses are often seen simply as places where people pass through, devoid of any real connection with those in it – a ‘non-place’.⁸ For stations to become attractive, they should form a bond with users, making them a space to be appreciated by both travellers and locals alike.

⁸ M. Augé, *Non-Places: Introduction to an Anthropology of Supermodernity*

SERVICE-RELATED INFORMATION

SOLUTION NAME:
DIGITAL DISPLAYS



Enhancing station amenities for greater user well-being – ‘Information & Wayfinding’

› WHY

Station users, particularly passengers, need clear and real-time information.

› WHAT

Digital displays providing dynamic information to passengers. Information overload and confusion should be avoided.



SOLUTION NAME:
PROJECTORS



Enhancing station amenities for greater user well-being – ‘Information & Wayfinding’

➤ **WHY**

Information, particularly of a type that may be new, dynamic or potentially important for somewhere that might impact people flow, should be provided in innovative ways that do not cause any physical obstructions but can still gain the user’s attention.

➤ **WHAT**

Innovative solutions for providing information can be to use a projection - either still or animated - to guide people to their destination. This could also potentially indicate departure times or to advertise services or retail outlets in the station.

➤ Static floor markings may not be as attention-grabbing as dynamic or interactive wayfinding. Projectors can be used to increase the interaction between the user and the information in order to bring them effectively to their destination.⁹

SOLUTION NAME:
TIME/DISTANCE TO PLATFORM INDICATIONS



Enhancing station amenities for better user well-being – ‘Wayfinding & Allowing Users to Feel in Control’

WHY

➤ Having a relatable way to understand the station allows station users to plan their movements within its confines.

➤ **WHAT**

Walking distance/time to the platform should be indicated, to allow passengers to plan how and when they will move through the station.

Departure information does not need to be the same across the whole station. At various locations it may be appropriate to remove information about the next departures when it is no longer possible to reach the vehicle without rushing.

⁹ https://uclic.ucl.ac.uk/content/2-study/4-current-taught-course/1-distinction-projects/1-17/wanyu_fu_2017.pdf

TICKET PURCHASE

SOLUTION NAME:

MULTIPLE PAYMENT OPTIONS



Enhancing station amenities for better user well-being – ‘Alternatives & People Flow’

➤ WHY

Passengers should have the option to pay using the widest range of options possible.

➤ WHAT

Numerous forms of payment should be accepted. Queues at ticket vending machines or service counters can be reduced if passengers can pay for their journey in advance, or pay directly at ticket gates with bank cards or mobile phones.

➤ MTR HONG KONG - MOBILE QR PAYMENT

Introduction of the option to pay by QR code has diversified payment options and is a milestone in the company's digital transformation paving the way for changing passenger behaviours. During the COVID-19 pandemic, the option to pay by QR code was welcomed. More information can be found in the Rail Success Stories report.

➤ METRORIO (RIO DE JANEIRO) - CONTACTLESS PAYMENT

The first Brazilian subway operator to accept contactless payment, MetrôRio improved the customer experience, reduced the cost of sales and contributed to a seamless transition between different modes of transportation. More information can be found in the Rail Success Stories report.

SOLUTION NAME:

USER-FRIENDLY TICKET VENDING MACHINES



Enhancing station amenities for better user well-being – ‘Accessibility & Reducing Frustration’

➤ WHY

Ticket machines should be user-friendly and intuitive.

➤ WHAT

Ticket vending machines need to be intuitive in order to reduce frustration, queues and make reliance on support of staff unnecessary. Instructions should be clear and concise, displays readable and interfaces should offer a choice of languages.

SOLUTION NAME:

REMOTE SUPPORT FOR TICKET VENDING MACHINES



Enhancing station amenities for better user well-being – ‘Customer Support & Reducing Frustration’

WHY

Support for using ticket vending machines is essential.

WHAT

If no staff are present, ticket vending machines should offer the possibility to connect with a member of staff, who can then provide personalised support and assistance.

SOLUTION NAME:

NOTIFICATIONS FOR LOW JOURNEYS/EXPIRING TICKETS



Enhancing station amenities for better user well-being – ‘Allowing Users to Feel in Control & Information’

WHY

Travellers should be informed about low credit balances or expiring journeys on their transport ticket when it is not easily visible.

WHAT

Notifications via an app linked to a customer account can inform travellers about their tickets. It should have the option to automatically top up or could show where to do it nearby.



CUSTOMER ASSISTANCE

SOLUTION NAME:

CUSTOMER SERVICE CENTRE



Enhancing station amenities for better user well-being – ‘Comfort & Customer Support’

WHY

While some users like - and are able to use - digital tools, others need or prefer a more-personalised assistance with human interaction.

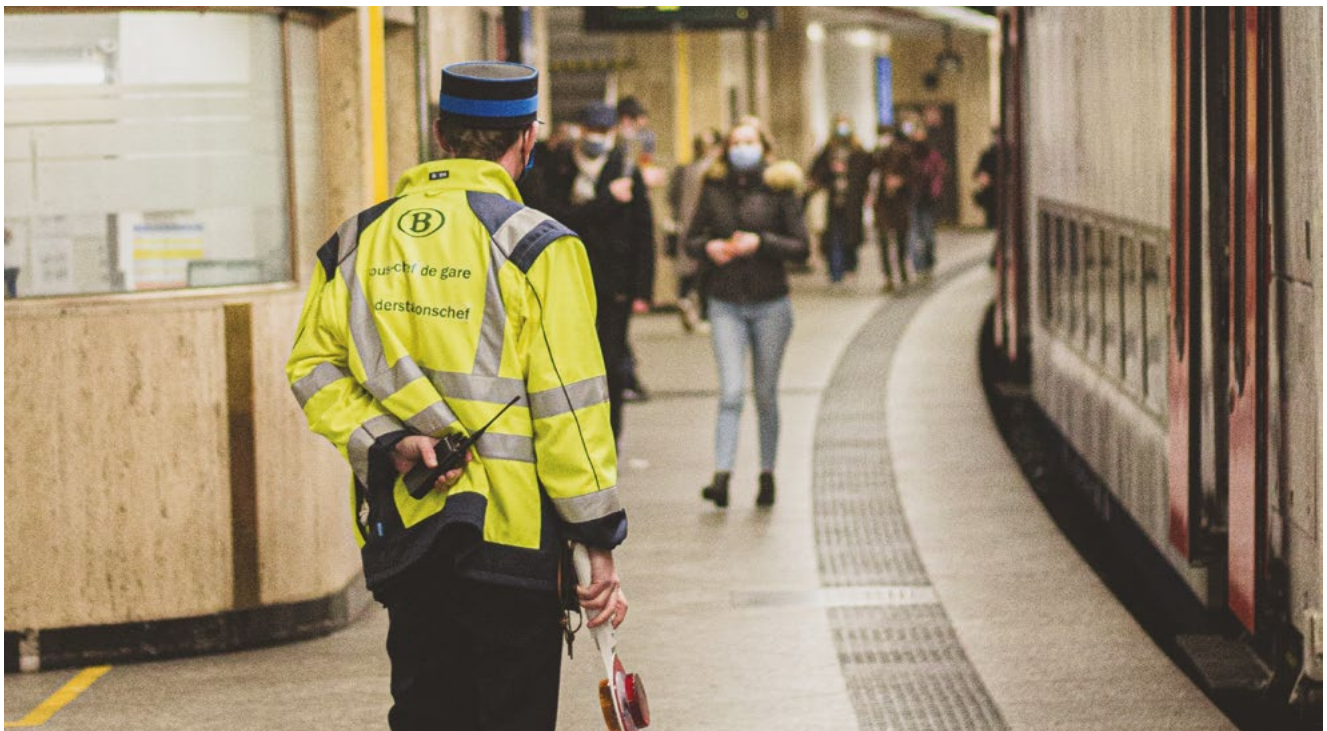
WHAT

Customer service centres should be available at major hubs or central stations to be accessible to the maximum number of station users.

Where station staff are present, they should be properly trained in communicating with users and travellers. Staff speaking multiple languages should be prioritised; however, as it is impossible for staff to know all languages, communication methods using clear pictograms/diagrams or other tools should be available, to ensure that the user still feels comfortable using the network.

SMRT - ENHANCING DEMENTIA-FRIENDLY TRANSPORT IN SINGAPORE

SMRT and the Agency for Integrated Care (AIC) have teamed up to enhance the service provision for those with dementia as they travel in Singapore. SMRT stations act as ‘Go-To-Points’, locations to be relied upon in when an issue with someone who has dementia arises. These ‘Go-To-Points’ serve as resource centres and safe return points to help people with dementia get back home.¹⁰



¹⁰ <https://www.smrt.com.sg/Announcements/articleid/smrt-and-aic-enhance-dementia-friendly-transport-in-singapore>

SOLUTION NAME:

MOBILE INFORMATION STANDS FOR EVENTS/ON DEMAND



Enhancing station amenities for better user well-being – ‘Comfort & Customer Support’

➤ WHY

Not all stations have the same facilities such as staffed service centres, which act as a point of contact between the user and the network operator. It may be inconvenient for users of a station without a staffed service centre to reach a station that would have one. Other users may be put off using the station without support.

➤ WHAT

A mobile stand can provide a similar service to the customer centre, without the need for fixed infrastructure. In addition to a more fixed agenda of locations for the mobile stands, they could be set up for a limited time when/where needed for specific events, for example sporting events, concerts or markets.

SOLUTION NAME:

VOLUNTEER/AMBASSADOR PROGRAMME – SUPPORTING THOSE NEEDING A BIT MORE HELP



Enhancing station amenities for better user well-being – ‘Allowing passengers to Feel in Control, Accessibility and Customer support’

➤ WHY

Sometimes, a station user with different needs may require a bit more support and may have different ways of understanding what is happening.

➤ WHAT

Volunteers from relevant associations or trained ambassadors from the staff can provide support, preparing those who may need extra help to be able to feel comfortable and confident when using the station and the network.

➤ METRO DE MADRID – L.A.R.A. (LÍNEA DE APOYO PARA EL REFUERZO DE LA AUTONOMÍA) [SUPPORT LINE FOR THE REINFORCEMENT OF AUTONOMY]

Metro de Madrid is enabling the use of public transport by ensuring that the system is accessible for all, including for those who may not feel comfortable navigating the network by themselves. More information can be found in the Rail Success Stories report.

SOLUTION NAME:

INSTRUCTORS TO EXPLAIN DIGITAL TOOLS



Enhancing station amenities for better user well-being –
'Customer Support & Allowing Passengers to Feel in Control'

➤ WHY

The use of digital tools is growing in public transport, and some users need support in learning how to use them.

➤ WHAT

Digital tools should be user friendly and have an intuitive interface; however, some people may need some extra help to use them. Trained instructors can be made available to help passengers understand, in a human and comprehensible way, how to use travel planners, ticketing apps and other innovative solutions.

QUALITY OF WAITING ZONES

SOLUTION NAME:

HEATING, VENTILATION AND AIR CONDITIONING (HVAC)



Enhancing station amenities for better user well-being – 'Comfort'

➤ WHY

Indoor and underground areas can at times be highly uncomfortable and make people feel claustrophobic, as can being surrounded by many other users.

➤ WHAT

Heating Ventilation and Air-Conditioning (HVAC) is essential for making people feel comfortable (temperature-wise) and safe (ventilation/airborne disease-wise).

SOLUTION NAME:

SILENT ZONES



Enhancing station amenities for better user well-being – 'Comfort'

➤ WHY

Station users who may need somewhere to concentrate, or who may need a moment away from the hustle and bustle of the station, need a place to get away.

➤ WHAT

Silent zones could be created and indicated in order to provide a calmer space for station users who prefer or need such a space.

SOLUTION NAME:
SOUNDSCAPES AND MUSIC



Enhancing station amenities for better user well-being – ‘Comfort’

➤ **WHY**

A station can be uncomfortable for some users where certain soundscapes can be very loud or unwelcoming.

➤ **WHAT**

Cutting through the announcement, birdsong or waves can provide a more welcoming environment.

Music can also provide a more homely feel. More upbeat music in the morning to get those travelling prepared, and calmer music in the evening to help people feel safer and discourage antisocial behaviours.

SOLUTION NAME:
DESIGN FOR ACOUSTIC LEVELS



Enhancing station amenities for better user well-being – ‘Comfort’

➤ **WHY**

Stations can be noisy places - the number of people, the announcements and the vehicles can make it impossible to hear clearly what needs to be heard.

➤ **WHAT**

Sound-absorbing materials or designs and art structures can help reduce noise, minimise echo and give more acoustic space to essential sounds such as announcements.



SOLUTION NAME:
SOURCE OF DRINKING WATER



Enhancing station amenities for better user well-being – ‘Comfort’

➤ **WHY**

Hydration is of great importance and those with refillable bottles need locations to refill them.

➤ **WHAT**

Simple solutions such as a source of drinking water can increase the comfort and appreciation of a station at low cost.

SOLUTION NAME:
MORE (NATURAL) LIGHT AND GREEN SPACES



Enhancing station amenities for greater user well-being – ‘Comfort’

➤ **WHY**

Underground areas in particular can feel very removed from nature and rather unwelcoming.

➤ **WHAT**

(Natural) light is an important and simple way of creating changes in emotions.

(Natural) light and green spaces provide a calming and inviting atmosphere and will mean that users are more likely feel at ease. This can be achieved through installing skylights or light wells that allow natural light to enter the station, and incorporating plants and greenery into the station’s design. Using reflective surfaces can help maximise the distribution of natural light throughout stations.



SOLUTION NAME:

ENTERTAINMENT IN WAITING AREAS



Enhancing station amenities for better user well-being – ‘Comfort’

➤ WHY

While waiting, station users require some level of entertainment to make the perceived waiting time seem shorter.

➤ WHAT

Waiting areas should provide some form of entertainment, potentially in the form of TVs and reading materials. This ensures that these passengers do not obstruct those who need to move through the station. It also provides a more-centralised point where information can be shared with the waiting passengers. Entertainment opportunities should also be provided for children.

SOLUTION NAME:

CLEAR LINES OF SIGHT



Enhancing station amenities for better user well-being – ‘People Flow, Wayfinding & Allowing Users to Feel in Control’

➤ WHY

Users need to be able to see where they need to go - even approximately - can help with wayfinding through the station.

➤ WHAT

Where possible, a direct line of sight from origin to destination within the building is ideal. This allows station users to make decisions based on estimating the times and distances that they can travel. Users will feel more comfortable knowing that they can see exactly where they need to go. Retail or additional signage should not detract from the clear lines of sight.

SOLUTION NAME:

CHARGING POINTS



Enhancing station amenities for better user well-being – ‘Comfort & Information’

➤ WHY

With the implementation of digital tools and particularly payment/wayfinding apps, users are at risk of low batteries and need power for their mobiles.

➤ WHAT

Charging points for mobile phones and other devices should be provided in the station.

SOLUTION NAME:

LIGHTING



Enhancing station amenities for better user well-being – ‘Comfort & Safety’

› WHY

Users need station lighting to be bright enough to feel safe and secure, as any areas of darkness or shadows may create safety concerns.

› WHAT

The station should be lit appropriately to ensure that station users do not feel unsafe.

The lighting should also be well-maintained and free of flickering, which can cause discomfort and headaches. Additionally, the colour temperature of the lighting should be carefully chosen to create a welcoming and comfortable atmosphere, with warmer temperatures promoting relaxation and cooler temperatures promoting alertness.

SOLUTION NAME:

DIGITAL CONNECTIVITY



Enhancing station amenities for better user well-being – ‘Comfort & Information’

› WHY

Network users should have access to a strong mobile phone signal in order to avoid feeling disconnected or unable to work, as well as being able to access the digital travel/station application available.

› WHAT

In addition to communication systems for operational purposes, operators should ensure coverage for station users; digital information on station services, timetables, the local area and payment all rely on connectivity.



THIRD-PARTY SERVICES

SOLUTION NAME:

CO-WORKING AREAS



Enhancing station amenities for better user well-being – ‘Additional Services’

› WHY

COVID-19 has increased the numbers of people working from home, with some missing the social nature of the office.

› WHAT

Co-working areas can provide a base for those who can work away from the office. Ideal locations for these, Stations are often easy to reach, making them ideal locations. It is also a financial opportunity for stations to take advantage of their often central locations and already-existing infrastructure.

SOLUTION NAME:

DELIVERY PICK-UP POINTS



Enhancing station amenities for better user well-being – ‘Additional Services’

› WHY

With online shopping forming a notable part of retail sales, those away from home may need to pick up a delivery.

› WHAT

Parcel pick up points in a station are highly convenient, allowing users to collect parcels on the way to, or from, their office or shopping.



SOLUTION NAME:

SHOPPING FACILITIES



Enhancing station amenities for better user well-being – ‘Additional Services’

➤ WHY

This provides convenience for travellers who may need to purchase essentials or souvenirs while on-the-go.

➤ WHAT

Shops at stations can help meet station users’ needs during their journey and generate additional revenue for the station and surrounding businesses. In order to improve facilities, data from surveys or applications can be used to identify which shops users want to see at the station.

➤ MTR HONG KONG – ALL-IN-ONE LIFESTYLE MTR MOBILE

With a mobile application, MTR Hong Kong has showed its commitment to continuously improving customer-oriented services (including the shopping experience) with an all-in-one application for greater convenience. Data analysis can be used to prepare for future uncertainties and challenges. More information can be found in the Rail Success Stories report.

INTEGRATING THE STATION INTO THE CITY

SOLUTION NAME:

ARCHITECTURE



Improving connectivity with the surrounding urban environment – ‘Comfort & Information’

➤ WHY

Architecture can be either off-putting or attractive and is a requirement to welcome people.

➤ WHAT

Station design can be inspired, by their local surroundings, to have a greater connection with the outside world.

For locals, it can be helpful for orientation and it can be a way to show off what is available nearby for visitors. During construction, historical items may be uncovered and spaces in the station can be used as an archaeological museum.

➤ ALGIERS METRO – IMPROVING MOBILITY ALGIERS

During construction, some archaeological remains were uncovered and put on display in stations to allow the citizens of Algiers to connect with their heritage. More information can be found in the Rail Success Stories report.

SOLUTION NAME:

QR CODE FOR ACCESS TO MORE INFORMATION



Improving connectivity with the surrounding urban environment – ‘Information & Wayfinding’

WHY

Visitors and locals alike may not be aware of nearby locations, restaurants, shops, events or landmarks.

WHAT

QR codes (stickers) at strategic places can provide a source of information about events or opening times of landmarks, which people can download and take with them.

As a digital source, it also means that the user can select the language of the information.

SOLUTION NAME:

ADVERTISING NEARBY EVENTS AND LANDMARKS



Improving connectivity with the surrounding urban environment – ‘Information’

WHY

Station users may be interested in events or new opportunities that are available around them, with the spaces in stations very valuable for the numbers that can be reached.

WHAT

Promotional material can help support cultural events taking place nearby and may have otherwise been overlooked. This promotion can take many forms, such as digital displays, posters, brochures or announcements over the PA system.

Advertisements can help to promote local businesses and provide extra income for the station. For example, transport operators and authorities could work with local restaurants or hotels to offer discounts or promotions for users who attend a particular event or landmark.



SOLUTION NAME:

POP-UP CULTURAL OR BUSINESS SPACES



Enhancing station amenities for better user well-being – ‘Additional Services’

WHY

For stations to be attractive, users need to have a reason to be in the station. Pop-up culture and business spaces can provide such a solution.

WHAT

Using temporary installations in the waiting area provide an opportunity to highlight neighbouring communities, business and activities.

Pop-up spaces or business spaces can provide an opportunity for station users to widen their horizons while in the station. The spaces can also make the station feel more like a destination and a place to be, rather than simply a place to pass through. Links with cultural activities can increase cooperation with the local community and make the station feel connected to users and local inhabitants.

CCR – PUBLIC UTILITY SERVICE & ENTERTAINMENT AND ART EVENTS

Areas within stations are made available for public vaccination campaigns, free health exams to the public and/or free massage are offered too. There can also be exhibitions of photos, campaigns, clothes at stations, with free music and cultural shows available for the passengers. The satisfaction and reputation related to the company services increases. It can attract more people to that location, thereby increasing footfall for other services of that station.





TICKET GATES: CHANGING ZONES

Ticket gates and security checkpoints mark a change in zones within a station, marked by a boundary. They inherently have an impact on people flow with congestion mitigation therefore required.

TICKET GATES

SOLUTION NAME:

VISIBLE DIFFERENCE BETWEEN PUBLIC AND FARE AREA



Managing people flows – ‘People Flow & Wayfinding’

WHY

As a station is not simply for those travelling - it can be for anyone using the services in the building - the different areas need to be clearly marked.

WHAT

Fare areas, especially in those stations without ticket gates, should be made highly visible and clear to all users. This will avoid any confusion or dispute.

SOLUTION NAME:

WIDE TICKET GATES



Managing people flows – ‘People flow & Accessibility’

WHY

Passengers may be going to an airport, pushing their child in a buggy or require a wider ticket gate for their mobility device to pass through.

WHAT

There should always be at least one ticket gate that is accessible to those who might need a wider access to the ticketed area. For those with reduced mobility in particular, this ticket gate should be easily found from the entrance.

SOLUTION NAME:

TICKET GATE SPEED



Managing people flows – People Flow

WHY

Passengers want to get to their destination as quickly as possible. Sometimes, however, going too fast can cause more issues by creating overcrowding at points that might not be able to cope with the flow.

WHAT

Timing gates that can operate slightly slower or faster, either acceptably or imperceptibly to the traveller, can improve the flow to the platform(s), increasing safety and comfort for passengers.

SOLUTION NAME:

PRESENCE OF STAFF TO HELP



Enhancing station amenities for better user well-being – ‘Customer support’

WHY

Users of the station may not be able to find the information needed through the physical or the digital tools available. They may need guidance through the gates, particularly where there are technical and other issues. Other users may prefer or need to interact with a human for purchasing tickets and for helping them pass through the ticket gates.

WHAT

Station staff members play a crucial role in reducing queues and congestion by assisting passengers at the gates. They can guide them to other gates or ticket machines if necessary, ensure that they can quickly and easily navigate through the station, as well as solve ticket validation and other problems at gates.

CCR (VLT CARIOCA) - DIGITAL MONITORING AND CONTROL OF AGENTS AND INSPECTORS POSITIONING

There is a mobile phone application in which the company’s agents and inspectors input the information of location and time of where they are, in addition to what happened. This information is available in real time to the supervisor. In the event of occurrences and contingencies, the supervisors and coordinator can check in real time the location of the agents and inspectors, allowing them to take the best decisions in to moving them from one place to another to help, mitigating risks and improving the service.

SOLUTION NAME:

DEDICATED SECURITY LANE FOR PASSENGERS WITH LUGGAGE



Managing people flows – ‘People Flow & Reducing Frustration’

WHY

Station users would like to pass through security with the minimum of disruption and without frustration, such as being behind those with (large) items of luggage.

WHAT

Dedicated luggage security lanes should be implemented. This will allow for the segregation of users according to security requirements. This can lead to greater efficiency by allowing station managers to know where to concentrate resources.

SOLUTION NAME:

DIRECTING USERS VIA A DIFFERENT ROUTE



Managing people flows – ‘People Flow & Reducing Frustration’

WHY

Passengers prefer to move, rather than wait in a queue that leads to potential congestion in certain areas.

WHAT

Sometimes, there can be more than one way for passengers to reach their destination within the station. Directing them via the longer (or shorter) route can allow the system just enough time to deal with crowding and provide a more comfortable journey. In underground stations in particular, users may not notice that they are taking a longer route.

SOLUTION NAME:

QUEUE BARRIERS



Managing people flows – ‘People Flow & Reducing Frustration’

WHY

Users often want to know where the queue starts.

WHAT

In order to coordinate the people flow in front of ticket gates or security check points, installing barriers to guide people could be considered, particularly during peak hours or major events.





CORRIDORS, STAIRS, ELEVATORS, ESCALATORS

Areas with restricted space or with vertical circulation provide challenges for people flow, as users try to reach their destination. Avoiding any obstacles or conflicting flows will increase efficiency in the available space.

ORGANISING PEOPLE FLOWS¹¹

SOLUTION NAME:

DEFINED WALKING DIRECTIONS



Managing people flows – ‘Wayfinding & People Flow’

WHY

Station users would like to move smoothly through a station and to avoid conflicts with others.

WHAT

Regulating the direction that station users are moving in will reduce conflict points and provide a smoother journey for all. Physical infrastructure, floor markings or lights could help clarify the walking directions and are more intuitive for station users.

NETWORK RAIL - STATION CAPACITY PLANNING DESIGN MANUAL (NR/GN/CIV/100/03)

The manual provides capacity thresholds for different areas across the station such as gatelines, platforms, concourse, staircases, ticket halls or elevators. It should be followed by anyone involved in the Network Rail station design process including staff, architects, train operating companies and engineering/planning consultants. It includes all calculations to assess whether a station meets Network Rail’s aspirations regarding passenger comfort and safety.



¹¹ A UITP report “Improving Passenger Flow and Crowd Management” is available here: <https://www.uitp.org/publications/improving-passenger-flow-and-crowd-management-through-technology-and-innovation/>

SOLUTION NAME:

BOLLARDS TO AVOID PEOPLE WITH LARGE ITEMS OF LUGGAGE



Managing people flows – ‘People Flow & Reducing frustration’

WHY

Removing obstacles in a station user’s path will reduce congestion in large people flows. Luggage or luggage trolleys can be difficult to manoeuvre and can constrict flow.

WHAT

Restrictions in the form of bollards at strategic locations can stop larger items of baggage passing through.

Alternative routes should be provided if these items are allowed on the vehicle. Care should be taken that the bollards themselves do not become obstacles.

SOLUTION NAME:

COLOUR CODING TO GUIDE STATION USERS



Managing people flows – ‘Wayfinding & People Flow’

WHY

Stations, particularly main transfer hubs, are often large and pose issues for navigating. Underground stations have the additional difficulty that above ground landmarks are not visible. Simple and understandable directions are required for users, particularly for those who may not speak the local language, are illiterate or may need more straightforward information.

WHAT

Colours could be used in floor design, in the walls or in the signage system. It has the added benefit of potentially making transfers for commuters faster, as colour coded guides are often quicker to comprehend than text.

SBS TRANSIT – FIND YOUR WAY

In Singapore, some larger stations deploy colours and corresponding images to help guide users to the correct exit. The images chosen are linked to the local landmarks, adding supplementary information in a quick and easily digestible way.¹²



¹² <https://www.sbstransit.com.sg/findyourway>

SOLUTION NAME:
FAST LANES



Managing people flows – ‘People Flow & Reducing Frustration’

➤ **WHY**

For stations users who know where they are going and how to get there, a minor disruption can have a major impact on their perceived time spent travelling.

➤ **WHAT**

Segregating faster and slower users via a fast and slow lane can allow those travelling quickly to make their way through the station more efficiently. Slower users can then move at their own pace.

VERTICAL CIRCULATION

SOLUTION NAME:
USER AWARENESS FOR STAIR/ESCALATOR USE



Enhancing station amenities for better user well-being – ‘Safety’

➤ **WHY**

In areas where escalators are either new or part of normal life, users might have bad habits that can also be dangerous to themselves or other users.

➤ **WHAT**

Users should be informed to have good habits when using stairs and escalators via nudging techniques or by more explicit campaigns and solutions.

Dynamic lighting using colours can be used on the steps of an escalator, indicating where to stand. This ensures people know where to step, maintains the distance between people and when to get off. More interactive solutions can include using artificial intelligence to inform users of their inappropriate use and indicate alternatives to stop accidents before they happen. Screens on escalators (and elevators) can be used to provide additional safety information and/or wayfinding.

➤ **KONE – PREVENTING UNSAFE BEHAVIOUR ON/AROUND ESCALATORS**

Video monitoring solutions, with the use of AI, can detect and prevent, in real time, potentially dangerous behaviour such as leaning over the escalator side, running or walking in the wrong direction.

It can also detect and react to people coming with objects that are too large - such as prams or luggage - and prevent potential incidents, or when the landing is crowded. Depending on the risk, the system can give an aural warning as well as guidance to use the elevators and can slow or stop the escalator

SOLUTION NAME:

REVERSABLE ESCALATOR



Managing people flows – ‘People Flow & Reducing frustration’

WHY

Vertical circulation is essential in certain locations, such as underground stations particularly for those travelling upwards. Large flows can mean longer waits and crowding.

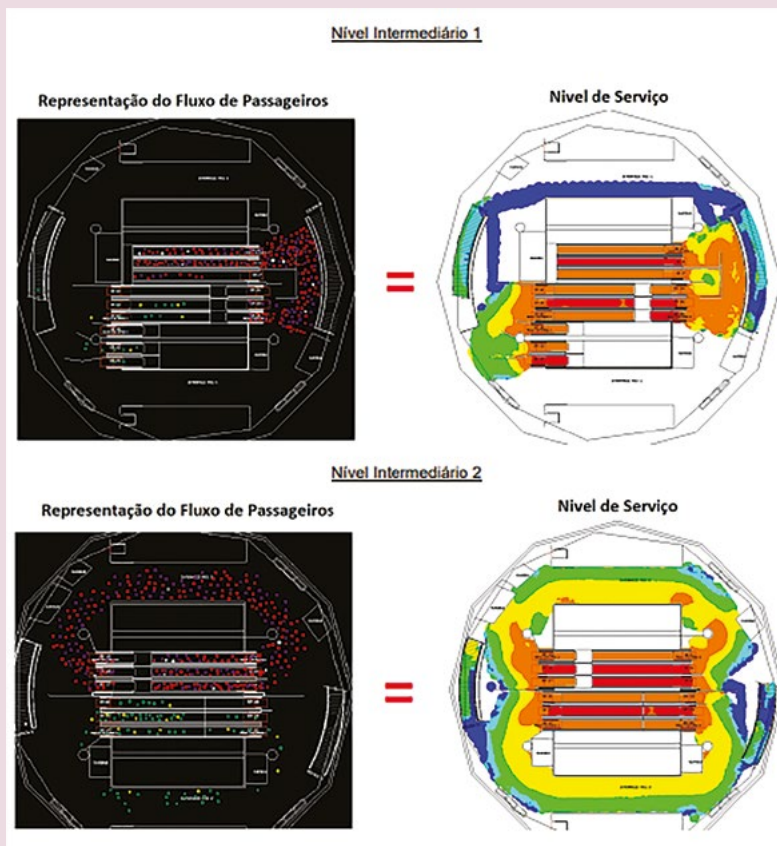
WHAT

A group of three escalators can be set up to have two operating with the flow, and one in the opposite direction. When the flow changes, one of the escalators will also change, making more efficient use of available infrastructure.

In a connected station, real-time monitoring of people flows can allow for the escalators to warn the operator of the situation or adapt autonomously such as preparing for a change in people flow when a vehicle enters the station.

CCR – FLOW ANALYSIS USING SOFTWARE

The data of the station are processed by software, and simulations of flow are undertaken to verify the best strategy for certain situations or events in that area. With this, the operation team can, for example, take certain actions such as reversing the direction of escalators, flow direction using barriers in order to improve the passenger flow.



SOLUTION NAME:
**SIGNAGE TO DIRECT TO STAIRS AS
ALTERNATIVE TO ESCALATORS**



Managing people flows – ‘People Flow & Wayfinding’

➤ **WHY**

A healthy option for some, quicker for others, users may follow the crowd to the escalators when stairs might also be available as a suitable option.

➤ **WHAT**

For shorter vertical distances, stairs provide an option for those who are able to bypass crowds on escalators. Signs can also be supplemented by campaigns promoting a healthy lifestyle and the impact of taking the stairs as an alternative.

SOLUTION NAME:
WAITING TIMES FOR ELEVATORS



Managing people flows – Allowing users to feel in control, Information & Reducing frustration

➤ **WHY**

Users appreciate knowing the waiting time for an elevator to feel in control of their journey.

➤ **WHAT**

For elevators that are not visible, it can be difficult for the user to understand when the next elevator will arrive. Indicators such as floor level can sometimes support this. However, if the elevator is running a service that is fixed (for example, stopping at all floors or only between very distant levels) the next elevator can be displayed. This will reduce the perceived wait time.



SOLUTION NAME:
INCLINED ELEVATORS



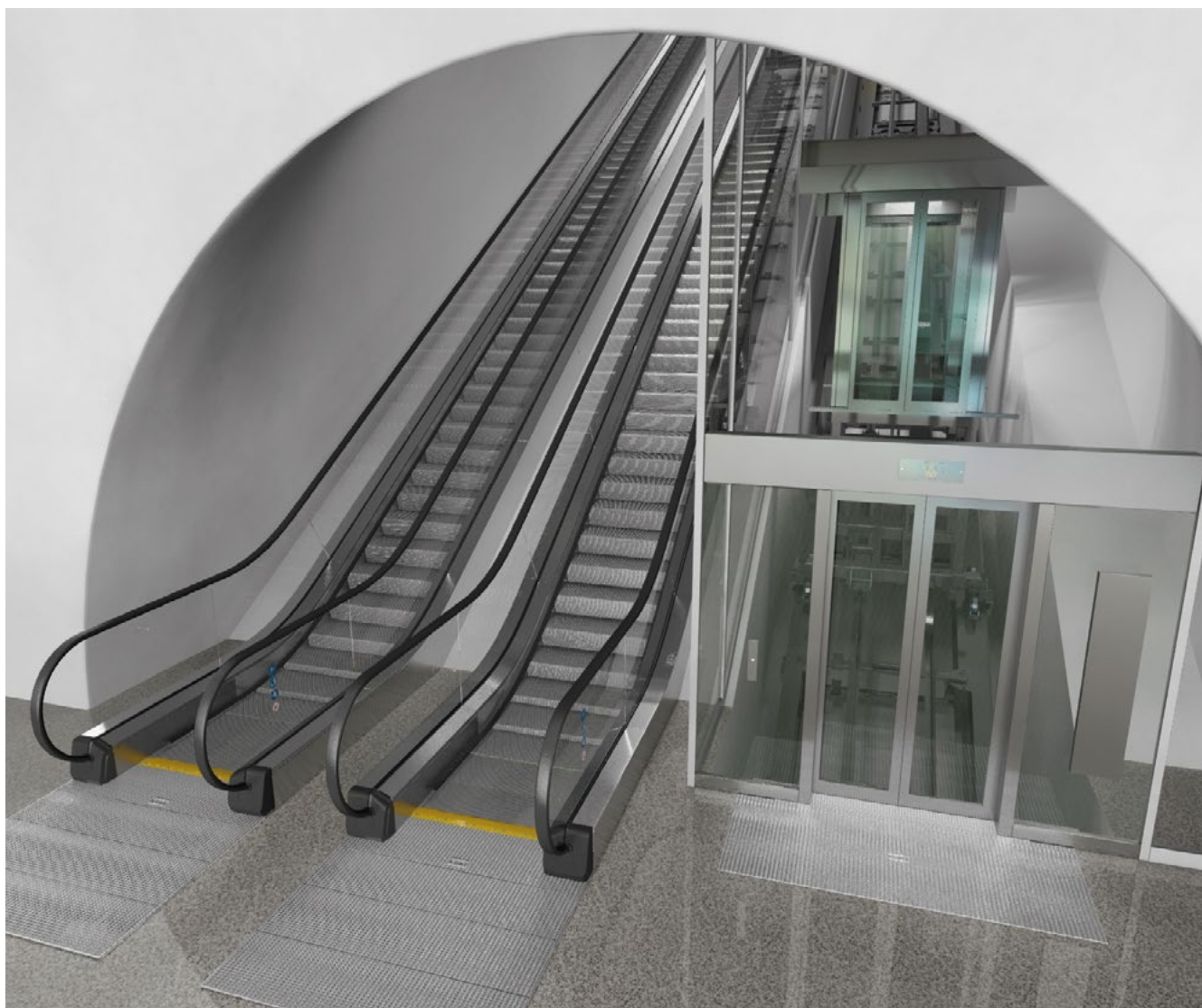
Enhancing station amenities for better user well-being – ‘Accessibility, People Flow’

➤ **WHY**

Station users who need to use an elevator might sometimes need to go a different and longer direction.

➤ **WHAT**

Incline elevators can be used to provide an alternative way of moving vertically. Often installed alongside escalators or stairs, they take advantage of already existing space without the need for an elevator shaft, improving accessibility across the station. Inclined elevators are therefore an ideal solution for stations where an additional lift shaft may not be feasible or might have an impact on station layout by making it more complicated.



SOLUTION NAME:
SMART ELEVATORS AND ESCALATORS



Managing people flows – ‘Accessibility, People Flow & Reducing Frustration’

➤ **WHY**

Less down time of infrastructure ensures accessibility, people flow and reduces frustration.

➤ **WHAT**

Connected elevators and escalators as well as other installations can be continuously monitored to ensure their availability. Monitoring and identifying problems in real time allows timely and swift corrective maintenance as well as any predictive or preventive maintenance. This helps minimise disruptions in people flow and dissatisfaction.

Automatic elevator landings can be programmed to wait at certain floors, or - in a fully connected station - autonomously take into consideration people flow when, for example, a train or bus enters a station or when connected to other machines such as robots or wheelchairs.





PLATFORM

The interface between station and vehicle, the platform is the place where people and their mode of transport connect. This connection needs to be as smooth and safe as possible, but also as pleasant as possible given the very nature of vehicles.

BOARDING FOR THE SERVICE

SOLUTION NAME:

EVEN DISTRIBUTION OF PASSENGERS



Managing people flows – ‘Wayfinding & People Flow’

➤ WHY

Passengers might not be able to see the full length of the platform and thus do not use it efficiently.

➤ WHAT

Floor markings indicating that passengers should move away from the entry point can be used.

They can guide passengers to use the entire boarding zone available and help to avoid crowds.

Another solution is to nudge passengers by putting services or retail options that attract them farther from the entry point.

SOLUTION NAME:

INDICATE TRAIN OCCUPANCY



Managing people flows – ‘People Flow & Allowing Users to Feel in Control’

➤ WHY

Understanding the occupancy level of the arriving vehicle is useful for a passenger to know what to expect.

➤ WHAT

Harnessing data available from vehicles can provide information on the train occupancy, nudging passengers to less crowded areas of the vehicle. This results in a smoother boarding and alighting process and for passengers to perceive being more in charge of their journey.

➤ SNCF - OCCUPANCY MONITORING WITH HECTOR

SNCF created a digital service to display occupancy in real time, allowing passengers to change their positions on the platform to facilitate boarding and alighting, increasing performance. More information can be found in the Rail Success Stories report.

SOLUTION NAME:

INDICATE POSITION OF ONBOARD FACILITIES



Managing people flows – ‘Information’

WHY

In preparation for boarding, passengers should have information on the facilities and layout of their vehicle.

WHAT

Screens and timetables can indicate the composition of the vehicle and the location of on-board facilities, so that passengers can know in advance of what will be available, and where. In addition, platforms can be marked or signposted to indicate the location of specific carriages or vehicles, allowing passengers to stand in the appropriate location for efficient boarding and disembarking.

SOLUTION NAME:

PLATFORM SCREEN DOORS



Enhancing station amenities for better user well-being – ‘Safety & Comfort’

WHY

Users would prefer to have platforms that are not noisy, have proper ventilation and are at the same time safe, particularly when crowded.

WHAT

Platform screen doors that separate the travellers from the vehicle, which helps to avoid accidents. Other benefits are that noise from the vehicles can be reduced, and ventilation and air-conditioning can be more easily controlled.

SOLUTION NAME:

SENSORS TO DETECT FALLS



Enhancing station amenities for greater user well-being – ‘Safety’

WHY

Passenger safety, particularly at the intersection between platforms and the tracks/road, should be monitored.

WHAT

Sensors or cameras can identify a passenger who has fallen on the tracks, stop traffic and inform those who need to be involved and automatically stop the appropriate systems.

SOLUTION NAME:

EMERGENCY/INFORMATION POINTS



Enhancing station amenities for better user well-being – ‘Safety & Customer Support’

➤ WHY

Station users need to have a direct contact to the relevant staff member in case of emergency or for information.

➤ WHAT

Emergency/Information points allow people to call for support in the event of emergencies or problems.

Alternatives to static points include robots or holograms, which can be more interactive / intuitive for users.

ARRIVING AT DESTINATION

SOLUTION NAME:

PICTOGRAMS TO SUPPORT WAYFINDING TO EXITS



Improving connectivity with the surrounding urban environment – ‘Wayfinding & Information’

➤ WHY

Users should be aware of which exit to use to leave the station.

➤ WHAT

Pictograms of landmarks on the respective exit signs provide users with a clear sense of direction, from the moment they alight onto the platform.

SOLUTION NAME:

TIME SENSITIVE DIRECTIONS TO SPECIAL EVENTS



Improving connectivity with the surrounding urban environment – Wayfinding & People flow

➤ WHY

The station users for events might not be familiar with the station near the stadium, theatre, or other event space.

➤ WHAT

During events, additional clear information should be available. Real time data with time-sensitive directions can allow users to be more aware of options/departure times as well as any other information.



EXIT

An exit is only the beginning of another stage of the user's journey, with some users completing their last mile connection while others are potentially continuing their journey. Connection to the surrounding area is essential, from informing users of transfer options to other modes, to what can be found in the surrounding area.

NEXT SERVICE

SOLUTION NAME:

DIRECTIONS TO CONNECTING SERVICES



Improving connectivity with the surrounding urban environment – ‘Intermodality & Wayfinding’

WHY

Passengers require information on how to continue their journey with other services and connecting modes.

WHAT

Signage should be at visible and strategic places both inside and outside the station to show directions to any connections or alternative modes.

SOLUTION NAME:

DEPARTURE INFORMATION FOR CONNECTING SERVICES



Improving connectivity with the surrounding urban environment – ‘Intermodality & Wayfinding’

WHY

Passengers require real-time information to understand their journey or organise alternatives.

WHAT

Passengers should be provided with dynamic information indicating departure times.

RESEARCH

In order for data to be shared¹³ for all those interested in providing connecting services, a standardised format or format interpreter should be used. In the European research projects NAPCORE¹⁴ (centralised National Access Points for all transport data) and Data4PT¹⁵ (format interpreter and validator), both seek to promote data sharing in a way that benefits all.



¹³ <https://www.uitp.org/publications/sharing-of-data-in-public-transport-value-governance-and-sustainability/>

¹⁴ <https://napcore.eu/>

¹⁵ <https://data4pt-project.eu/>

CONNECTING WITH THE URBAN SURROUNDING

SOLUTION NAME:

MAP AND VISUALISATION OF SURROUNDINGS



Improving connectivity with the surrounding urban environment – ‘Wayfinding & Information’

▶ WHY

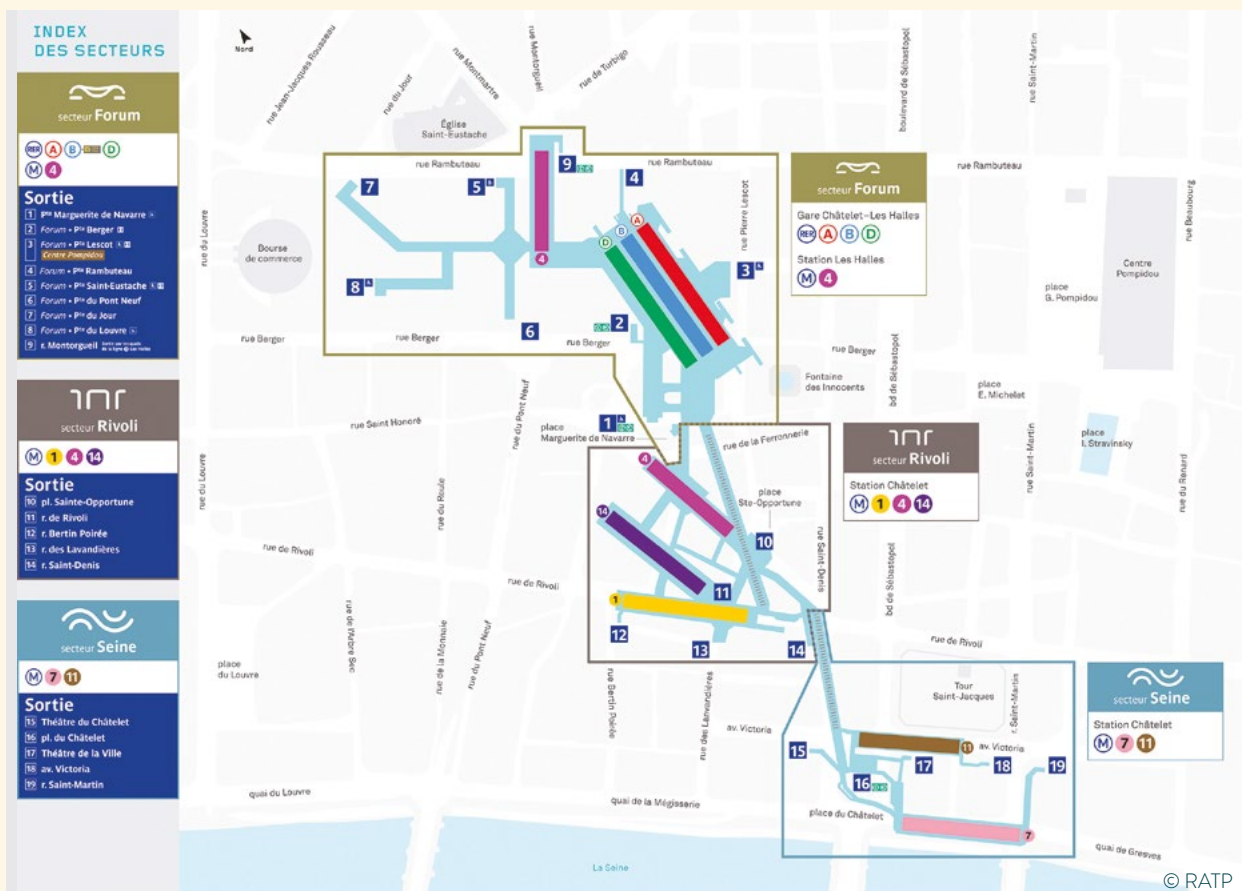
Users need to know which direction they would need to go – a line of sight to some local surroundings can help.

▶ WHAT

Where possible, the surroundings should be visually represented, in a way that is understood by all. An example could be indicating directions by using the different surroundings of a station such as a park, the city centre, or a museum district – with signs reflecting these as travellers might not know the names, areas or streets.

▶ RATP/SNCF – CHÂTELET-LES-HALLES STATION

An interconnected complex made up of three individual stations and one of the largest underground stations in the world, Châtelet-Les-Halles is split into the three sections to make it easier to navigate.



SOLUTION NAME:

HIGHLIGHT CONNECTING PATHS TO MAJOR LANDMARKS



Improving connectivity with the surrounding urban environment – Wayfinding & Information

WHY

Stations are the gateways to certain areas and landmarks, so it is important that stations have reliable indications of what can be found outside

WHAT

For those unfamiliar with the area and whose destination might be the landmark, wayfinding and information of the surrounding area needs to be provided in the station to help orient people and direct them to their destination.

RESEARCH

As part of a project of the Shift2Rail Joint Undertaking, one of the objectives was to investigate the integration of augmented reality (AR) into the Location Based Experience (LBE) functionality of the Travel Companion that was being developed. The use of technologies such as AR can enhance the experience of the surrounding area as well as the station, informing users of what was around them and the station.¹⁶



¹⁶ <https://projects.shift2rail.org/download.aspx?id=0758bde2-098e-4f12-b6d9-86977adf5ca0>

MAKING THE UNSEEN SEEN: ENHANCING THE STATION EXPERIENCE BEYOND PHYSICAL TOUCHPOINTS

The previous sections have focused on physical touchpoints for users at a station. However, many aspects - which may have an abstract touchpoint from the point of view of the user - may not have been covered. The following sections will introduce how the experience of station users can be improved in ways they might not even be aware of.

THE POTENTIAL OF DIGITALISATION AND DATA

“Digital concourse”

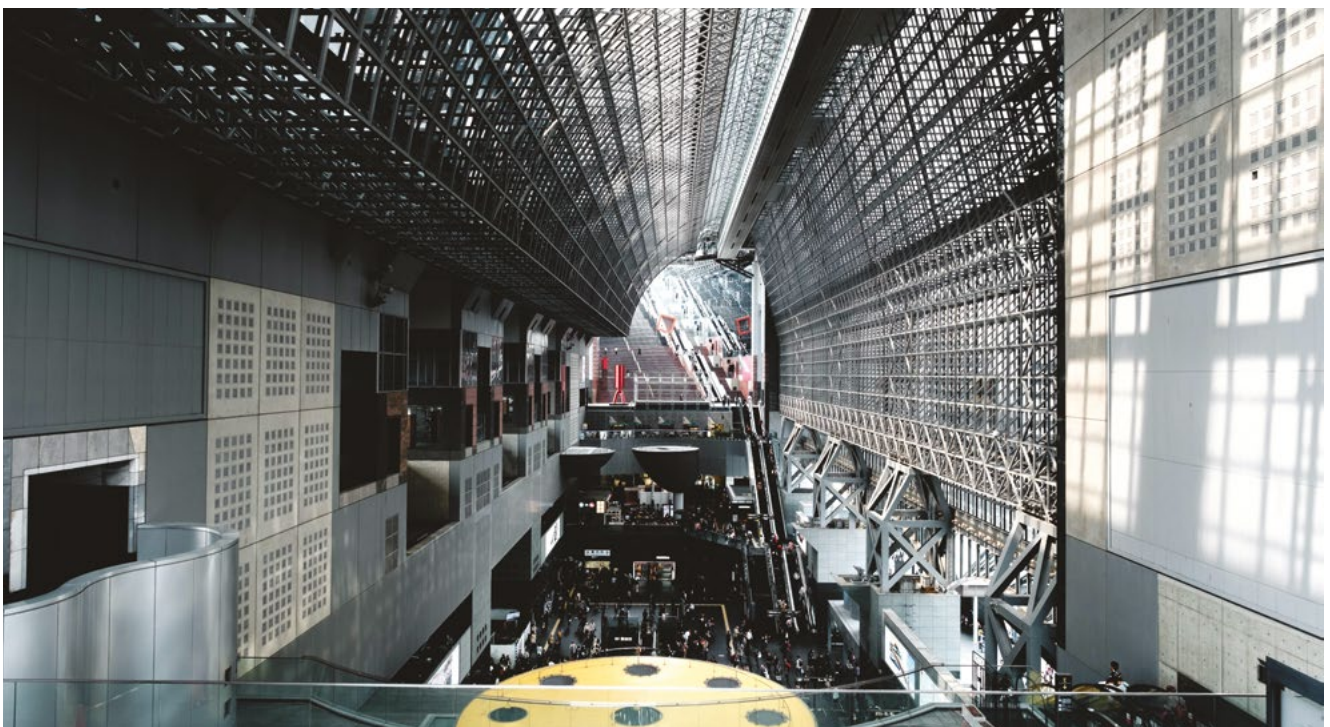
One of the abstract touchpoints is the significant development in digital services. From online ticketing to travel companions that replace some of the services

offered at the station concourse, digitalisation has brought customised travel experiences based on passenger preferences such as comfort, mode of transport and moving style. These services might include real-time information on facilities availability (such as toilets, retail and other services) at stations before arrival, automatic alerts and rerouting based on real-time traffic information, notifications on ticket status and customised recommendations for station users, such as route mapping with advice on which train car or exit to use.

With the emergence of AI development organisations, as well as natural language-processing chatbots and applications, new opportunities have arisen in the field of travel companionship. AI can now compose the best travel routes and recommendations based on users’ needs and expectations, providing personalised and tailored travel experiences.

▶ BEST PRACTICES: TRIP-TRACKER

Citymapper is a popular public transit app and mapping service that displays transportation options, with live timing, between any two locations in supported cities. It is available both as an app and on the web, and is widely used for urban commuting, providing information on buses, trains, metro, scooters and mopeds. The app’s features include turn-by-turn directions for all public transport modes, real-time travel updates and alerts for delays and disruptions. Citymapper can be used to plan and optimise travel routes, save favourite locations and set up alerts for disruptions or delays.



DIGITALISATION IN PLANNING AND OPERATION OF STATIONS

The rapid pace of technological advancements has also significantly impacted the design and operation of stations. Technologies such as the Internet of Things (IoT), Artificial Intelligence (AI), and Machine Learning (ML) have made it easier to gather, process, and analyse large quantities of data, improving cost efficiency, safety and customer experience.

To plan and design stations effectively, several tools are available. Building Information Modelling (BIM) creates digital representations of a station's physical and functional characteristics, while Geographic Information Systems (GIS) capture and manage spatial data. Both Virtual Reality (VR) and 3D modelling, combined with simulation software to form the digital twin support the visualisation of design options, optimise efficiency holistically and simulate potential behaviour of station users, ensuring high standards and minimising costs.

Digital twins play a crucial role in the operation and maintenance of stations. By creating a virtual representation of the station and its systems, a digital twin allows for quality control, scenario simulation, predictive maintenance and asset management, providing real-time monitoring. Sustainability evaluation and construction simulation are also key components of a digital twin.

Data collection and analysis from these tools are critical elements of station digitalisation. In addition, data from other sources, including people flow patterns and equipment performance, can be collected and analysed to optimise station layout and design, adapt service offer and plan asset maintenance. Leveraging these tools helps stations operate efficiently, ensuring a high-quality experience for their customers. As such, data-driven decision-making is essential in achieving station optimisation and providing seamless travel experiences.

▶ BEST PRACTICES: DIGITAL TWIN FOR IMPROVING CUSTOMER EXPERIENCE¹⁷

St Pancras station has deployed a real-time digital twin to enhance the customer experience and station performance. The focus is on prioritising positive emotions in station users, which are crucial in attracting and retaining users. The digital twin provides performance data for optimising wayfinding, advertisements and crowd management. It also monitored social distancing during the pandemic. There are plans to expand the technology to link people flow across different stations, lines and train carriages for system-wide optimisation.



¹⁷ <https://www.rssb.co.uk/what-we-do/insights-and-news/blogs/real-time-digital-twin-of-st-pancras-station-and-journey-to-create-an-emotion-optimised-railway>

GOVERNANCE AND FINANCING: HOW TO MAKE THIS HAPPEN?

While this report does not focus primarily on station governance, it is important to recognise the critical role that governance plays in developing stations. In this section, we will briefly examine two key aspects; collaboration between stakeholders to improve the user experience, and governance of station development. Although these aspects are crucial, it is important to note that station governance is a complex issue, one which requires further exploration and discussion that goes beyond these two points in order to have a holistic approach to understanding the topic.

Examples of collaboration to improve the station experience

Collaboration between stakeholders involves developing stations as destinations, rather than simply places to pass through. By fostering collaboration among stakeholders for services not directly related to transport, and by leveraging data analyses, stations can better understand the needs of their customers and offer relevant services and facilities. This approach enables infrastructure managers and SMEs at stations to adapt ancillary services and increase non-fare revenues, ultimately creating fully-fledged and diverse spaces for users to enjoy.

JR EAST - TRANSIT-ORIENTED DEVELOPMENT

TAKANAWA GATEWAY CITY is an effort led by JR East in partnership with various stakeholders, including state and city authorities, the railway industry, public transport operators, and others. The project covers a 9.5-hectare area, comprising offices, residences, hotels and commercial facilities, with Phase I slated for completion by FY 2026. The project is part of a broader initiative to create a Transit-Oriented Development model, and the recently opened new station has already become one of Tokyo's busiest rail nodes with significant potential.

The Tokyo metropolitan area authorities are playing a critical role in the project's development, with the primary objective of creating a new centre that fosters collaboration between companies and talent from around the world, driving innovation and culture. JR East Group is leading the project, aiming to fulfil its social responsibility and achieve sustainable growth.

The ultimate goal of TAKANAWA GATEWAY CITY is to accelerate the area's changing dynamic and enhance the convenience of life in the region. Achieving this objective requires close collaboration and stakeholder involvement in TAKANAWA GATEWAY CITY.



Another important point is to recognise the role that stations play in providing access to special events in the city. By promoting public transportation in conjunction with these events, local authorities can encourage non-regular users onto public transport. One approach to achieving this is to offer combined transport and event tickets, creating closer synergy between transportation and activities in the city. It can also assist crowd management efforts, which is a critical consideration for ensuring public safety during large-scale events.

STIB/MIVB – EVENT PASS¹⁸

Many transport agencies, including STIB-MIVB, offer an Event Pass that allows event attendees to access public transport without any additional fees. This pass is included in the ticket for events such as concerts, shows and football fixtures. The primary goal of the Event Pass is to provide attendees with a hassle-free experience by eliminating concerns over traffic and parking.

¹⁸ https://www.stib-mivb.be/article.html?l=en&_guid=30fa3e16-098e-3410-a38a-c8fdc3647d64

In addition, it is crucial to contribute to the safety of stations as public spaces and prevent unwanted behaviours. One of the solutions is to extend security-related partnerships beyond the station itself that can help engage with local inhabitants. Community outreach programmes, including those for immigrants and homeless people, neighbourhood watch groups and public safety campaigns, can help create a stronger sense of community and encourage individuals to take pride in their local area.

STM – COLLABORATIVE SUPPORT FOR HOMELESS POPULATIONS IN MONTREAL¹⁹

In November 2020, Montreal launched the Metro Intervention and Concertation Team (EMIC) to aid the homeless population, who were greatly affected by the pandemic. The team comprises a police officer, an inspector from the operator and a social worker. They patrol the metro network and guide people towards the right resources. EMIC collaborates with other teams, including the Mobile Reference and Intervention Team for the Homeless. Info-Crime Montreal generously donated CAN\$12,000 to set up EMIC, which was used to purchase necessary equipment, clothing and food for those in need.

LA METRO - 'RESPECT THE RIDE' PROGRAMME²⁰

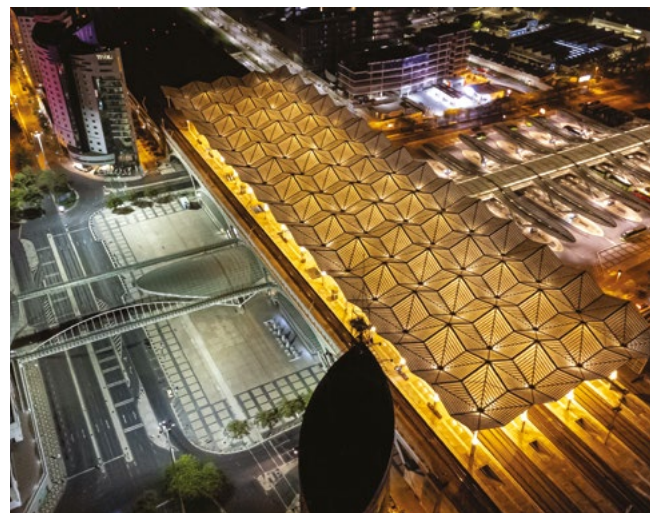
LA Metro launched 'Respect the Ride', a pilot programme aimed at improving safety and the customer experience on the system. LA Metro is deploying a range of staff to help riders navigate the Metro system, to use the Transit app and to remind everyone of good transit etiquette. Metro is also adding more custodians to keep stations clean and working with security staff and law enforcement partners to ensure safety. The programme also includes outreach efforts to connect unhoused riders with social services and housing. The Metro Board approved spending of US\$5 million annually for more outreach, case management and temporary housing for unhoused riders.

THE CROSS RIVER RAIL EXPERIENCE CENTRE²¹

The Cross River Rail Experience Centre is an innovative initiative developed in partnership with the Queensland Museum. Its purpose is to engage the local community and educate visitors about the Cross River Rail project, which is aimed at improving public transport, reducing traffic congestion and creating jobs in Queensland. The Experience Centre offers interactive exhibits and displays showcasing the project's construction process and progress, providing visitors with a comprehensive understanding of its impact on the community.

Examples of governance for station development²²

Effective governance in station development requires early cooperation in areas such as land use, transport planning and investment. This entails planning for growth and potential new urban developments with a Transit-Oriented Development (TOD) focus, including the provision of affordable housing. Collaboration is also necessary for station planning and the activation of public spaces in the vicinity. In essence, successful station development hinges on integrated planning and cooperation from the outset.



The governance of ageing stations, particularly those with historical significance, presents distinct challenges that demand collaboration between diverse stakeholders.

¹⁹ <https://rapportspvm2020.ca/emic-a-new-specialized-team-to-help-highly-vulnerable-individuals/>

²⁰ <https://thesource.metro.net/2022/04/06/metro-launches-respect-the-ride-pilot-program-to-improve-customer-experience-and-safety-on-system/>

²¹ <https://crossriversrailexperiencecentre.qld.gov.au/>

²² The UITP 'Better Urban Mobility Playbook' can be read here <https://www.uitp.org/publications/better-urban-mobility-playbook/>

To devise a successful strategy, engaging with local communities, heritage organisations, transport authorities and urban planners is essential. Similarly, governance of brownfield stations involves repurposing previously developed land for new uses, and requires cooperation between local authorities, developers and environmental agencies to ensure sustainable redevelopment.

NETWORK RAIL - PRESERVING HISTORY IN THE KING'S CROSS STATION REDEVELOPMENT PROJECT²³

The King's Cross Station Redevelopment project is one of the finest practice examples of collaboration and preserving historical architecture. Network Rail, the local council, heritage organisations and architects worked together to bring the Victorian station into the 21st century, while creating new public spaces and facilities. Partners provided a range of services, including transport planning, engineering, security, IT, lighting design and impact assessment. The project included a comprehensive energy master plan, consideration of social and economic impacts, and the ensuing benefits were widely shared. The sympathetic restoration of the station's facade and train shed, new Western Concourse and 150m 'diagrid' roof preserved the Victorian architecture while transforming the station into a dynamic transport hub and vibrant new part of the city.

REPURPOSING OF ITALIAN STATIONS²⁴

The growing interest in cycling tourism in Italy has led to the regeneration of small and medium-sized train stations in inland areas. These stations are being transformed into 'green mobility hubs', offering services for cycle tourists and local inhabitants. Redesigning the entire building and external areas fosters territorial development and promotes the combined use of bicycles and trains, contributing to the modal shift towards collective transport. By using these stations as urban and territorial gates, small towns in the countryside can be sustained and the local economy reinforced. This initiative also improves the rail system by connecting isolated areas and promoting sustainable tourism.

Another aspect mentioned in our project's workshops was making stations more environmentally friendly and energy efficient. This involves adopting passive construction techniques and implementing smarter energy management solutions such as monitoring consumption, adjusting usage during peak hours and reducing electricity in less-used areas. In addition, some projects incorporate green energy sources to further reduce environmental impact.

DELHI METRO RAILWAY CORPORATION - HARNESSING SOLAR POWER AND ENERGY EFFICIENT STATIONS IN DELHI²⁵

Station design can have a large impact on energy consumption. As such, the standards used for stations are being reviewed by the government. Delhi Metro Rail Corporation has already been taking energy efficiency into account with solar panels on the roofs of stations and other buildings, as well as alongside tracks. Metro stations in Delhi are already being considered as green buildings as certified by the Indian Green Buildings Council.

It is also worth mentioning the governance solutions for addressing the investment risks of station development projects, which require significant investment. An integrated project approach, involving multiple partners to share risks and optimise investments along with inter-municipal development agreements, can be effective solutions. Additionally, PTOs cooperation, tax funding and commercial facilities are other financing solutions worth considering.



²³ <https://www.networkrailconsulting.com/our-capabilities/network-rail-projects/kings-cross-station-redevelopment-programme/>

²⁴ <https://cityterritoryarchitecture.springeropen.com/articles/10.1186/s40410-017-0069-x>

²⁵ <https://www.delhimetrorail.com/pages/en/corporate/clean-development-mechanism>
https://www.delhimetrorail.com/pages/en/news_details/778

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